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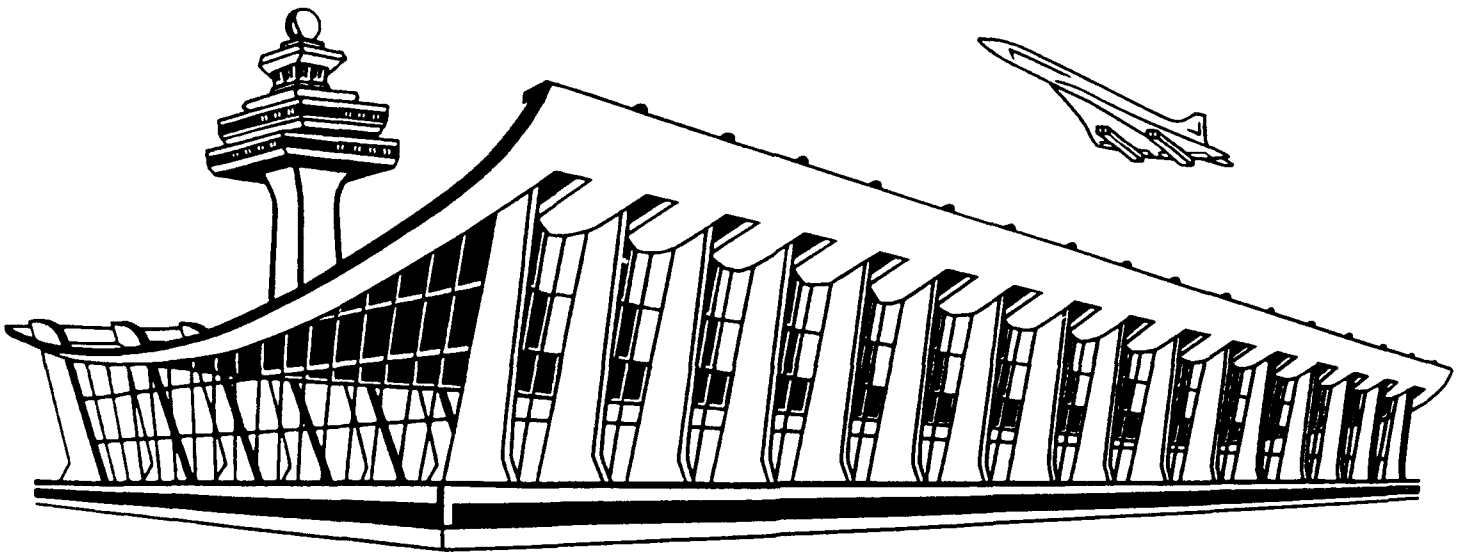
FAA AVIATION FORECASTS



FISCAL YEARS 1992–2003

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16. Abstract

This report contains the Fiscal Years 1992-2003 Federal Aviation Administration (FAA) forecasts of aviation activity at FAA facilities. These include airports with FAA control towers, air route traffic control centers, and flight service stations. Detailed forecast were made for the major users of the National Aviation System: air carriers, air taxi/commuters, military and general aviation. The forecasts have been prepared to meet the budget and planning needs of the constituent units of the FAA and to provide information that can be used by state and local authorities, the aviation industry, and the general public.

The lethargy of the domestic and international economies over the past year have caused the aviation industry to experience its worst year ever. However, the outlook for the 12-year forecast period is for moderate economic growth, stable real fuel prices, and moderate inflation. Based on these assumptions, aviation activity by fiscal year 2003 is forecast to increase by 25.7 percent at towered airports, 28.3 percent at air route traffic control centers, and 4.8 percent in flight services performed. Hours flown by general aviation are forecast to increase 15.1 percent and domestic revenue passenger miles (RPM's) are forecast to increase 54.9 percent, with scheduled international RPM's forecast to increase by 112.8 percent and regional/commuter RPM's forecast to increase by 146.5 percent.

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PREFACE

I am pleased to submit to the aviation community FAA Aviation Forecasts, Fiscal Years 1992-2003. These forecasts are developed annually by Gene S. Mercer and his staff in the Forecast Branch for use by the agency in its planning and decision-making processes. In addition, these forecasts are used extensively within the aviation and transportation communities as the industry looks to and prepares for the future.

This year's report again consists of ten chapters, discussing in detail four major areas: (1) the economic environment, assumptions, and predictions which are used to develop the forecasts; (2) discussions, historical data, and forecasts of future traffic and aircraft activity for each of the major non-military user groups--commercial air carriers, regional/commuter airlines, general aviation, and helicopters; (3) workload measures for FAA towers, centers, and flight service stations; and (4) aviation traffic and aircraft activity at large, medium, and small hub airports, as well as summary information from three special hub forecasts completed in 1991--one for Las Vegas and the State of Nevada, one for Washington/Baltimore and environs, and one for Columbus, Ohio, and environs. The report concludes with a discussion of our forecast accuracy (which I am pleased to report has been very high in the short-term of 2 to 3 years and reasonable in the long-term of 10 to 12 years) and year-by-year data for our individual forecasts of aviation activity.

Briefly, the forecast predicts continued expansion of both the U.S. economy and U.S. aviation activity following one of the worst years ever for the airline industry. This was caused by the lethargy of the domestic and international economies.

Based on economic projections which the Office of Management and Budget provides through fiscal year 1997 and which DRI/McGraw-Hill, Evans Economics, and the WEFA Group provide through 2003, we expect the U.S. economy (as measured by real gross national product) to grow at an average annual rate of 2.6 percent between 1991 and 2003, with higher increases projected for many major foreign countries and regions. Combining these three critical factors--economic projections (e.g., GNP growth and oil prices), industry assumptions (e.g., industry capacity and yield management), and analyst expertise--results in an anticipated average annual growth rate (as measured in revenue passenger miles) of 4.9 percent from 1991 to 2003, with annual domestic growth being 4.1 percent and annual international growth being 7.0 percent.

In reading and using the information contained in this book, it is important to recognize the limits of forecasting. That is, forecasting is not an exact science. Its accuracy is dependent principally on its

underlying economic and political assumptions. While this always introduces uncertainty, usually the range is relatively narrow. This year, however, the situation is different. As we go to press, the status of the current economic recovery remains uncertain and a highly debateable issue among industry experts. Hence, these forecasts, especially the short-term forecasts, may require significant revision if economic recovery is slower than currently anticipated.

Again, I am pleased to submit to the aviation community this year's forecasts of aviation and FAA activity through the year 2003. If in using this document you see opportunities for improvement, I would appreciate hearing from you in order that we may improve the usefulness of our forecasts and this document. You are encouraged to send your comments to me at the Federal Aviation Administration, 800 Independence Avenue, S.W., Washington, D.C. 20591.

Michael C. Moffet
Assistant Administrator for Policy, Planning, and International Aviation

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This document was prepared by the Forecast Branch, under the leadership of Mr. Gene Mercer. The following individuals were responsible for individual subject areas:

Economic Environment - Jack Smith
Commercial Air Carriers - Robert Bowles
Regionals/Commuters - Charles Moles
General Aviation - James Veatch
Helicopters - Mike Hartmann
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Statistical Assistance - Virginia Price and Diane Green
Text Preparation - Nellie Jones

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CHAPTER I

EXECUTIVE SUMMARY

The lethargy of the domestic and international economies over the past year have caused the aviation industry to experience its worse year ever.

Last year at this time, we were projecting a short war, a mild recession, and a moderate recovery. The continuing softness in the U.S. and world economies has resulted in world aviation traffic declining for the first time in history. Jet fuel prices are remaining high, air traffic remains soft, and profits continue to elude the industry. Eastern, Midway, and Pan American have ceased operations, Continental and America West are in bankruptcy, and several other carriers are posting significant operating losses. Three major carriers--American, Delta, and United--now carry over half of the industry traffic. Further consolidation depends in large measure on the length and severity of the current world-wide economic problems.

Since enactment of the Airline Deregulation Act of 1978, we have witnessed a number of structural and operational changes in the commercial aviation industry. There was a proliferation of low fares which were partially responsible for the dramatic increase in passenger traffic. Many communities saw improved air service with increased frequencies through connecting hub airports to multiple destinations. The more successful air carriers had significant increases in their operating profits. However, with the industry now facing domestic economic uncertainty at the same time that operating costs are escalating, airline managements face difficult challenges. Which of the U.S. carriers will still be operating in 10 years? Decisions being made today will determine the viability of individual airlines tomorrow.

The players in the international arena continue to change. With the globalization and privatization of international airlines proceeding at a rapid pace, competition has become rigorous. With increasing penetration of foreign markets by deregulated major carriers of the United States and Canada, there exists a strong incentive for European and Pacific Rim national carriers to compete on equal terms. The dramatic increase in the mergers and alliances that we saw beginning in 1989 will likely lead to new multinational carriers or consolidations with North American, European, and Pacific Rim carriers--as seen by the Delta/SwissAir/Singapore marketing agreement--thereby forming "Mega-carriers" that will compete for traffic on a worldwide scale. The race among the world's air carriers is to put together the most effective global system.

While domestic air carrier RPM's increased an anemic 3.5 percent from 1987 through 1991, international RPM's increased a whopping 49.3 percent, as

the "big three" U.S. air carriers significantly expanded their international markets. United is now the dominant U.S. carrier in the Pacific, American in Latin America, and Delta is rapidly taking over pre-eminence in the North Atlantic. With the introduction of the new long-haul aircraft, B747-400 and MD-11, and the rapid expansion in the fleet of two-engine over-water aircraft, new markets are being opened as international marketing strategies evolve.

The international service challenge facing us today is how--with all the new markets, all the new players, all the new equipment, and potential international traffic growth --will the industry accommodate this international demand and still maintain a safe, efficient, and profitable air transportation network.

The regional/commuter airlines have also experienced unique challenges and changes since deregulation. The number of carriers increased from 210 in 1978 to 250 in 1981, then declined to 149 in 1991. In addition, the regional/commuter airlines have become increasingly integrated with the large, scheduled air carriers through code-sharing agreements and/or through acquisition in part or in total by their larger partners.

Over the past 4 years, much of the growth in the regional/commuter portion of the industry resulted from the major carriers replacing large aircraft service with smaller aircraft operated by their regional/commuter partners. The U.S. experience with code-sharing agreements between the large air carriers and regional/commuter airlines suggests that the smaller carriers benefit from working relationships with the larger airlines. In future years, the same could hold true for competition in international markets, with small national and regional airlines feeding passengers to the "mega-carriers."

Between 1955 and 1980, general aviation expanded dramatically. In 1955 there were 350 thousand pilots and a fleet of 61 thousand aircraft. By 1980, there were 815 thousand pilots and a fleet of 210 thousand aircraft. Since 1978, however, there has been a dramatic decline in shipments of all types of general aviation aircraft, and the active fleet remains at about the same total as 1980. A number of reasons have been advanced for this, chief among them being rapid price increases, high interest rates, and expensive fuel throughout this period. A portion of the price increases can be attributed to massive awards assessed against manufacturers in product liability lawsuits. This triggered extreme increases in liability insurance premiums, driving up manufacturers' costs. More recently, the imposition of the "luxury tax" has further dampened demand for general aviation aircraft.

General aviation is an important component of both the aviation industry and our national economy. It provides aviation services that commercial aviation cannot or will not provide, while the production and sale of general aviation aircraft, avionics, and other equipment, along with the provision of support services such as flight schools, fixed base operators, finance, and insurance, make the general aviation industry an important contributor to the Nation's economy.

Although the active general aviation fleet has remained relatively constant since 1980, we have seen changes in the fleet composition, with the turbine-powered fleet increasing by 12.4 percent from 8.9 thousand in 1980 to 10.0 thousand in 1991. Pilots also are more sophisticated with 42.3 percent of them being instrument rated, up from 30.3 percent in 1980. These changes reflect the increasing sophistication of the general aviation industry. Also, with further congestion and delay developing at major air carrier airports as the commercial industry expands, the demand for business-

general aviation may expand.

The FAA will do its part to meet the forecasted demands on the aviation system as reflected in this document so as to ensure a safe and efficient national system. However, the FAA is only one of three important players in the U.S. aviation picture. If demand is to be satisfactorily met, the private sector and State and local governments must do their parts also. The private sector must continue to improve the operation of our Nation's airlines and to provide the world's best aviation equipment. State and local governments, which directly or indirectly through public authorities operate our Nation's airports, must expand their airports and improve the efficiency of their operations--an arena in which private sector involvement may well be in the public interest. The FAA remains committed to working with all facets of the aviation community to ensure the continued growth and viability of the system.

REVIEW OF 1991

In fiscal year 1991, the large U.S. air carriers decreased their system capacity (seat miles) by 0.8 percent, while demand (revenue passenger miles) decreased 1.6 percent. The net result was a decrease in the load factor to 62.3 percent, down from 62.8 percent in 1990.

As expected, domestic capacity and traffic declined 1.7 percent. In order to stimulate traffic growth, particularly in the second quarter, the airlines offered promotional fares which resulted in real yield declining by 4.2 percent. With traffic down, yield down, and operating expenses up significantly (primarily the cost of fuel) the airlines lost approximately $3 billion dollars in 1991.

Primarily as a result of the Gulf War, but also affected by a weak economy and significant schedule reductions by Pan American and TWA, total international traffic of the U.S. air carriers declined by 1.4 percent in 1991. North Atlantic traffic was off 12.3 percent. Pacific traffic increased by only 5.9 percent, down from the mid-20 percent growth rates experienced each year from 1986 through 1990. Stimulated by the entry of American, Latin America traffic increased by 14.7 percent.

Airline profits over the past several years have been concentrated among relatively few carriers. The future viability of individual carriers, and possibly the entire industry, is highly dependent on the national economy. The current slow recovery of the U.S. economy and over-capacity in the industry may cause economically distressed carriers to engage in further fare wars to generate cash. If this occurs, the ranks of the losers could swell.

During the year, significant actions were taken to address the aviation noise problem. Based on passage of the Airport Noise and Airports Act of 1991, the FAA issued a final "noise" rule in September 1991. This rule will go a long way toward addressing the unacceptable levels of aircraft noise experienced in communities surrounding airports by phasing out nearly all of the noisier Stage 2 aircraft by the end of the decade.

New commercial aircraft orders totaled 603 in fiscal year 1991, while 799 new aircraft were delivered. Narrowbody aircraft orders and deliveries continue to exceed the demand for widebody aircraft. This reflects the air carriers' continuing reliance on increased schedule frequency, rather than larger aircraft, to accommodate projected passenger demand.

Contrary to the 2.7 percent decline in passenger enplanements experienced by the large U.S. air carriers in 1991, the regional/commuter airline industry

continued to grow with its passenger enplanements increasing by 3.2 percent to 38.4 million.

In fiscal year 1991, there were 1,052 general aviation aircraft shipments. This consisted of 587 single engine piston aircraft, 48 multi-engine piston, and 417 turbine powered. Billings decreased by 8.4 percent over 1990 to just under $2 billion.

In fiscal year 1991, air carrier operations at FAA air traffic control towers decreased by 3.1 percent. General aviation operations decreased by 3.6 percent and military operations decreased by 10.7 percent. Air taxi/commuter operations increased by 1.1 percent. As a result, total operations and instrument operations at FAA air traffic control towers and aircraft handled by the air route traffic control centers declined between 3 and 4 percent over 1990 levels.

In summary, the impacts of deregulation and fierce competition continue to alter the commercial aviation industry. In spite of a particularly bad year for aviation, as the economy recovers we expect activity at FAA facilities to resume moderate levels of growth.

ECONOMIC FORECASTS

While the recession in 1991 was well anticipated by most economists, there is considerable difference of opinion about the short-term outlook. Generally, however, it appears that fiscal year 1992 will likely exhibit slow growth, with somewhat stronger growth in 1993. For the balance of the forecast period (through 2003), the consensus seems to be that we will experience moderate economic growth of about 2.6 percent per year. Furthermore (and assuming no major disruptions in the price and availability of oil), inflation is projected to also remain moderate throughout the forecast period.

The projected growth of aviation is consistent with these national short- and long-term economic growth forecasts. The table on page 7 is a summary of the key economic assumptions used in developing this forecast. It should be recognized that in any given year there may be some perturbation from the long-term trend, because none of the economic models is sufficiently precise to predict interim business cycles. Also, unanticipated developments, like the Iraqi invasion of Kuwait, cannot be predicted at all.

AVIATION ACTIVITY FORECASTS

Domestic air carrier revenue passenger miles are forecast to increase at an annual rate of 4.1 percent between 1991-2003. This assumes a modest growth in 1992 (2.7 percent) with stronger growth as the economy pulls out of recession. During the same time period, domestic enplanements are forecast to increase by 3.7 percent annually. We have assumed that competition will be such that real yields will increase very slowly over the forecast period. Air carrier aircraft operations are forecast to increase at an annual rate of 2.3 percent during the forecast period. The high growth in revenue passenger miles and enplanements relative to operations assumes higher load factors, larger seating capacity for air carrier aircraft, and longer passenger trip lengths.

International air carrier revenue passenger miles are forecast to increase at an annual rate of 7.0 percent during 1991-2003. This high growth rate is

FAA FORECAST ECONOMIC ASSUMPTIONS

FISCAL YEARS 1992 - 2003

ECONOMIC VARIABLE	HISTORICAL 1985	1990	1991	FORECAST 1992	1993	2003	PERCENT AVERAGE ANNUAL GROWTH 85-91	90-91	91-92	92-93	91-200
Gross National Product (Billions 1987$)	4,261.7	4,892.5	4,860.4	4,907.8	5,046.5	6,620.5	2.2	(0.7)	1.0	2.8	2.6
Consumer Price Index (1982-84 = 100)	106.6	128.7	135.2	139.1	143.6	217.2	4.0	5.1	2.9	3.2	4.0
Oil & Gas Deflator (1987 = 100)	121.8	116.2	129.9	120.1	124.4	210.9	1.1	11.8	(7.6)	3.6	4.1

Source: 1992-97; Executive Office of the President, Office of Management and Budget

1998-2003; Consensus growth rate of DRI/McGraw-Hill, Evans Economics, Inc., and The WEFA Group

AVIATION ACTIVITY FORECASTS

FISCAL YEARS 1992 - 2003

AVIATION ACTIVITY	HISTORICAL 1985	1990	1991	FORECAST 1992	1993	2003	PERCENT AVERAGE ANNUAL GROWTH 85-91	90-91	91-92	92-93	91-200
AIR CARRIER											
Enplanements (Millions)											
Domestic	350.4	424.1	413.3	423.1	440.8	640.1	2.8	(2.5)	2.4	4.2	3.7
International	24.3	41.3	39.7	44.6	48.2	84.5	8.5	(3.8)	12.2	8.1	6.5
System	374.6	465.4	453.1	467.7	489.0	724.6	3.2	(2.7)	3.2	4.6	4.0
RPM's (Billions)											
Domestic	265.8	339.2	333.6	342.7	358.8	540.9	3.9	(1.7)	2.7	4.7	4.1
International	64.4	115.1	113.5	130.2	141.0	225.8	9.9	(1.4)	14.7	8.3	7.0
System	330.2	454.3	447.1	472.9	499.8	796.7	5.2	(1.6)	5.8	5.7	4.9
COMMUTERS/REGIONALS											
Enplanements (Millions)	23.0	37.2	38.4	40.9	44.2	81.5	8.9	3.2	6.5	8.1	6.5
RPM's (Billions)	3.6	6.7	7.1	7.7	8.5	17.5	12.0	6.0	9.0	10.4	7.8
FLEET											
Air Carrier	2,938	4,017	4,252	4,242	4,329	5,965	6.3	5.9	(0.2)	2.1	2.9
Commuter	1,551	1,819	1,896	1,944	2,002	2,324	3.4	4.2	2.5	3.0	1.7
General Aviation (000)	220.9	219.7	212.2	210.9	211.1	225.5	(2.0)	(3.4)	(0.8)	0.3	0.5
HOURS FLOWN (Millions)											
Air Carrier	7.7	10.6	10.4	10.5	10.9	15.7	5.1	(1.9)	0.8	4.0	3.2
General Aviation	36.2	34.8	35.2	35.6	36.2	40.5	(0.4)	1.1	1.1	1.7	1.2

Source: 1985-91; DOT-RSPA, FAA DATA
1992-2003; FAA Forecast

being driven by the strong growth rates being projected for the Pacific Rim and Latin American markets. The North Atlantic is projected to exhibit less robust growth than the Pacific and Latin American markets after a year of substantial growth in 1992 (15.2 percent) as it recovers from the significant drop that occurred primarily as a result of the Gulf War in 1990. During this same period, international enplanements are forecast to increase by 6.5 percent annually, a rate somewhat slower than passenger mile growth due to longer passenger trip lengths in the Pacific.

These air carrier projections assume that the industry will respond to economic growth, that the economy will soon return to positive growth, that industry productivity will improve with the introduction of new aircraft, and that the industry will embrace a rational pricing policy. The forecast also is predicated on the air carriers being able to convert to an all stage 3 fleet by 2000 while increasing overall capacity. Present aircraft orders and retrofit prospects support this assumption.

In 1992, the regional/commuter airlines are expected to enplane 40.9 million passengers, 8.8 percent of all passenger traffic in scheduled domestic air service. By the year 2003, these carriers are expected to carry 81.5 million passengers and to account for 11.3 percent of all domestic passenger enplanements. Regional/commuter airlines are expected to continue the trend toward purchase of small jet aircraft and larger, propeller-driven aircraft.

Increased business use of general aviation is reflected in the changing character of the fleet. The more expensive and sophisticated turbine-powered part of the fixed wing fleet is expected to grow much faster than the piston aircraft portion between 1991-2003. In 1991, there were 10,008 turbine-powered aircraft in the fixed wing general aviation fleet--5.1 percent of the total fixed wing fleet. By the year 2003, it is projected that there will be 13,700 turbine-powered aircraft--6.7 percent of the total fixed wing fleet. Similarly, in the helicopter fleet in 1991 there were 3,900 turbine-powered aircraft--53.2 percent of the total fleet. By the year 2003, it is projected that there will be 8,000 turbine-powered aircraft--74.1 percent of the total helicopter fleet.

The various FAA aviation traffic and activity forecasts are summarized numerically in the table on page 7.

FAA WORKLOAD FORECASTS

The FAA forecasting process is a continuous one which involves FAA Forecast Branch's interaction with various FAA offices and services, other government agencies, and aviation industry groups, including individual discussions with most major carriers and manufacturers. In addition, the process uses various economic and aviation data bases, the outputs of several econometric models and equations, and other analytical techniques. The FAA workload measures, summarized numerically in the table on page 9, are the resultant forecasts of this process and are used annually by the agency for manpower and facility planning.

Following an unusually depressed year, the workload at FAA facilities is expected to resume the growth pattern that began in 1983. The demand for FAA operational services is anticipated to increase over the forecast period as a result of continued growth in aviation activity. Total aircraft operations at FAA-towered airports are forecast to increase to 77.3 million in the year 2003, a 1.9 percent annual growth rate

FAA WORKLOAD MEASURES

FISCAL YEARS 1992 - 2003

WORKLOAD MEASURES (IN MILLIONS)	HISTORICAL			FORECAST			PERCENT AVERAGE ANNUAL GROWTH				
	1985	1990	1991	1992	1993	2003	85-91	90-91	91-92	92-93	91-2003
Aircraft Operations											
Air Carrier	11.3	12.9	12.5	12.6	13.0	16.4	1.7	(3.1)	0.8	3.2	2.3
Commuter/Air Taxi	6.9	8.8	8.9	9.2	9.6	12.6	4.3	1.1	3.4	4.4	2.9
General Aviation	37.2	39.0	37.6	37.8	38.6	45.5	0.2	(3.6)	0.5	2.1	1.6
Military	2.5	2.8	2.5	2.8	2.8	2.8	0.0	(10.7)	12.0	0.0	0.9
TOTAL	57.9	63.5	61.5	62.4	64.0	77.3	1.0	(3.2)	1.5	2.6	1.9
Instrument Operations											
Air Carrier	11.8	14.0	13.5	13.6	14.0	17.7	2.3	(3.6)	0.7	2.9	2.3
Commuter/Air Taxi	6.4	9.4	9.5	9.8	10.2	13.4	6.8	1.1	3.2	4.1	2.9
General Aviation	16.4	19.1	18.1	18.3	18.8	23.0	1.7	(5.2)	1.1	2.7	2.0
Military	4.1	4.4	4.0	4.4	4.4	4.4	(0.5)	(11.4)	10.0	0.0	0.6
TOTAL	38.7	46.8	45.1	46.1	47.4	58.5	2.6	(4.1)	2.2	2.8	2.2
IFR Aircraft Handled											
Air Carrier	14.6	18.6	18.3	18.5	19.1	23.9	3.8	(1.6)	1.1	3.2	2.3
Commuter/Air Taxi	4.8	5.6	5.6	5.8	6.0	8.2	2.6	0.0	3.6	3.4	3.2
General Aviation	8.3	7.9	7.4	7.5	7.7	9.1	(1.8)	(6.3)	1.4	2.7	1.7
Military	5.0	5.5	5.1	5.5	5.5	5.5	0.3	(7.3)	7.8	0.0	0.6
TOTAL	32.7	37.6	36.4	37.3	38.3	46.7	1.8	(3.2)	2.5	2.7	2.1
Flight Services											
Pilot Briefs	14.6	11.5	10.7	10.4	10.5	11.0	(4.3)	(7.0)	(2.8)	1.0	0.2
Flight Plans Originated	8.0	6.9	6.2	6.0	6.2	6.9	(3.4)	(10.1)	(3.2)	3.3	0.9
Aircraft Contacted	7.7	6.1	5.5	5.4	5.4	5.5	(4.3)	(9.8)	(1.8)	0.0	0.0
TOTAL	52.9	42.9	39.4	38.2	38.8	41.3	(3.9)	(8.2)	(3.0)	1.6	0.4

Source: FY 1985-91 FAA Data

FY 1992-2003; FAA Forecasts

over the 61.5 million operations realized in 1991.

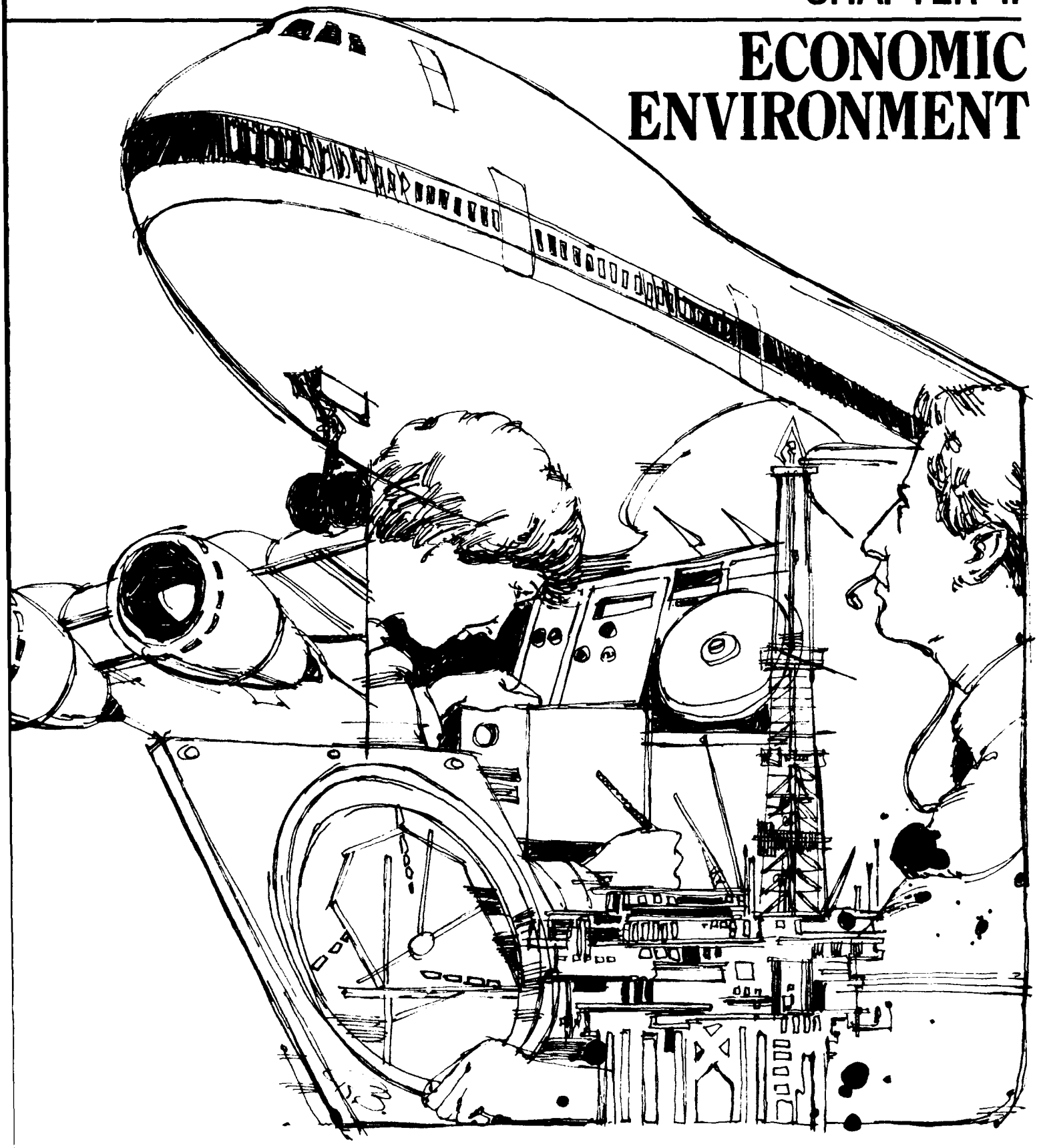
The increased use of avionics by regional/commuter airlines and general aviation and the implementation of additional airport radar service areas will contribute to instrument operations at FAA-towered airports growing faster than total aircraft operations. Instrument operations are forecast to increase from 45.1 million in 1991 to 58.5 million in the year 2003, a 2.2 percent annual growth rate.

The workload at the air route traffic control clnters is forecast to increase at an average annual rate of 2.1 percent between 1991-2003. The number of commuter/air taxi aircraft handled are expected to increase at a faster rate than the other user categories--46 percent from 5.6 million in 1991 to 8.2 million in fiscal year 2003.

In summary, aviation activity at FAA facilities is expected to continue to grow at about the same rate as the general economy. Aviation will continue to dominate all other transportation modes in the long distance intercity and international passenger markets. Regional/ commuter aircraft activity and the general aviation business sector are expected to experience greater growth than that experienced by the larger airlines and the general aviation pleasure sector, respectively.

CHAPTER II

ECONOMIC ENVIRONMENT



CHAPTER II

ECONOMIC ENVIRONMENT

REVIEW OF 1991

UNITED STATES

In fiscal year 1991, the economy of the U.S. was in recession. Real gross national product decreased 0.7 percent compared to fiscal year 1990, with declines registered in two of the four quarters. Inflation in fiscal year 1991 was 5.1 percent. In addition, the Persian Gulf War created a roller coaster for fuel prices, particularly in the aviation sector. Overall, however, the year ended with a slight decrease in the oil and gas deflator compared to fiscal year 1990.

While the current economic downturn may finally be bottoming out, a number of economic forecasters indicate the possibility of the recession continuing into 1992. The major concerns with the economy at the start of fiscal year 1992 are the sluggish nature of the economic recovery, the high level of corporate and personal debt, and the very low level of consumer confidence. At the end of 1991, consumer confidence was at the lowest level it has been since 1982. Surely if this continues, a second drop in the economy could be a reality.

WORLD

Many of the world's economies were also depressed in 1991. The combined world economy, measured by real gross domestic product (GDP), decreased 0.2 percent in 1991, down from 1990's modest growth rate of about 0.7 percent. This is the first decline in estimated world GDP in the post-World War II era. Variations in growth ranged from the Pacific Basin, where growth was estimated at 7.1 percent, to centrally planned economies, which declined an estimated 7.0 percent. It is notable that estimates of economic changes for some countries in the latter category may be "soft," since the economies of some former USSR republics can be described as in a state of freefall at the end of 1991.

Europe's GDP increased approximately 1.2 percent in 1991, down from the 2.8 percent growth achieved in 1990. Inflation was generally stable in Europe (+6.1% in 1991), although higher than the level of inflation in 1990 (+5.6%).

THE ECONOMIC OUTLOOK

The economic scenario utilized in developing the FAA Aviation Forecasts for the period 1992 thru 1997 was provided by the Executive Office of the President, Office of Management and Budget (OMB). For the period from 1998 through 2003, the economic scenario utilizes consensus growth rates of the economic variables based on forecasts prepared by DRI/McGraw-Hill (DRI), Evans Econometrics (Evans), and the WEFA Group. The U.S. effective exchange rate index and other international data were derived from the WEFA Group's World Economic Outlook.

The principal series utilized in the individual aviation models to develop the FAA aviation forecasts are discussed in the following pages. The data are presented in tabular form in Chapter X, Tables 1 through 5.

GROSS NATIONAL PRODUCT

United States

GNP has proven to be a significant variable of business activity which in turn drives aviation activity. GNP is one of the key variables used by FAA in projections of aviation activity.

While the recession in 1991 was well anticipated by most economists, there is considerable difference of opinion about the immediate short term outlook, as shown by the graph on page 15. The possibility of the recession continuing into the first quarter of calendar year 1992 shows up in the quarterly forecasts, with three of five forecasts showing decreased gross national product in the first quarter of 1992. One forecaster shows no recovery in the economy until the third quarter of fiscal year 1992, and zero GNP growth for the fiscal year. The forecast utilized by the FAA projects a pessimistic 1.0 percent growth of real GNP for 1992, then an average of 2.6 percent growth in GNP through 1997. The forecast of long term GNP is shown by the graph on page 16. Over the entire forecast period, GNP is expected to grow at an average annual rate of 2.6 percent.

World

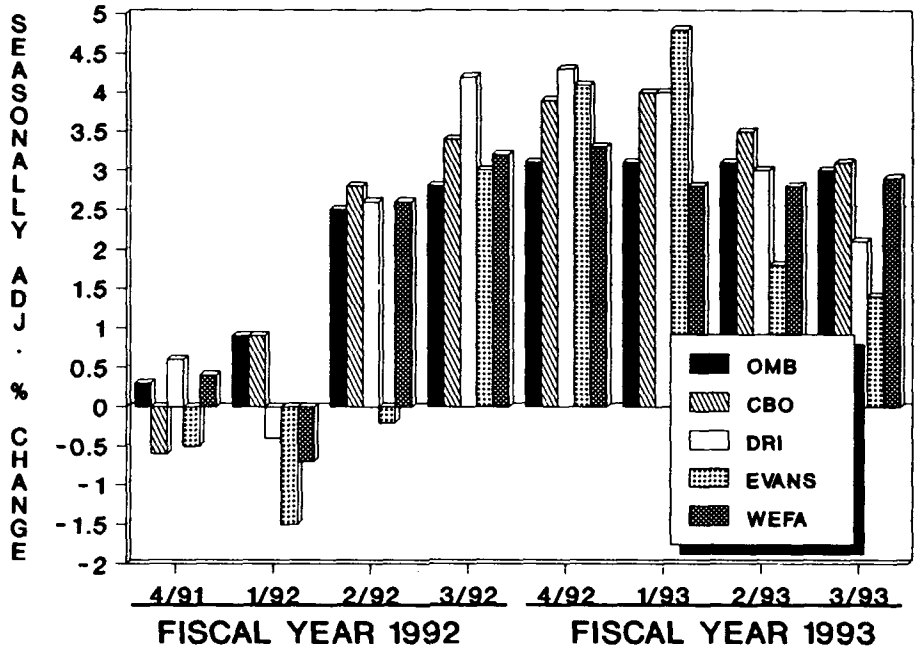
As reflected by the graphs on page 17 the combined gross domestic product for Europe, Africa and the Middle East, adjusted for price changes, is expected to grow at an average annual rate of 3.0 percent throughout the forecast period. In the short term, gross domestic product will increase by 2.5 percent in 1992, then by 3.1 percent in 1993.

Latin American economic growth is expected to be considerable in the forecast period. The combined gross domestic product for Latin America (including South America, Central America and Mexico), adjusted for price changes, is expected to grow at an average annual rate of 4.0 percent throughout the forecast period. In the short term, gross domestic product should increase by only 1.0 percent in 1992, then 2.8 percent in 1993.

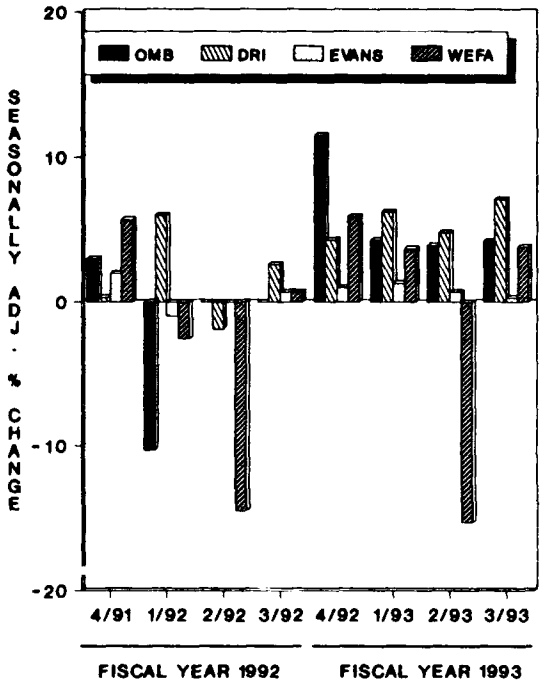
The combined gross domestic product for Japan, Australia, New Zealand, and the Pacific Basin countries, adjusted for price changes, is expected to grow at an annual rate of 4.5 percent throughout the forecast period. In the short term, gross domestic product should increase by 4.0 percent in 1992, then by 4.6 percent in 1993.

U.S. SHORT-TERM ECONOMIC FORECASTS

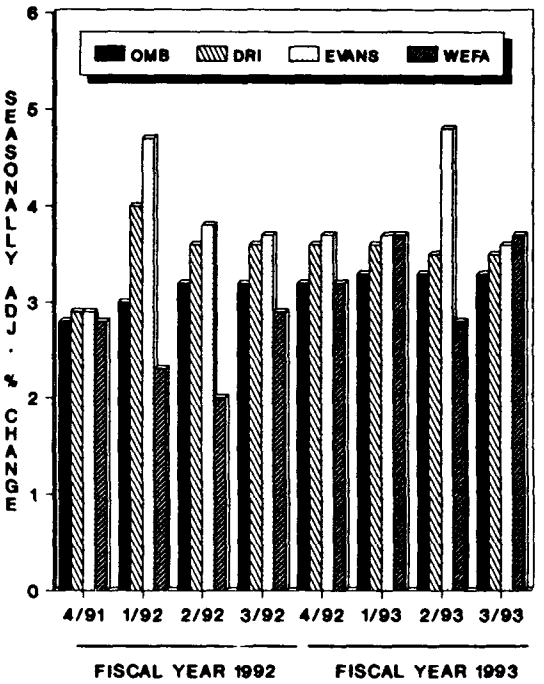
REAL GROSS NATIONAL PRODUCT



OIL AND GAS DEFLATOR

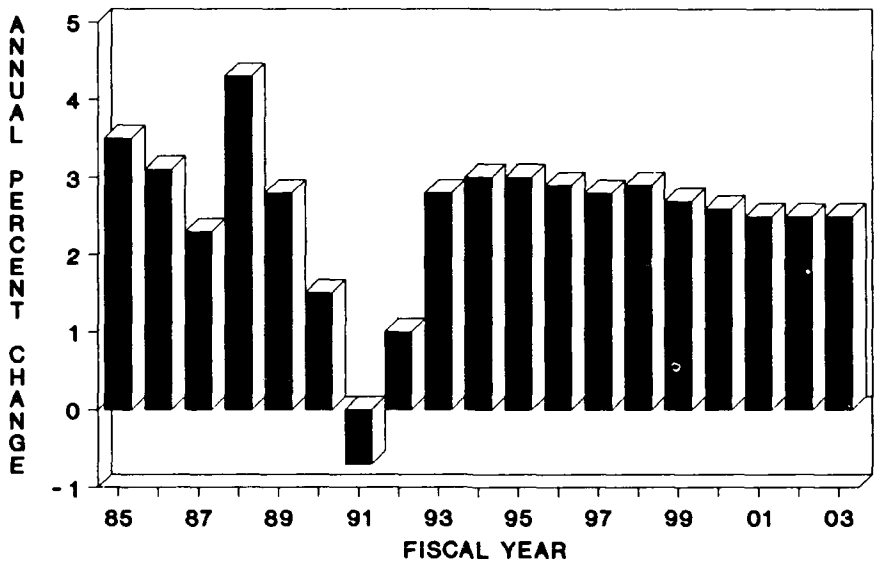


CONSUMER PRICE INDEX

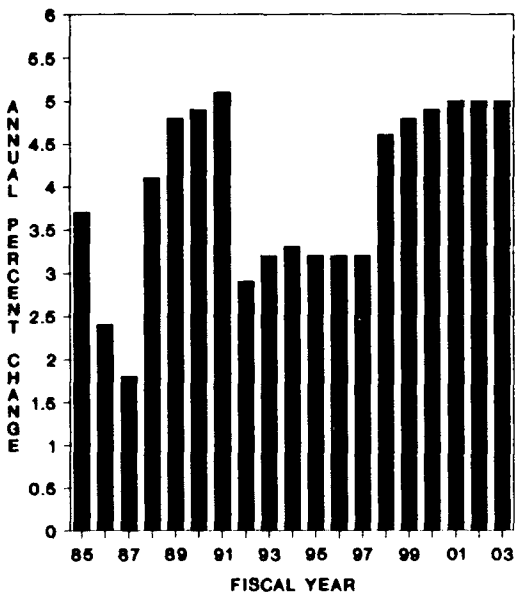


U.S. LONG-TERM ECONOMIC FORECASTS

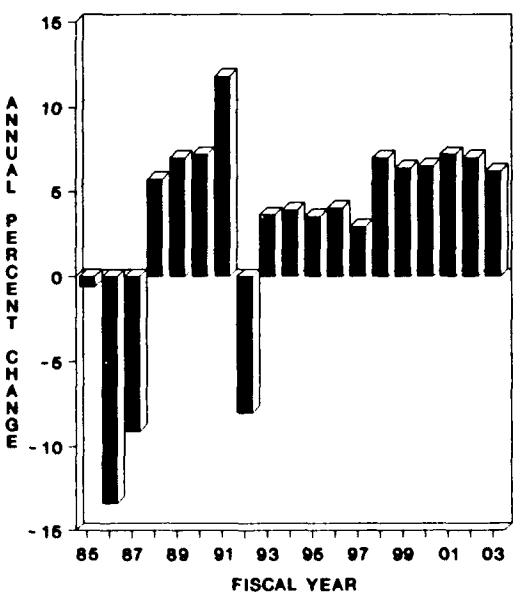
GROSS NATIONAL PRODUCT
(1987 DOLLARS)



CONSUMER PRICE INDEX
(1980-82$)

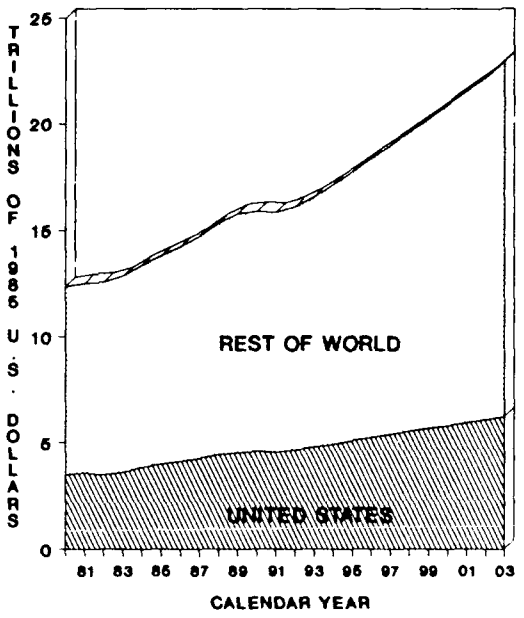


OIL AND GAS DEFLATOR
(1982 = 100)

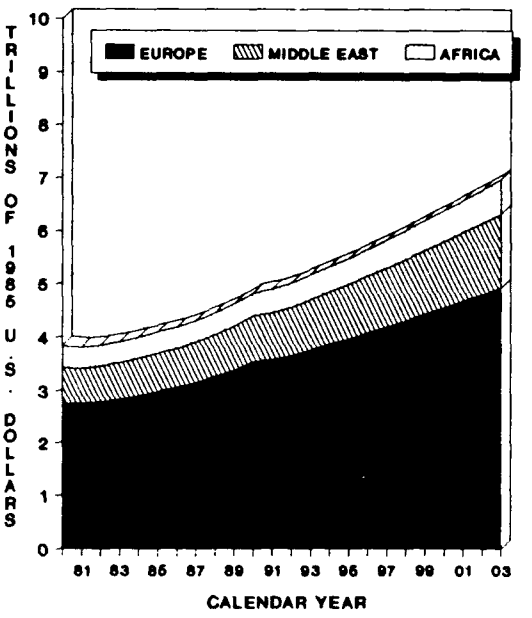


GROSS DOMESTIC PRODUCT BY WORLD REGION

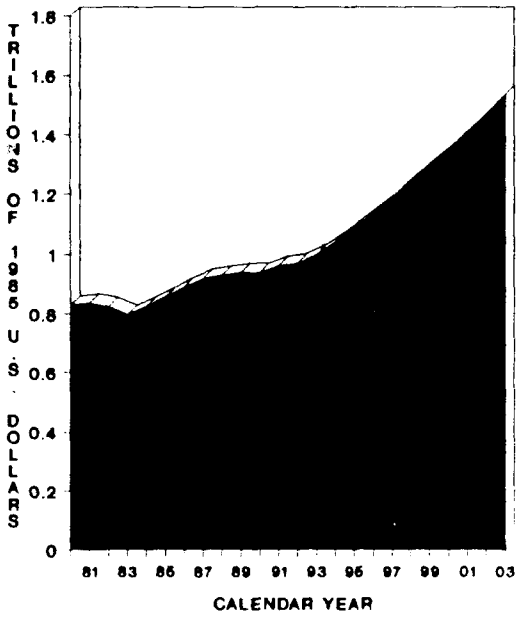
WORLD



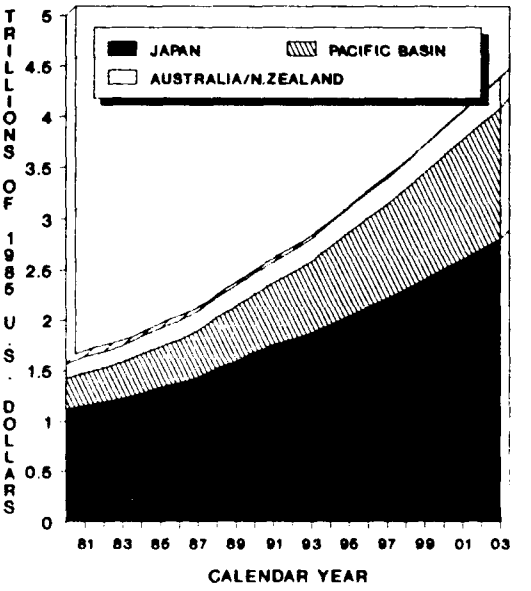
EUROPE/MIDDLE EAST/AFRICA



LATIN AMERICA



JAPAN/PACIFIC BASIN/ AUSTRALIA/NEW ZEALAND



CONSUMER PRICE INDEX

United States

As shown on page 16, consumer prices as measured by the Consumer Price Index (CPI) are expected to remain in the moderate range, increasing at an average annual rate of 4.0 percent over the forecast period. Inflation is forecast to increase by 2.9 percent in 1991 and 3.2 percent in 1992. (The CPI is used in our models to adjust airline fares and costs relative to other goods and services.)

World

Consumer price inflation in Germany is expected to remain moderate, increasing at an average annual rate of 2.8 percent over the forecast period. Inflation is forecast to increase by 4.3 percent in 1992 and 3.7 percent in 1993.

Consumer price inflation in the United Kingdom is expected to remain moderate, increasing by an average annual rate of 4.0 percent over the forecast period. Inflation is forecast to increase by 5.3 percent in 1992 and 3.6 percent in 1993.

Consumer price inflation in Japan is expected to remain low, increasing by an average annual rate of 2.8 percent over the forecast period. Inflation is forecast to increase by 1.7 percent in 1992 and by 2.8 percent in 1993.

An important trend in the future involves shifts in labor cost among different regions of the world. One forecaster projects a change in foreign trade based on increases in Asian wage rates compared to those in Latin America--especially Brazil and Mexico. In the year 2000, Japan's labor cost index for manufacturing production workers is expected by some economists to be slightly higher than that of the U.S., while that of Korea is expected to jump from 28 percent of U.S. costs to 87 percent. Over this same period, Brazil's labor cost is expected to increase from 19 percent of the U.S. rate in 1990 to 53 percent in 2000. Mexico's cost index over the same period is expected to increase from 12 to 34 percent of U.S. rates. As foreign labor rates approach those of U.S. workers, the U.S. economy should benefit.

OIL AND GAS DEFLATOR

As summarized on page 16, nominal fuel prices in the United States are predicted to increase at an annual rate of 4.1 percent over the entire forecast period, with real fuel prices expected to remain approximately constant.

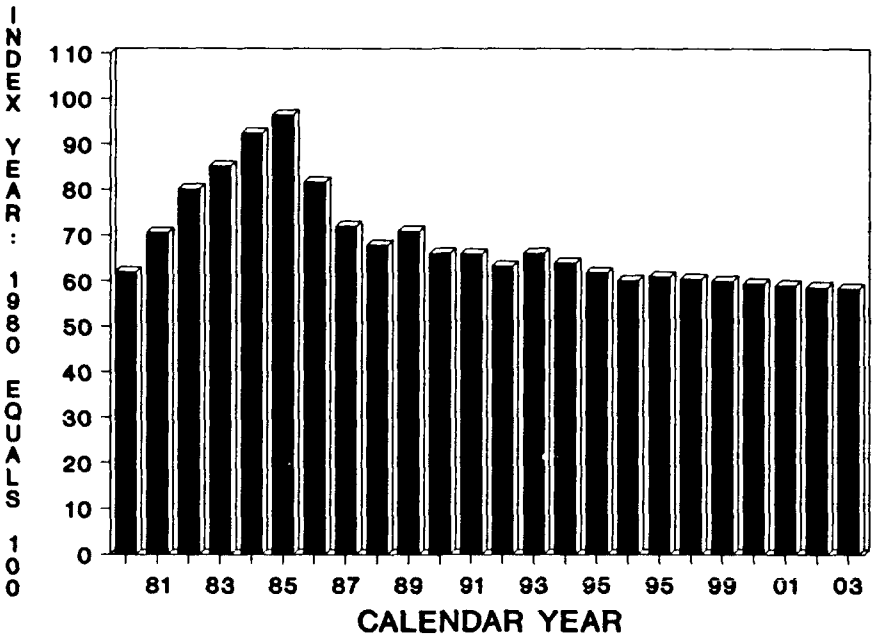
DOLLAR EXCHANGE RATE

United States

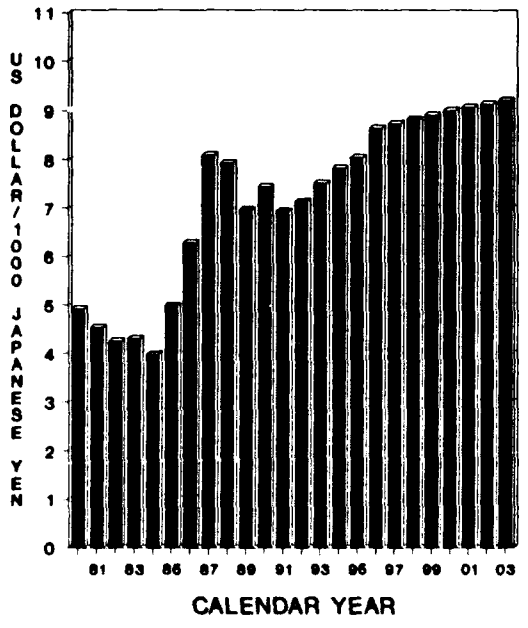
The charts on page 19 show that the U.S. dollar effective exchange rate is expected to decline slightly throughout the forecast period. The index for the entire 12-year forecast period declines at an average annual rate of about 1.0 percent per year. While a decline of 4.1 percent is expected in 1992, the exchange rate is expected to rebound by an increase of 4.6 percent in 1993, but then to resume a long term decline in 1994 and beyond. The projected decline in the U.S. effective exchange rate will make imports of foreign goods more expensive to U.S. buyers, possibly reducing imports. At the same time, it will make U.S. originating foreign travel more expensive and, conversely, travel to the U.S. by foreign nationals less expensive.

EXCHANGE RATE TRENDS AND FORECASTS

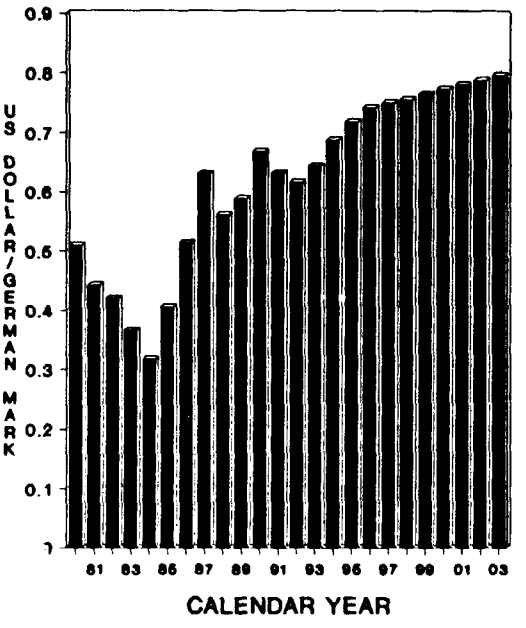
U.S. EFFECTIVE EXCHANGE RATE



JAPANESE YEN



GERMAN DEUTSCHE MARK



The German deutsche mark is expected to gain in value relative to the U.S. dollar, averaging 1.9 percent growth annually over the 12-year forecast period.

The Japanese yen is also expected to gain in value relative to the U.S. dollar, averaging 2.4 percent over the forecast period.

NATIONAL INCOME CONSIDERATIONS AND MATURITY OF THE INDUSTRY

Many analysts have looked at the domestic airline industry in the last few years and posed a fundamental question about the long-run future of the aviation industry, namely, "Is the airline industry now matured, and thus going to be growing at rates equal to or below real GNP growth?" While both sides of the issue can make cogent arguments, it is too early for a definitive answer. More data, observation, and analysis are needed before we will know the answer. The following discusses the question and offers directions for more definitive analysis.

The terms of reference for this discussion are important. We define a growth industry as one in which activity, measured in terms of revenues or the consumption of industry output (in this case revenue passenger miles) increases at a rate greater than the rate of growth of gross measures of the economy (in this case GNP).

MATURITY

There are two major arguments behind a view that the industry has matured. First, there is the last five years or so of domestic activity where growth has been very low. The compound rate of growth between 1986 and 1991 for domestic revenue passenger miles and GNP were about the same, 2.5 percent and 2.3 percent, respectively. There was a revenue passenger mile decline in one year (1991) and minimal growth in two other years (1988 and 1989). These numbers are fundamental to the maturity argument.

The second argument involves diminished competition, now and in the future. Much of the slow growth of the last few years is arguably the result of industry consolidation and the financial condition and ultimate bankruptcy of several carriers. (In fact, some argue that without the fare-cutting precipitated by carriers which were "in extremis" in the last several years, traffic could have declined sharply.) Many argue that the potential change in competitiveness of the industry has already started to show in the statistics, as a small oligopoly seems to be the newly emerging industry structure.

It is argued that if the industry settles down to three or four major carriers, and a small number of niche-type national carriers, then price competition, which has arguably driven growth in the last several years, will diminish. Further, this source of stimulus will turn around and become a negative--fares could increase, with a negative affect on passenger miles. It is also argued that a tight oligopoly will not be as competitive in initiating new services or offering new products, as was the more competitive industry with many large national carriers.

Basically, those supporting the "maturity" position argue that any industry will have its periods of rapid expansion, sometimes quite long, and

then settle into a period of maturity, in which it grows at about the same rate of growth as the economy in general. Proponents of this approach say that the airlines have had their day, and the mature phase is here.

There are a number of other minor points one can make to strengthen the maturity argument. For example, one can point to competing communications products which may have or will cut into domestic air markets (e.g., improved cellular communications, teleconferencing, computer networking, and alternative marketing approaches).

GROWTH INDUSTRY

There are also strong arguments to make on the other side of the issue. Growth has been a fact of life for the industry for a very long time. The industry has had an admirable string of growth years. It is difficult to predict the passage of the airline industry into a mature phase just because of a few bad years.

Two arguments for continued growth are simply the trend of statistics, and the need for a more convincing showing of "maturity." Also, there appear to be additional potential markets for air travel growth, and new products are still possible. The main phenomenon seen since the mid 1960's is that the aviation industry has grown by spurts, with a cyclical pattern which involves periods of decline, relative to GNP.

The graph on page 22 depicts the growth in RPMs and the growth in GNP for the period from 1965 through 1990. (Prior to 1965, the period from 1940 thru 1965 was one of extraordinary growth for the airline industry, relative to the economy in general.) Since 1965, even though growth has continued to exceed the rate of growth of GNP, domestic RPM growth has been more gradual, and there is a clear cycle, associated primarily with major business cycles, when growth in RPMs is less than growth in GNP.

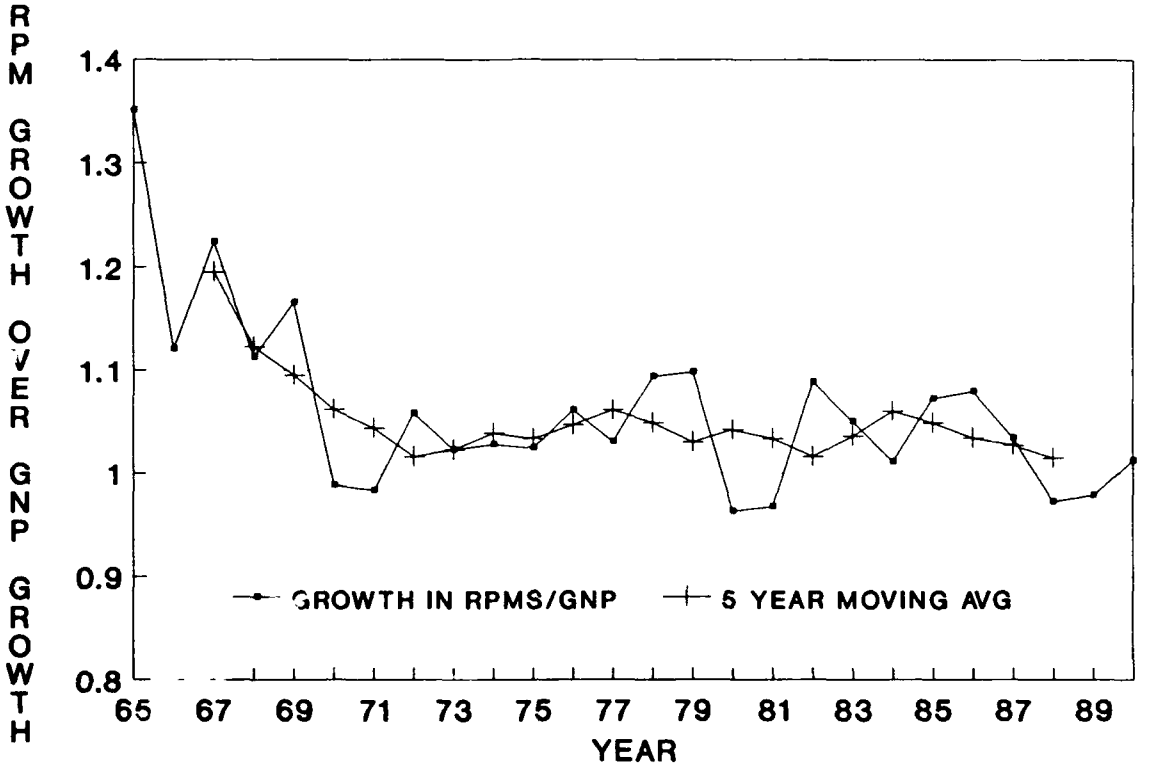
The years 1970 and 1971 were years in which the airline industry grew at a slower rate than the overall economy. So were the years 1980 and 1981, and the years 1988, 1989 and 1991. These were periods of recession or weak performance of the economy in general. Other periods between 1971 and 1991 (comparing RPM growth with GNP growth) included significant growth spurts. In 1978 and 1979, RPMs grew significantly faster than the GNP, just before the "bust" years of 1980 and 1981. A similar pattern occurred in 1985 through 1987.

Basically, the argument against the "mature industry" outlook for the airline industry is that not enough of a pattern is shown. We are currently in a down cycle to be sure. However, this should not make us conclude that the industry is mature and that the traditional growth expectations should be significantly modified. This forecast does not embrace the "mature" industry theory. The forecast of RPMs for 1992 and beyond continue to show that domestic RPM growth will exceed GNP growth. Even without the stimulus from moderate decline in yields, our forecast model shows a greater than one elasticity of RPMs over GNP. When the relationship between RPMs and GNP (RPM growth/GNP growth) approximates 1.00 for a number of years, we will adopt the "mature" industry argument.

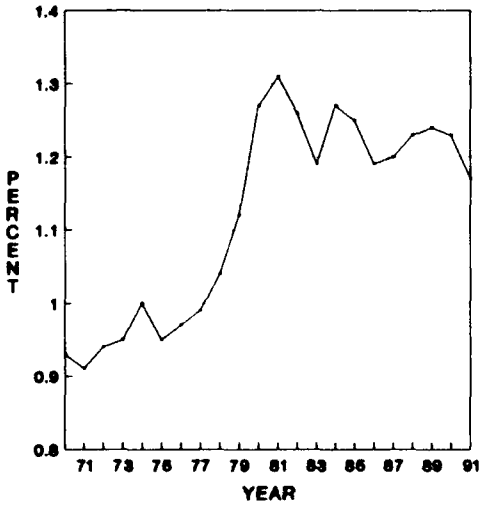
INCOME CONSIDERATIONS

While the forecast approach in this document relies heavily on trends in general economic activity, we believe additional research into income factors and the effect they have on air travel demand is also needed. Recent review of factors such as personal consumption expenditures and the closely related disposable personal income indicate possible correlations which could be of

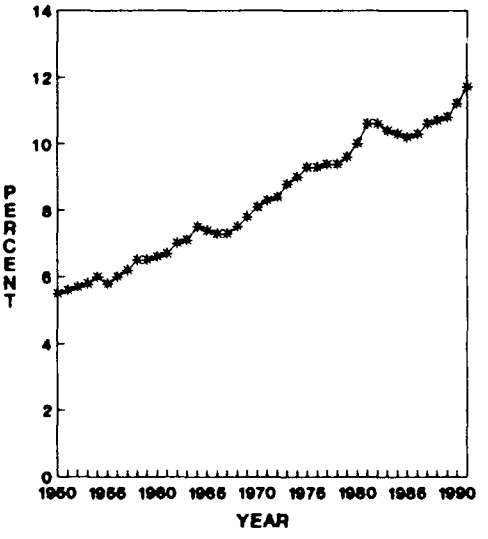
DOMESTIC RPM GROWTH COMPARED TO GNP GROWTH (CONSTANT DOLLARS)



AIR CARRIER PASSENGER REVENUE AS A PERCENT OF U.S. PERSONAL CONSUMPTION



MEDICAL PERCENT OF TOTAL CONSUMPTION EXPENDITURES



value in understanding the future trend of travel demand.

A major improvement in understanding the causes of change in aviation demand might result from income analysis. Fluctuations in disposable income, or personal income as a whole, for example, might have far more of an affect on air travel than fluctuations in GNP, particularly when looking at personal travel.

In looking at the domestic market, analysts have always found it difficult to split traffic into its two major components, business travel and personal travel. A good time series of these two types of travel would likely make forecasting domestic travel somewhat easier. Recent industry practices have made the personal travel component more complex in recent years because of frequent flyer awards. Many such awards are "spent" on personal travel, even though they are earned as a result of business travel. Such awards may be viewed as a free good, and thus their use would not be highly correlated with income effects. The frequent flyer component is important, as some estimate that frequent flyers make up 10 percent of travel and perhaps up to 20 percent of personal travel.

Generally, only assumptions can be made about the split between personal and business passenger miles. However, most would agree that disposable personal income has a major role in determining the level of personal travel. Factors in the income area need additional research and analysis. For example, trends in personal consumption expenditures and disposable personal income need to be more closely reviewed. It is not easy to forecast changes in per capita personal consumption, since it is affected not only by the general level of economic activity, but by many other factors like the level of taxes, investment, and population growth.

Detailed analysis of income accounts involves a process of considering different consumption expenditure accounts and how they might affect air transportation expenditures. Many nondurable goods expenditures (food, clothing, gasoline and oil, and fuel oil and coal), for example, are generally considered necessities, as are medical expenses. As shown in the graph on page 22, the percentage of personal consumption expenditures spent for medical costs in the past 40 years has increased from 5.4 percent to 11.5 percent, or about 1 percent every six to seven years. The trend is unfortunately a very straight line which, if extended, will further impinge on other consumption expenditures in the future.

Unfortunately, undertaking a satisfactory analysis of disposable income is very difficult and complex for at least three reasons; there are numerous competing and changing uses for disposable income; it is highly dependent on individual price changes for necessities (e.g., gas and oil for heating and transportation); and it is strongly affected by local, state and national tax policies.

Furthermore, it is not clear which income and consumption relationships are truly independent. One interesting relationship is the general relationship of domestic air passenger revenues and personal consumption expenditures. As shown in the graph on page 22, after increasing steadily in the period from 1970 to 1981, the air revenue percent of U.S. personal consumption has stabilized at between 1.2 and 1.3 percent of total personal consumption expenditures.

An initial exercise in regression analysis involving consumption expenditures and domestic revenue passenger miles showed some value to consumption expenditures as a predictive model for RPMs. However, income variables do not seem to be better predictors than GNP.

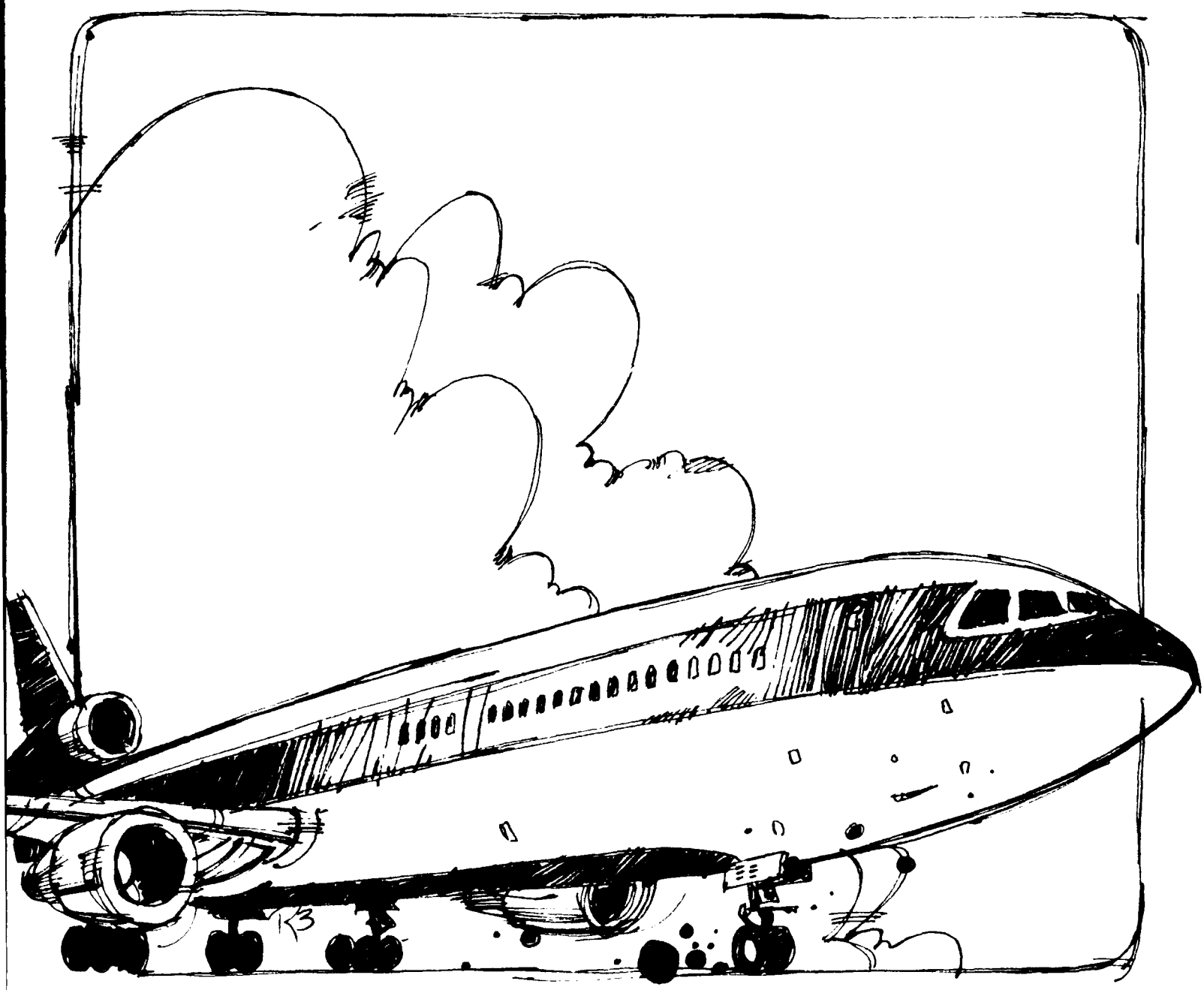
However, income accounting may explain many things about fluctuations in air travel, now and in the future. Perhaps the biggest question facing those who forecast future air travel trends is whether personal income will increase in such a way that personal travel can sustain the growth for which it has the potential. Trends in income must be reviewed carefully, for if the wealth of the economy becomes increasingly committed to items in the government account and necessities such as medical expenses, then increasing pressure on the income available after necessary expenditures could have a significant impact on the aviation industry, regardless of overall trends in economic activity.

SUMMARY

We do not believe that the aviation industry can be said to be a mature industry, primarily because we believe that the demand for the air transport product is still potentially quite large. The key reason for recent stagnation in domestic travel is likely the poor performance of the economy, which when it turns around, would again stimulate real growth in the aviation industry.

CHAPTER III

COMMERCIAL AIR CARRIERS



CHAPTER III

COMMERCIAL AIR CARRIERS

At the end of calendar year 1991, there were 58 U.S. commercial airlines (both scheduled and charter) reporting traffic and financial data to the Research and Special Programs Administration (RSPA), Department of Transportation (DOT), on Form 41. These included 39 passenger airlines (operating aircraft with over 60 seats) and 19 all-cargo carriers.

Twenty-five of the airlines provide scheduled passenger service and, as such, constitute the data base (both domestic and international) for the air carrier forecasts discussed in this chapter. Twenty-four of the carriers provided scheduled domestic service (within the 50 states, the District of Columbia, Puerto Rico, and the U.S. Virgin Islands), while 14 of the carriers provided scheduled international service. Of the 14 carriers providing scheduled international service, eight served the Atlantic routes, seven served the Latin American routes, and seven served the Pacific routes.

Air carrier traffic forecasts and assumptions are presented in Chapter X (Tables 6 through 17). FAA air carrier workload forecasts are discussed in Chapter VII and presented in Chapter X (Tables 27 through 33).

A list of active domestic and international commercial passenger and cargo air carriers may be found in Appendices A and B, beginning on page 245. A listing of inactive commercial passenger and cargo air carriers may be found in Appendix C, beginning on page 249.

REVIEW OF 1991

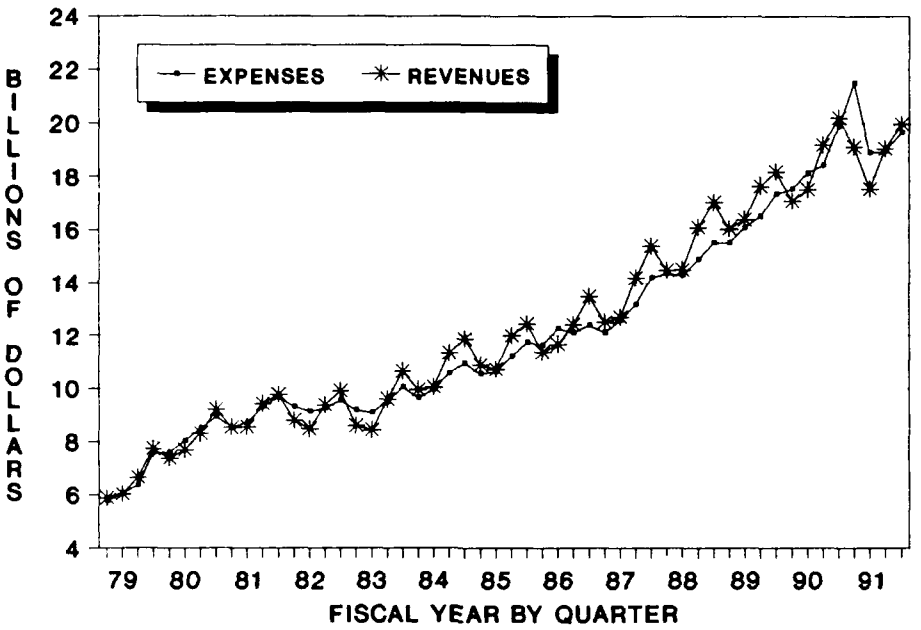
FINANCIAL RESULTS

By all accounts, fiscal year 1991 ranks as one of the worst years in U.S. commercial airline industry history. First, the U.S. economy officially entered into a recession in July 1990, with real GNP declining for two consecutive quarters (4th quarter FY-90 and 1st quarter FY-91). As a result, the U.S. economy declined by 0.7 percent in fiscal year 1991, this following growth of just 1.5 percent in 1990. The slowdown/downturn in U.S. economic growth had a major impact on U.S. travel demand, especially on the high-yield business traveler.

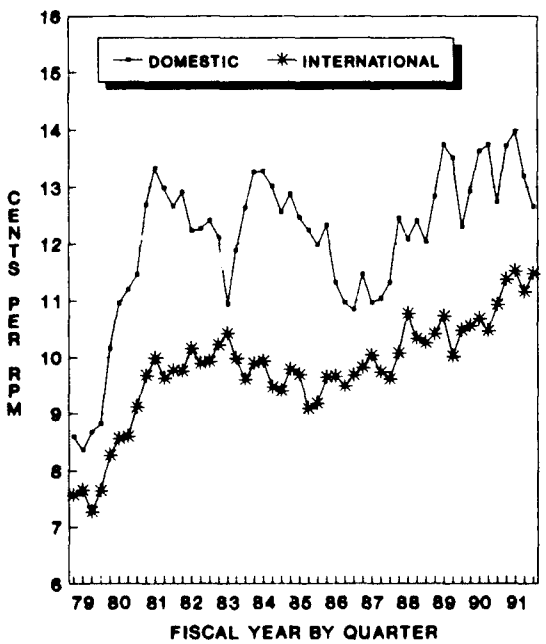
Second, Iraqi forces invaded Kuwait on August 2, 1990, sending U. S. air carrier jet fuel prices skyrocketing (from $0.564/gallon in July to $1.092/gallon

U.S. AIR CARRIER REVENUE AND COST TRENDS

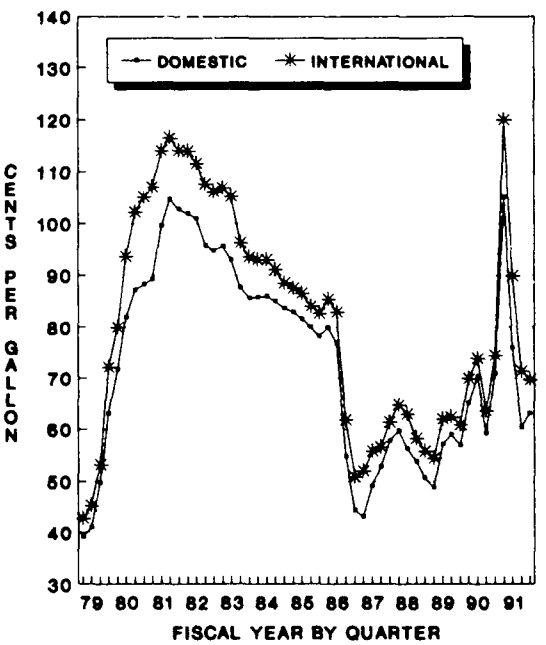
OPERATING REVENUES AND EXPENSES



PASSENGER YIELDS



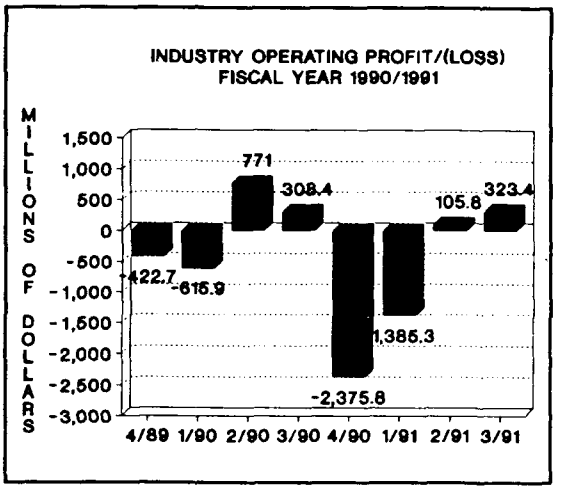
JET FUEL PRICES



in October) and seriously eroding industry profitability. Then on January 16, United States and allied armed forces began "Operation Desert Storm" to free Kuwait. One of the immediate results of the conflict was a significant decline in air travel, especially between the United States and Europe where renewed fears of terrorism had already negatively affected traffic demand. Despite a relatively quick end to the conflict (February 28) and the euphoric sense of relief and success that immediately followed, the expected strong recoveries in the U.S. economy and air travel demand failed to materialize.

The double effect of declining traffic and significantly higher fuel costs on an already financially weakened U.S. air industry was only too predictable. Over a period of seven months, one U.S. carrier was forced into liquidation (Eastern Air Lines--January 1991) and four other large air carriers entered into Chapter 11 bankruptcy--Continental Airlines (December 3, 1990), Pan American Airways (January 8, 1991-- ceased operating December 4, 1991), Midway Airlines (March 26, 1991--ceased operating November 14, 1991), and America West Airlines (June 27, 1991). Trans World is expected to enter into Chapter 11 bankruptcy in early 1992. However, the red ink was not confined to just the financially weaker carriers. In fact, most major airlines suffered substantial losses in 1991, the result being an industry operating loss of over $3.3 billion, the largest single-year loss in the history of the U.S. commercial aviation industry.

Although all of the loss occurred during the first half of the fiscal year ($3.8 billion), profits earned during the second half of the year ($338.2 million) were both too little and too late to offset the disastrous financial performance during the first half of the year. In fact, the 1990's have not been particularly kind to the U.S. commercial aviation industry, with fiscal year 1990's profits totaling



only $20.6 million. However meager the profits in 1990, it did continue the string (broken in 1991) of consecutive profitable years to seven, a period during which industry operating profits totaled almost $13.2 billion.

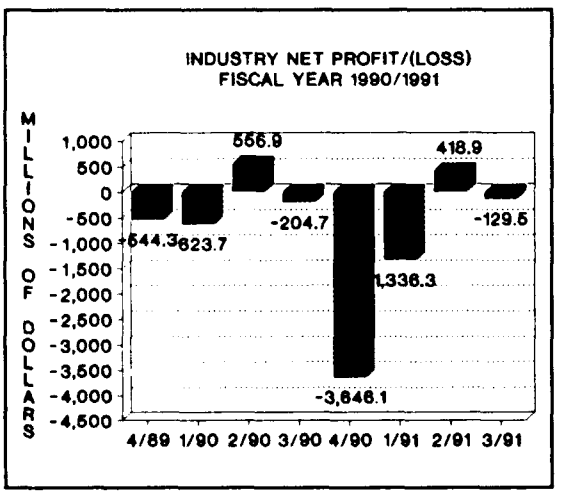
The U.S. economic recession and the rapid increases in the price of jet fuel are largely responsible for the financial deterioration in fiscal year 1991. Of the two, the increase in the price of jet fuel is more measurable in determining its impact on the industry's financial position. It is estimated that higher jet fuel prices during the first quarter of fiscal year 1991 increased U.S. air carrier operating costs by more than $1.8 billion in that quarter alone. These higher fuel costs were the major contributor to a 22.7 percent increase in industry system operating expenses in the first quarter and a major factor in the operating loss of almost $2.4 billion during the period.

Not surprisingly, both the domestic and international air travel sectors showed substantial losses in fiscal year 1991, with losses totaling $1.9 and $1.5 billion, respectively. In 1991, the demand for domestic air travel (as measured in revenue passenger miles [RPM's]) declined (down 1.6 percent) for the first time since 1981. This decline, however, follows three consecutive years of sluggish growth (up

1.7 percent annually). In addition, passenger yields (as measured by revenue received per passenger mile) increased by only 0.7 percent. The combination of the two (declining traffic and low yield growth) resulted in a 0.7 percent decline in operating revenues. Domestic operating expenses increased by 3.2 percent during the same time period.

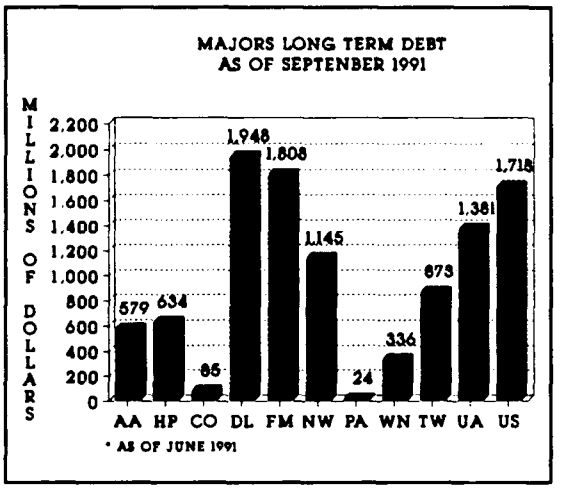
On the other hand, the international air travel sector, after recording double-digit passenger growth for four consecutive years (15.8 percent annually), declined (down 1.4 percent) for the first time since 1986. This traffic loss, when combined with a 6.5 per cent increase in international passenger yields, resulted in a 9.9 percent increase in international revenues. Unfortunately, operating expenses (up 16.6 percent) increased even faster.

U.S. airlines posted a net loss of almost $4.7 billion in fiscal year 1991, a considerable deterioration from the $815.8 million net loss in 1990.



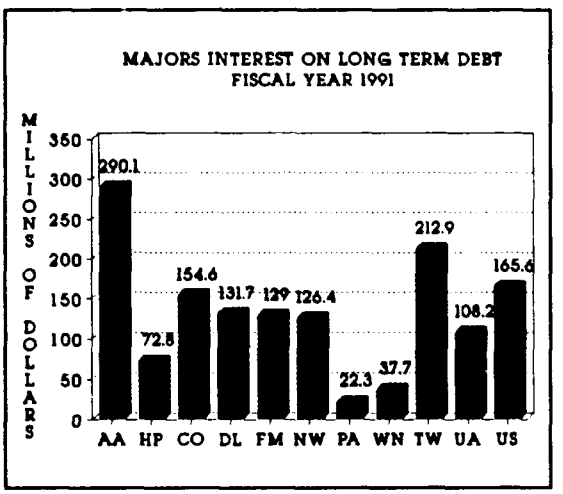
Despite combined net profits of almost $2.8 billion between 1987 and 1989, the industry has incurred a net loss of almost $1.3 billion over the last eight years, $11.1 billion less than the operating profits ($9.8 billion) posted during the same time period.

Much of the difference between the industry's operating and net profits can be attributed to the interest that must be paid, in good times or in bad,



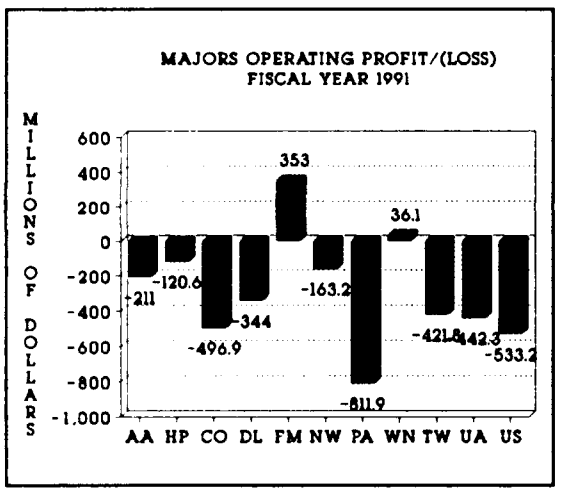
on the industry's considerable long-term debt. At the end of fiscal year 1991, the industry's long-term debt totaled almost $10.2 billion. However, it should be noted that the debt of carriers currently in Chapter 11 bankruptcy are not included in this total. Nevertheless, the 1991 long-term debt of those carriers not in Chapter 11 bankruptcy is still more than double the amount of long-term debt held prior to the start of deregulation ($4.5 billion [nominal dollars] in the third quarter of 1978).

In 1991, it cost U.S. commercial air carriers over $2.1 billion to service



the interest on its long-term debt. Over the past eight years, interest payments on the industry's long-term debt have totaled over $14.5 billion, $3.4 billion more than the difference between the industry's operating profit and net profit levels over this time period.

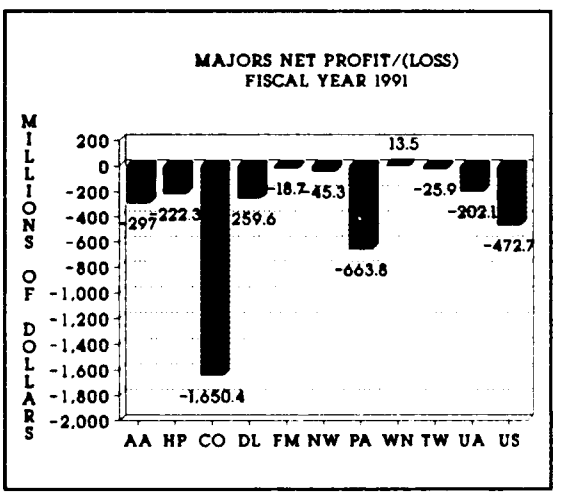
There is considerable disparity among individual carriers with respect to their long-term debt and annual interest payments, and in part, as a consequence there is also difference among individual carrier financial results as well. However, very few of the larger carriers were immune from the red ink in fiscal year 1991. This included the supposedly financially strong Big-3 carriers (American [AA], Delta [DL], and United [UA]), who reported combined operating losses of almost $1.0 billion in fiscal year 1991, down from profits of almost $2.8 billion the previous year. At the other end of the scale, three carriers (Pan American [PA], USAir [US], and Continental [CO]) reported combined operating losses of over $1.8 billion in fiscal year 1991.



Over half (24 of 46 carriers) of the carriers filing financial reports with RSPA in 1991 reported an operating profit. However, with the exception of Federal Express (FM) and Southwest Airlines (WN), most of the carriers reporting profits in 1991 were classified as Nationals (9 of 15 carriers) or Regionals (13 of 19 carriers). By definition (See financial definition of carrier groupings on page 239 of the Glossary of Terms.), these carriers annual operating revenues/expenses are relatively small when compared to the Majors financial results. As such, these carriers profit/loss levels also tend to be relatively smaller than the Majors. In fact, the cumulative profits of the 22 Nationals/Regionals who reported profits in 1991 was only $242 million. The cumulative operating loss of the 12 Nationals/ Regionals reporting losses in 1991 was $237 million. Overall, the Nationals/Regionals (34 carriers reporting) earned an operating profit of $5 million in 1991.

It should be noted, however, that the above results do not include the fourth quarter (July to September) financial results of Midway Airlines, a National carrier currently in liquidation. If Midway's fourth quarter results were added to the combined Nationals/Regionals financial results, it is highly likely that the $5 million operating profit would turn into a substantial loss. After all, Midway lost a reported $67.2 million during the first three quarters of fiscal 1991.

With respect to net profit, the Big-3 carriers (AA, DL, UA) reported a combined net loss of $758.7 million in fiscal year 1991. At the other ex-



treme, three carriers (CO, PA, and US) posted a combined net loss of almost $2.8 billion. It should be noted that most of the Majors had non-operating income which offset some of their operating losses. For example, the revenue earned by Pan American and Trans World in the sale of their international routes.

The industry's strong traffic growth during the 1984-87 period (RPM's up 44.3 percent), combined with strong U.S. economic growth (up 10.1 percent) and declining jet fuel prices (down 39.7 percent), eased the pressure on those carriers with weak balance sheets. At the same time, these same factors also masked the seriousness of the industry's long-term debt problem.

However, declining traffic, the current U.S. economic recession, the recent shut-down of three large airlines, and the financial plight of several other carriers currently in Chapter 11 bankruptcy, has served to heighten the publics awareness of the financial plight of not only the more heavily leveraged airlines, but that of the entire U.S. commercial aviation industry as well.

The current forecast portends a continued slowing in both U.S. economic growth and traffic demand in fiscal year 1992. Should the U.S. economic slowdown be more severe or longer in duration than now expected (strong growth starting in the second half of 1992), several additional carriers could be forced into Chapter 11 bankruptcy, or worse, into liquidation.

Generally, it has been the financially weaker carriers who establish discount fare policy within the industry, the goal being largely one of cash flow, often without any regard to the profitability of such fares. The shut-down of three of the financially weaker carriers during the past year has reduced the likelihood of continued uneconomic fare levels in those markets where these carriers were major competitors. However, the current financial plight of those carriers still in Chapter 11, as well as the strong probability of other carriers following suit, lends itself to a situation where uneconomic fare levels could continue to plague the industry for several more years. In addition, the continued slowdown of both the U.S. economy and traffic demand almost virtually assures the heavy discounting of fares during the early months of fiscal year 1992 as all carriers attempt to fill otherwise empty seats.

If the industry is to return to profitability within the near future, it is imperative that the industry establish rational pricing policies whose goal is to ensure both short- and long-term industry profitability. A continuation of current pricing policies would seriously erode both industry profits and future growth. Without the assurance of steady profits, the industry may be unable to obtain the financing necessary to acquire the new fuel efficient equipment needed to assure the continued growth of the U.S. commercial aviation industry.

SCHEDULED PASSENGER TRAFFIC AND CAPACITY

Scheduled system (domestic and international) passenger traffic on U.S. commercial airlines declined in 1991, this following nine consecutive years of growth. Over the previous nine-year period (1982 to 1990), system RPM's and enplanements increased by 82.9 and 62.8 percent (an average of 6.9 and 5.6 percent per year), respectively. In fiscal year 1991, however, system RPM's (447.1 billion) declined by 1.6 percent and passenger enplanements (453.1 million) declined by 2.7 percent.

The decline in passenger demand in 1991 was largely the result of two factors--the U.S. economic recession and the

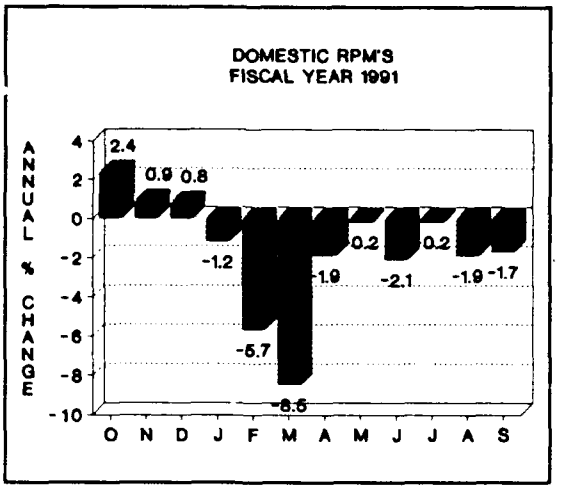
Gulf War--both of which had deeper and longer lasting impacts than could have been predicted.

Available seat miles (ASM's) also declined for the first time in a decade, totaling 717.7 billion in fiscal year 1991, a decline of 0.8 percent. The capacity decline in 1991 was due, in large part, to the liquidation of Eastern Air Lines in January 1991 (approximately 3.9 percent of system capacity in FY-90) and, to a lesser extent, by capacity cutbacks by other carriers in response to low passenger demand and increased fuel costs. This was especially true of those carriers currently in Chapter 11 bankruptcy. Some of the larger capacity passenger aircraft (B-747's) that may have been grounded during the first half of fiscal year 1991 were, in fact, kept flying for use in the CRAF (Civil Reserve Air Fleet) program to transport U.S. troops and supplies between the United States and the Middle East. Otherwise, the decline in capacity may have been even greater in 1991.

Prior to 1991, system ASM's had grown by 71.1 percent (6.2 percent annually) over the previous nine years. During this nine-year period, the system load factor had increased from 58.7 percent in 1981 to 62.8 percent in fiscal year 1990. Despite the downturn in traffic demand in 1991, system load factors remained at relatively high levels, averaging 62.3 percent, down 0.5 points from 1990.

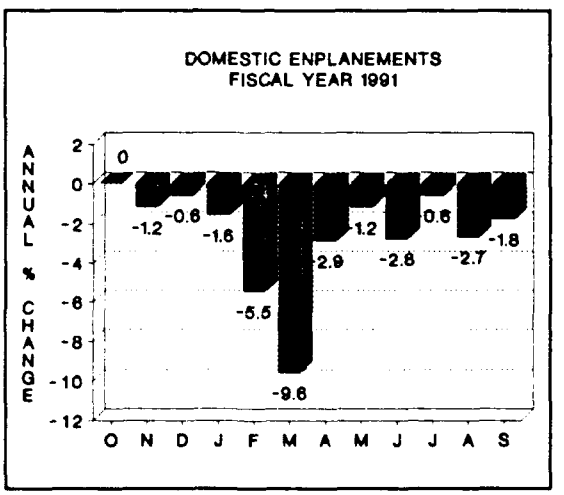
Domestic Passenger Traffic and Capacity

Domestic RPM's (333.6 billion) declined by 1.6 percent in fiscal year 1991, continuing the slowdown in demand for air travel within the United States that began in 1988. In the three years prior to 1988, domestic RPM's grew by 35.5 percent (10.7 percent annually). In the four years since then, however,



domestic RPM's have grown by just 3.6 percent (0.9 percent annually). However, most of that growth occurred in 1990 when domestic RPM's increased by 3.2 percent.

Domestic passenger enplanements (413.3 million) declined by 2.6 percent in fiscal year 1991. In fact, domestic enplanements in 1991 were actually less

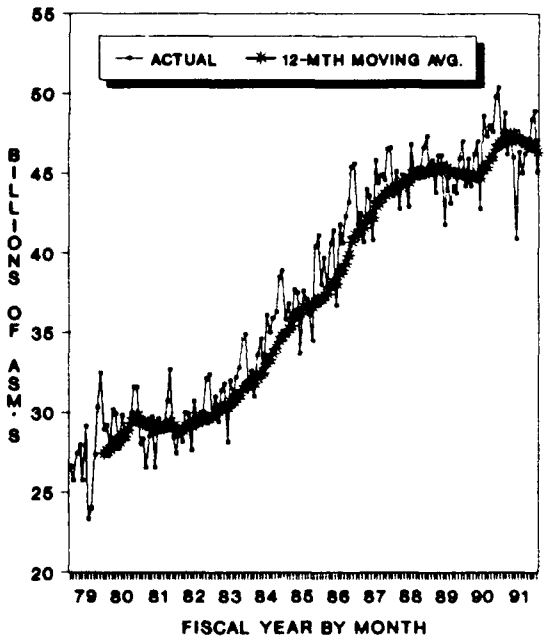


than recorded during any of the previous four years (1987 to 1990). Except for a 2.1 percent increase in 1990, domestic enplanements have remained virtually flat since 1987.

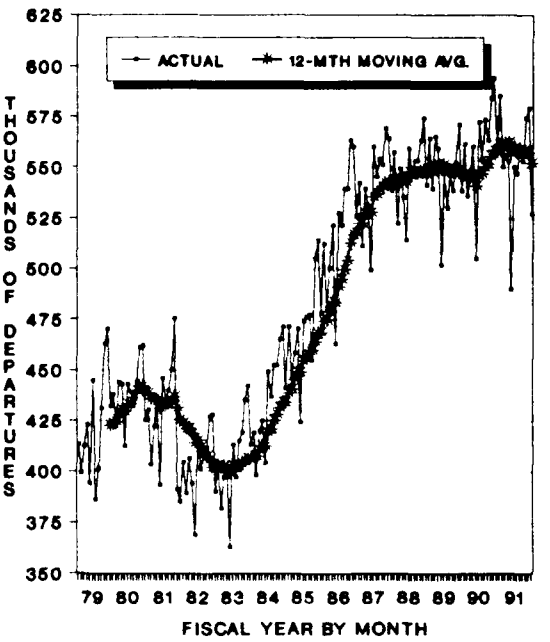
Higher fares (nominal yields up 16.7 percent) were considered one of the main causes for the sluggish growth in domestic passenger demand in both

U.S. AIR CARRIER DOMESTIC TRAFFIC TRENDS

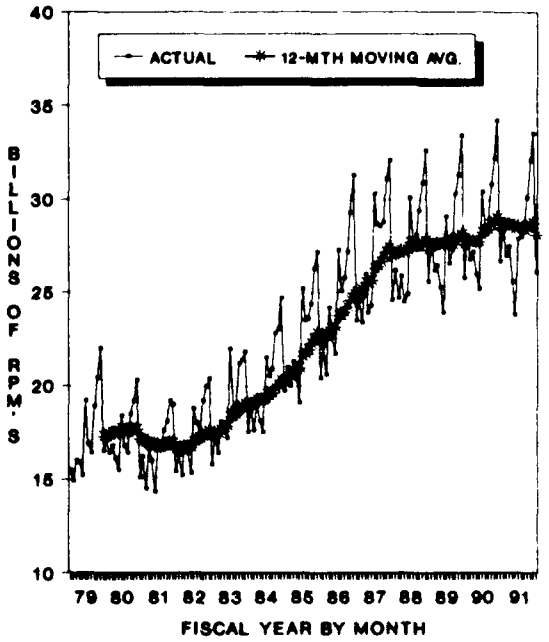
AVAILABLE SEAT MILES



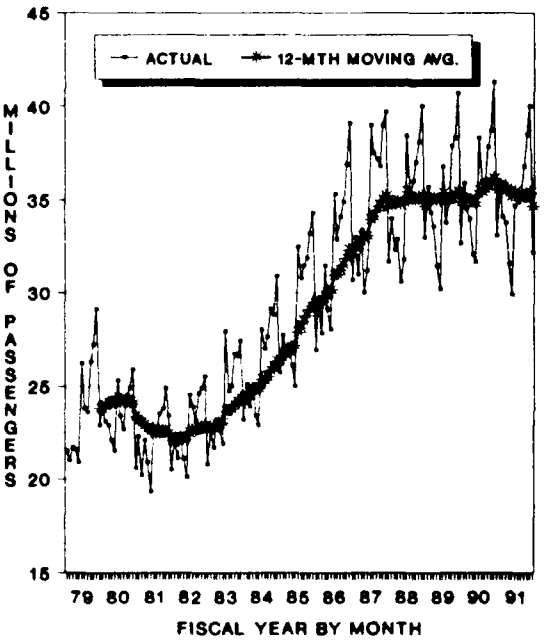
AIRCRAFT DEPARTURES



REVENUE PASSENGER MILES

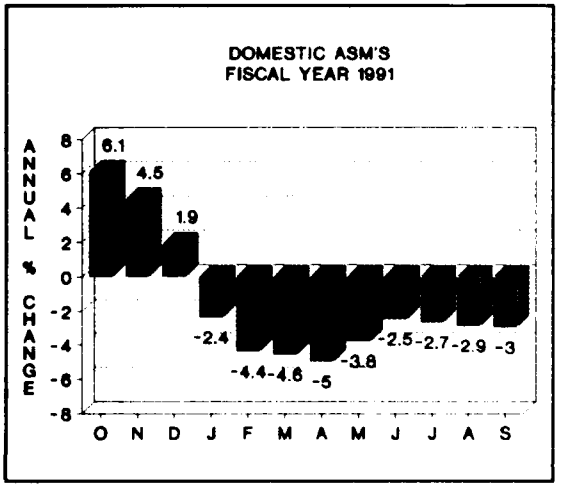


PASSENGER ENPLANEMENTS



1988 and 1989. However, nominal yields have increased by only 2.1 percent over the past two years. In real terms (FY-1991$), yields actually declined by 7.4 percent. This suggests that other factors (i.e., the U.S. economy) had a much more pronounced impact on domestic passenger demand during the past two years.

Domestic capacity (548.4 million ASM's) declined by 1.6 percent in fiscal year



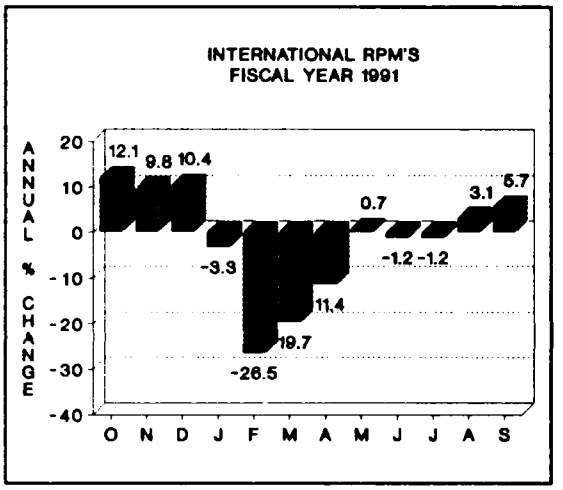
1991. However, a large part of the decline was due to the fact that domestic capacity in 1991 was affected by the liquidation of Eastern Air Lines (accounted for 4.5 percent of domestic capacity in FY-90) in January 1991. In addition, declining traffic demand and the economic slowdown forced several other domestic airlines to curtail schedules and/or ground inefficient aircraft.

Despite declining traffic in 1991 and slow growth over the previous three years, domestic load factors (60.8 percent in 1991) have remained at historically high levels (averaging 61.1 percent between 1985 and 1991). This is due, in large part, to the fact that since 1985, domestic air carriers have been able to adjust their capacity levels (ASM's up 25.6 percent) to keep pace with the level of traffic demand (RPM's up 25.5 percent).

The domestic load factor remained constant in fiscal year 1991; however, the load factor is inflated somewhat because of the shut-down by Eastern Air Lines.

International Passenger Traffic and Capacity

After a disappointing traffic year in fiscal year 1986 (RPM's down 0.7 percent--largely due to terrorist activities abroad), international RPM's and



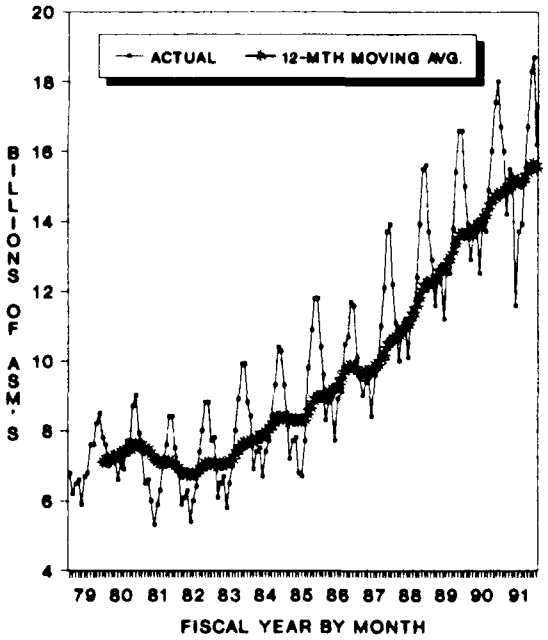
passenger enplanements increased by 79.9 and 68.5 percent, respectively, over the next four years. However, international RPM's (113.5 billion) and passenger enplanements (39.7 million) declined 1.4 and 3.8 percent, respectively, in fiscal year 1991.

International traffic in 1991 was affected by a number of interrelated events. These events included the Gulf War, the U.S. economic recession and the slowdown in world economic growth. Of the three factors, it is thought that the Gulf conflict had the most detrimental and longest lasting impact on international traffic demand.

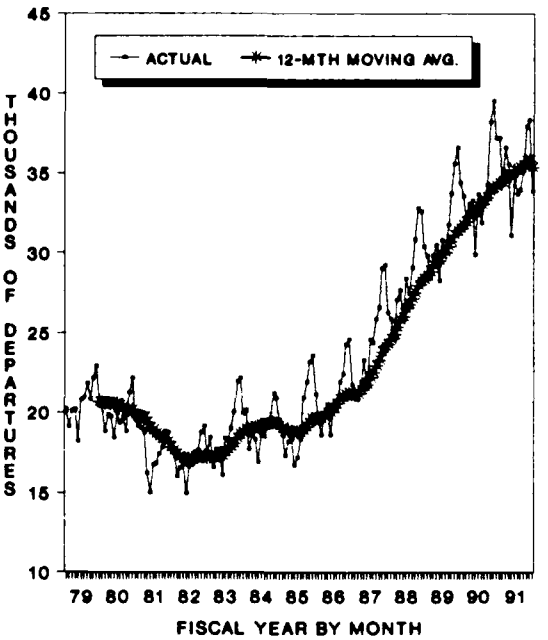
The Iraqi invasion of Kuwait, and subsequent deployment of U.S. and allied military forces to the Middle East,

U.S. AIR CARRIER INTERNATIONAL TRAFFIC TRENDS

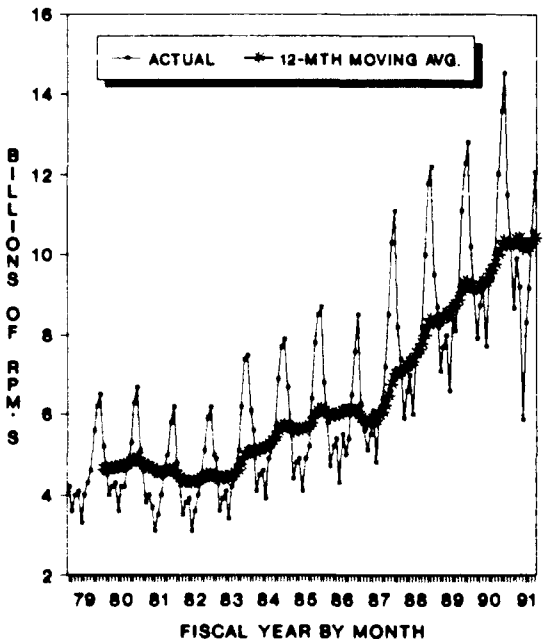
AVAILABLE SEAT MILES



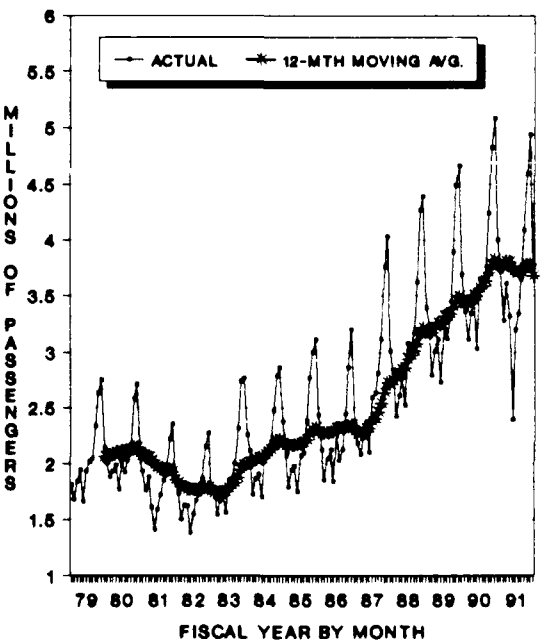
AIRCRAFT DEPARTURES

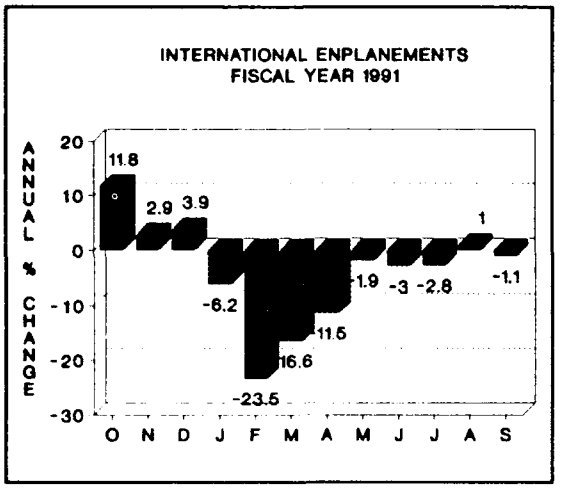


REVENUE PASSENGER MILES



PASSENGER ENPLANEMENTS

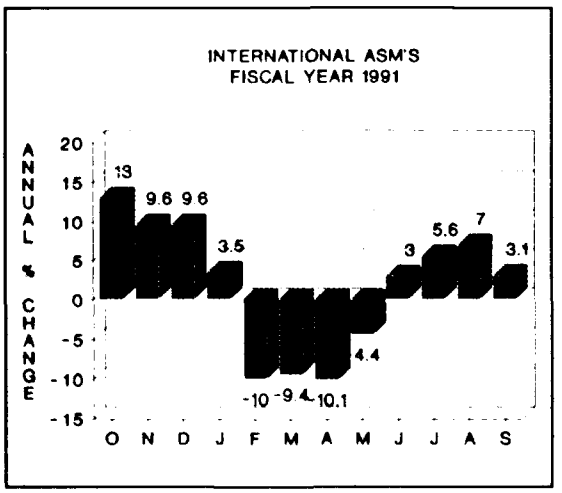




brought threats of terrorist retaliation against those nations supplying military troops. These threats of terrorism (real or implied) vividly reminded the traveling public of the December 1988 midair destruction of Pan American flight 103 and other earlier terrorist incidents against U.S. and other foreign flag carriers. Traffic between the United States and Europe started to decline in November 1990 and continued throughout the remainder of fiscal year 1991. Although the Gulf conflict ended on February 28, the fear of terrorism remained prevalent in the minds of air travelers for some time afterward.

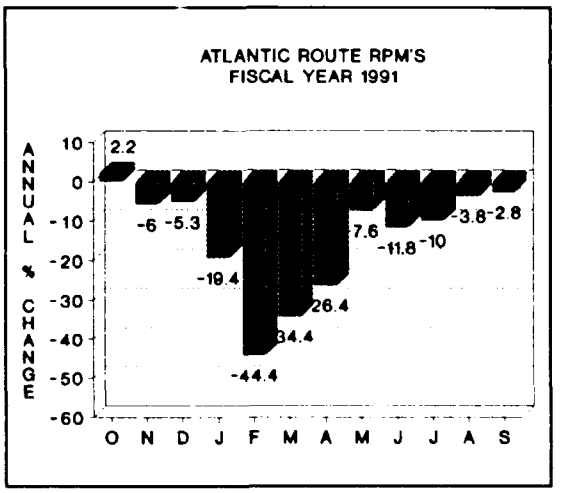
Notwithstanding the traffic declines in 1986 and 1991, the growth in the demand for international travel since 1983 is due, in large part, to the relatively large increases that have occurred in international schedules. Between 1983 and 1991, international capacity more than doubled (9.6 percent annually). However, international seat miles (169.3 billion) increased by only 1.9 percent in fiscal year 1991, the slower growth due, almost entirely, to the large reductions in capacity (down 11.9 percent in 1991) between the United States and Europe.

Despite the relatively large increases in international capacity since 1983, international load factors have, with the exception of 1986 (59.1 percent) and 1990 (69.2 percent), remained consistently in the mid-60's. In 1991 the international load factor averaged 67.0 percent, 2.2 points lower than the 1990 load factor but the second highest load factor ever achieved in the international sector. The load factor achieved in 1990 is the highest ever recorded for international travel.



Atlantic Routes

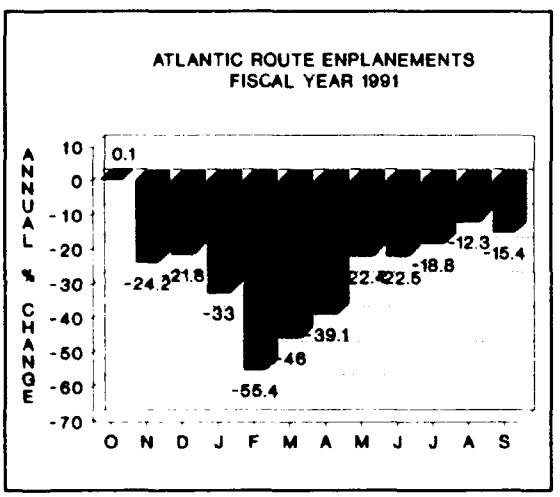
Transatlantic traffic demand has proved to be very susceptible to terrorist activities, both real and implied. Terrorist activities in 1986 resulted in a 9.7 percent decline in traffic. The December 1988 mid-air destruction



of Pan American fight 103 reduced traffic levels for a number of months

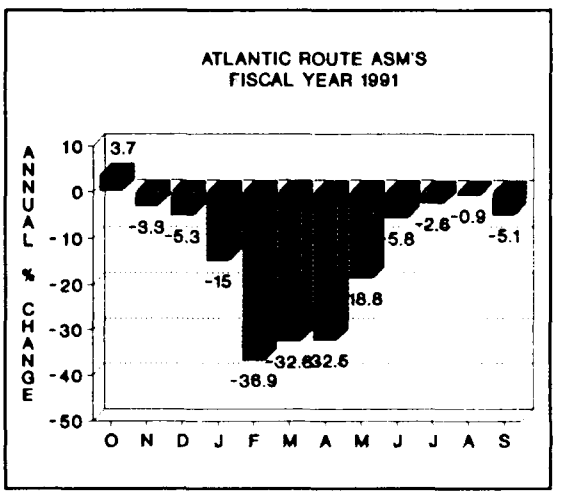
(from 20.1 percent growth in first quarter FY-89 to only 4.4 percent in the 2nd quarter) and was, in large part, responsible for the sub-par traffic growth (6.5 percent) in 1989. The damage to Pan American was both immediate (traffic down 16.1 percent in the immediate three month period) and long-term, with the carrier never really fully recovering its previous traffic levels. In fact, the destruction of Pan American 103 is often given as one of the main reasons given for the carrier filing for Chapter 11 bankruptcy.

While there were no terrorist actions directed at commercial aviation in 1991, the mere threat of such activity was enough to discourage large numbers of travelers (both business and pleasure) from flying between the United States and Europe. In fact, a survey conducted by a large U.S. airline during the early months of 1991 found that 31.0 percent of the corporations responding had banned all company travel between the United States and Europe. As a result, transatlantic route RPM's (47.1 billion) declined by 12.3 percent in fiscal year 1991. The falloff in traffic both during and immediately following the conclusion of the Gulf conflict was much more pronounced, declining by 44.4 and 34.4 percent, respectively, in the months of February and March.



The number of passengers enplaned on the Atlantic routes in fiscal year 1991 totaled only 12.2 million, a decline of 23.8 percent. In fact, 1991 enplanements were 1.2 percent below the passenger count recorded four years earlier. However, a large part of the decline in enplanements is the result of factors other than the Gulf conflict and the threat of terrorist activity. In November 1990, Pan American completed the sale and transfer of its intra-Germany routes (intercity service between the cities of Berlin, Cologne, Dusseldorf, Frankfurt, Hamburg, Munich, Nuremburg, and Stuttgart) to Lufthansa. While the short-haul intra-Germany service (an average of 259 miles in FY-90) accounted for only a small percentage of total atlantic route passenger miles (1.1 percent in FY-90), it accounted for a substantial percentage of total Atlantic route passenger enplanements (13.7 percent in FY-90). If the intra-Germany traffic statistics are deleted from the 1990 data base, both atlantic route RPM's and enplanements would have declined by only 11.4 percent in fiscal year 1991.

U.S. carriers reacted to declining 1991 traffic demand with equal reductions in capacity levels, either through the



utilization of smaller aircraft or through the outright reduction and/or elimination of service to some European countries. The carriers began reducing capacity in November (down 3.5 per-

U.S. AIR CARRIER CAPACITY AND TRAFFIC TRENDS
INTERNATIONAL OPERATIONS - ATLANTIC ROUTES

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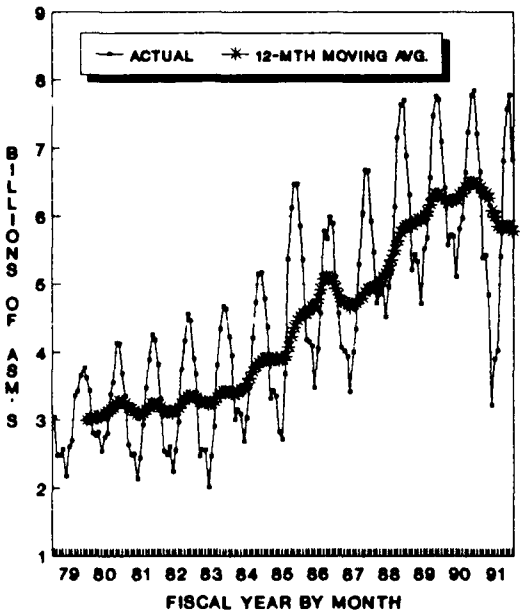
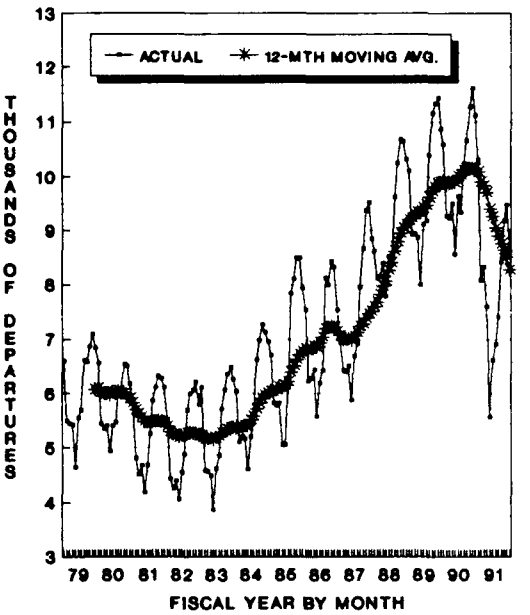
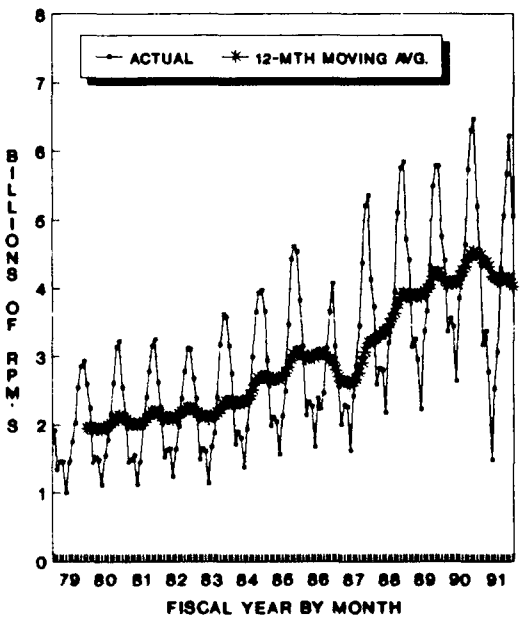


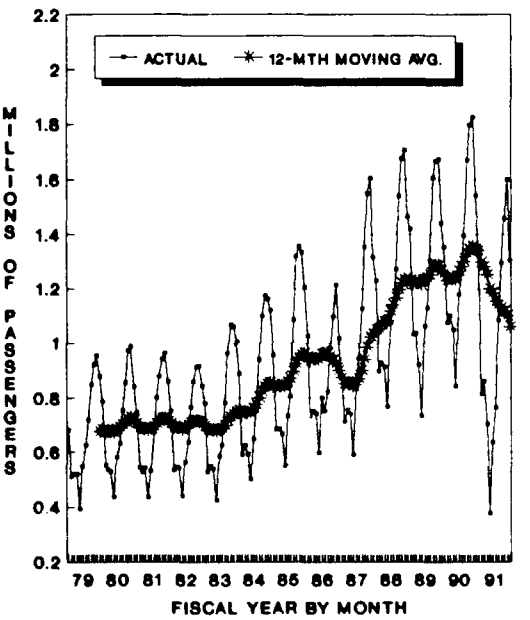
AIRCRAFT DEPARTURES



REVENUE PASSENGER MILES



PASSENGER ENPLANEMENTS

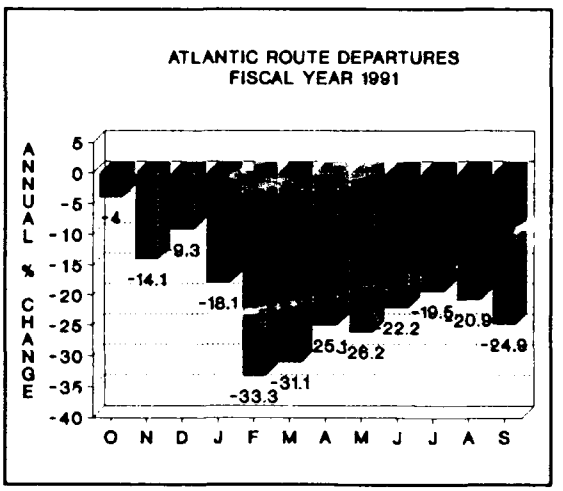


cent), with service reductions bottoming out during the February to April period when capacity was reduced an average of 34.0 percent. Capacity levels have not yet returned to the previous 1990 capacity levels, although capacity during the peak summer months of July and August were only 2.6 and 0.8 percent, respectively, below the previous year's capacity levels.

Most of the capacity reductions in 1991 were implemented by two carriers--Pan American (PA) and Trans World (TW)--whose combined capacity reductions averaged 57.1 percent during the February to April period. For the entire year, the two carrier's capacity declined by 35.6 percent. On the other hand, the capacity levels of the other carriers operating across the Atlantic were up 27.8 percent in 1991. Of course, these statistics also reflect the transfer of a large number of routes from PA and TW to American and United Airlines, most taking place during the spring and summer of 1991.

The final result of these monthly capacity reductions was a 11.9 percent decline in capacity in fiscal year 1991, with Atlantic route ASM's totaling only 67.8 billion. Some of the capacity decline in 1991 is due to loss of the Pan American intra-Germany capacity (1.3 percent of FY-90 ASM's). Nevertheless, 1991 ASM's are still 3.3 percent lower than the capacity flown three years earlier in 1988.

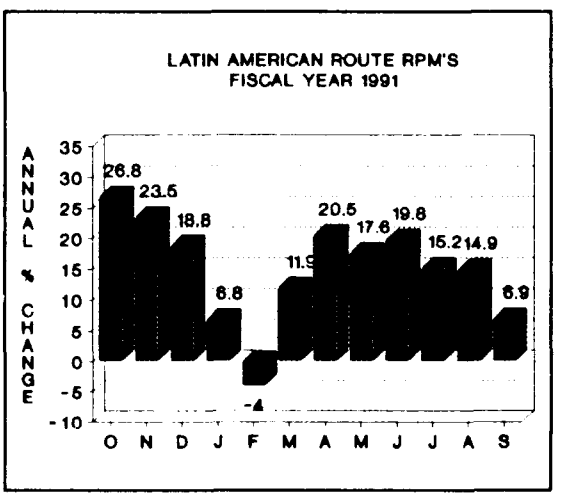
Atlantic route departures (as reported to RSPA on Form 41) totaled 99,305 in fiscal year 1991. This represents a decline of 20.6 percent from 1990, almost double the decline reported for ASM's. The reason for the wide discrepancy between the two capacity measures is due, in large part, to the loss of the intra-Germany routes beginning in November 1990. While the intra-Germany routes accounted for a relatively small percentage of total ASM's, the short-haul routes accounted for a disproportional large percentage of aircraft departures.



By adjusting capacity levels to meet declining passenger demand, U.S. air carriers were able to achieve an annual load factor of 69.5 percent on the Atlantic routes in fiscal year 1991. This was only 0.3 points below the all-time high load factor of 69.8 percent recorded in fiscal year 1990.

Latin American Routes

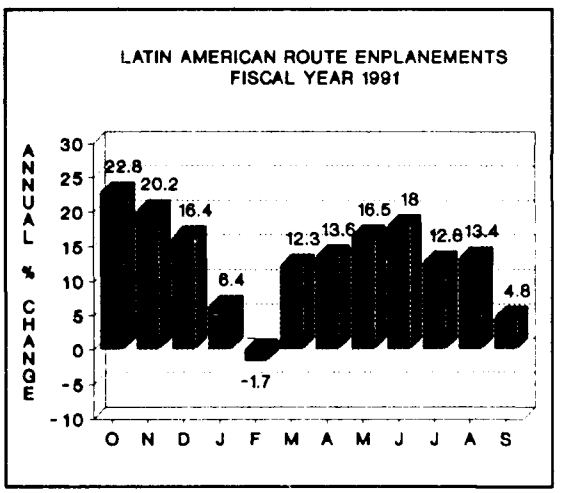
Traffic demand to Latin American destinations (South America, Central America, Mexico, and the Caribbean),



unlike the demand for domestic and other international travel markets, appears to have been relatively unaffected by either the U.S. economic

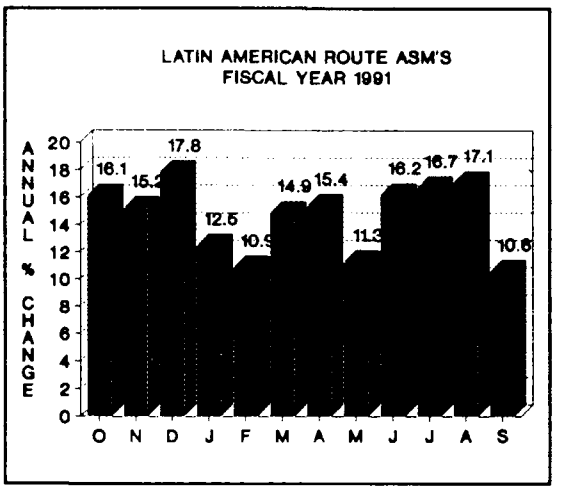
recession or the Middle East conflict. In fact, Latin American markets may have benefitted from U.S. traveler's fear of terrorism abroad, becoming an alternative travel destination in lieu of trips to Europe and the Far East. Whatever the reason, traffic demand in this sector continued to exhibit considerable strength during fiscal year 1991, with RPM's (18.3 billion) and enplanements (14.7 million) growing by 14.6 and 14.7 percent, respectively.

Some of the growth in 1991 is due, in part, to the fact that American Airlines, a more financially viable and aggressive competitor than its predecessor (Eastern Air Lines sold its routes to American in June 1990), operated these routes for the entire year in 1991. In addition, Alaska Airlines traffic between Mexico and the United



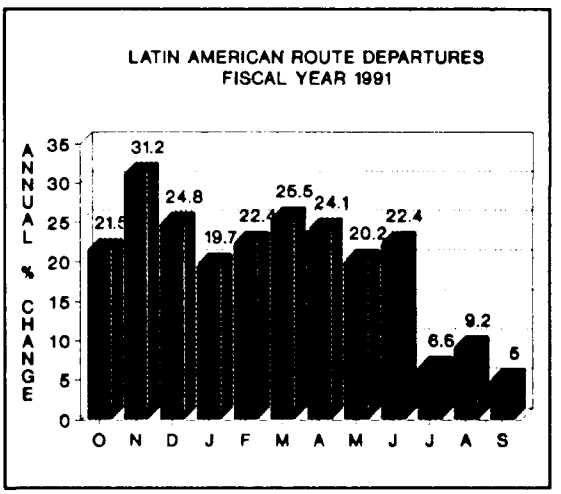
States was reported as Latin American for the first time in 1991 (beginning October 1990). Heretofore, this traffic had been reported as domestic. (RSPA does not require a carrier to report traffic as international until it accounts for a minimum percentage [as determined by RSPA] of the carriers' total traffic, i.e., United Airlines' Chicago-Mexico City traffic is still reported as domestic traffic.) However, even discounting the Alaska Airlines traffic, Latin American RPM's and enplanements would have grown by 10.8 and 9.0 percent, respectively, in 1991.

Latin American ASM's (29.6 billion) grew by 14.6 percent in fiscal year 1991. These capacity levels are also



overstated somewhat by the addition of Alaska Airlines capacity between Mexico and the United States now being reported as Latin American. However, if Alaska Airlines' capacity is removed from the totals, Latin American capacity would have still increased by 10.7 percent in 1991.

The number of aircraft departures between the United States and Latin American destinations (164,826) in-

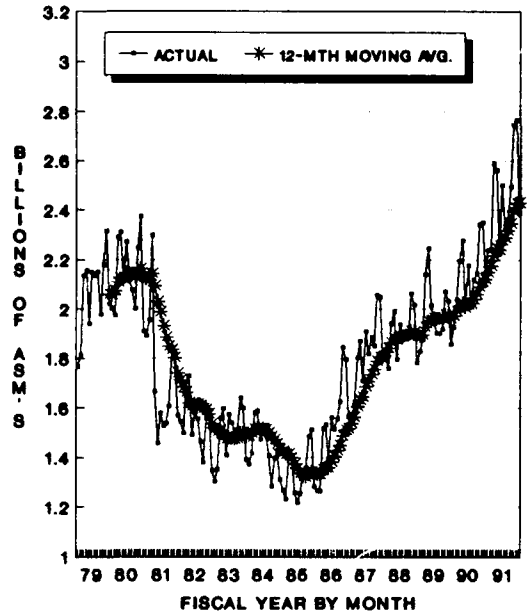


creased by 18.7 percent in 1991. The higher percentage growth in departures relative to ASM's reflects, to a great extent, the increased utilization of smaller aircraft on these routes.

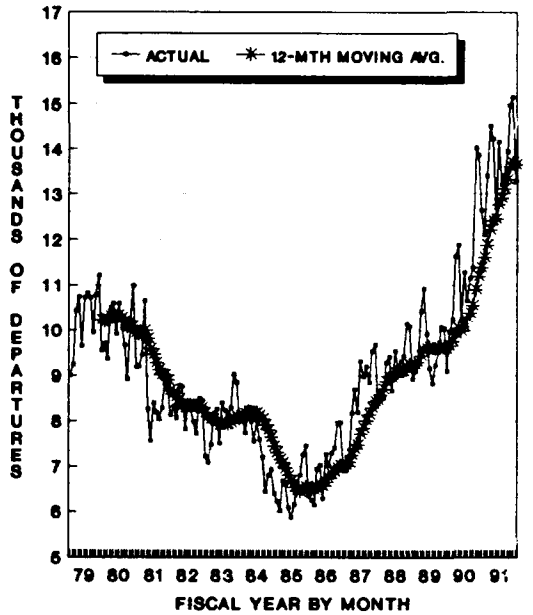
U.S. AIR CARRIER CAPACITY AND TRAFFIC TRENDS

INTERNATIONAL OPERATIONS - LATIN AMERICA ROUTES

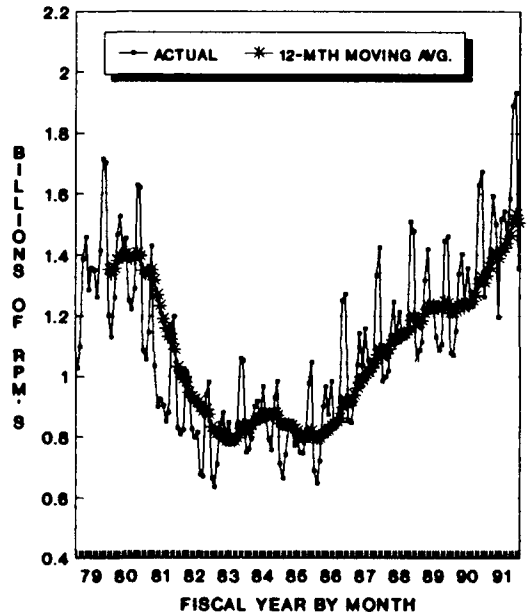
AVAILABLE SEAT MILLES



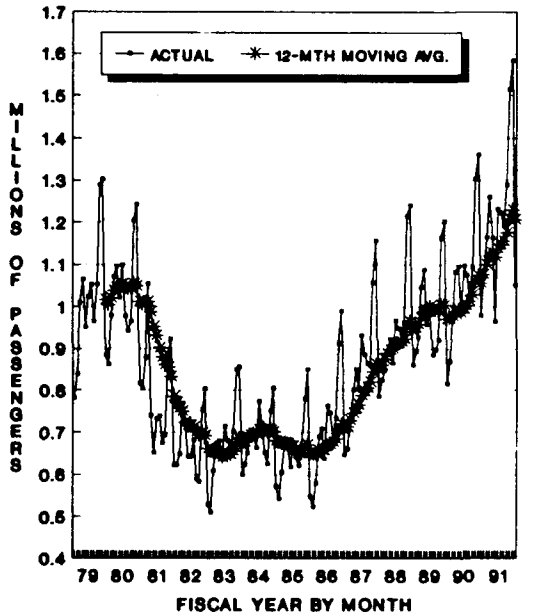
AIRCRAFT DEPARTURES



REVENUE PASSENGER MILES



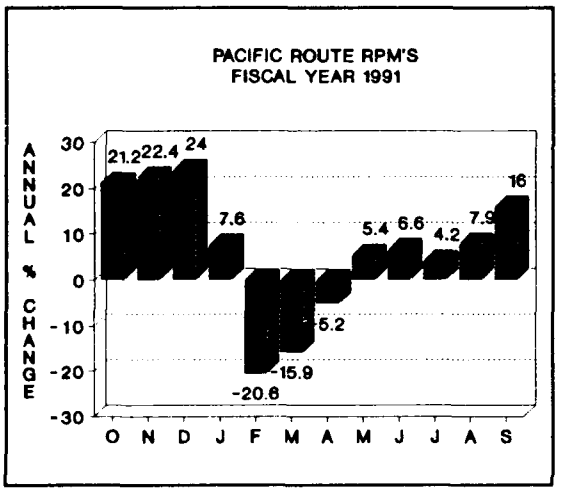
PASSENGER ENPLANEMENTS



Load factors on Latin American routes was virtually unchanged in 1991, averaging 62.3 percent for the year.

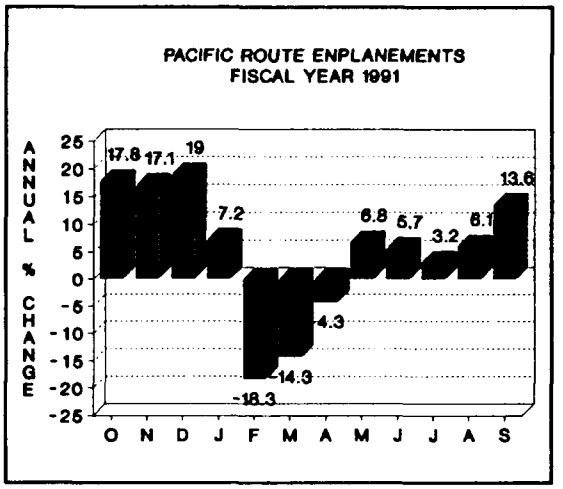
Pacific Routes

Passenger traffic to Pacific destinations increased for the tenth consecutive year in 1991. Over this ten-year period, RPM's and passenger enplanements have almost quadrupled, increasing at average annual rates of 14.3 and 14.4 percent, respectively. Over the four-year period 1987 to 1990, the growth was even more spectacular, with RPM's increasing by 22.3 percent annually and enplanements increasing by an average of 22.6 percent.



Demand to Pacific destinations slowed considerably over the past year, registering its smallest gain in ten years. In fiscal year 1991, Pacific route RPM's (48.1 billion) were up only 5.9 percent and enplanements (12.8 million) grew by only 4.8 percent.

A number of reasons can be advanced for the slowing of demand between the United States and transpacific markets, including the U.S. economic recession and a slowing of the Japanese economy. The most unlikely factor, but nevertheless one of the principal reasons given for the falloff in demand in



1991, was the Middle East conflict. It is claimed that Japanese citizens were urged to avoid travel outside Japan during the Middle East conflict and/or to travel only on their own flag carriers, which were claimed to be safer than U.S. flag carriers.

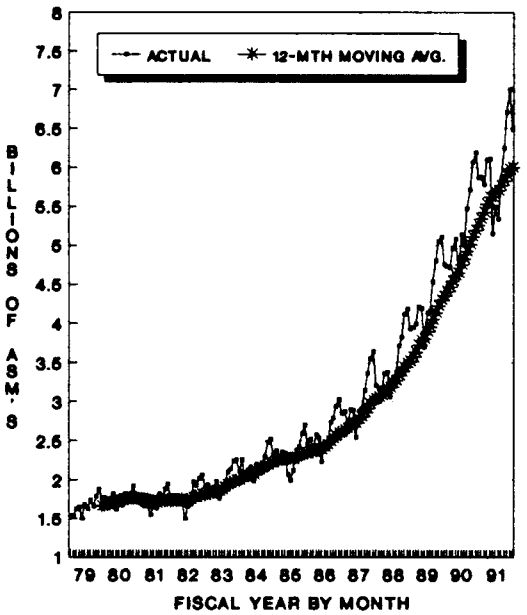
During the first quarter of fiscal 1991 (October to December), Pacific RPM's and enplanements increased by 22.5 and 18.2 percent, respectively, more or less in sync with the growth achieved over the previous four years. However, once the ground action started in Kuwait, traffic in the transpacific markets fell rapidly. During February and March, Pacific RPM's and enplanements declined by an average of 18.2 and 16.3 percent, respectively, below traffic levels of a year earlier. Although traffic levels did turn positive over the remainder of the fiscal year, the growth rates have been, for the most part, less than one-third to one-half that achieved prior to the start of the allied invasion of Kuwait.

Capacity on the transpacific routes more than doubled between 1986 and 1990, averaging almost 19.1 percent annually over the four-year period. During the first quarter of fiscal 1991, transpacific capacity was up 23.3 percent. However, capacity grew by only 10.5 and 6.8 percent, respectively, during the months of February and March as carriers reduced schedules

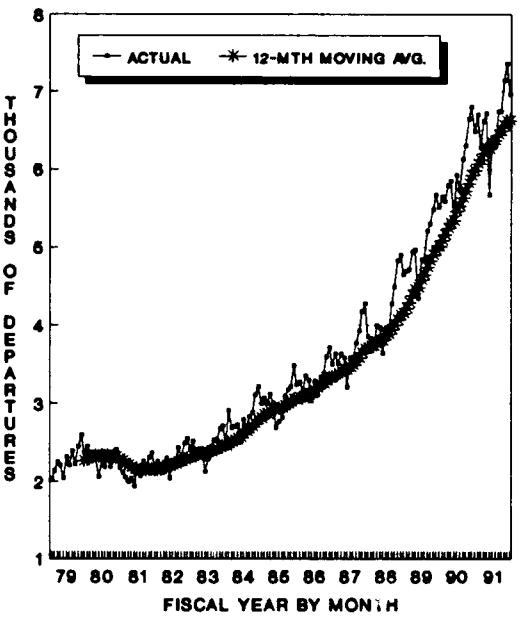
U.S. AIR CARRIER CAPACITY AND TRAFFIC TRENDS

INTERNATIONAL OPERATIONS - PACIFIC ROUTES

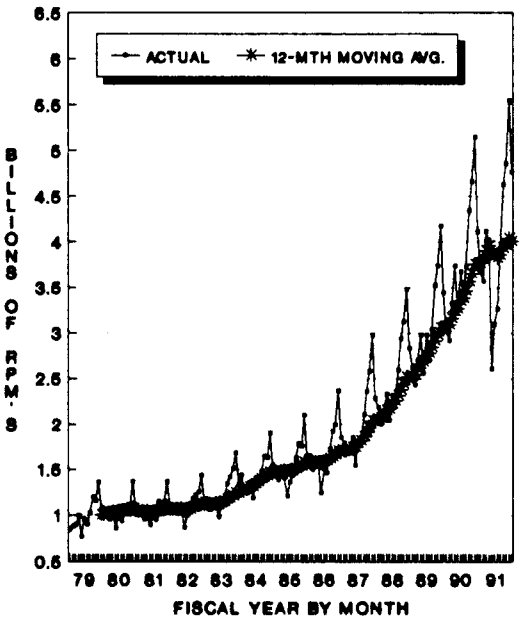
AVAILABLE SEAT MILES



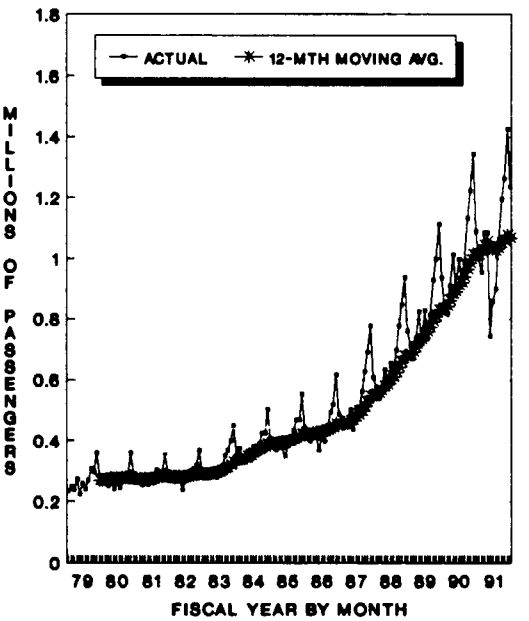
AIRCRAFT DEPARTURES

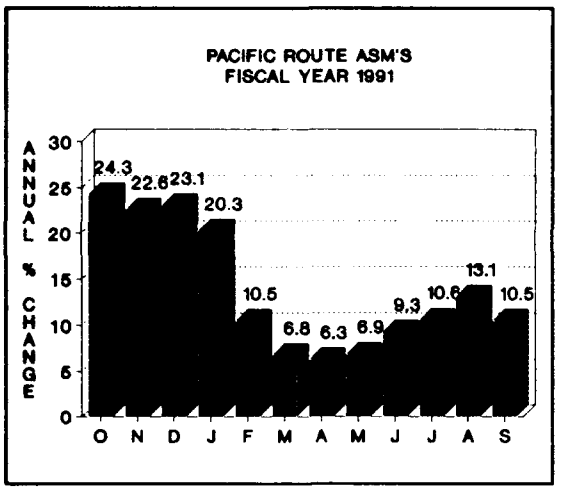


REVENUE PASSENGER MILES



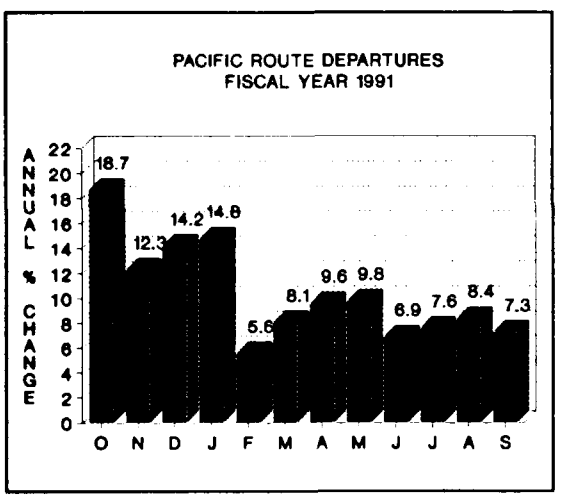
PASSENGER ENPLANEMENTS





in response to traffic declines. Although transpacific capacity has increased somewhat over the low February level, the growth experienced during the peak summer months of July (up 9.3 percent) and August (up 13.1 percent) was only half of what it had been prior to the start of the Gulf conflict. Overall, transpacific ASM's (72.1 billion) were up 13.4 percent in fiscal year 1991.

The number of aircraft departures (79,615) between the United States and Pacific destinations grew by 10.2 per-



cent in 1990. This slower growth in departures relative to ASM's reflects the increased utilization of larger capacity aircraft on the transpacific routes.

Despite the large increases in capacity over the past several years, load factors on transpacific routes remained at relatively high levels, averaging more than 70.0 percent between 1988 and 1990. Load factors on the transpacific routes remained at relatively high levels in fiscal year 1991, averaging 66.7 percent. However, this represents a 4.7 point decline from the 1990 load factor (71.4 percent), the highest load factor ever achieved on these routes.

NONSCHEDULED TRAFFIC AND CAPACITY

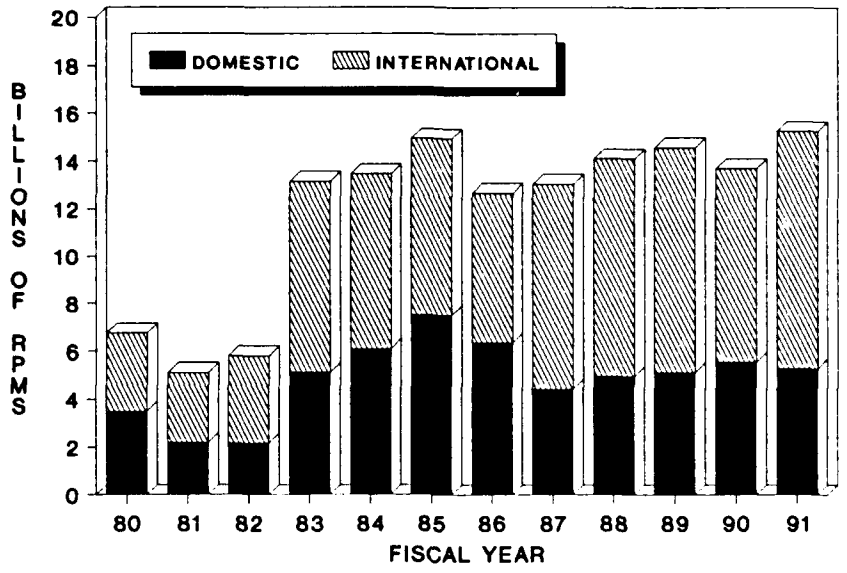
The number of nonscheduled (charter) passengers flying on U.S. commercial air carriers declined by 2.1 percent in fiscal year 1991, to a total of 8.9 million. Domestic enplanements (4.9 million) declined by 6.3 percent, while international enplanements (4.0 million) increased by 3.5 percent.

Nonscheduled revenue passenger miles increased by 11.3 percent in fiscal year 1991, to a total of 15.3 billion. Domestic passenger miles (5.3 billion) were down 4.7 percent, while international passenger miles (10.0 billion) increased by 22.2 percent. Nonscheduled U.S. air carriers gained share in international markets during fiscal year 1991. This was due, in part, to the cutbacks in international schedules that were instituted by the scheduled airlines in response to terrorist threats and declining passenger demand. However, a large part of the increase was the result of the large numbers of troops that were transported between the United States and the Middle East as part of the CRAF program.

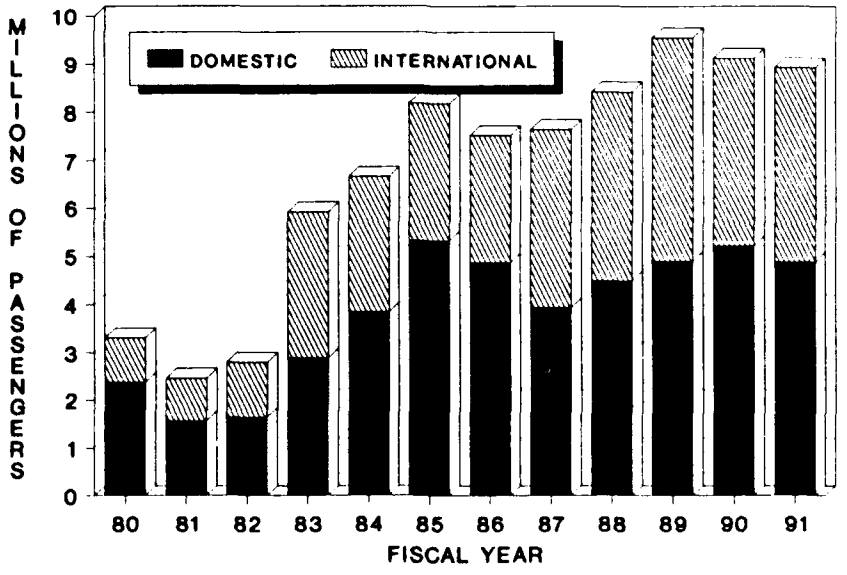
Nonscheduled available seat miles (23.1 billion) increased by 23.9 percent in fiscal year 1991. Domestic seat miles (7.6 billion) were up 2.5 percent, while international seat miles (15.5 billion) were up 38.1 percent. The large increase in inter-

U.S. COMMERCIAL AIR CARRIERS
NONSCHEDULED TRAFFIC

REVENUE PASSENGER MILES



PASSENGER ENPLANEMENTS



national capacity is largely due to the CRAF program.

Nonscheduled load factors averaged 66.1 percent in fiscal year 1991, down 7.5 points from 1990. Domestic load factors averaged 69.8 percent (down 5.3 points), while international load factors averaged 64.3 percent (down 8.4 points).

Historical (1982-1991) nonscheduled traffic (RPM's and enplanements), capacity (ASM's), and load factor statistics may be found in Appendix D, beginning on page 253.

AIR CARGO TRAFFIC

Air cargo revenue ton miles (RTM's) flown by U.S. air carriers reporting on RSPA Form 41 totaled 16.5 billion in fiscal year 1991, an increase of 1.5 percent over statistics published for 1990. This included an increase of 1.9 percent in system freight/express RTM's (14.6 billion) and a decline of 1.4 percent in mail RTM's (2.0 billion).

Domestic freight/express ton miles (7.6 billion) increased by 1.2 percent in fiscal year 1991 while international freight/express RPM's (7.0 billion) grew by 2.7 percent. A large part of the increase in international RTM's is the result of the movement of military supplies between the United States and the Middle East as part of the CRAF program.

Domestic mail RTM's (1.5 billion) declined by 1.3 percent and international mail RTM's (0.5 billion) declined by 1.7 percent in fiscal year 1991. The rapidly growing acceptance of facsimile mail is thought to be at least partly responsible for the slow growth that has occurred in mail RTM's over the past several years.

Historical (1982-1991) domestic and international air cargo statistics may be found in Appendix E, beginning on page 255.

FORECAST ASSUMPTIONS

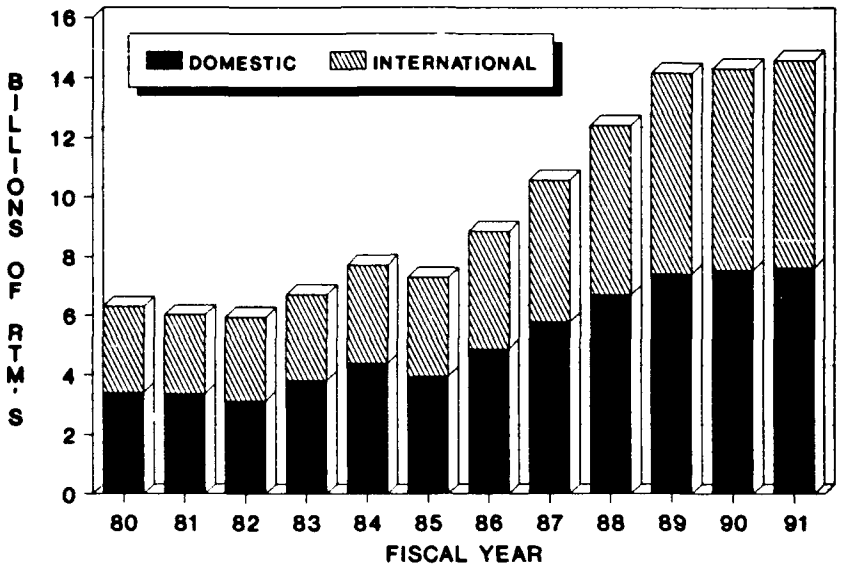
The baseline forecasts of commercial air carrier traffic and activity over the next 12-year period (1992 to 2003) assumes that the industry will continue to consolidate into a smaller number of larger air carriers. The extent and speed of this consolidation will depend, in large part, on the timing and strength of the U.S. economic recovery. A prolonged continuation of the current slowdown in U.S. economic growth could result in the loss of several of the carriers currently operating under Chapter 11 bankruptcy. On the other hand, a stronger than expected economic recovery in 1992 could breath new life into some of the financially weaker carriers, thus slowing industry consolidation.

Continued consolidation of the U.S. commercial aviation industry, however, does not preclude the emergence of new low-cost airlines seeking to establish a market niche for themselves, i.e., the proposed start-up of Air Reno utilizing Reno Cannon International Airport as a connection point for trans-continental passengers. However, the actual emergence of such carriers are expected to be relatively few in number, especially in light of current economic projections and the current U.S. banking crisis.

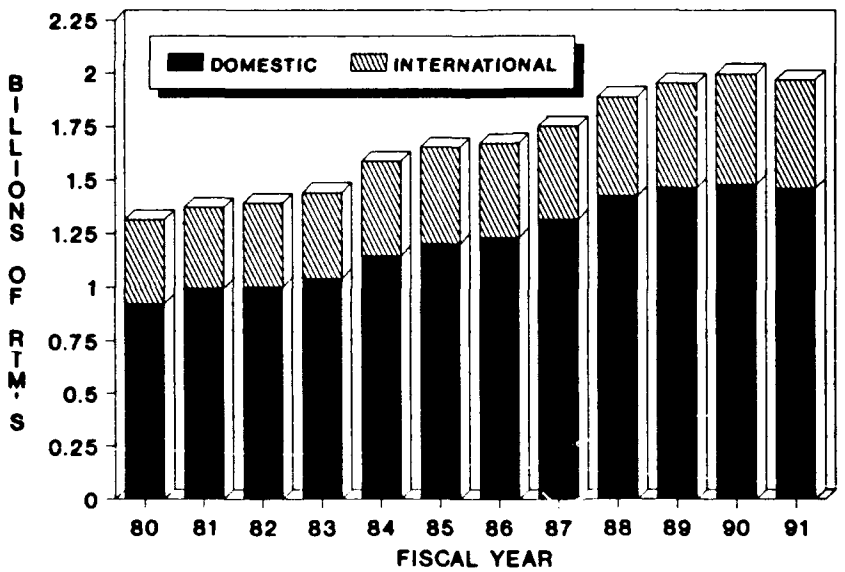
Consolidation will, however, certainly move the industry toward increased globalization. The surviving large U.S. air carriers are expected to become increasingly global in scope, with the ultimate goal being to offer

U.S. COMMERCIAL AIR CARRIERS
AIR CARGO REVENUE TON MILES

FREIGHT/EXPRESS TON MILES



MAIL TON MILES



its passengers any destination in the world. This will by necessity result in increased cooperation and/or alliances between U.S. air carriers and those of other countries. These alliances could take the form of any number of cooperative marketing agreements, including joint flights, shared frequent flyer programs, and/or schedule coordination to feed one carriers's passengers into the other carrier's hub system.

Of course, increased industry consolidation will result in the merger and/or liquidation of a number of the financially weaker carriers, carriers that heretofore were the leaders in the promotion of deep discounted fares. Despite the loss of one or more of these airlines, the surviving carriers are expected to continue to experiment with methods to stimulate travel markets, either through the use of innovative discount fares and/or other travel incentives. However, the vast majority of these incentive may be slanted toward the highly competitive international markets.

In the immediate short-term, commercial air carriers are likely to slow the expansion of their present domestic hub systems and/or delay the development of new secondary hubs at medium and small airports. However, due to the large numbers of new narrowbody aircraft scheduled for delivery over the next several years, hub expansion can be expected to resume once the U.S. economy recovery gathers some momentum and traffic volumes return to normalcy. Nonetheless, hub expansion, at least domestically, is likely to occur at a considerably slower pace than was witnessed during the 1980's.

Any hub expansion, however, increases the likelihood of delays and capacity problems at some of the larger U.S. air carrier airports. Additional delay and capacity problems could, in turn, significantly constrain the growth of future air carrier traffic.

JET FUEL PRICES

In fiscal year 1991, U.S. commercial air carriers paid an average price of $0.794 per gallon for jet fuel. This represented a nominal increase of 17.4 percent and a real increase (FY 1991$) of 11.8 percent. However, the average price, in this case, is somewhat misleading since fuel prices have actually declined from $0.908 per gallon in September 1990 to $0.678 per gallon in September 1991, a decline of 25.3 percent. The actual decline is even greater if measured against the peak jet fuel prices of $1.14 and $1.139 per gallon reached last October and November, respectively.

Fuel prices have a profound effect on the profitability of U.S. airlines, depending on whether the trend in prices is generally downward (as occurred between June 1981 and November 1986) or upward (November 1988 to October 1990). The 17.4 percent increase in jet fuel prices in 1991 is estimated to have increased U.S. air carrier operating expenses by over $1.8 million, more than half of the reported $3.3 billion operating loss.

When jet fuel prices reached its previous peak price during the third quarter of 1981 ($1.088 per gallon), fuel costs accounted for over 31.0 percent of U.S. air carrier operating costs. However, by the second quarter of 1989, jet fuel costs as a percentage of total operating costs had declined to only 13.7 percent. The run-up in oil prices during the first quarter of fiscal 1991 (October to December) increased this percentage to 23.0 percent. However, a similarly rapid decline in oil prices since November has reduced this percentage to 12.9 percent during the third quarter of fiscal year 1991 (April to June). Barring any new unforeseen fuel supply disruptions or major new oil discoveries, jet fuel costs as a percent of total operating costs is expected to increase only

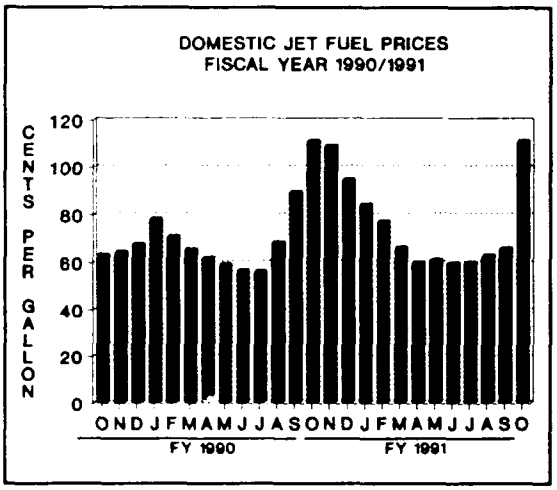
gradually over the 12-year forecast period.

In fact, the price of jet fuel has begun to rise once again. After declining to $0.631 cents per gallon in June, the price has since increased to $0.711 per gallon (up 12.7 percent) in November. Nevertheless, the average price of jet fuel is forecast to decline to $0.734 per gallon (down 7.6 percent) in fiscal year 1992, then resume its upward trend, averaging $0.761 per gallon (up 3.6 percent) in 1993 and $0.790 per gallon (up 3.9 percent) in 1994. In real dollars, jet fuel prices are expected to decline to $0.710 per gallon (down 10.6 percent) in 1992 and to $0.709 per gallon (down 0.2 percent) in 1993. In fact, real jet fuel prices are forecast to decline by 12.7 percent during the first six years of the forecast period. Thereafter, jet fuel prices are expected increase fairly rapidly in price, both in nominal dollars (6.7 percent annually) and in real dollars (1.7 percent annually), over the remaining half of the forecast period.

Over the entire 12-year forecast period, jet fuel prices are expected to increase by an average annual rate of 4.1 percent, from $0.794 per gallon in 1991 to $1.289 per gallon in fiscal year 2003. In real dollars, jet fuel prices are forecast to decline from $0.794 per gallon to $0.766 per gallon in 2003, an average annual decline of 0.3 percent.

Domestic Jet Fuel Prices

In fiscal year 1991, U.S. airlines paid an average of $0.766 per gallon for domestic jet fuel, 14.7 percent more than the average price paid in 1990. On a month over month basis, however, domestic fuel prices have declined by 26.3 percent, from $0.897 per gallon in September 1990 to $0.661 per gallon in



September 1991, thus continuing the roller coaster ride that fuel prices have exhibited since the first worldwide energy crisis in 1973.

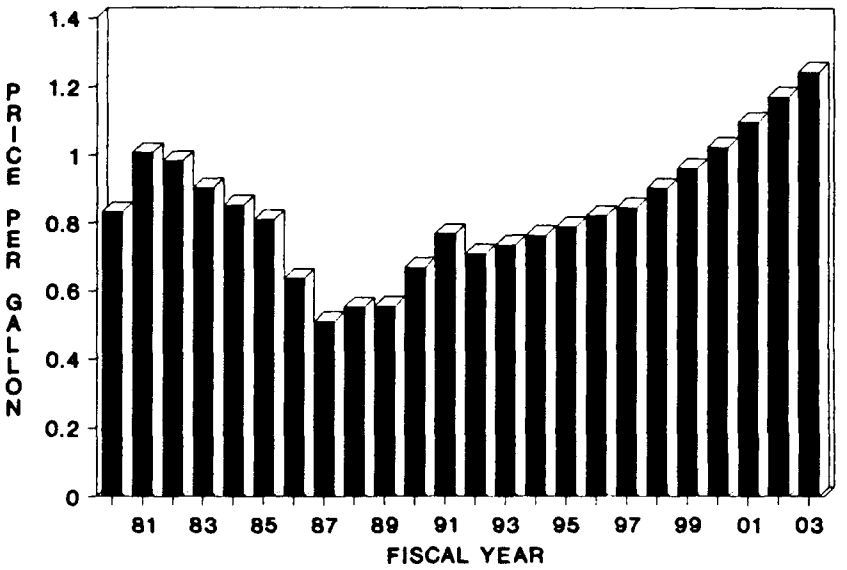
Starting from a base of just over $0.115 cents a gallon in 1973, the price of jet fuel, aided by two worldwide energy crises, rose to a peak price of $1.052 in May 1981. Over the following five and one-half years (June 1981 to November 1986), the price of domestic jet fuel declined 60.0 percent to $0.422 per gallon. In December 1986, domestic fuel prices began to move upward once again, reaching a peak of $0.601 per gallon (up 42.4 percent) in November 1987, before falling to $0.472 per gallon (down 21.5 percent) in October 1988.

Since November 1988, however, the trend in domestic jet fuel prices has generally been upward. By February 1990, the price had risen to $0.783 per gallon, the highest recorded price since May 1981. Although U.S. airlines enjoyed a brief respite in prices (declining to $0.564 per gallon in July), the Iraqi invasion of Kuwait pushed prices up to an all-time peak price of $1.113 per gallon in October 1990.

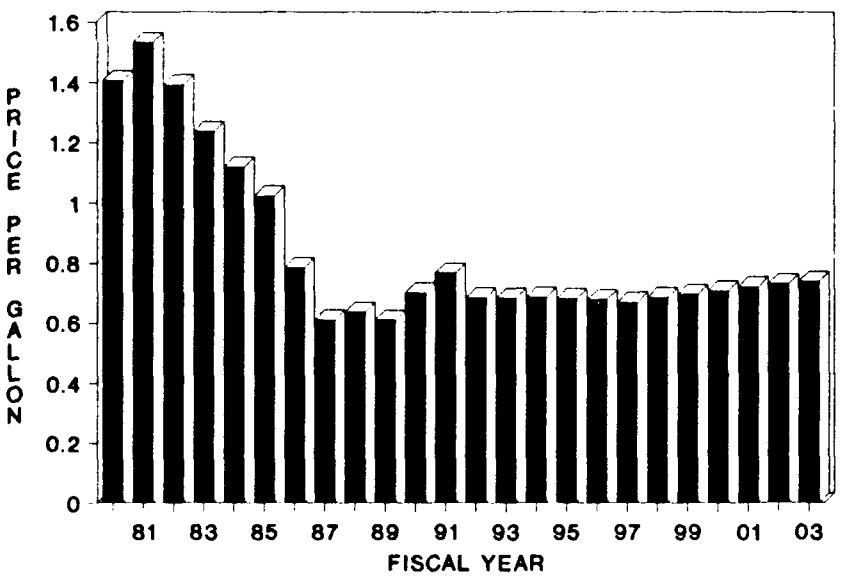
Domestic jet fuel prices have since declined to $0.599 per gallon in June before once again edging back up to $0.696 per gallon in November. The average price of domestic jet fuel

U.S COMMERCIAL AIR CARRIERS
DOMESTIC JET FUEL PRICES

CURRENT DOLLARS



REAL (FY-1991) DOLLARS

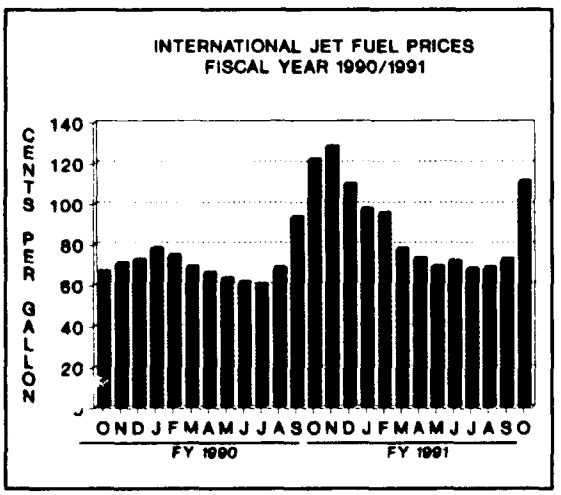


prices is expected to decline to $0.708 per gallon (down 7.6 percent) in fiscal year 1992, then increase to $0.733 per gallon (up 3.6 percent) in 1993 and to $0.762 per gallon (up 3.9 percent) in 1994. Over the 12-year forecast period, domestic jet fuel prices are projected to increase at an average annual rate of 4.1 percent, reaching $1.243 per gallon in fiscal year 2003.

In real dollars (FY 1991$), the price of domestic jet fuel is projected to decline by 10.6 percent in 1992 and by nearly 2.0 percent annually during the first six years of the forecast period, from $0.766 cents per gallon in 1991 to $0.669 per gallon in 1997. Over the entire 12-year forecast period, the real price of jet fuel is projected to decline by 0.3 percent annually, reaching $0.739 per gallon in fiscal year 2003.

International Jet Fuel Prices

International jet fuel prices averaged $0.877 per gallon in fiscal year 1991, an increase of 24.4 percent over the average price paid in 1990. However, on a month over month basis, jet fuel prices have declined from $0.937 per gallon in September 1990 to $0.726 per gallon in September 1991, a 22.5 percent decline.



International jet fuel prices peaked at $1.168 per gallon in May 1981, the height of the second worldwide oil crises (1979-81). Over the following 66 months (June 1981 to November 1986) the price of international jet fuel declined 57.2 percent to $0.499 per gallon. Starting in December 1986, however, international jet fuel prices edged upward again, peaking at $0.652 per gallon in December 1987 before declining to $0.534 per gallon in November 1988. Since then, the trend has been generally upward, peaking at $0.782 per gallon in February 1990 and again at $1.284 per gallon in November 1990. Since peaking in November, the price of international jet fuel declined to $0.679 per gallon in July, before once again edging upward to $0.757 per gallon in October. Average jet fuel prices are forecast to decline to $0.810 per gallon (down 7.6 percent) in 1992 before increasing to $0.840 per gallon (up 3.6 percent) in 1993.

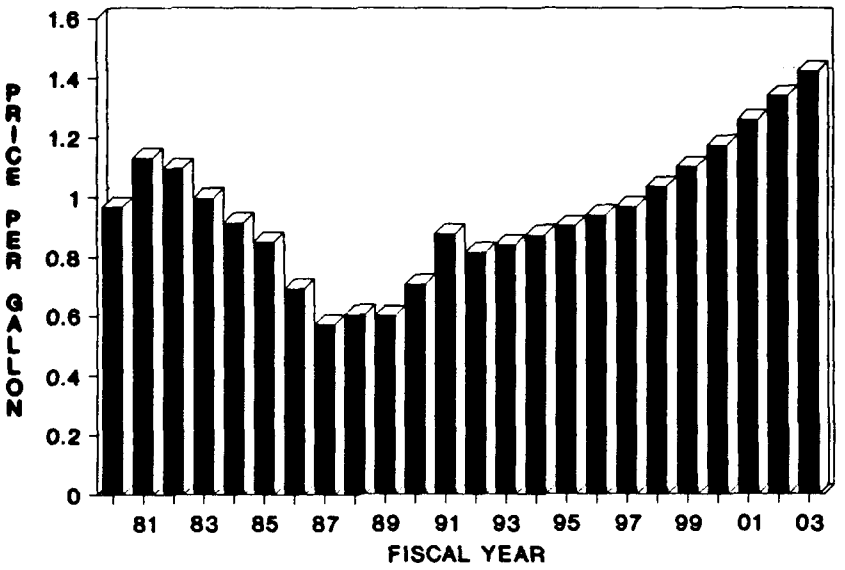
Over the 12-year forecast period, international jet fuel prices are projected to increase at 4.1 percent annually, reaching $1.423 per gallon in fiscal year 2003. In real dollars (FY 1991$), international jet fuel prices are forecast to decline from $0.877 per gallon in 1991 to $0.846 per gallon in 2003, a increase of 0.3 percent annually.

PASSENGER YIELDS

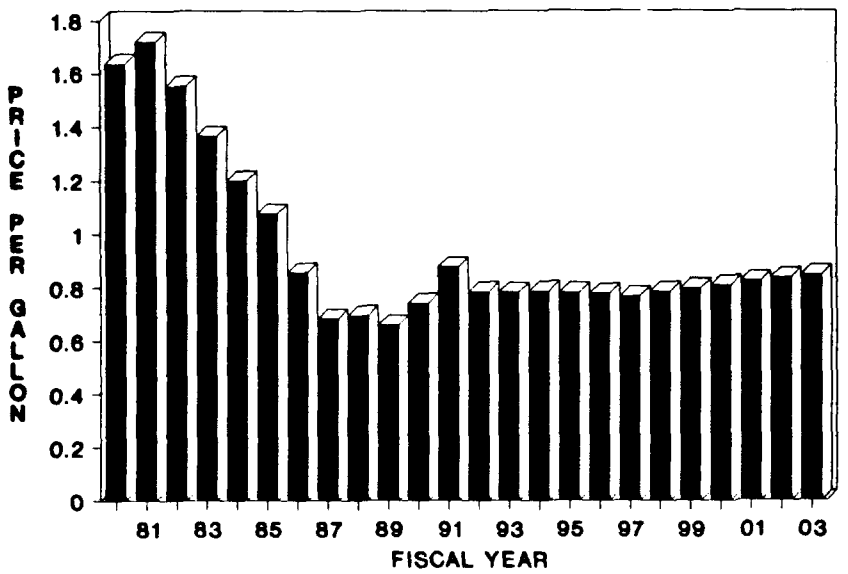
Between 1984 and 1987, the cost of air travel (as measured by passenger yield, i.e., revenue received per passenger mile flown) on U.S. air carriers declined by 11.1 percent in nominal dollars and by 17.9 percent in real dollars (FY 1991$). Then, over the next three years (1988 to 1990), the per mile cost of air travel increased by

U.S COMMERCIAL AIR CARRIERS
INTERNATIONAL JET FUEL PRICES

CURRENT DOLLARS



REAL (FY-1991) DOLLARS



15.4 percent in nominal dollars, by 0.8 percent in real dollars.

By all accounts, the upward spiral in jet fuel prices in early fiscal year 1991 should have resulted in a similar increase in yields. During the previous two oil price shocks, the U.S. commercial air industry had responded with relatively large increases in passenger fares--a 20.2 percent increase in the 1984-85 period and a 41.8 percent increase in the 1980-81 period. The machinery was in place for such increases in 1991 as U.S. air carriers pushed through numerous fuel surcharges, both in domestic markets (5.3 percent in September and 4.2 and 5.8 percent in October) as well as in international markets (7.0 percent in October). While U.S. air carriers were able to pass through most of the international fuel surcharge, very little of the domestic increases got totally passed through to the flying public.

System passenger yields did increase by 6.1 percent during the first quarter of fiscal 1991. However, passenger traffic plummeted with the start of the allied invasion of Kuwait (down 7.8 percent in 2nd quarter FY-91), forcing U.S. air carriers to once again resort to deep discounted fares in an effort to lure frightened U.S. passengers back to the air travel. Although jet fuel prices also declined during this period (down 27.0 percent from 1st quarter FY-91), the drop in oil prices was not sufficient enough to justify the discounted fare levels being offered by U.S. airlines.

Still, system passenger yields remained relatively high (up 3.9 percent) during the second quarter, before dropping below 1990 levels during the latter half of fiscal 1991 (down 0.5 percent). For the entire year, system passenger yields were up 1.9 percent in 1991, averaging 12.85 cents per passenger mile. In real dollars, system yields declined by 3.0 percent in 1991.

There are at least three factors which have the potential to be disruptive of the short-term fare policy of U.S. air carriers. These factors are (1) the strength (or lack of) and timing of the U.S. economic recovery, (2) the financial position of those U.S. air carriers currently operating under Chapter 11 bankruptcy, and (3) the large numbers of aircraft scheduled to be delivered to U.S. airlines over the next several years. Despite the above factors, this year's forecast assumes that there will be no major fare wars to stimulate traffic demand.

A slower than expected U.S. economic recovery could pressure the financially weaker carriers to introduce deep discounted fares (largely uneconomic) to maintain cash flow. Even the healthy carriers may, because of the large numbers of new aircraft scheduled to be delivered, feel compelled to match deep discounted fares so as to fill otherwise empty seats and/or gain market share at the expense of the weaker carriers. However, the staggering financial losses incurred by the commercial airline industry in 1991 should preclude most U.S. carriers from resorting to the destructive price competition that has been prevalent during previous periods of slow growth.

"Yield management" will be expected to play an increasingly important role in allocating the number of discount seats available on individual flights. Given the current weak financial condition of a number of U.S. carriers either already in or close to Chapter 11 bankruptcy, it is felt that the financially stronger carriers will opt to match uneconomic discount fares (noncompensatory) only reluctantly, if at all, and only in those markets where necessary to meet increased competitive pressure.

Despite the expected increase in concentration of the industry among a few larger carriers, this forecast assumes that there will be sufficient competitive pressure, including the possible threat of legislative initiatives, to hold fare increases to a minimum over

the 12-year forecast period. However, the forecast also assumes that the surviving larger carriers will, over the longer-term, seek to maximize profits, even at the expense of significantly slower traffic growth.

System passenger yields are forecast to increase to 13.18 cents (up 2.6 percent) in fiscal year 1992, to 13.64 cents (up 3.5 percent) in 1993, and to 14.09 cents (up 3.3 percent) in 1994. In real dollars, yields are expected to decline by 0.4 percent annually over the next three years. The decline in real yields during this period reflects both the continued discount fare actions of those domestic carriers with cash flow problems as well as significantly increased competition in international markets. After 1995, however, fare levels are expected to approximate the expected increase in the consumer price index, i.e., real yields will remain basically flat over the remainder of the forecast period.

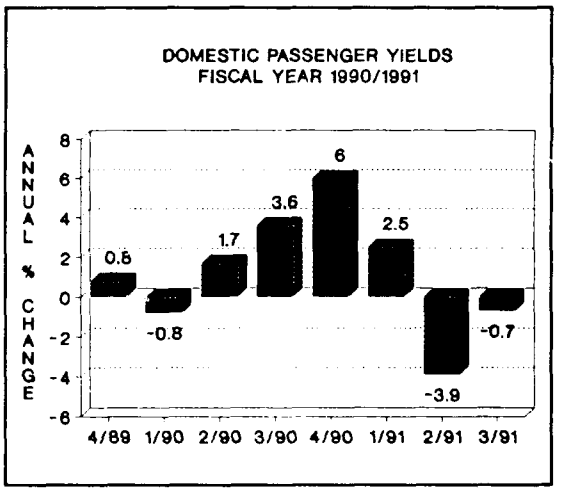
Over the 12-year forecast period, system yields are expected to increase at an average annual rate of 4.3 percent, reaching 21.30 cents in 2003. In real terms, passenger yields are expected to decline by 0.1 percent annually, from 12.85 cents in 1991 to 12.66 cents in 2003.

However, the passenger yield forecasts do not include a cost that will increase the cost of air travel even further. Effective July 1, 1991, U.S. airports were permitted to impose a Passenger Facility Charge (PFC) of up to $1.00, $2.00, or $3.00 for each paying passenger enplaned at the airport to finance eligible airport related projects. (PFC's will be limited to the originating airport plus one connection, i.e. maximum charge of $6 per passenger/each one-way trip.) These charges do not enter into the passenger yield calculation since the PFC's are to be returned directly to the individual airports.

A number of airports have indicated their desire to impose PFC's on passengers enplaning at their particular facilities. Our analysis of these costs indicate that the PFC's will, by increasing the overall cost of air travel, reduce traffic demand to some extent. The exact impact will, of course, depend largely on the number of airports that opt to impose PFC's and the rate that they elect to charge.

Domestic Passenger Yields

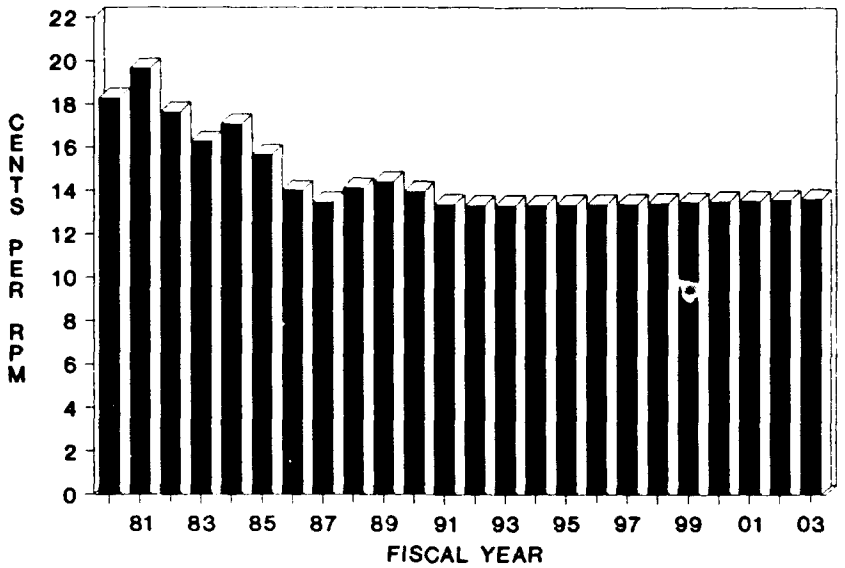
Domestic passenger yields, after declining on a year-over-year basis for 10 consecutive quarters (from 13.02 cents in 3rd quarter FY-84 to 10.97 cents in 2nd quarter FY-87), increased during 15 of the next 16 quarters (from 10.97 cents to 13.97 cents in 2nd quarter FY-91). However, this trend reversed itself during the next two quarters (down 2.2 percent), the result being a small increase (0.7 percent) in domestic passenger yields in fiscal year 1991, to 13.35 cents. In real dollars (FY 1991$), domestic yields declined 4.2 percent in 1991.



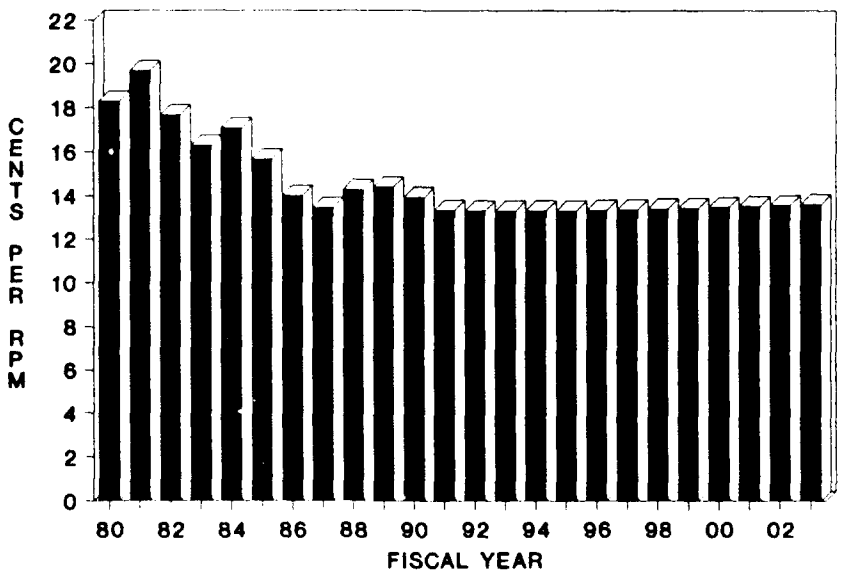
The overall result of U.S. air carrier domestic pricing policies during the last seven years has been a 2.7 percent (0.4 percent annually) increase in nom-

U.S COMMERCIAL AIR CARRIERS
DOMESTIC PASSENGER YIELD

CURRENT DOLLARS



REAL (FY-1991) DOLLARS



inal yields and a 3.6 percent decline in real dollars. Looking at it from a revenue perspective, a 40.3 percent increase in traffic over this seven-year period produced only a 44.1 percent increase in passenger revenues. This, in turn, produced a cumulative seven-year operating profit of only $7.7 billion and one of the lowest returns on investment of any U.S. industry.

Clearly, then, there is a need for U.S. air carriers to rationalize its fare structure so as to improve or maximize not only its own profits but the overall profitability of the entire U.S. commercial aviation industry as well. Since domestic traffic accounts for well over three-fourths of all passenger revenues, it is imperative that the rationalization of domestic yields be the starting point in the industry's return toward long-term profitability. The recent shut-down of three of the financially weaker carriers has essentially eliminated uneconomic fare levels in many markets formerly served by these carriers. In addition, over half (52.3 percent in FY-91) of domestic traffic is now concentrated among the three largest carriers and this concentration is expected to increase over the forecast period. Clearly, the time is ripe for U.S. carriers to begin a rationalization of its domestic fare policies.

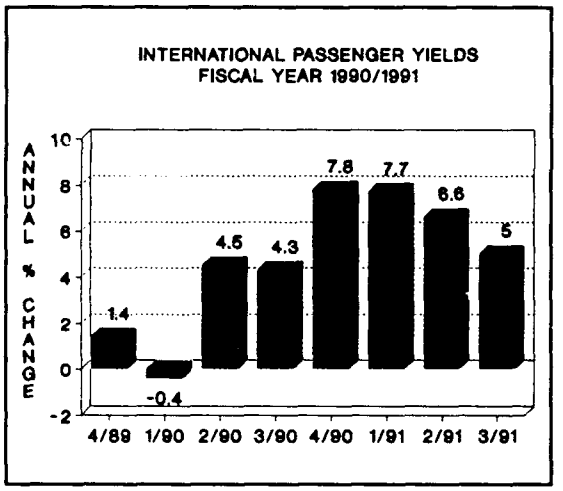
Based upon the above discussions and expectations, domestic passenger yields are projected to increase to 13.77 cents (up 3.1 percent) in 1992, to 14.29 cents (up 3.8 percent) in 1993, and to 14.79 cents (up 3.5 percent) in 1994. In real terms, domestic yields are projected to decline slightly (down 0.2 percent) in 1992 and then remain relatively constant over the next two years. Thereafter, real yields are forecast to increase gradually over the remainder of the forecast period.

Domestic yields are projected to increase by 4.6 percent annually over the 12-year forecast period, reaching 22.90 cents in fiscal year 2003. Real domestic yields are forecast to increase slightly from 13.35 cents in 1991 to 13.61 cents in 2003, an average annual rate of growth of 0.2 percent.

International Passenger Yields

The setting of international fare levels differ from the domestic process in that most international fare increases/decreases must meet International Air Transport Association (IATA) guidelines and/or approval by the respective foreign governments.

International passenger yields have increased in all but two years (1984 and 1985) since 1978. Over the previous



five years, international yields increased by 14.4 percent (2.7 percent annually) from 9.34 cents in 1985 to 10.68 cents in fiscal year 1990. In real terms (FY 1991$), international yields declined by 5.2 percent (1.1 percent annually) over the same time period, from 11.83 cents in 1985 to 11.22 cents in 1990.

During late 1990 and early 1991, there were a number of IATA approved fare increases which impacted fiscal year 1991 fare levels. In addition, U.S. international air carriers also im-

plemented a fuel surcharge on international fares (approximately 7.0 percent), which became effective in October 1990. Unlike the domestic fuel surcharge, most of the international fare increases stuck. As a result, international yields increased to 11.38 cents in fiscal year 1991, an increase of 6.5 percent. In real dollars, international yields increased 1.4 percent in 1991.

A so called "changing of the guard" occurred in international travel markets in 1991. The old guard U.S. flag carriers (Pan American and TWA) have, for all intents and purposes, been replaced by American, Delta, and United. These carriers are generally considered to be much stronger, both from a financial and a marketing/scheduling prospective, than were their predecessors. As such, we can expect an increased U.S. competitive presence in international markets. Fares are certainly one of the major competitive tools that these carriers can be expected to use to regain lost U.S. market share.

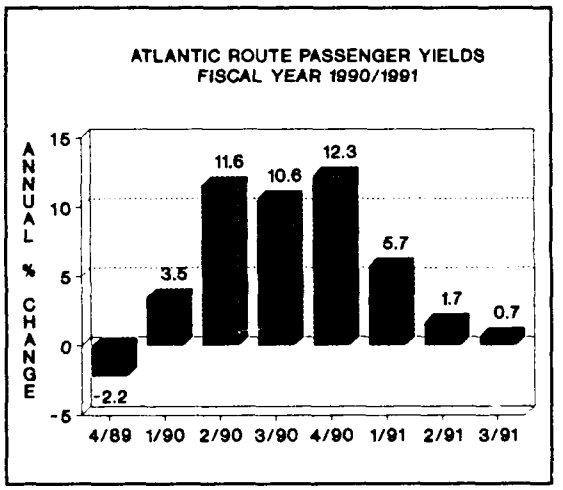
Based upon the expected increase in competition in international travel markets, international yields are forecast to increase to 11.64 cents (up 2.3 percent) in 1992, to 12.00 cents (up 3.1 percent) in 1993, and to 12.35 cents (up 2.9 percent) in 1994. In real terms, international yields are expected to decline by 1.1 percent in 1992, by 0.7 percent in 1993, and by 0.5 percent in 1994.

Over the 12-year forecast period, international yields are forecast to increase at an annual rate of 3.9 percent, reaching 17.92 cents by 2003. Real international passenger yields are forecast to decline by 0.6 percent annually over the same period, from 11.38 cents in 1991 to 10.65 cents in fiscal year 2003.

Atlantic Routes

Although passenger yields on the Atlantic routes have increased in five of the last six years (down 3.7 percent in 1989), they have increased only 10.3 percent since 1981. In real terms, Atlantic route passenger yields have declined by 27.5 percent over the last ten years, from 13.76 cents in 1981 to 9.98 cents in 1991.

During 1990 and 1991, there were, in addition to a 7.0 percent fuel surcharge in October, a number of approved IATA fare increases in the transatlantic markets. The result of this myriad of fare increases was a



12.3 percent increase in Atlantic routes yields during the first quarter of fiscal year 1991. Although these fare increases dissipated throughout the remainder of the year, Atlantic route passenger yields increased to 9.98 cents in fiscal year 1991, an increase of 4.4 percent. In real terms, Atlantic route passenger yields declined by 0.6 percent during 1991.

In 1992, the dominant U.S. carriers on the transatlantic routes will be American, Delta, and United, having acquired most of the markets previously served by Pan American and Trans World. Because these carriers lack the instant market identity of the two previous carriers, the Atlantic route markets

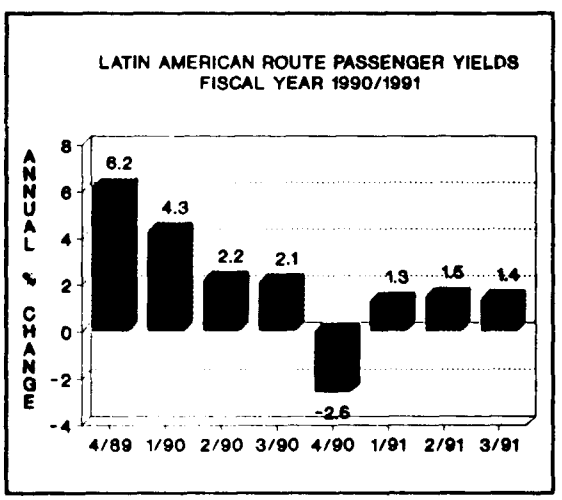
can expect to be the subject of intensive and aggressive competition over the next several years, both in terms of schedules and in promotional fares.

Atlantic route yields are forecast to increase to 10.18 cents (up 2.0 percent) in fiscal year 1992, to 10.46 cents (up 2.8 percent) in 1993, and to 10.74 cents (up 2.7 percent) in 1994. In real terms, Atlantic route yields are projected to decline by 1.4 percent in 1992, by 1.0 percent in 1993, and by 0.7 percent in 1994.

Over the 12-year forecast year period, Atlantic route yields are forecast to increase at an average annual rate of 3.7 percent, from 9.98 cents in 1991 to 15.47 cents in fiscal year 2003. Real Atlantic route yields are expected to decline from 9.98 cents in 1991 to 9.19 cents in fiscal year 2003, an average annual rate of decline of 0.7 percent.

Latin American Routes

Passenger yields on the Latin American routes increased to 12.06 cents (up 0.4 percent) in fiscal year 1991. In real terms (FY 1991$), Latin American passenger yields declined 4.4 percent in 1991. Although passenger yields on



the Latin American routes have increased in each of the last four years (up a cumulative 7.4 percent), they have increased only 4.2 percent since 1981. In real terms, Latin American passenger yields have declined by 27.5 percent over this 10-year time period, from 17.59 cents in 1981 to 12.06 cents in 1991.

For the second consecutive year, a major U.S. carrier serving Latin America will have been replaced by a significantly stronger carrier. In fiscal 1991, American Airlines replaced Eastern Air Lines. In December, Pan American, the second largest U.S. carrier (34.0 percent of 1991 RPM's) in this market, shut-down its operations and its Latin American routes were purchased by United Airlines. United, as a new entrant in these markets, will lack the instant market identity of Pan American and, as such, can be expected to rely on marketing promotions, such as promotional fares, to increase its presence in Latin America.

Passenger yields on the Latin American routes are forecast to increase to 12.37 cents (up 2.6 percent) in 1992, to 12.72 cents (up 2.8 percent) in 1993, and to 13.05 cents (up 2.6 percent) in 1994. In real terms, yields are forecast to decline by 0.8 percent in 1992, by 0.9 percent in 1993, and by 0.8 percent in 1994.

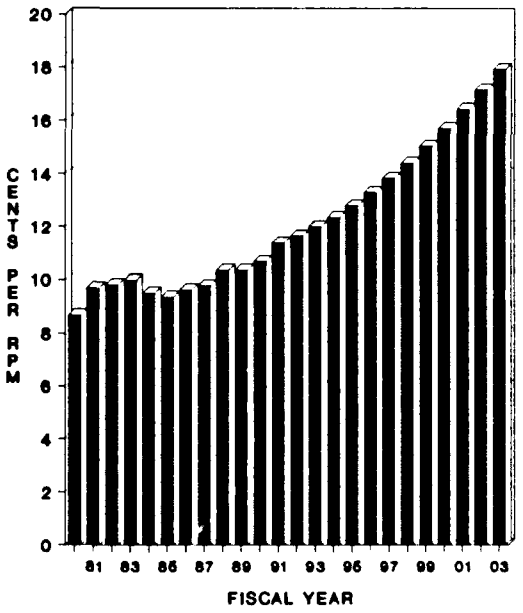
Over the 12-year forecast period, passenger yields are forecast to increase at an annual rate of 3.8 percent, averaging 18.90 cents in 2003. Latin American yields are projected to decline by 0.6 percent annually in real dollars, reaching 11.23 cents in fiscal year 2003.

Pacific Routes

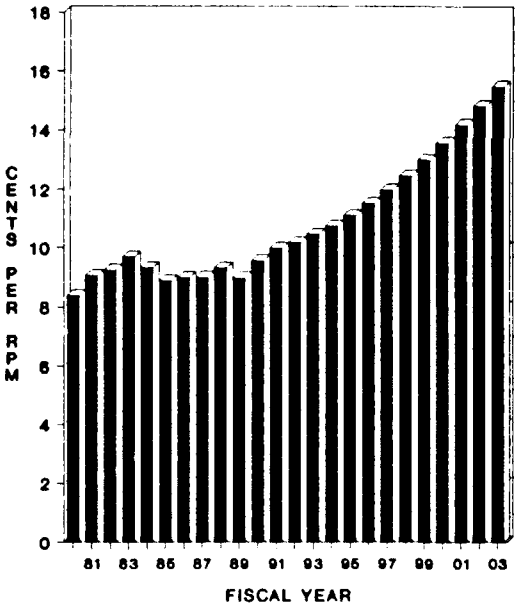
In fiscal year 1991, transpacific passenger yields (12.50 cents) increased by 8.2 percent, 3.0 percent in real terms (FY 1991$). The increase in 1991 means that transpacific yields have now increased in five of the past six years

U.S COMMERCIAL AIR CARRIERS
INTERNATIONAL PASSENGER YIELDS

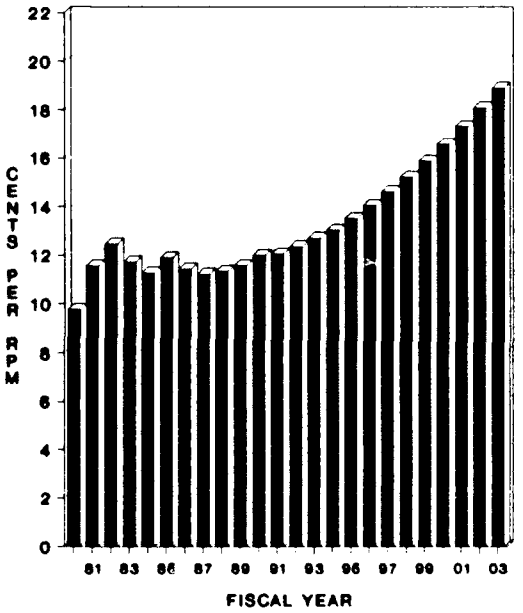
ALL INTERNATIONAL ROUTES



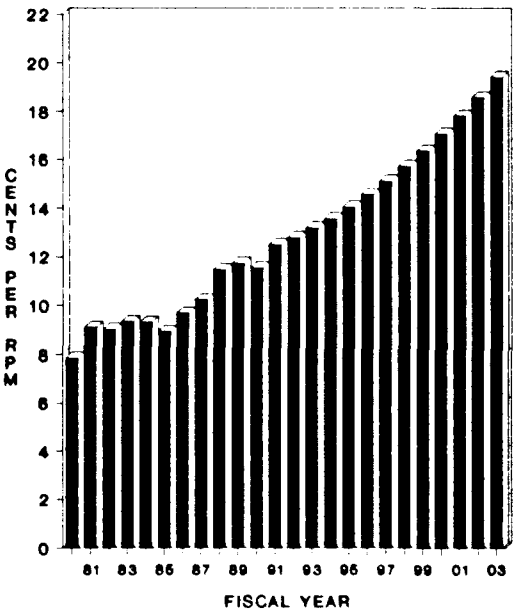
ATLANTIC ROUTES



LATIN AMERICAN ROUTES

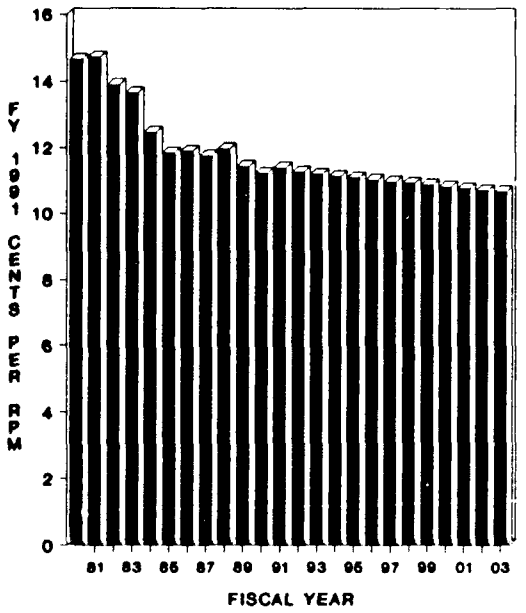


PACIFIC ROUTES



U.S COMMERCIAL AIR CARRIERS
INTERNATIONAL REAL PASSENGER YIELDS

ALL INTERNATIONAL ROUTES



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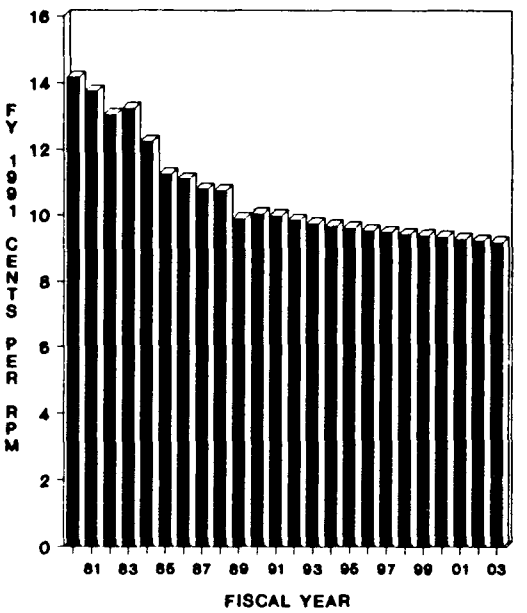

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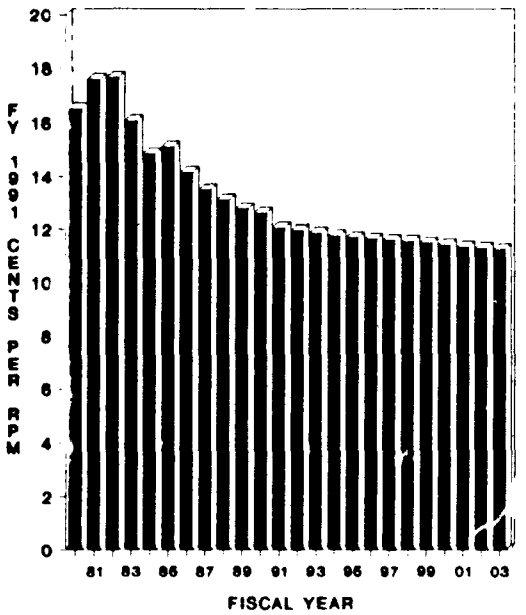

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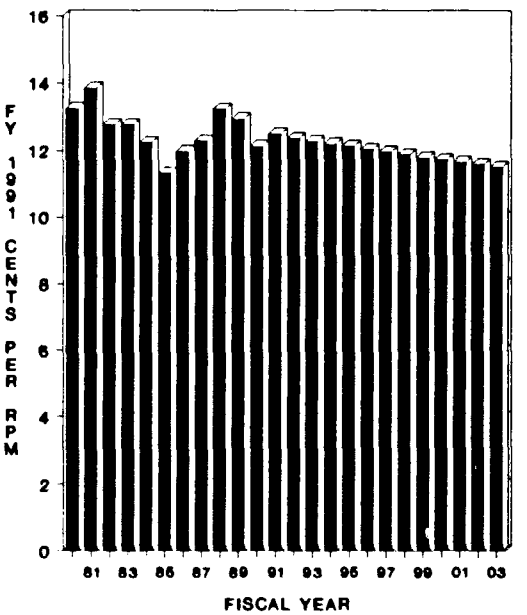
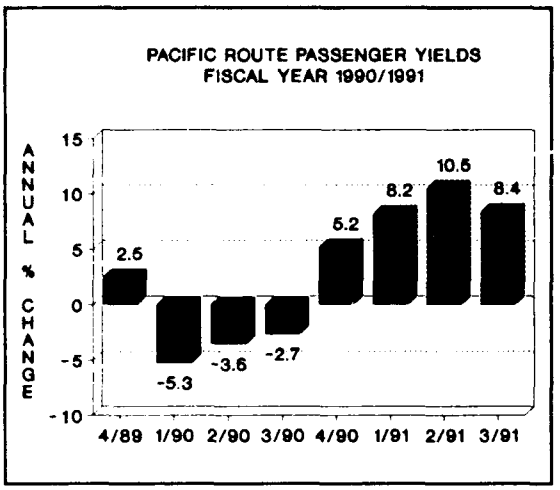




(down 1.6 percent in 1990). During this six-year period, transpacific passenger yields increased by 39.8 percent (5.7 percent annually) in nominal terms and 10.2 percent (1.6 percent annually) in real terms.

The 1990 route awards authorizing major expansion of air service to Japan will assure large capacity increases by U.S. air carriers on the transpacific routes. Based upon aircraft now on order by the foreign flag carriers in the area, it can be assumed that these carriers are contemplating similar or even larger increases in capacity. Therefore, it is safe to assume that the competition for traffic in this region will be fierce. Lower fares is one way to compete and fill otherwise empty seats.

Pacific route passenger yields are forecast to increase to 12.79 cents (up 2.3 percent) in 1992, to 13.19 cents (up 3.1 percent) in 1993, and to 13.56 cents (up 2.8 percent) in 1994. In real terms, yields are expected to decline by 1.0 percent in 1992 and by 0.6 percent in both 1993 and 1994.

Transpacific passenger yields are projected to increase by 3.7 percent annually over the 12-year forecast period, reaching 19.40 cents in fiscal year 2003. In real dollars, passenger yields are forecast to decline from 12.50 cents in 1991 to 11.53 cents in fiscal year 2003, a decline of 0.7 percent annually.

PASSENGER TRIP LENGTH

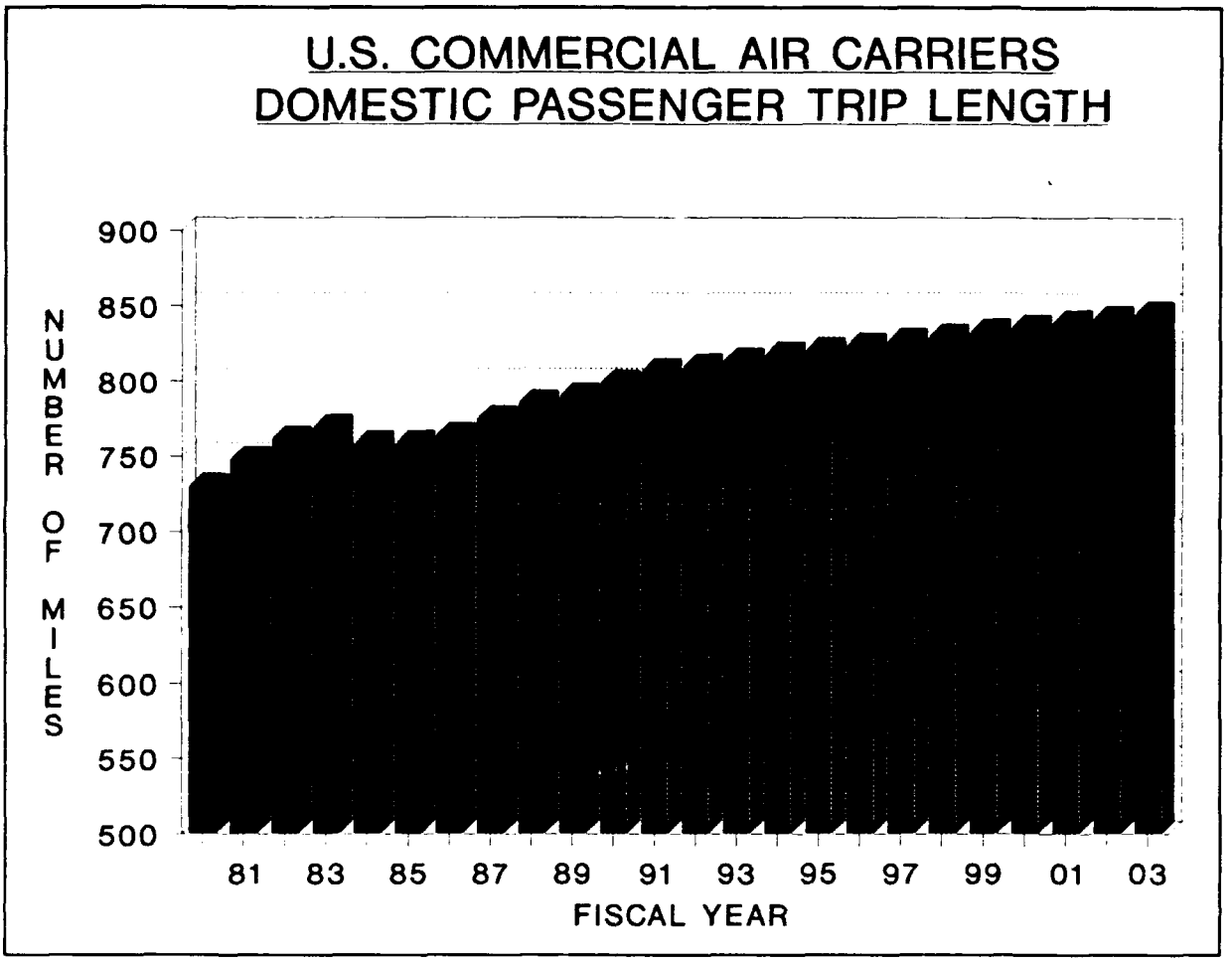
The average system passenger trip length (986.8 miles), increased by almost 11 miles in fiscal year 1991, largely the result of a change in the mix of domestic and international traffic. The average trip length is forecast to increase by over nine miles annually over the 12-year forecast period, reaching 1,100 miles by fiscal year 2003.

It should be noted, however, that there are likely to be large swings around the trend line. The movement in any one year will depend largely on the discount fare policies adopted by U.S. air carriers and by changes in the mix of business/vacation and domestic/international travelers.

Domestic Passenger Trip Length

Over the past five years, the average domestic passenger trip length has increased by almost 43 miles, growing from 764.1 miles in fiscal year 1986 to 807.0 miles in fiscal year 1991. The domestic passenger trip length increased 7.3 miles in 1991.

The relatively slow recovery projected for the U.S. economy in 1992 is expected to impact both business traveler and discretionary/pleasure travel about equally. However, as the U.S. economic recovery gathers momentum in the later half of 1992 and 1993, the mix in traffic is expected to shift slightly in favor of discretionary/pleasure travel, which, on the average, tend to be of longer distances than strictly business travel. This is expected to increase the average domestic passenger trip length to 810 miles (up 3 miles)



in 1992, to 814 miles in 1993, and to 818 miles in 1994. Thereafter, the domestic passenger trip length is projected to increase by approximately three miles annually, averaging 845 miles in fiscal year 2003.

International Passenger Trip Length

The international passenger trip length (2,856.4 miles) increased by more than 70 miles in fiscal year 1991, this on top of an increases averaging 66 miles over the previous three years. The increases over the past four years result largely from two factors. First, the relatively larger traffic growth in the longer haul transpacific markets tends to exert a disproportionate effect on the average international trip length. Second, the increase in the number of transatlantic gateways and the overflying of established gateways in both the U.S. and Europe have substantially increased the average transatlantic passenger trip length.

In addition to these two factors, the 1991 international passenger trip length was distorted somewhat by the fact than Pan American discontinued service of its intra-Germany routes (average trip length of 259 miles in FY-90) in November. In fact, if the intra-Germany traffic were removed from 1990 data, the international passenger trip length would have declined by approximately 70 miles in 1991. This anomaly would have occurred because both the longer-haul North Atlantic and Pacific traffic was negatively affected by the Gulf conflict in 1991. During the same time period, traffic to the shorter-haul Latin American markets

grew substantially.

The international trip length is projected to increase to 2,919 miles (up 63 miles) in 1992 and to 2,925 miles (up 8 miles) in 1993. The large increase in 1992 is due, in large part, to the substantially greater traffic growth forecast on the transatlantic and transpacific routes (recovery from depressed 1991 traffic levels) relative to the somewhat slower growth predicted in the Latin American markets.

The international passenger trip length is projected to increase by over 14 miles per year over the 12-year forecast period, reaching 3,027 miles in fiscal year 2003. Much of the projected increase, especially after 1992, results from the fact that travel demand between the United States and the longer distance Pacific destinations is expected to increase at a relatively faster rate than is travel to other international destinations.

Atlantic Routes

The average passenger trip length on the Atlantic routes (3,848.0 miles) increased by almost 507 miles in fiscal year 1991. This comes on top of increases averaging almost 79 miles over the previous three years. The large increases during the 1988 to 1990 time period were due, in large part, to the increased utilization of widebody twins (B-767 and A-310) on the transatlantic routes which allowed carriers to overfly the established gateway airports on both sides of the Atlantic, namely New York Kennedy and London Heathrow. However, the large increase in 1991 is due entirely to Pan American discontinuing it intra-Germany service in November. Heretofore, these relatively short-haul routes (259 miles in 1990) had been included as part of the overall Atlantic route data. The removal of these short-haul routes from the data base in 1991 resulted in a disproportionate increase in the Atlantic route passenger trip length. If the intra-Germany data were removed from the 1990 traffic base, the Atlantic route passenger trip length would have increased by only 16 miles in 1991.

The transatlantic passenger trip length is forecast to increase to 3,855 miles (up 7 miles) in 1992. Thereafter, the average passenger trip length is forecast to increase by approximately five miles annually over the remaining 11 years of the forecast period, reaching 3,910 miles in fiscal year 2003.

Latin American Routes

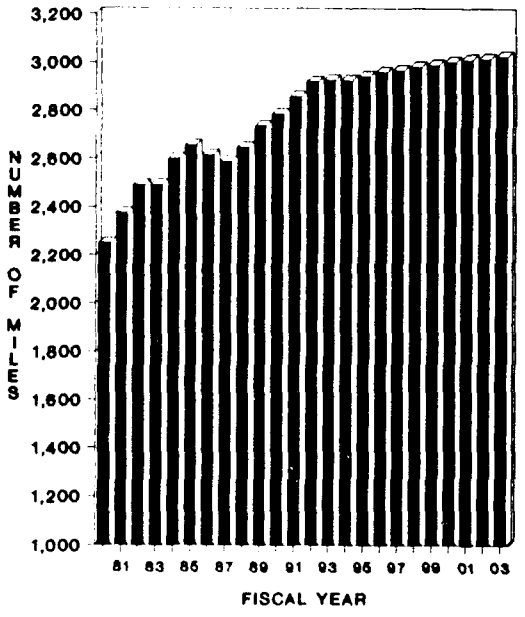
The Latin American average passenger trip length (1,246.6 miles in 1991), which had declined by almost 70 miles between 1986 and 1990, increased by over 19 miles in fiscal year 1991. The Eastern Air Lines' strike (beginning March 1989) and the subsequent sale of its South American routes to American Airlines (June 1990), in effect, distorted much of the 1989 and 1990 data, possibly altering the historical trends which had been evident from analyses of previous years data.

Fiscal year 1991 marked the first full year of American Airlines' operation in these markets. For the lack of any additional information, we have assumed that 1991 should be used as a benchmark (unless future years data proves us wrong) for forecasting average trip length and average seat size in this region. However, it is possible that 1991 data was distorted somewhat by a shift in traffic from Atlantic destinations to the safer (from terrorism) South American markets. In addition, the purchase of Pan American's Latin American routes by United in December could also distort historical trends for several years.

The Latin American average passenger trip length is projected to increase by almost four miles annually over the

U.S COMMERCIAL AIR CARRIERS
INTERNATIONAL PASSENGER TRIP LENGTH

ALL INTERNATIONAL ROUTES



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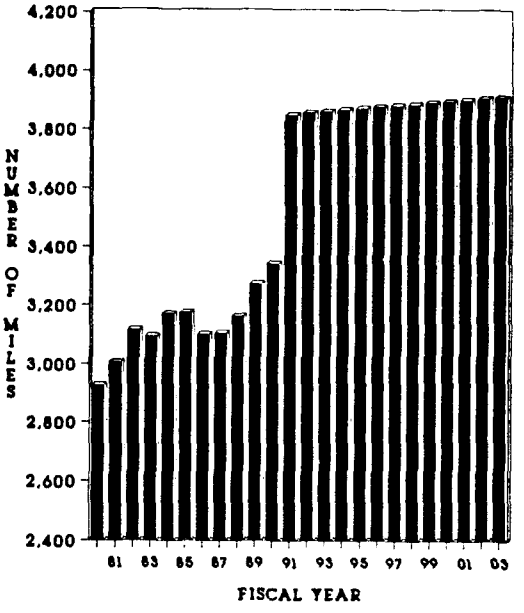
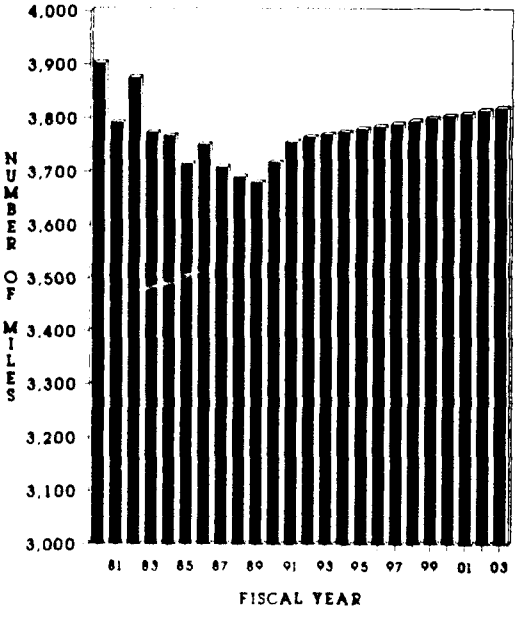
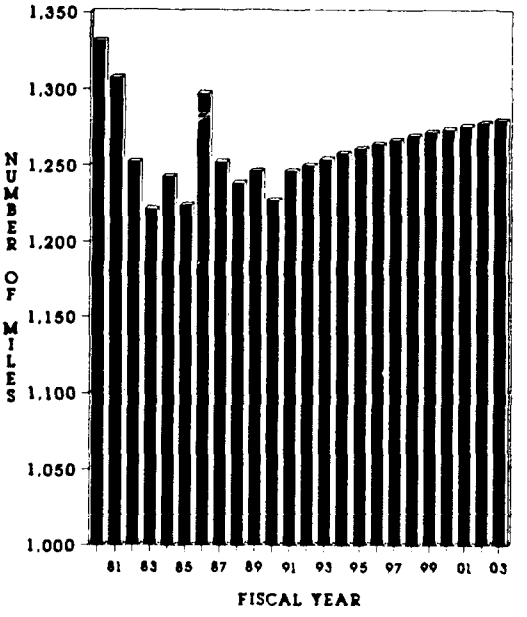


PACIFIC ROUTES



LATIN AMERICAN ROUTES



next three years as both American and United aggressively promote the longer-haul Middle and South American markets. Thereafter, it is expected that the average passenger trip length will increase by between two and three miles annually over the remainder of the forecast period. The average Latin American passenger trip length is expected to reach 1,280 miles in fiscal year 2003, an average increase of just under three miles annually.

Pacific Routes

The average passenger trip length on the Pacific routes (3,756.8 miles in 1991) has increased by 76 miles over the past two years, increasing by almost 39 miles in fiscal year 1991. This reverses a trend that had seen the average trip length decline by almost 70 miles during the previous three-year (1987 to 1989) period. The increased trip length over the past two years is due, in large part, to an increase in the service now flying beyond Japan.

The average passenger trip length for the transpacific routes is expected to increase by just over five miles annually over the 12-year forecast period. The Pacific passenger trip length is forecast to reach 3,800 miles in fiscal year 2003.

AVERAGE AIRCRAFT SIZE

Between 1978 and 1983, the average system seating capacity of aircraft utilized by U.S. commercial air carriers increased by almost 20 seats (from 147.2 to 167.1 seats). Since 1983, however, the average seating capacity of the U.S. fleet (167.9 seats in 1991) has increased by just under one seat.

A number of factors are responsible for this lack of growth in the average seating capacity of the U.S. airline fleet. These factors are: (1) deregulation, (2) declining fuel prices (until August 1990), (3) the continued expansion of hub-and-spoke route systems, and (4) the increased utilization of widebody twins on transatlantic routes.

Airport hubbing, with its greater emphasis on higher frequencies, is one of the direct by-products of deregulation. Hubbing has led to a large increase in the number of small narrowbody aircraft in the U.S. fleet. Until the Iraqi invasion of Kuwait, declining jet fuel prices (down 44.0 percent between 1981 and 1989) had allowed U.S. airlines to retain large numbers of the older, less fuel efficient, stage-2 aircraft (B-727, DC-9, BAC-111, F-28) in their fleets. The seating capacity of the stage-2 aircraft is also considerably smaller that of stage-3 aircraft.

Increased fuel prices and declining passenger demand in 1991 forced some U.S. air carriers to either ground or retire some of the smaller capacity stage-2 aircraft. New legislation will require all stage-2 aircraft to be out of the U.S. fleet by January 1, 2000 (with exemptions allowing for some continued use until December 31, 2003). This legislation should result in the retirement of significant numbers of the smaller stage-2 fleet throughout the forecast period. This, added to the fact that the aircraft being delivered to the U.S. fleet are generally larger than the ones being replaced (the exception being the Fokker 100), should result in an increase in the average seating capacity of the air carrier fleet throughout the 12-year forecast period.

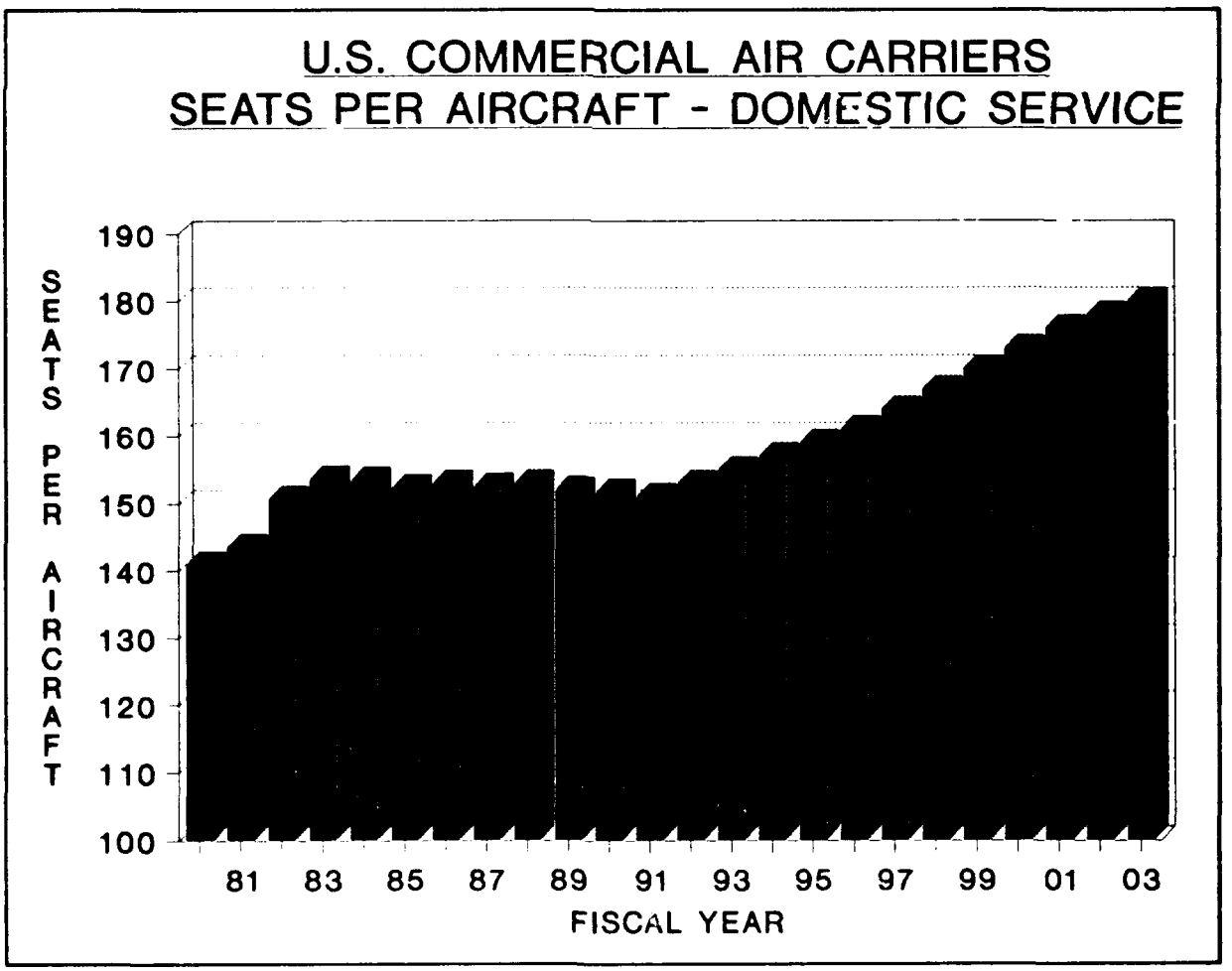
The forecast assumes that the average seating capacity of the U.S. commercial airline fleet will increase by an average of just under three seats per year over the entire 12-year forecast period. In fiscal year 2003, U.S. air carrier aircraft are expected to have an average seating capacity of 201 seats.

Domestic Routes
Average Aircraft Size

Between 1978 and 1983, the average seating capacity of aircraft utilized in domestic passenger service increased by just over 17 seats, from 136.4 to 153.6 seats. Since 1983, however, the average seating capacity of domestic aircraft has actually declined by over two seats (down 0.6 seats in 1991), averaging 151.1 seats in fiscal year 1991. The continued expansion of the hub-and-spoke route systems and the retention of older (and smaller) stage-2 aircraft are the main reasons for the decline in the average seating capacity of the domestic fleet since 1983.

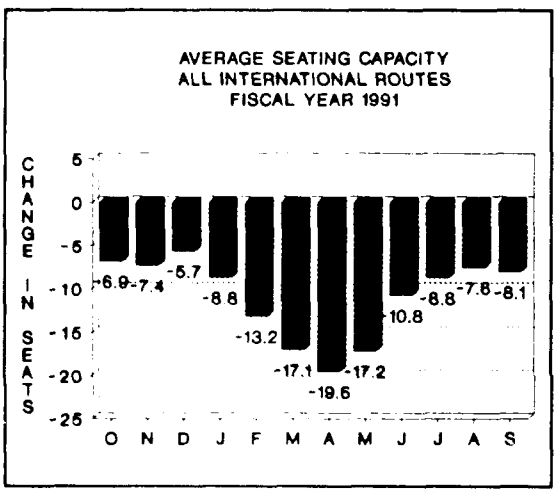
The forecast assumes relatively small increases (2 seats annually) in the average seating capacity of domestic aircraft over the next five years (to 161 seats in 1995), reflecting the retirement and/or grounding of some fuel inefficient stage-2 aircraft in these years. Thereafter, existing noise legislation should accelerate the retirement (and/or retrofitting) of the stage-2 aircraft, such that the average seat size of domestic aircraft increases at a somewhat faster pace over the remainder years of the forecast period.

Over the 12-year forecast period, we expect the average seating capacity of aircraft utilized in domestic service to increase from 151 seats in 1991 to 180 seats in fiscal year 2003, an increase of just over two seats annually.



International Routes
Average Aircraft Size

The average seating capacity of aircraft flown in international passenger service (262.8 seats in 1991) has declined by 29 seats since 1986, largely as a result of the increased utilization of the smaller two-engine widebody aircraft (B-767 and A-310) on both the transatlantic and Latin American routes. The increased presence of American, Delta, and United in these two international travel areas should assure the continuance of this aircraft

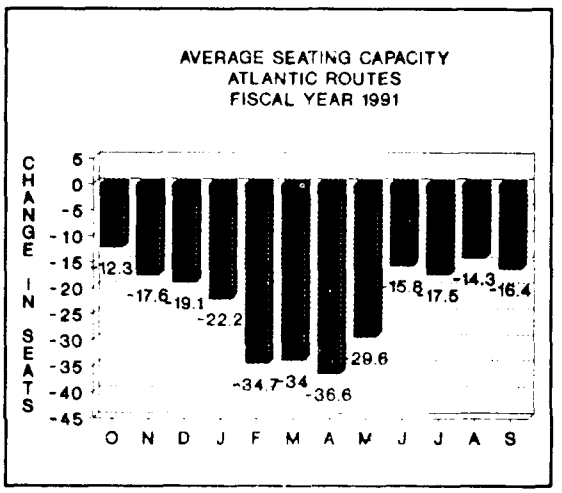


downsizing trend at least through the middle of the century. However, the overall impact is expected to be minimized somewhat by the increased utilization of larger seating capacity aircraft (B-747-400 and MD-11) on the transpacific routes.

The average seating capacity of international passenger aircraft is expected to remain basically flat (at 263 seats) through the middle of the century. Thereafter, the average seating capacity is expected to increase by an average of just over two seats annually over the remainder of the forecast period. In fiscal year 2003, aircraft utilized in international passenger service are forecast to have an average seating capacity of 277 seats, almost 15 more seats than the average seating capacity in 1991.

Atlantic Routes

The increased use of widebody twins has reduced the average seating capacity of passenger aircraft on transatlantic routes (257.7 seats in 1991) by more than 73 seats (almost 15 seats annually) over the past five years and by almost 21 seats in fiscal year 1991. The relatively larger decline in 1991 is due, in large part, to the severely depressed traffic levels during much of the year. This forced carriers to ground or substitute for some of their

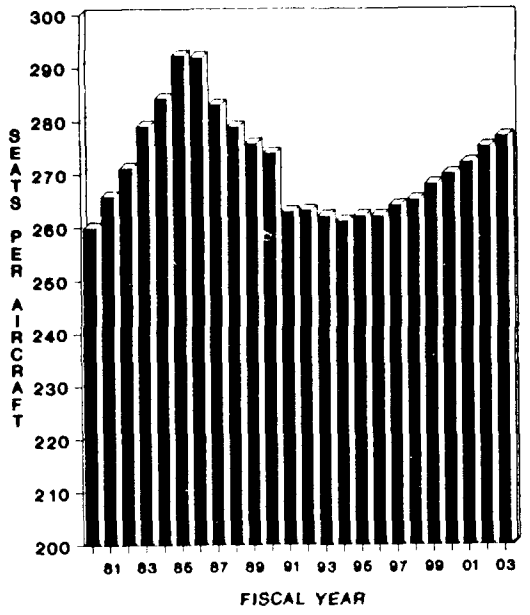


larger aircraft as well as retain more of the smaller equipment during the peak travel periods. In addition, some of the larger aircraft was utilized in the CRAF program to transport troops between the United States and the Middle East.

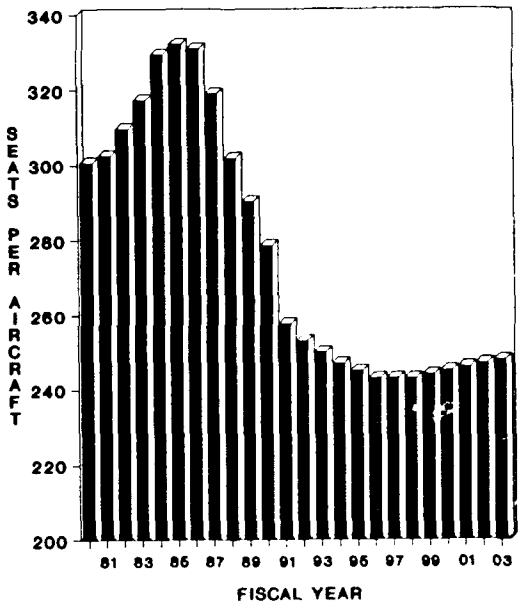
This forecast assumes the aircraft downsizing trend will continue well into the future, albeit at a considerably slower pace than has been the experience over the past five years. The emergence of American, Delta, and United as the new major players on the Atlantic (in place of Pan American and Trans World)--all of whom either now have, or currently have on order, a large number of the widebody twins--suggests that the aircraft downsizing trend will continue, if not indefinitely, at least for a longer period of time than was previously foreseen.

U.S COMMERCIAL AIR CARRIERS
SEATS PER AIRCRAFT - INTERNATIONAL SERVICES

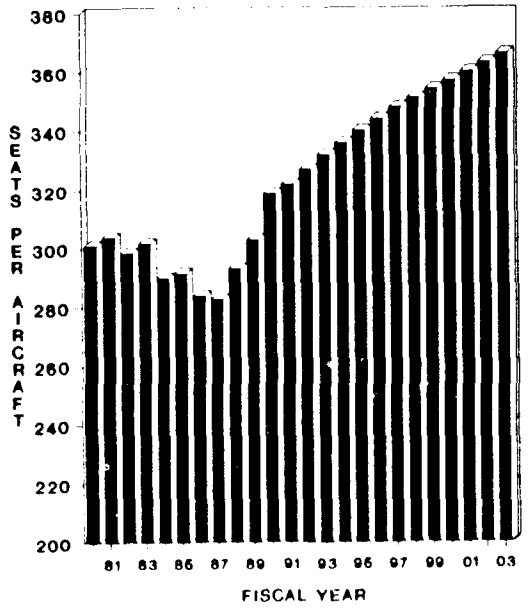
ALL INTERNATIONAL ROUTES



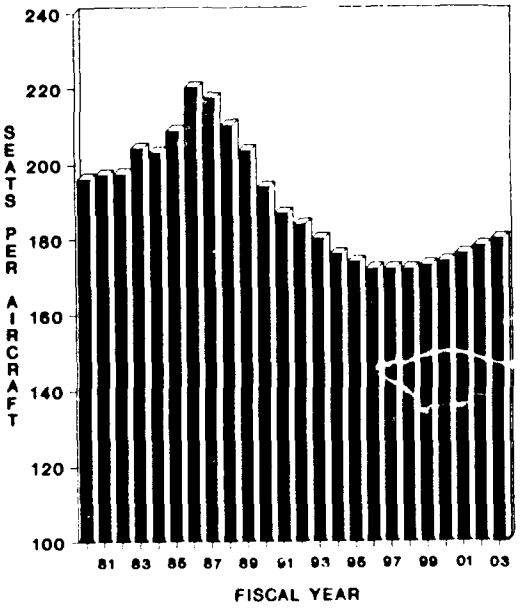
ATLANTIC ROUTES



PACIFIC ROUTES



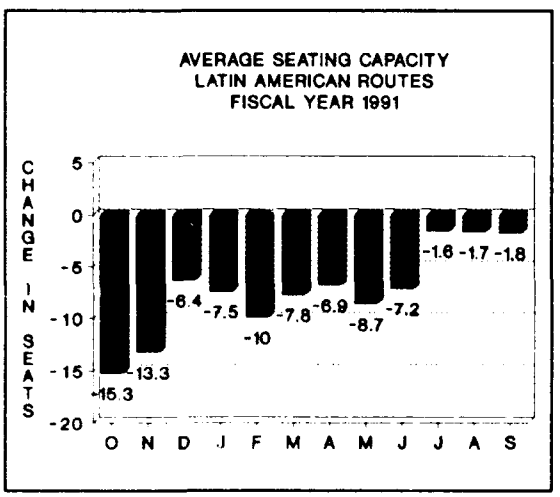
LATIN AMERICAN ROUTES



Therefore, the average seating capacity of passenger aircraft used on the transatlantic routes is forecast to decline by almost 15 seats over the next five years, averaging 243 seats in fiscal years 1996 through 1998. Starting in 1999, however, the average seating capacity of transatlantic route aircraft is expected to increase by one seat annually over the remainder of the forecast period. In fiscal year 2003, passenger aircraft utilized on the transatlantic are forecast to average 248 seats, nearly 10 fewer seats than the average seating capacity of aircraft in 1991.

Latin American Routes

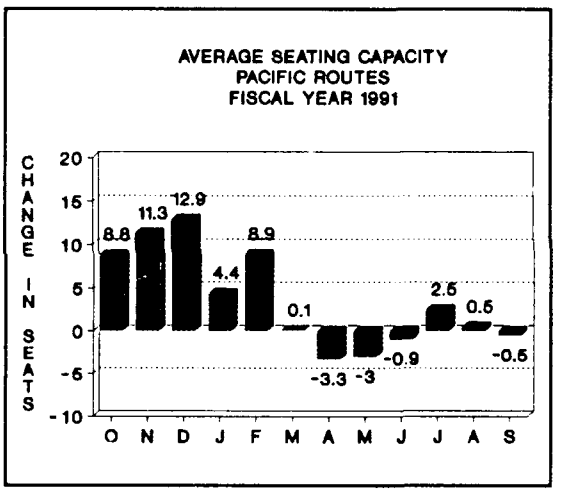
The average seating capacity of aircraft utilized on Latin American routes (187.0 seats in 1991) has declined by more than 33 seats since 1986 and by seven seats in fiscal year 1991. The presence of both American and United Airlines (beginning in 1992) as the major carriers in this travel region would seem to assure a continuance of this trend. Given both carriers preference for widebody twins, this forecast assumes that the downsizing in



aircraft size will continue over the next five years, with the average aircraft size declining to 172 seats by 1996. Beginning in 1999, the number of seats is expected to increase by one to two seats annually over the remainder of the forecast period. The average seating capacity of an aircraft utilized in Latin American service is expected to average 180 seats in fiscal year 2003, seven seats fewer than the average seating capacity of aircraft in 1991.

Pacific Routes

The average seating capacity of aircraft utilized on transpacific routes (321.9 seats in 1991) has increased by over 39 seats over the past four years. Although the gain in aircraft seat size (up 3.3 seats) slowed in fiscal year



1991, this was due, in large part, to the carriers response to the slowdown in traffic caused by the gulf conflict, whereby carriers substituted smaller aircraft wherever possible.

Because of the extensive re-equipment programs (B-747-400 and MD-11 aircraft) of most U.S. carriers now operating on the transpacific routes, this forecast assumes that the average seating capacity of aircraft operating across the Pacific will increase by between four to five seats a year over the next six years (reaching 348 seats in 1997). Thereafter, we expect the increase to average three seats annually over the remaining half of the forecast period.

The average seating capacity of an aircraft operating between the United States and Pacific destinations is projected to increase by 44 seats over the 12-year forecast period, reaching 366 seats in fiscal year 2003.

It is possible that the smaller two-engine extended range aircraft (currently the B-767-ER and A-310), now utilized extensively between the U.S. and Europe, may be approved for operation on transpacific routes at some time during the current forecast period. However, this forecast has not assumed the introduction of these wide-body twins on the transpacific routes during this 12-year period.

PASSENGER LOAD FACTOR

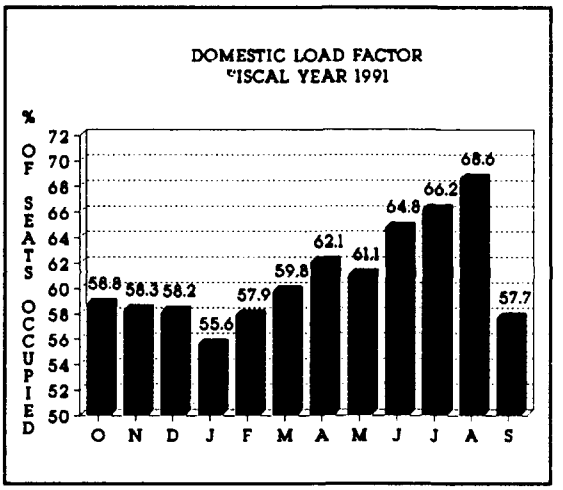
Despite declining traffic levels, U.S. scheduled air carriers recorded a systemwide load factor of 62.3 percent in fiscal year 1991. This was only 0.5 points below the 1990 load factor and only 0.9 points below the record high load factor of 63.2 percent achieved in 1979.

If appears that U.S. air carriers have, over the past several years, honed their scheduling operations to the point where they can rapidly and efficiently adjust capacity levels in accordance with either increasing or decreasing passenger demand levels, or vice versa (i.e., adjust traffic levels to meet increased capacity levels through "yield management"). Since 1987, systemwide load factors have varied only slightly, averaging between 62.2 (in 1988 and 1991) and 63.0 percent (in 1989).

We see no reason that current air carrier scheduling policies should change significantly over the current forecast period. Therefore, it is assumed that systemwide load factors, after increasing to 62.9 percent (up 0.6 points) in fiscal year 1992, will vary only slightly over the remaining 11 years of the forecast period, averaging 63.1 percent in fiscal year 2003.

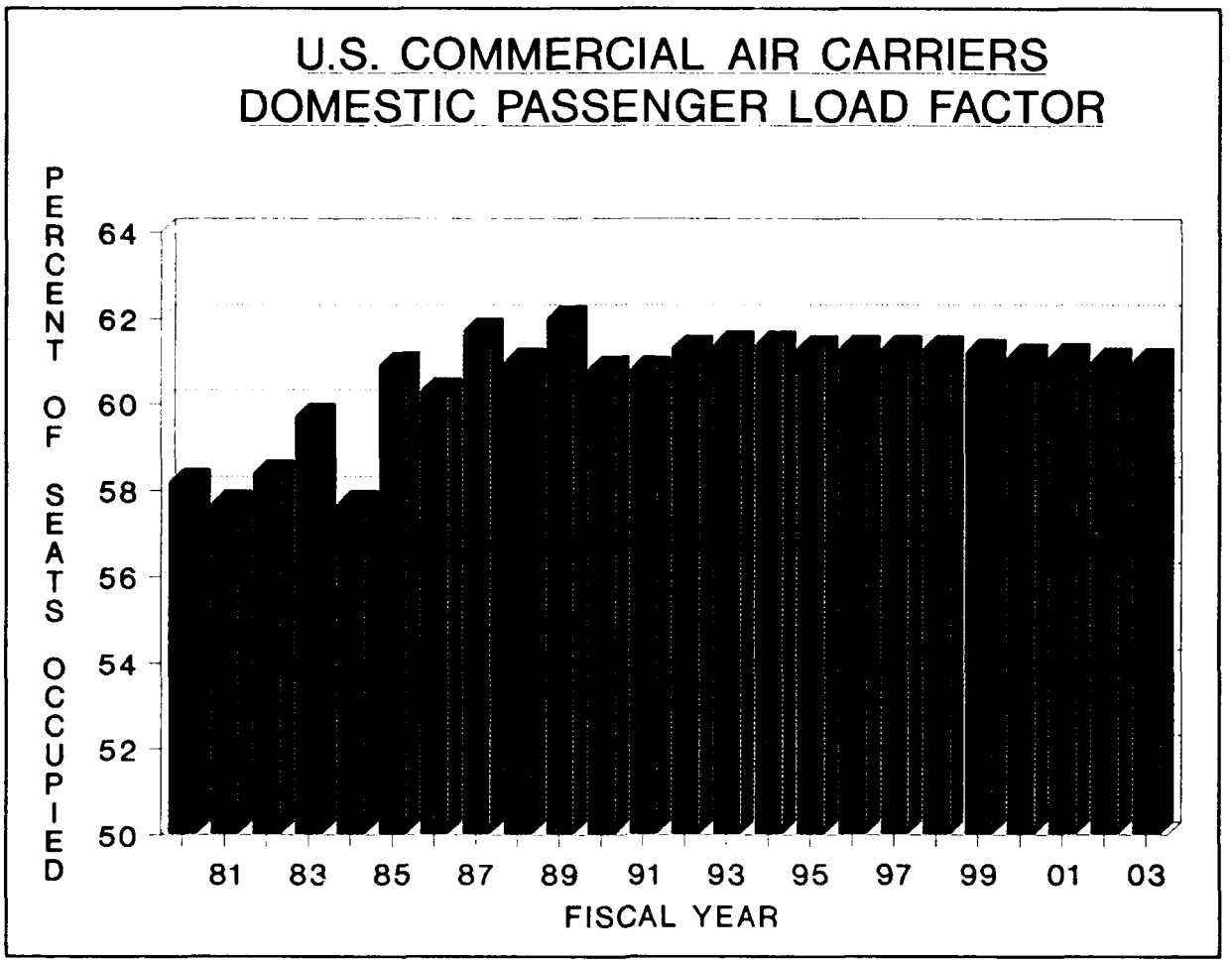
Domestic Passenger Load Factor

U.S. scheduled domestic air carriers achieved a load factor of 60.8 percent in fiscal year 1991, the same as recorded in 1990. Of course, the liquidation of Eastern Air Lines is estimated to have reduced domestic capacity



by approximately 19 million ASM's (3.5 percent) in fiscal year 1991. If this capacity had remained in the system in 1991 (no carrier picked up its aircraft in FY-91), domestic load factors could have declined to approximately 58.8 percent. Presumably, however, had Eastern remained in operation for all of 1991, the other domestic carriers, in light of declining passenger demand, would have adjusted its capacity levels accordingly. In any event, load factors would still have averaged in the 60.0 percent range in 1991.

As discussed earlier, it appears that U.S. airlines are capable of adjusting its capacity levels to changing levels



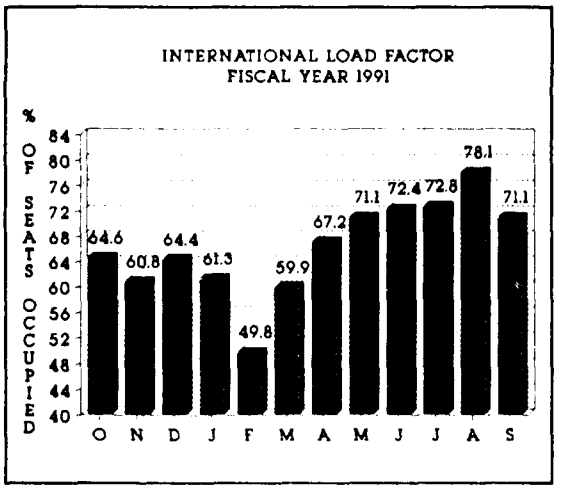
of demand, or vice versa. Domestic load factors have also varied very little over the past seven years, ranging from a low of 60.3 percent (in 1986) to a high of 62.0 percent (in 1989). At least until 1999, some U.S. air carriers will have the latitude to adjust capacity levels by either increasing/decreasing stage-2 aircraft utilization rates or temporarily grounding its stage-2 fleets. In addition, U.S. airlines can also be expected to cutback or eliminate some of its lower load factor, uneconomic service and/or reduce the utilization of some of its older stage-3 aircraft.

So far in fiscal year 1992, two carriers have been forced to discontinue operations--Midway Airlines (in November) and Pan American (in December). In September, the latest month for which data is available, these two carriers accounted for a combined 2.4 percent of domestic ASM's. The loss of some of this capacity should help keep load factors at relatively high levels in 1992. (It has been assumed that only the two carriers' stage-3 aircraft would be retained in the U.S. aircraft fleet.)

The net result of these capacity adjustments in fiscal year 1992 is expected to be a slight increase (0.4 points) in domestic load factors (to 61.3 percent). Domestic load factors are expected to remain in the 61.0 to 61.4 percent level throughout the 12-year forecast period, averaging 61.0 percent in fiscal year 2003.

International Passenger Load Factor

Despite severely depressed traffic demand during much of the year, U.S. scheduled international airlines achieved a load factor of 67.0 percent in fiscal year 1991, only 2.2 points below the 1990 load factor, the highest



ever recorded in international service.

As in domestic markets, it appears that U.S. airlines are capable of adjusting their international capacity levels to changing levels of demand, or vice versa. Despite the large increases forecast in international capacity over the next several years, the international load factor is forecast to increase to 67.7 percent (up 0.7 points) in fiscal year 1992 and to remain fairly constant (ranging between 67.4 and 68.0 percent) over the remainder of the forecast period. International load factors are forecast to average 68.0 percent in fiscal year 2003.

Atlantic Routes

Despite a 12.3 percent decline in traffic, load factors on the transatlantic routes averaged 69.5 percent in fiscal year 1990, only 0.3 points below the 1990 load factor, which was the highest ever recorded on the transatlantic. The carriers serving the transatlantic markets we able to maintain the high load factors by significantly reducing capacity levels (down 11.0 percent).

The new major carriers on the transatlantic routes (American, Delta, and United) are expected to significantly increase their schedules over the next several years. Therefore, Atlantic route load factors are forecast to decline slightly over the next four years (to 68.8 percent in 1995), as the expected capacity increases exceed passenger demand. Thereafter, load factors are forecast to increase gradually over the remaining years of the forecast period, averaging 69.4 percent in fiscal year 2003.

Latin American Routes

Despite an almost 15.0 percent increase in capacity in 1991, U.S. scheduled airlines achieved a 62.3 percent load factor on the Latin American routes, the same as achieved during the previous year.

Although relatively large capacity increases are forecast over the next several years, Latin American load factors are forecast to increase gradually over the forecast period, reaching 62.9 percent in fiscal year 2003.

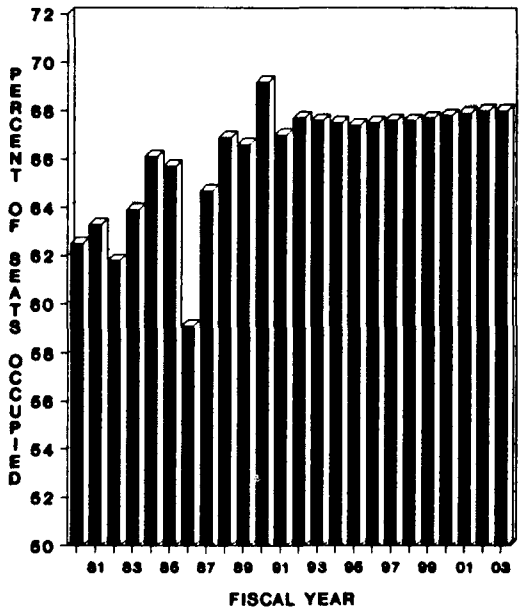
Pacific Routes

Despite a doubling of transpacific capacity since 1986 (18.0 percent annually), U.S. scheduled airlines achieved a load factor of 66.7 percent in fiscal year 1991. This, however, was 4.7 points below the load factor recorded in 1990. Although U.S. air carriers did react to declining passenger traffic in 1991, their capacity reductions were not sufficient enough to offset the decline in demand.

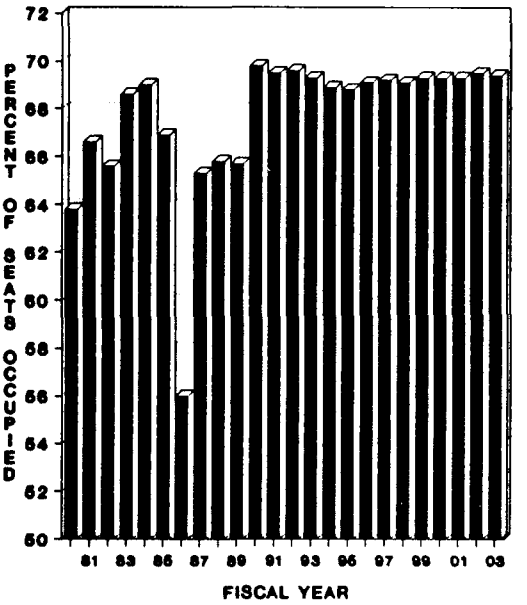
Despite the projected large capacity

U.S COMMERCIAL AIR CARRIERS
INTERNATIONAL PASSENGER LOAD FACTOR

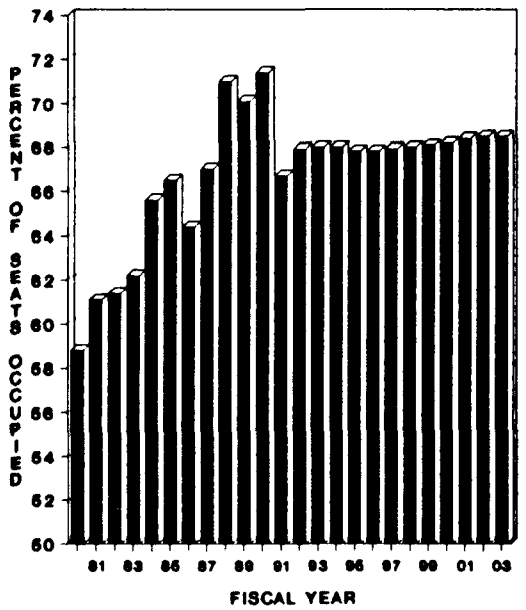
ALL INTERNATIONAL ROUTES



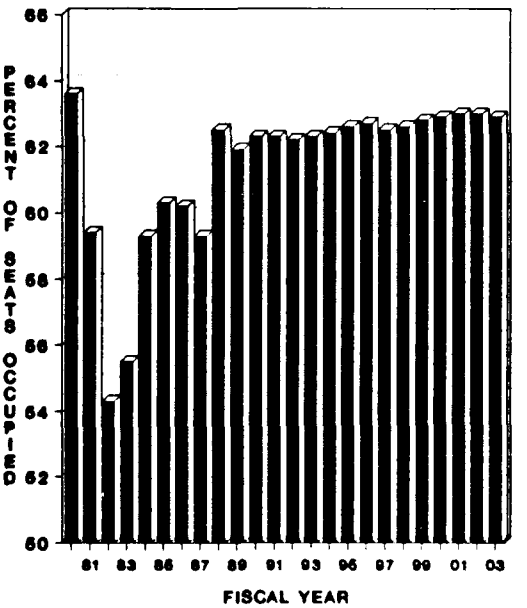
ATLANTIC ROUTES



PACIFIC ROUTES



LATIN AMERICAN ROUTES



increases (8.3 percent annually) on the transpacific routes, load factors are expected to increase slightly over the forecast period. Pacific load factors are forecast to increase to 67.9 percent (up 1.3 points) in fiscal year 1992, then increase gradually over the remaining 11 years of the forecast period. The passenger load factor on the transpacific routes is forecast to average 68.5 percent in 2003.

AIR CARRIER FORECASTS

The forecasts of air carrier demand are based upon a specific set of assumptions, not the least of which is the economic and political environment in which they will take place. There are a number of uncertainties which could significantly alter the short- and/ or long-term environment and cause the results to be significantly different from those forecast.

Some of the economic and/or political developments which have the potential to significantly alter the forecast results include, but are not limited to, the following:

(1) the current U.S. economic slowdown could be deeper (double-dip recession) and/or of longer duration than expected (strong recovery beginning in the third quarter of fiscal year 1992);

(2) oil prices (currently projected to decline 7.6 percent in 1992) could be much higher than predicted;

(3) the collapse of the Soviet Union could have serious economic consequences on the Eastern European countries, thus slowing or delaying the establishment of new travel markets to and from the United States;

(4) the current economic problems (i.e, high inflation) associated with German reunification could spread to other Western European countries, slowing both European economic growth and passenger demand between the United States and Europe;

(4) the current weakening of the Japanese economy (now in its most severe recession since 1973-74) and their precarious financial markets could result in significantly slower traffic demand in the transpacific markets; and

(5) the economic deregulation of the European Economic Community (EEC) scheduled to take place in 1992 and the impact that changes in Eastern Europe and a unified Germany will have on this process.

In addition to the above, the network of bilateral pacts that the U.S. currently has in place in Europe, the Far East, and South America could significantly inhibit the expansion plans (current and future) of air carriers operating in these international regions and restrain traffic growth. Additionally, the United States may have to negotiate future bilateral route agreements with regional blocks (e.g. a single European market or a single Asian market) rather than with individual countries.

Two U.S. carriers--America West and Continental--are currently operating under Chapter 11 bankruptcy protection. The possible liquidation of additional U.S. airlines could exasperate an already bloated used aircraft market. This could conceivably help to eliminate the industry's short-term overcapacity problem (relative to declining traffic demand) or it could open the way for new entrants (or financially solvent carriers) to skim traffic or increase market share in already depressed markets.

The projected continued slowdown in economic growth and traffic could also result in more U.S. carriers canceling or delaying the delivery of the aircraft now on order.

In addition, there is the ever present possibility of renewed terrorism in Europe and the Middle East, especially in light of the current peace talks between Israel and other Middle Eastern countries. Any renewal of terrorism, especially against U.S. airlines, could result in traffic losses in that particular region and shifts in traffic to other flag carriers and/or to other travel destinations.

In 1991, it was the rapid run-up in jet fuel prices (and subsequent escalation of air fares) and the Gulf War conflict that altered historical traffic patterns. Any of the factors discussed above have the potential to cause passenger traffic to differ from the forecast.

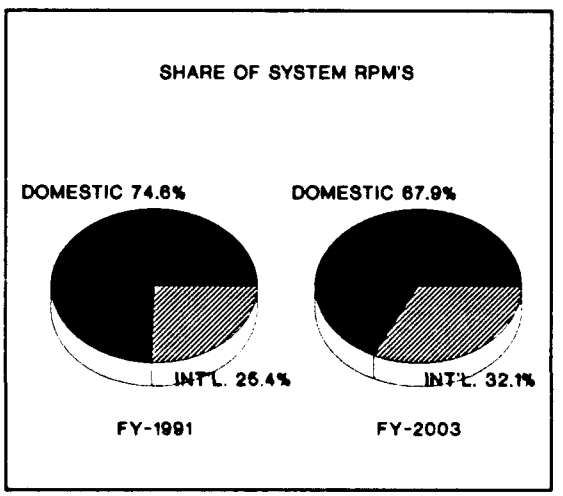
However, the driving force, especially in the short-term, is the strength of the U.S. economy. If U.S. economic recovery occurs sooner or is stronger than predicted, passenger demand could be higher than forecast. On the other hand, if the economy sinks back into negative growth or the recovery is later or weaker than forecast, then traffic demand is likely to be lower than forecast.

Additionally, this forecast has assumed that the U.S. commercial airline industry will continue to move toward greater concentration among a smaller number of larger airlines. Inherent in this assumption is a move toward a more rational industry pricing policy. These assumptions have been incorporated into the FAA forecast process by assuming a reversal of the long-term trend of declining real domestic passenger yields. The forecasts contained herein assume a gradual increase (0.2 percent annually) in real yields over the 12-year forecast period. Should the increase in real yields be considerably higher than forecast then traffic levels could be significantly lower. On the other hand, should real passenger yields continue to fall throughout the forecast period, traffic is likely to be significantly higher than forecast. However, this would raise serious questions with regard to the industry's future financial viability.

REVENUE PASSENGER MILES

U.S. scheduled air carriers recorded a total of 447.1 billion revenue passenger miles (down 1.6 percent) in fiscal year 1991. System passenger miles are forecast to increase to 472.9 billion (up 5.8 percent) in fiscal year 1992, to 499.8 billion (up 5.7 percent) in 1993 and to 526.8 billion (up 5.4 percent) in 1994. Over the 12-year forecast period, system RPM's are projected to increase at an average annual rate of 4.9 percent, reaching 796.7 billion in fiscal year 2003.

The relatively large increase in system RPM's in 1992 is almost entirely due to the large increases forecast for international travel. However, most of the growth in 1992, both in domestic and international markets, is due more to a



return from significantly depressed 1991 demand levels than to strong increases in passenger demand. International travel is expected to continue to outpace domestic travel over the entire 12-year forecast period, with RPM's growing at an annual rate almost 70.0 percent faster than that forecast for domestic RPM's. International travel's share of the total U.S. travel market is expected to increase from its current 26.4 percent in 1991 to 32.1 percent in 2003.

Domestic Revenue Passenger Miles

Scheduled domestic passenger miles totaled 333.6 billion (down 1.7 percent) in fiscal year 1991. Domestic traffic is projected to increase only slightly in 1992 (up 2.7 percent), with RPM's totaling 342.7 billion. The relatively slow traffic growth in 1992 is due largely to the continued sluggishness of the U.S. general economy (real GNP up 1.0 percent). Most of the growth, however, is expected to occur during the January to March period (down 5.3 percent in FY-91), a period that was adversely impacted by both the U.S. economic recession and Gulf conflict.

Beginning in 1993, with the expected recovery in the U.S. economy (real GNP up 2.8 percent), the forecast is for considerably stronger domestic passenger demand over the next several years. Domestic RPM's are forecast to increase to 358.8 billion (up 4.7 percent) in 1993 and to 375.3 billion (up 4.6 percent) in 1994. Somewhat slower growth is forecast over the latter half of the forecast period (4.0 percent annually), this reflecting greater concentration within the industry and a reversal of the long-term trend of declining real yields. Real domestic yields have been assumed to increase by 0.3 percent annually over the last half of the forecast period.

Domestic RPM's are projected to total 540.9 billion in fiscal year 2003, an average annual growth rate of 4.1 percent over the 12-year forecast period.

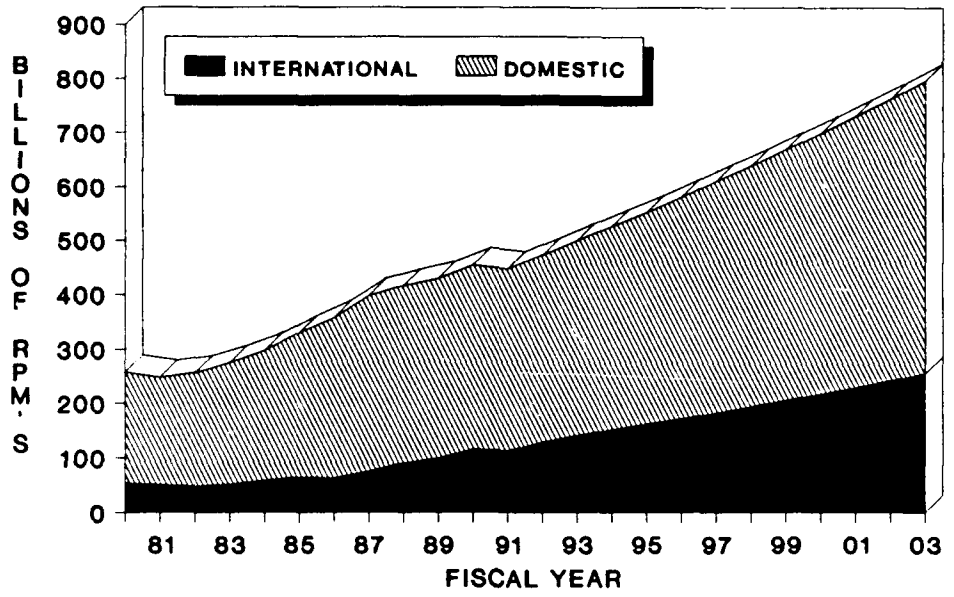
Although the FAA does not develop high/low scenarios, it is felt that, based upon the assumptions which underlie the forecasts (i.e., 2.5 percent growth in real GNP and 0.2 percent growth in real yields), the forecasts represent not only a best case scenario but potentially, a high scenario as well. In other words, it is believed that most of the risk is on the downside, i.e., U.S. economic growth is likely to be lower than projected and domestic real yields are likely to increase at a higher rate than assumed. Therefore, users of these forecasts should be aware that the long-term growth projections contained herein could be significantly lower than projected.

International Revenue Passenger Miles

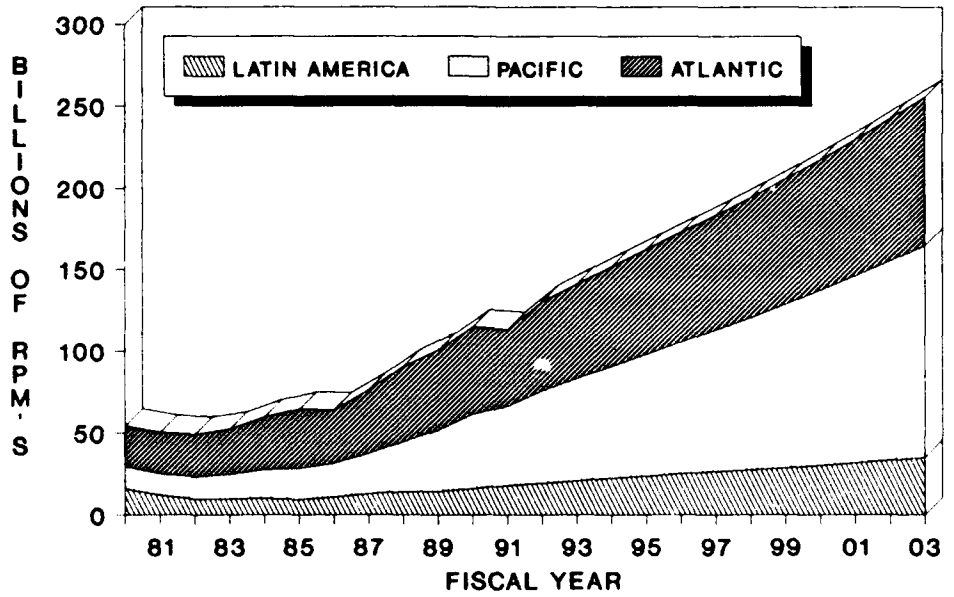
After experiencing unprecedented growth over the previous four-year period (up 79.9 percent between 1987 and 1990), the demand for international travel declined during fiscal year 1991, with international RPM's totaling only 113.5 billion (down 1.4 percent). International RPM's are forecast to increase 14.7 percent (to 130.2 billion) in 1992. However, most of the growth in 1992 will be due more to a return from significantly depressed 1991 demand levels (down 16.0 percent in January-March 1991) than to strong increases in passenger demand.

Although slower traffic growth (6.3 percent annually) is forecast over the remaining 11 years of the forecast, the growth after 1992 is derived from a real increase in passenger demand. International RPM's are forecast to increase to 141.0 billion (up 8.3 percent) in 1993 and to 151.5 billion (up

U.S. COMMERCIAL AIR CARRIERS
SCHEDULED REVENUE PASSENGER MILES

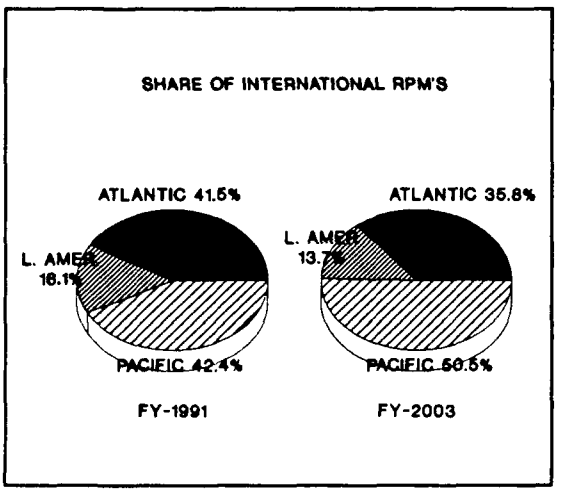


SCHEDULED INTERNATIONAL RPMS
BY TRAVEL REGION



7.4 percent) in 1994. International RPM's are projected to more than double (7.0 percent annually) over the 12-year forecast period, reaching 255.8 billion in fiscal year 2003.

In fiscal year 1991, transpacific RPM's (42.4 percent of scheduled international RPM's) accounted for the greater share of all international traffic. This share is expected to increase significantly over the fore-



cast period, reaching 50.5 percent in fiscal year 2003.

Atlantic Routes

Scheduled revenue passenger miles on the transatlantic totaled 47.1 billion (down 12.3 percent) in fiscal year 1991. Transatlantic passenger miles are expected to increase by 15.2 percent (to 54.3 billion) in 1992. However, this growth is due more to a return from significantly depressed demand levels during 1991 (down 31.9 percent during the January-March 1991 period) than from increased passenger demand. In fact, the RPM's projected for 1992 represent only a 1.1 percent increase over 1990 traffic levels. This slowdown in passenger demand basically reflects the sluggishness of both the U.S. and European economies (real GNP/GDP up 1.0 and 2.2 percent, respectively, in 1992).

Strong traffic growth (real) is expected to resume in transatlantic markets in 1993, averaging 4.9 percent annually over the last 11 years of the forecast period. Atlantic RPM's are forecast to increase to 57.8 billion (up 6.4 percent) in 1993 and to 61.0 billion (up 5.5 percent) in 1994. In 2003, Atlantic route RPM's are forecast to total 91.6 billion, an average annual growth rate of 5.7 percent over the 12-year forecast period.

Latin American Routes

Latin American passenger miles totaled 18.3 billion (up 14.7 percent) in fiscal year 1991. However, traffic to Latin American destinations is thought to have benefitted from the events that adversely impacted both domestic and other international traffic in 1991, (i.e., fear of terrorism) by offering a lower risk pleasure travel alternative.

The anticipated aggressive marketing of the new United Airlines' South American service (purchased Pan American's Latin American routes in December), coupled with the strong economic growth (after 1992) forecast for most Latin American countries, is expected to result in relatively large increases in passenger traffic over the next several years. Latin American RPM's are forecast to increase to 19.4 billion (up 5.9 percent) in 1992, to 21.0 billion (up 8.2 percent) in 1993, and to 22.6 billion (up 7.6 percent) in 1994.

Latin American RPM's are forecast to total 35.0 billion in fiscal year 2003, an annual rate of growth of 5.5 percent over the 12-year forecast period.

Pacific Routes

Passenger demand between the United States and the Pacific slowed considerably in fiscal year 1991, with RPM's totaling 48.1 billion (up 5.9 percent). However, it is assumed

that the slowdown in 1991 was a one year anomaly and that passenger demand in the Pacific should continue to exhibit strong growth throughout the entire forecast period (8.6 percent annually), although at considerably lower rates than those observed during the 1987 to 1990 period (22.3 percent annually).

Transpacific RPM's are forecast to increase to 56.5 billion (up 17.6 percent) in 1992. Some of this growth, however, is due to a recovery from significantly depressed demand levels during the January-March 1991 period (down 9.1 percent). Growth after 1992 will be due to a number of factors which should have a positive affect on transpacific passenger demand.

The first of these factors is the relatively large growth that has been forecast for the economies of the Far East/ Pacific Basin countries (real GDP up 4.5 percent annually). A second factor is the large increases in capacity (ASM's up 8.3 percent annually) that has been forecast as a result of the new Japan route authority that was awarded to U.S. carriers in 1990. A third factor responsible for the strong growth in the transpacific is the decline of the U.S. dollar (32.7 percent) relative to the Japanese yen over the 12-year forecast period. It is estimated that between 60 and 65 percent of U.S. traffic on the transpacific originates in the Far East countries. Therefore, as the U.S. dollar declines relative to the yen, all other things being equal, the cost of travel to the United States becomes cheaper.

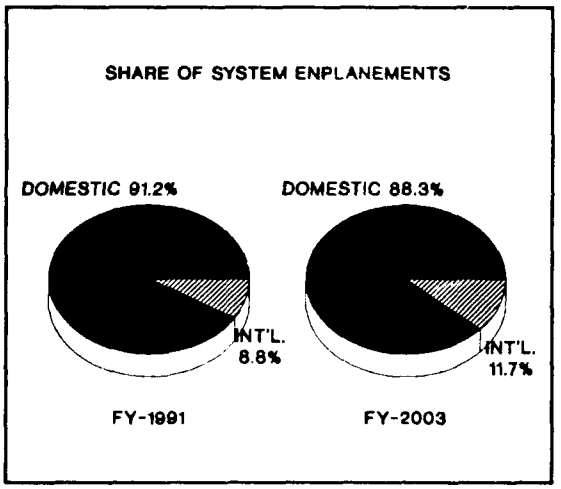
Transpacific RPM's are projected to increase to 62.2 billion (up 10.1 percent) in 1993 and to 67.9 billion (up 9.2 percent) in 1994. While traffic growth will be relatively slower over the remainder of the forecast period (6.3 percent annual growth), transpacific traffic is projected to increase by 8.6 percent annually over the entire 12-year forecast period. In fiscal year 2003, transpacific RPM's are forecast to total 129.2 billion.

PASSENGER ENPLANEMENTS

In fiscal year 1991, U.S. scheduled air carriers enplaned a total of 453.1 million passengers (down 2.7 percent). The continued slowdown in the U.S. economy is expected to result in weak traffic growth in 1992. System passenger enplanements are forecast to increase to 467.7 million (up 3.2 percent) in 1992. However, most of this growth is expected to occur during the January to March period, a period that was adversely impacted by the U.S. economic recession and Gulf conflict in 1991 (passenger enplanements down 6.6 percent). In fact, 1992 passenger enplanements are forecast to be only 0.5 percent above 1990 passenger enplanement levels.

Stronger economic growth in both the U.S. and world economies beginning during the latter half of 1992 should result in stronger traffic growth over the remainder of the forecast period. System passenger enplanements are forecast to increase to 489.0 million (up 4.6 percent) in 1993 and to 510.6 million (up 4.4 percent) in 1994. Over the 12-year forecast period, system enplanements are forecast to increase by an average of 4.0 percent per year, totaling 724.6 million passengers in fiscal year 2003.

International passenger enplanements are expected to grow more than 75.0 percent faster than domestic enplanements over the 12-year forecast period. Despite this relatively large disparity in growth, international enplanements are expected to account for only 11.7 percent of all system enplanements in fiscal year 2003, up from 8.8 percent in fiscal year 1991.



Domestic Passenger Enplanements

U.S. scheduled domestic air carriers enplaned a total of 413.3 million (down 2.5 percent) passengers in fiscal year 1991. The U.S. economic recession in 1991 is largely responsible for the negative growth in 1991. Domestic passenger enplanements are forecast to increase to 423.1 million (up 2.4 percent) in fiscal year 1992. The continued slowdown in U.S. economic growth results in largely to blame for the relatively slow growth in enplanements in 1992. However, much of the growth in 1992 is due to a recovery from depressed 1991 demand levels (down 5.8 percent in the January-March 1991 period) than to strong passenger demand. In fact, 1992 domestic enplanements are actually 0.3 percent below the number of passenger enplanements recorded in 1990.

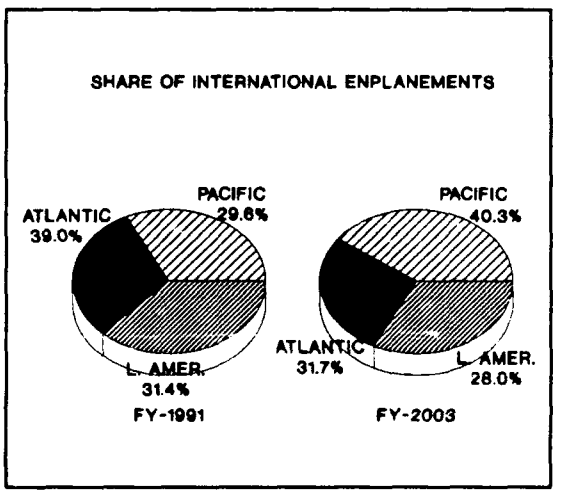
As the U.S. economic recovery gathers momentum during the latter half of 1992, passenger traffic should enter into a recovery phase. Domestic passenger enplanements are forecast to increase to 440.8 million (up 4.2 percent) in 1993 and to 458.8 million (up 4.1 percent) in 1994.

The projected growth in domestic enplanements is expected to average 3.7 percent annually over the 12-year forecast period, with the number of domestic enplanements reaching 640.1 million in fiscal year 2003.

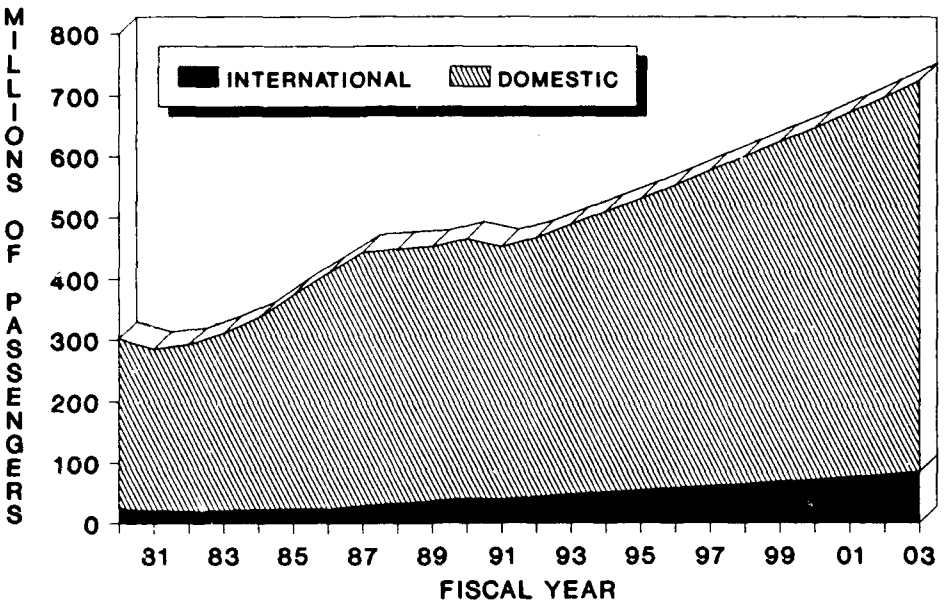
International Passenger Enplanements

A total of 39.7 million passengers (down 3.8 percent) were enplaned by U.S. scheduled international airlines in fiscal year 1991. International enplanements are forecast to increase to 44.6 million (up 12.2 percent) in 1992. The relatively large growth in 1992 results largely from a recovery from significantly depressed passenger levels in 1991 (down 15.1 percent during the January-March period) rather than from strong passenger demand.

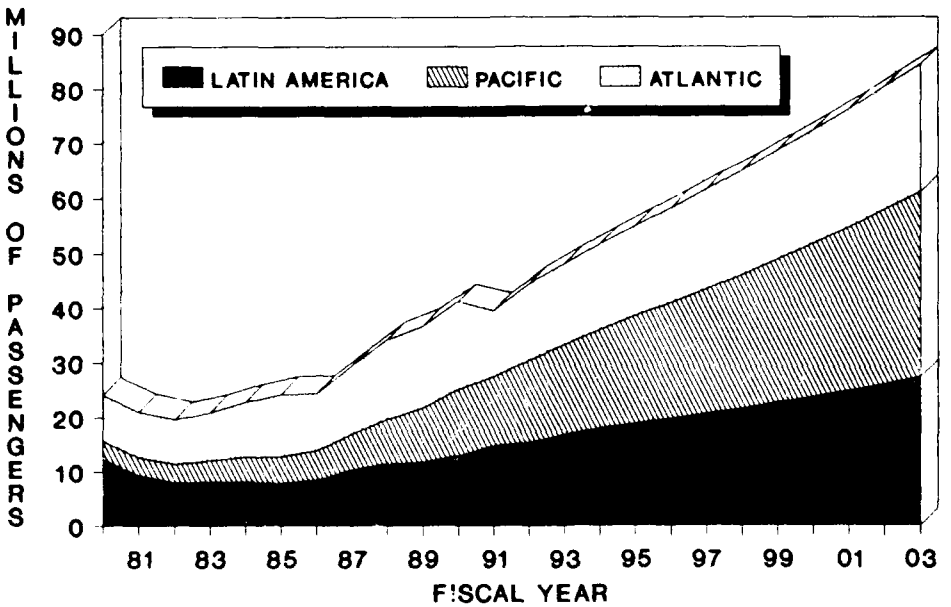
The projected expansion in both the United States and world economies is expected to account for much of the traffic growth in the international regions after 1992. International passenger enplanements are forecast to increase to 48.2 million (up 8.1 percent) in 1993 and to 51.8 million (up 7.5 percent) in 1994. The increase in the number of international passenger enplanements is expected to average 6.5 percent annually over the 12-year forecast period, with enplanements totaling 84.5 million in fiscal



U.S. COMMERCIAL AIR CARRIERS
SCHEDULED PASSENGER ENPLANEMENTS



SCHEDULED INTERNATIONAL ENPLANEMENTS
BY TRAVEL REGIONS



year 2003.

In 1991, passenger enplanements on the Latin American routes accounted for the major share (37.0 percent) of all international passengers. However, the number of transpacific enplanements is projected to account for the major share (40.0 percent) by the end of the 12-year forecast period. The number of transpacific enplanements is expected to equal the number of Latin American enplanements in 1994 and to surpass its enplanement total in 1995.

Atlantic Routes

Passenger enplanements on the Atlantic routes totaled 12.2 million (down 23.8 percent) in fiscal year 1991. Transatlantic passenger enplanements are forecast to increase to 14.1 million (up 15.1 percent) in fiscal year 1992. However, the growth in 1992 is largely a result of a recovery from the severely depressed traffic levels of a year ago, when passenger enplanements declined 44.1 percent during the January to March period. While half of the decline in 1991 can be attributed to Pan American discontinuing its intra-Germany service, the fact remains that, even if the intra-Germany service were removed from the 1990 data base, 1992 Atlantic enplanements would only be 1.7 percent higher than the 1990 passenger enplanement count.

The predicted strong economic recovery in both the United States and Europe in late 1992 should result in relatively strong passenger demand in the years beyond 1992. Transatlantic passenger enplanements are forecast to increase to 15.0 million (up 6.4 percent) in 1993 and to 15.8 million (up 5.3 percent) in 1994.

The projected annual rate of growth over the 12-year forecast period is 5.5 percent, with passenger enplanements on the Atlantic routes expected to total 23.4 million in fiscal year 2003.

Latin American Routes

U.S. scheduled airlines operating on the Latin American routes enplaned a total of 14.7 million (up 12.9 percent) passengers in fiscal year 1991. The number of passenger enplanements is projected to increase to 15.5 million (up 5.4 percent) in 1992, to 16.7 million (up 7.7 percent) in 1993, and to 18.0 million (up 7.8 percent) in 1994.

Between 1991 and 2003, the number of enplaned passengers traveling between the United States and Latin American destinations is forecast to increase by 5.3 percent annually, reaching a total of 27.3 million in the final year of the forecast period.

Pacific Routes

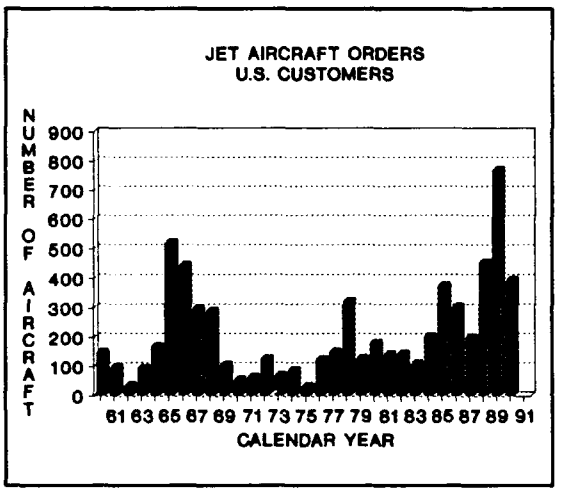
Passenger enplanements on routes between the United States and Pacific destinations totaled 12.8 million (up 4.8 percent) in fiscal year 1991. Passenger enplanements are forecast to increase to 15.0 million (up 17.3 percent) in 1992. However, some of the growth in enplanements in 1992 is the result of a recovery from depressed passenger enplanement levels in 1991 (enplanements down 8.1 percent during the January-March period), rather than an indication of a strong increase in overall passenger demand.

Strong economic growth in both the United States and the Far East/Asian countries in 1993 and beyond is expected to result in continued strong traffic demand in transpacific markets throughout the remainder of the forecast period. Pacific passenger enplanements are forecast to increase to 16.5 million (up 10.0 percent) in 1993 and to 18.0 million (up 9.1 percent) in 1994. Over the 12-year forecast period, transpacific passenger enplanements are projected to increase at an

average annual rate of 8.4 percent, totaling 33.8 million in fiscal year 2003.

AIR CARRIER FLEET

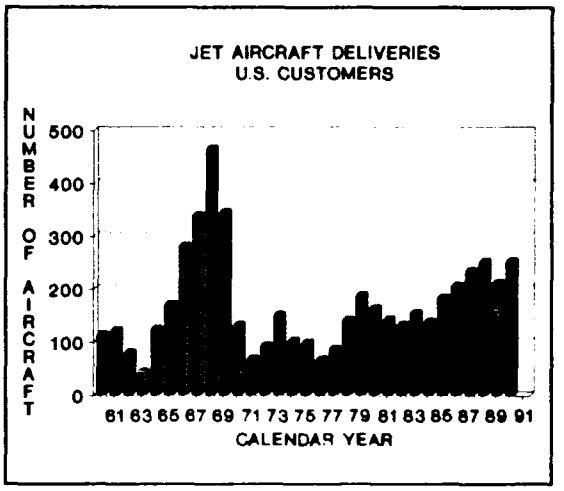
World air carriers placed an estimated 279 orders (down from 1,071 in 1990) for large jet aircraft with U.S. and foreign aircraft manufacturers during 1991. Of this total, only 85 (30.5 percent) were for two-engine



narrowbody (B-737, B-757, MD-80, and F-100) aircraft. As of December 31, 1991, U.S. and foreign aircraft manufacturers had a total world-wide backlog of 3,127 aircraft on order. Of the total backlog, 2,021 (64.6 percent) were for two-engine narrowbody aircraft.

Since leasing company orders are classified according to the country in which the leasing company has its headquarters, the number of new aircraft orders destined for the U.S. airline fleet is, at best, difficult to estimate. Therefore, no estimate has been made for U.S. airline aircraft orders in 1991.

Aircraft manufacturers delivered approximately 836 large jet aircraft worldwide in 1991. Of this total, 610 (73.0 percent) were two-engine narrowbody aircraft. Deliveries to



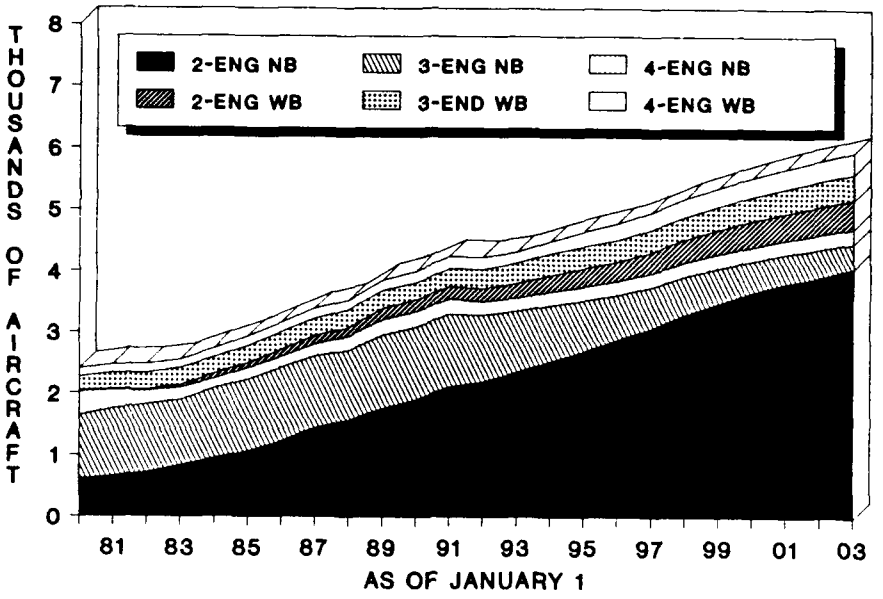
U.S. air carriers totaled 215 in 1991, 25.7 percent of the worldwide total. Of the total deliveries to U.S. airlines, 83.3 percent (179 aircraft) were two-engine narrowbody aircraft.

It is important to note until 1990, aircraft deliveries to U.S. air carriers had been, for all intents and purposes, net additions to the U.S. air carrier fleet. This was due to the fact that U.S. airlines retired very few of their older stage-2 aircraft and, in fact the number of stage-2 aircraft in the fleet actually increased in by 44 aircraft in 1987. However, the run-up in jet fuel prices during the latter months of 1990, in combination with a downturn in both the U.S. economy and passenger demand, caused some U.S. air carriers to sell/ground or retire many of the smaller capacity, fuel inefficient stage-2 aircraft. As such, U.S. airlines retired 39 aircraft in 1990 and another 225 during 1991. It should be noted, however, that a large number of these retirements result from the shut-downs of three carriers--Eastern, Midway, and Pan American. Impetus for further retirements of stage-2 aircraft will come largely from the recently enacted noise legislation.

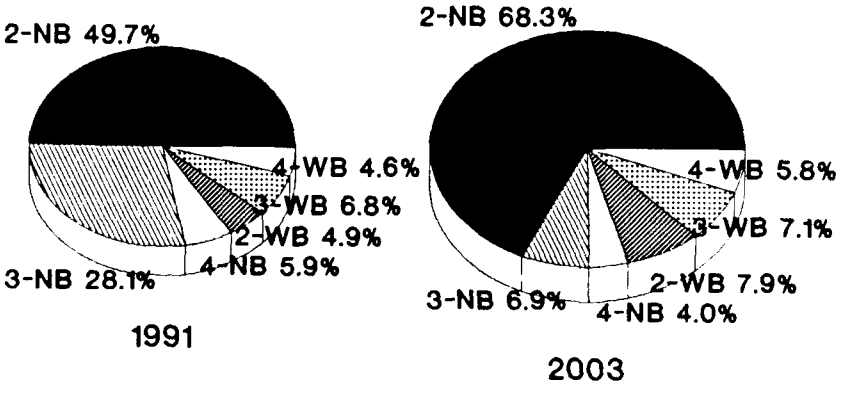
Previous forecasts have assumed a

U.S. COMMERCIAL AIR CARRIERS

LARGE JET AIRCRAFT

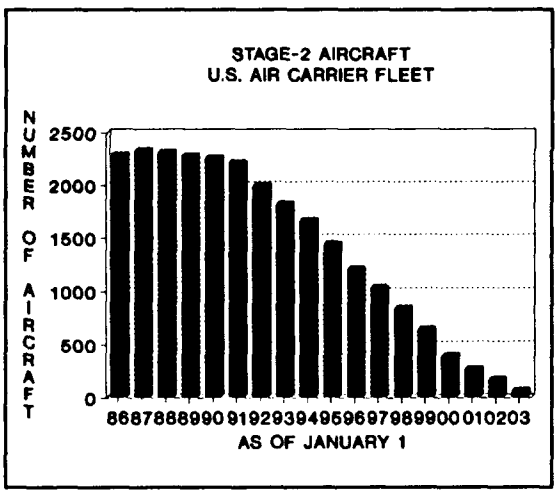


PERCENT BY AIRCRAFT TYPE



25-year life cycle for most stage-2 aircraft (except for those aircraft considered likely candidates for retrofit). This forecast, while assuming a 25-year life cycle, has also followed the guidelines proposed by the national noise policy legislation. Namely, that all stage-2 aircraft (regardless of age) will be withdrawn from the U.S. fleet by the end of 1999, with waivers possible to delay retirement until December 31, 2003 (assuming that the individual air carriers have met 85 percent of the target by July 1, 1999, and the remaining 15 percent is on firm order).

At the end of 1991, there were approximately 1,994 stage-2 aircraft (46.9 percent of the total fleet) remaining in the U.S. air carrier jet fleet. (This number is based on the assumption that the stage-2 fleets of



Eastern, Midway, and Pan American will not be picked up by other U.S. air carriers.) Follows the guidelines proposed by national noise policy legislation, the forecast shows the number of stage-2 aircraft in the fleet declining to 67 aircraft (1.1 percent of the total fleet) by the last year (as of January 1, 2003) of the forecast period.

It should be noted, however, that the forecast of the U.S. fleet on January 1, 2003 also includes 624 stage-2 aircraft which are assumed to have been retrofitted to meet stage-3 noise standards. These aircraft are, for the most part, assumed to be operating as cargo aircraft. The forecast further assumes significant reductions in the utilization rates of the older stage-2 aircraft.

Based on the backlog of aircraft orders and the projections of air carrier traffic, seat capacity, load factors, and fleet retirements, the U.S. commercial air carrier fleet is projected to increase from an inventory of 4,252 large jet aircraft on January 1, 1991 to 5,965 aircraft by January 1, 2003. This implies the net addition (after retirements) of approximately 143 aircraft (2.9 percent annually) to the U.S. fleet each year. The U.S. fleet is predicted to actually decline by 10 aircraft in 1992 (only the stage-3 aircraft of Eastern, Midway, and Pan American is retained in the U.S. fleet), then increase by 147 aircraft annually (3.3 percent) over the next five years, reaching a total of 5,108 aircraft in 1997. Thereafter, the U.S. fleet grows by 164 aircraft (3.1 percent) annually over the remaining six years of the forecast period.

By far, the largest increase, in terms of number of aircraft, is projected to occur in the two-engine narrowbody aircraft category, which is expected to grow by an average of almost 163 aircraft (5.6 percent) annually. By the year 2003, two-engine narrowbody aircraft are expected to total 4,073 units and to account for 68.3 percent of the U.S. total fleet, up from 49.7 percent in 1991.

Three-engine narrowbody (B-727) aircraft (all stage-2), the mainstay of the U.S. air carrier jet fleet during the 1970's and early 1980's, are expected to decline from 1,194 aircraft (28.1 percent of the fleet) in 1991 to only 413 aircraft (6.9 percent) in the year 2003. The number of four-engine narrowbody (DC-8, B-707 and BA-146) aircraft is also expected to decline in absolute numbers over the forecast

period, from 249 aircraft (5.9 percent) in 1991 to 239 aircraft (4.0 percent) in 2003.

Widebody aircraft, which accounted for only 16.4 percent of the U.S. fleet in 1991, are expected to account for 20.8 percent of the U.S. air carrier large jet fleet by 2003. Two-engine widebody (A-300, A-310, and B-767) aircraft, the fastest growing of all the aircraft groupings, are expected to increase by an average of almost 31 aircraft annually (6.9 percent), from 210 aircraft in 1991 to 469 aircraft in 2003.

Four-engine widebody (B-747 and A-340) aircraft are forecast to increase from 196 aircraft in 1991 to 349 aircraft by 2003, an annual increase of 4.9 percent. The three-engine widebody category (MD-11, DC-10 and L-1011) is projected to grow from 290 aircraft in 1991 to 422 aircraft in 2003, an average annual increase of 3.2 percent.

AIRBORNE HOURS

U.S. commercial air carriers flew an estimated total of 10.4 million hours in fiscal year 1991, a decline of 1.9 percent from 1990. Two aircraft categories accounted for three-fourth of total airborne hours: two-engine narrowbody aircraft (53.5 percent) and three-engine narrowbody aircraft (21.6 percent). In fiscal year 2003, the number of airborne hours is forecast to increase to 15.7 million, an average annual increase of 3.2 percent.

Airborne hours are forecast to increase only slightly in fiscal year 1992, totaling 10.5 million (up 0.8 percent). The continued slow growth in 1992 reflects the shutdown of both Midway and Pan American and the loss of their stage-2 aircraft (127 aircraft) from the U.S. fleet. Thereafter, the number of airborne hours resumes more normal growth, increasing to 10.9 million in 1993 (up 4.0 percent) and to 11.4 million (up 4.1 percent) in 1994.

Much of the growth in airborne hours (4.4 percent annually) is expected to occur during the middle years of the forecast period (1995 to 1998), reflecting the large numbers of smaller aircraft scheduled to be delivered to U.S. airlines during this period. In addition, the relatively large increases during this period reflects increased hub activity at many large and medium hub airports.

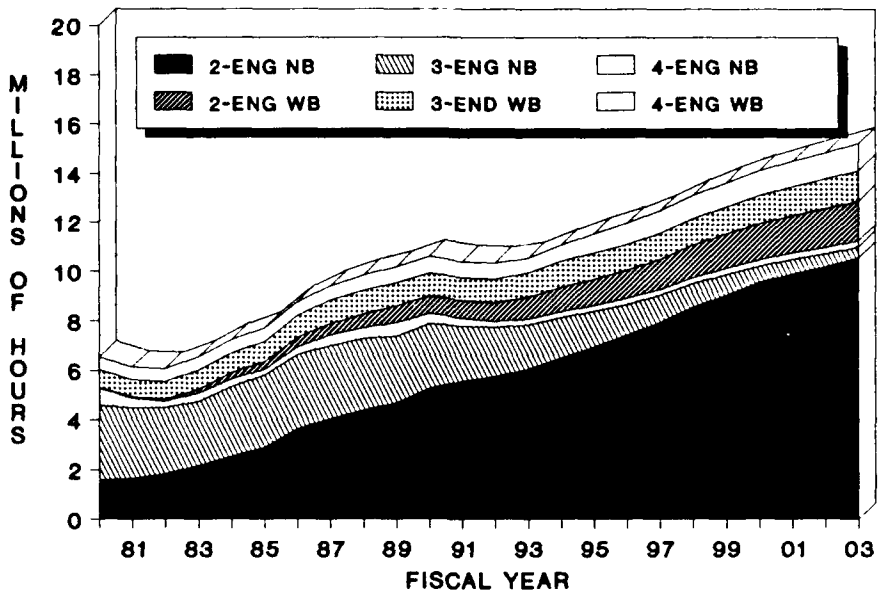
Two engine aircraft (both narrowboby and widebody) are projected to account for almost 80.0 percent of all airborne hours flown in fiscal year 2003. Two-engine narrowbody aircraft are expected to account for the vast majority of total hours (68.8 percent) in fiscal year 2003, increasing at an average annual rate of 5.7 percent over the 12-year forecast period. Airborne hours flown by two-engine widebody aircraft are forecast to grow at an average annual rate of 7.3 percent over the same time period and account for 11.0 percent of total airborne hours in fiscal year 2003, up from only 7.2 percent in 1991.

The number of hours flown by three-engine widebody aircraft is forecast to increase by 3.0 percent annually over the forecast period. However, its share of total hours declines from 8.7 percent in 1991 to 8.2 percent in fiscal year 2003. Four-engine widebody aircraft airborne hours will increase at an annual rate of 5.2 percent during the same period, accounting for 7.6 percent of total hours in fiscal year 2003, up from 6.2 percent in 1991.

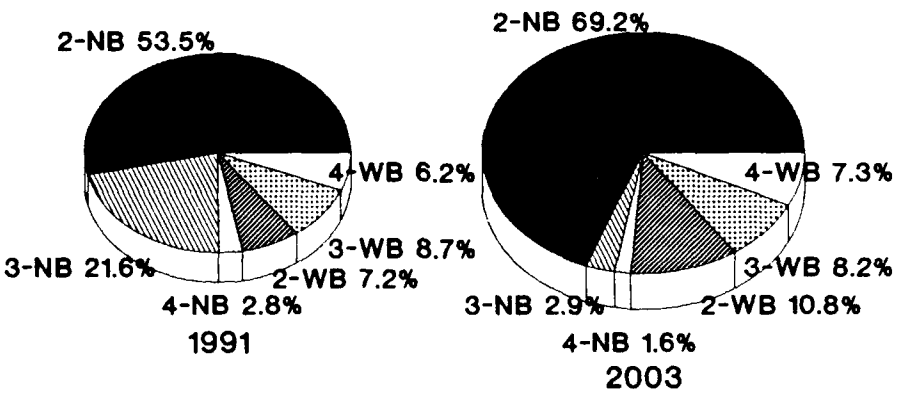
Hours flown by two aircraft categories will decline significantly over the forecast period. The number of airborne hours flown by three-engine narrowbody aircraft will decline by 80.1 percent between 1991 and fiscal year 2003. This decline reflects not only the retirement of significant

U.S. COMMERCIAL AIR CARRIERS

AIRBORNE HOURS



PERCENT BY AIRCRAFT TYPE



numbers of older stage-2 aircraft but also declining utilization rates of those aircraft still in service, many of which have been shifted to cargo service.

Hours flown by four-engine narrowbody aircraft are also forecast to decline (down 16.9 percent) during the 12-year forecast period. In fiscal year 2003, this aircraft category is expected to account for only 1.6 percent of total U.S. air carrier airborne hours.

CHAPTER IV
REGIONALS/COMMUTERS

CHAPTER IV

REGIONALS/COMMUTERS

The regional/commuter airline industry, for the purpose of this forecast, is defined as those air carriers that provide regularly scheduled passenger service and whose fleets are composed predominantly of aircraft having 60 seats or less. During 1991, 149 regional/commuter airlines reported traffic data to RSPA on Form 298-C. (A listing of these carriers is presented in Appendix E.) The FAA historical data base includes activity for all regional/commuters operating in the 48 contiguous states, Hawaii, Puerto Rico, and the U.S. Virgin Islands. Excluded from the data base is activity in Alaska, other U.S. territories, and foreign territories. Additionally, the regional/commuter traffic statistics include duplicated data for selected operators included in the commercial air carrier traffic statistics. The duplication is for those air carriers operating both large jets (over 60 seats) and commuter type aircraft (see technical notes at the beginning of Chapter X for Table 10 and Table 19).

REVIEW OF 1991

Since 1984, the regional/commuter airline industry has been in a period of transition. In 1985, there was a dramatic growth in the number of code-sharing agreements with the major air carriers. This was followed in 1986 by a wave of large jet air carrier acquisitions of, or equity interest in, their regional/commuter code-sharing partners. These actions have resulted in a process of industry consolidation, increasing concentration, and increasing integration with the large commercial air carriers that has continued through 1991.

INDUSTRY SUMMARY

During fiscal year 1991, the number of regional/commuter airlines totaled 149, compared to 151 in 1990. While the number of reporting airlines declined, industry growth continued to out-pace the growth of the major and national air carriers.

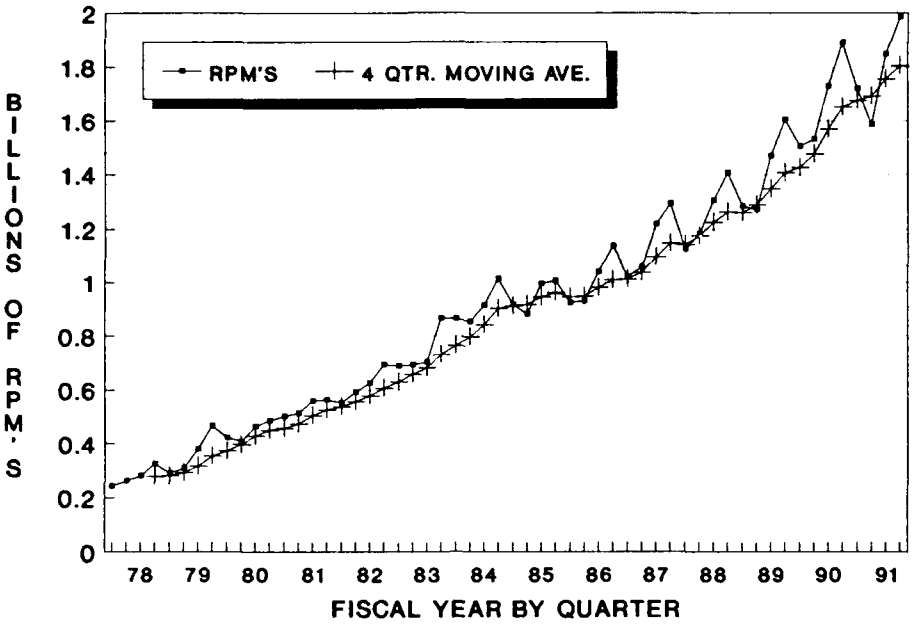
REVENUE PASSENGER ENPLANEMENTS

Total revenue passenger enplanements for the regional/commuter airlines, including Alaska and foreign territories, totaled 39.9 million, a 3.4 percent increase compared to 1990. Excluding Alaska and foreign territories, enplanements totaled 38.4 million, up 3.2 percent over 1990.

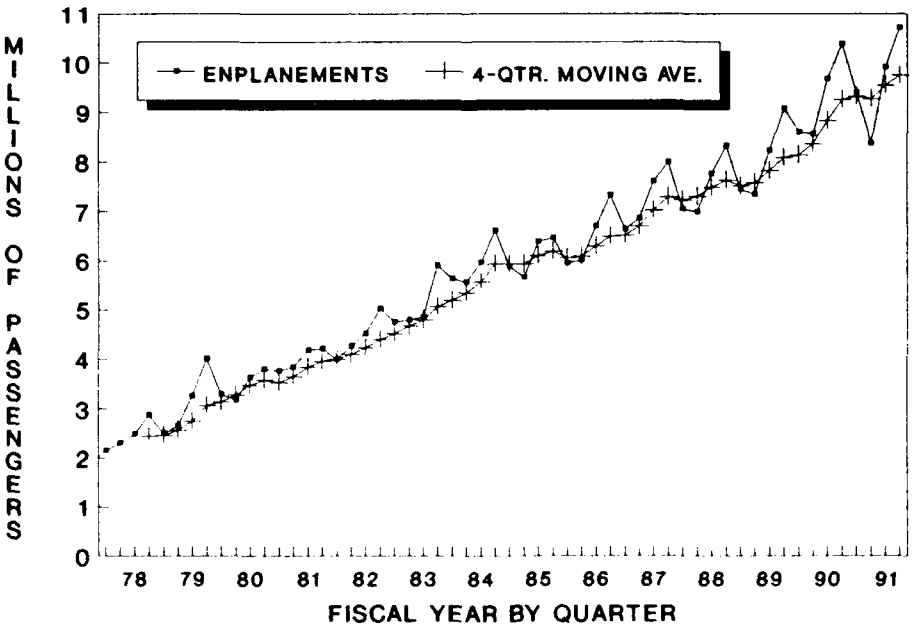
For the 48 states, enplanements increased 3.4 percent to 36.7 million. Enplanements in Hawaii, Puerto Rico, and the U.S. Virgin Islands totaled 1.7 million--unchanged from the pre-

U.S. REGIONALS/COMMUTERS TRAFFIC TRENDS

REVENUE PASSENGER MILES



PASSENGER ENPLANEMENTS



vious year. Enplanements in Hawaii increased 8.6 percent compared to 1990 reversing the downward trend experienced over the last several years following the failure of Mid-Pacific Airlines. In contrast to Hawaiian traffic, enplanements in Puerto Rico and the Virgin Islands posted a slight decline of 1.0 percent.

While not included in the forecast base, enplanements in Alaska and foreign territories totaled 1.5 million, an increase of 4.0 percent compared to 1990. Enplanements in Alaska were up 9.3 percent and all other areas decreased 2.9 percent.

REVENUE PASSENGER MILES

Revenue passenger miles totaled just under 7.4 billion in 1991, an increase of 7.6 percent from 1990. For the 48 states, revenue passenger miles increased 7.4 percent in 1991 to just under 7.0 billion, and the average passenger trip length increased by 7.2 miles to 190.7 miles. Passenger miles in Hawaii, Puerto Rico, and the Virgin Islands increased 0.4 percent to 141.3 million, while in Alaska and other areas, revenue passenger miles totaled 242.9 million, an increase of 17.5 percent compared to 1990.

INDUSTRY COMPOSITION

During the mid 1980's and through today, the fundamental character of the industry has changed; from the relative size and sophistication of airline operations, the players involved (especially the dominant industry operators), and aircraft fleets, to the industry's relationship with the large commercial air carriers in the national air transportation system. While the role of the industry, in the past and today, is to provide feeder service to the large hubs served by the large commercial air carriers, the exact scope and relationships of their role has changed dramatically.

In 1991 the composition of the regional/commuter airline industry continue to evolve. The factors contributing to this change included economic and competitive influences and marketing strategies and alliances. Since the mid-1980's two distinct but interrelated trends underlie the changing character and composition of the industry. They are industry consolidation and increasing integration of operations with the major and national air carriers.

INDUSTRY CONSOLIDATION

From a high of about 250 carriers in 1981, the number of regional/commuter operators has declined to 149 in 1991. The 149 operators in 1991 is a drop of only two compared to 1990 when 151 carriers reported traffic data to RSPA. Of the 151 carriers which reported traffic data in 1990, 143 were in operation at the end of the year.In 1991, of the total of 149 carriers, 133 were still in operation at the end of the year. Because of the increased integration of operations with the major and national air carriers (through code-sharing agreements and acquisition of regionals totally or in part), the success of many regionals is tied closely to the success of their larger partners. During 1991, this was evidenced by the demise of several large regional air carriers. The most notable are Eastern Express, Midway Commuter, and Pan Am Express which shut down as a result of the failure of the major/national carriers they were owned by. At the present time there is no reason to assume that the trend towards

TOP 50

REGIONAL/COMMUTER AIRLINES

FISCAL YEAR 1991

1. WestAir	26. Air Midwest
2. Britt Airways	27. Sunaire
3. Atlantic Southeast	28. Aloha IslandAir
4. Simmons	29. StatesWest
5. Henson Aviation	30. Crown Airways
6. Horizon	31. Commutair
7. Flagship Airlines	32. Scenic Airlines
8. Comair	33. Precision Airlines
9. Metroflight Airlines	34. Command Airways*
10. Business Express	35. Great Lakes Airlines
11. SkyWest Aviation	36. NPA*
12. Express Airline I	37. Northeast Regional Exp.
13. Trans States Airlines	38. Paradise Island
14. Wings West	39. ERA Aviation
15. Mesaba Aviation	40. Aspen Airlines*
16. Rocky Mountain Airways	41. Eastern Metro Express*
17. Executive Airline	42. Hermens
18. Alleghany Airlines	43. Viequies Air Link
19. Pan Am Express	44. Air Cape
20. Mesa Air Shuttle	45. Bar Harbour Airlines*
21. Pennsylvania Airlines	46. Conquest Airlines
22. CCAir	47. L'Express Airlines
23. Jetstream International	48. Southcentral Airlines
24. Midway Commuter	49. Mohawk Airlines
25. Chautauqua Airlines	50. Peninsulia Airways

* These reporting entities were no longer operating at the end of FY 1991

Source: RSPA Form 298-C and Form 41 enplanement data

TOP 30 CORPORATE STRUCTURES

Carrier/ Carrier Group	Percent of Industry Enplanements	Carrier/ Carrier Group	Percent of Industry Enplanements
1. American	15.5	16. Chautauqua	1.2
2. Delta	13.1	17. Sunaire	.9
3. USAir	11.1	18. Aloha IslandAir	.9
4. Texas Air	8.1	19. StatesWest	.9
5. WestAir	7.8	20. Crown Airways	.9
6. Alaska	4.9	21. Commutair	.8
7. Metro	4.0	22. Scenic	.7
8. Mesa	3.2	23. Precision	.7
9. Business Express	3.2	24. Great Lakes	.6
10. Express Airline I	2.9	25. Northeast Express	.5
11. Trans States	2.8	26. Paradise Island	.5
12. Mesaba	2.5	27. ERA Aviation	.5
13. Pan Am Express	2.2	28. Air Wisconsin/Aspen	.5
14. CCAir	1.9	29. Hermens	.4
15. Midway Commuter	1.6	30. Viequies Air Link	.3

consolidation will not continue.

INDUSTRY CONCENTRATION

While the number of carriers has declined, the size of the dominant industry carriers has increased dramatically. This has resulted in increased industry concentration with the top 50 carriers accounting for approximately 96.1 percent of total industry passenger enplanements in 1991, relatively unchanged from 1990. While total enplanements increased by 3.4 percent in 1991, the top 50 carriers grew more than twice as fast (7.2 percent). The top 50 carriers for 1991 are listed in the table on page 96. The relative ranks have changed for many carriers, but the composition of this group is relatively unchanged from 1990.

The above data are based on RSPA Form 298-C and Form 41 reporting entities. However, looking at the industry only in this manner does not reflect the true level of industry consolidation, concentration, and integration with the major and national air carriers. Many of the carriers are owned, totally or in part, by their larger code-sharing the current industry composition is presented by looking at the industry partners, and still others are owned by other regionals. A better picture of the current industry composition is presented by looking at the industry from a corporate structure point of view. A total of 19 regionals are owned, totally or in part, by 9 major and national air carriers, and seven

AIR CARRIER/COMMUTER AIRLINES CODE-SHARING AGREEMENTS

Air Carrier Program Name	Designated Commuter Carrier	Hubs Served
1. Alaska Airlines	Horizon*	Portland Seattle
2. Aloha Airlines	Aloha IslandAir	Honolulu
3. American Eagle	Chaparral	Dallas/Ft. Worth
	Command	Boston New York
	Executive Air Charter	San Juan
	Metro	Dallas/Ft. Worth
	Nashville Eagle	Miami Nashville Raleigh/Durham
	Simmons	Chicago
	Wings West	Los Angeles San Francisco San Jose
4. Continental Express	Britt	Cleveland Houston Boston Cleveland Newark
	Rocky Mountain	Denver
5. Delta Connection	Atlantic Southeast	Atlanta Dallas/Ft. Worth
	Business Express	Boston New York
	Comair	Cincinnati Dayton Florida
	SkyWest	Los Angeles Salt Lake City
6. Northwest Airlink	Big Sky	Billings Helena
	Express Airline I	Memphis Minneapolis/St. Paul

AIR CARRIER/ COMMUTER AIRLINES
CODE-SHARING AGREEMENTS (Continued)

Air Carrier Program Name	Designated Commuter carrier	Hubs Served
6. Northwest Airlink (Continued)	Horizon*	Portland
		Seattle
	Mesaba	Detroit
		Minneapolis/St. Paul
	Northeast Express	Boston
	Precision	Boston
		New York
7. Trans World Express	Air Midwest	St. Louis
	Westates	New York
	Trans States	St. Louis
	Jet Express	New York
8. United Express	Aspen*	Denver
	Mesa	Denver
		Portland
		Seattle
	WestAir*	Los Angeles
		San Francisco
		Washington, D.C.
9. USAir Express	CCAir	Charlotte
	Chautauqua	Orlando
		Pittsburgh
	Commutair	Boston
		New york
		Syracuse
	Crown	Pittsburgh
	Henson	Baltimore
		Charlotte
		Florida
	Jetstream	Baltimore
		Dayton
	Pennsylvania	Pittsburgh
		Philadelphia
	Allegheny Commuter	Pittsburgh
		Philadelphia
	StatesWest	Los Angeles
		Phoenix

* Carrier operates both large jet and commuter aircraft.

more are owned by three other regionals. The table on page 97 presents the top 30 corporate structures and their percent share of 1991 industry enplanements. Viewed in this manner, it can be seen that there is a much higher level of industry concentration, and also points out the degree of integration with the major and national airlines. In 1991, enplanements for these carriers grew by 9.1 percent and accounted for 95.1 percent of total industry enplanements.

FORECAST ASSUMPTIONS

Industry growth will continue to outpace that of the larger commercial air carriers and be driven by increased demand. The introduction of new state-of-the-art aircraft offering amenities similar to those found on large jet aircraft will contribute to greater public acceptance and stimulate higher growth. Increasing integration of service with the majors and nationals, together with the introduction of new aircraft, will lead to further route rationalization programs by the majors, opening new opportunities for growth. While there are risks, the regional airline industry is expected to benefit from continued service integration with major/national air carriers and the introduction of larger aircraft. This will create new opportunities for growth through service substitution and expansion in markets currently served with large jet aircraft.

The average passenger trip length is expected to increase over the forecast period, but the industry will continue to serve primarily short-haul markets, with emphasis on improved quality and schedule frequency in the markets best suited to their operations.

It is expected that the aircraft fleet will continue to grow over the forecast period and the average seats per aircraft is expected to increase from 21.5 in 1991 to 34.4 in 2003, an average annual growth of 4.0 percent.

The average passenger trip length in the 48 States is projected to increase from 190.7 miles in 1991 to 222.0 miles in 2003, an average annual growth rate of 1.3 percent. The average trip length for Hawaii, Puerto Rico, and the Virgin Islands is expected to remain constant at 83.0 miles throughout the forecast period.

The average industry load factor is expected to increase only slightly from 46.4 in 1991 to 48.9 in 2003 reflecting continued emphasis on frequency of service. A year-by-year detail of the above assumptions is presented in Table 18.

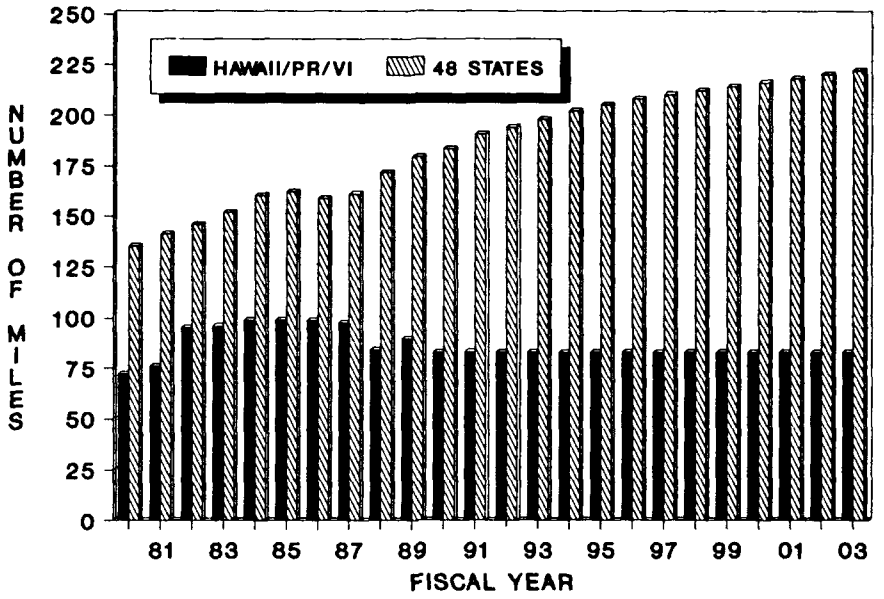
REGIONAL/COMMUTER FORECASTS

REVENUE PASSENGER MILES

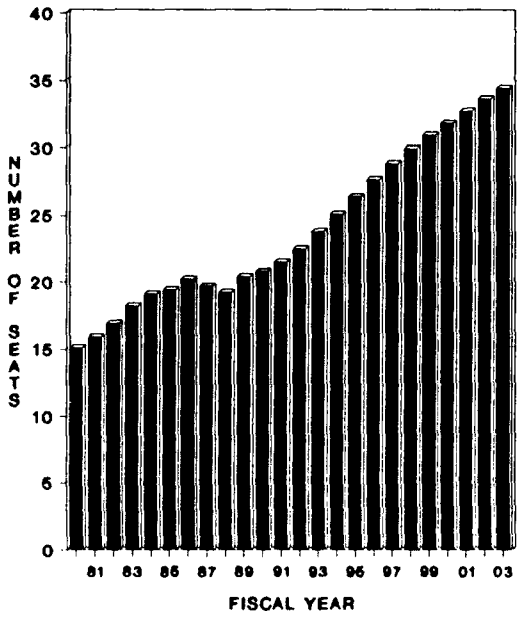
Revenue passenger miles are expected to total 17.5 billion in 2003. Passenger miles are projected to increase 8.2 percent in 1992, 10.2 percent in 1993, and average 7.7 percent over the forecast period. Passenger miles in the 48 contiguous states are forecast to total 17.1 billion in 2003, increasing 8.1 percent in 1992 and 10.2 percent in 1993, and averaging 7.6 percent growth between 1993 and 2003. Traffic in Hawaii, Puerto Rico, and the Virgin Islands is forecast to increase by 11.6 percent in 1992, by 10.5 percent in 1993, average 8.6 percent growth over the forecast period, totalling 381.8 million passenger miles in 2003.

U.S. REGIONALS/COMMUTERS FORECAST ASSUMPTIONS

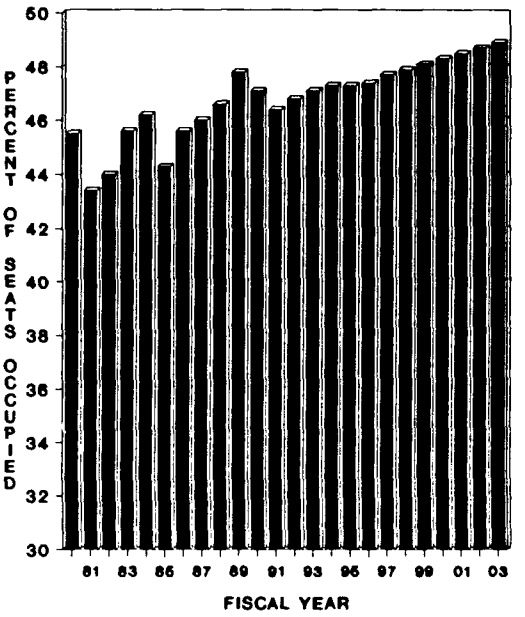
PASSENGER TRIP LENGTH



AVERAGE AIRCRAFT SIZE

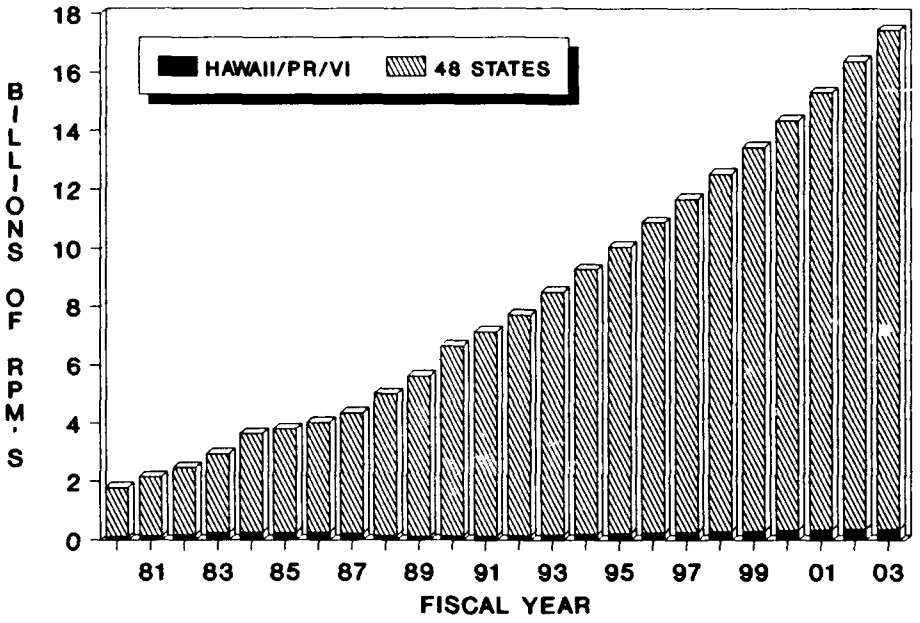


PASSENGER LOAD FACTOR

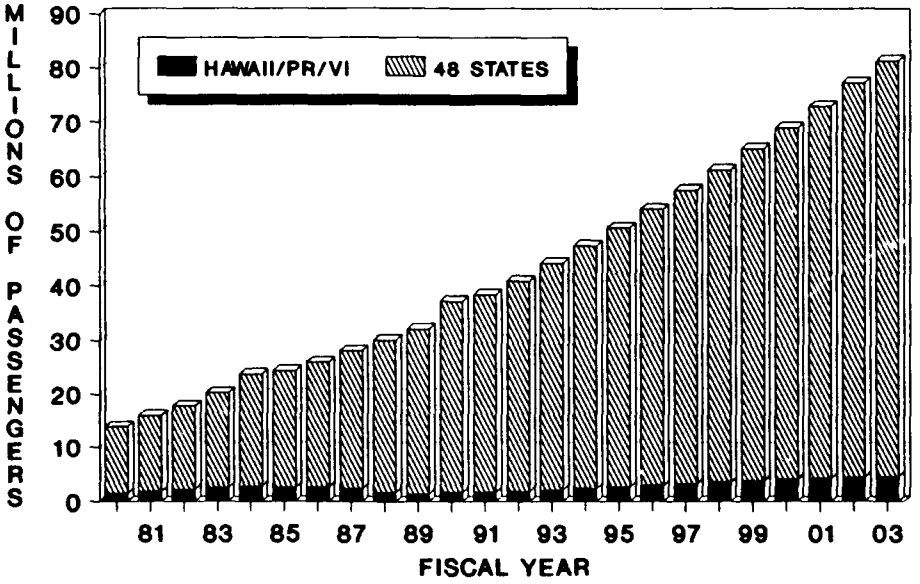


U.S. REGIONALS/COMMUTERS

SCHEDULED REVENUE PASSENGER MILES



SCHEDULED PASSENGER ENPLANEMENTS



REVENUE PASSENGER ENPLANEMENTS

Passenger enplanements are forecast to reach 81.5 million in 2003, more than double the 1991 enplanements. Overall, passenger enplanements are expected to increase by 6.5 percent in 1992 and 8.1 percent in 1993, averaging 6.5 percent growth annually during the forecast period.

In the 48 states, passenger enplanements are projected to increase 6.3 percent in 1992, 7.9 percent in 1993, averaging 6.4 percent growth between 1991 and 2003, totalling 76.9 million in 2003. Enplanements in Hawaii, Puerto Rico, and the Virgin Islands are projected to total 4.6 million in 2003, increasing by 12.8 percent in 1992 and 10.5 percent in 1993, averaging 8.6 percent over the 12-year forecast period.

REGIONAL/COMMUTER FLEET

The current composition of the regional/commuter fleet underscores the growth of the industry and quality of service provided. From a fleet once composed predominantly of general aviation type aircraft, today's fleet is increasingly composed of new state-of-the-art aircraft offering amenities similar to those found on large jet aircraft. Today, regional/commuter airlines have a large variety of aircraft from which to choose to create a fleet tailored to the specific markets they serve.

While there are numerous models to choose from in the categories presented in this forecast, the most significant are the new aircraft in the larger seat size categories, primarily "20 to 40 seats" and "greater than 40 seats." The introduction of the larger new aircraft is reflected in the growth of the average seats per aircraft from 11.9 in 1980 to 21.5 in 1991, an increase of 80.9 percent, while the fleet grew by only 34.2 percent during the same time period.

Over the forecast period, it is projected that the average seats per aircraft will grow at a rate significantly higher than the fleet, reflecting the continued introduction of larger aircraft. The fleet is projected to grow at an average annual rate of 1.7 percent, increasing from 1,896 units in 1991 to 2,324 in 2003.

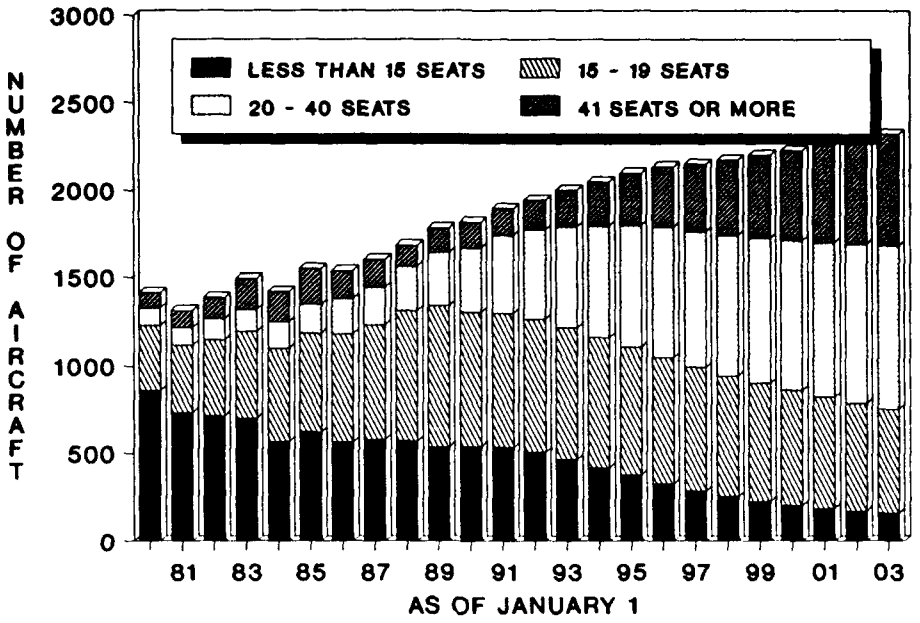
The number of aircraft having under 15 seats, which once made up the bulk of the fleet, decreased slightly 1991. In 1991 this group made up 28.2 percent of the fleet. Between 1991 and 2003, the number of aircraft in this category is expected to decline from 535 to 162, a drop of 69.7 percent. By the year 2003 it will represent only 7.0 percent of the total fleet.

In 1991, the "15 to 19 seats" category accounted for the largest portion of the fleet at 40.2 percent. Over the last 10 years, most of the growth of the regional/commuter fleet has been in this group of aircraft. However, during the forecast period, this group is expected to decline steadily through 2003. It is projected that the "15 to 19 seats" category will drop by approximately 22.2 percent by 2003 compared to 1991, but will still account for over 25 percent of the fleet.

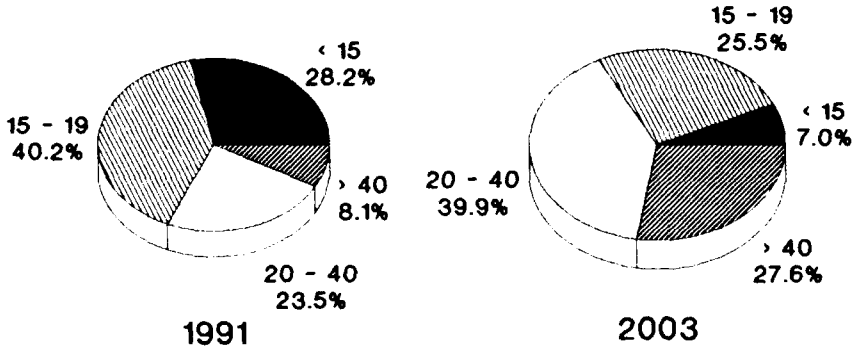
The greatest growth in the fleet will be in the 20 to 40 seats and "greater than 40 seats" categories because of continued substitution of service and new route opportunities created through the use of larger, longer range aircraft. In 1991, the "20 to 40 seats" category accounted for 23.5 percent of the fleet, while the "greater than 40 seats" accounted for 8.1 percent. By the year 2003, these two categories are expected to account for 67.5 percent of the total fleet, with 39.4 percent being in the "20 to 40 seats" category

U.S. REGIONALS/COMMUTERS

PASSENGER AIRCRAFT



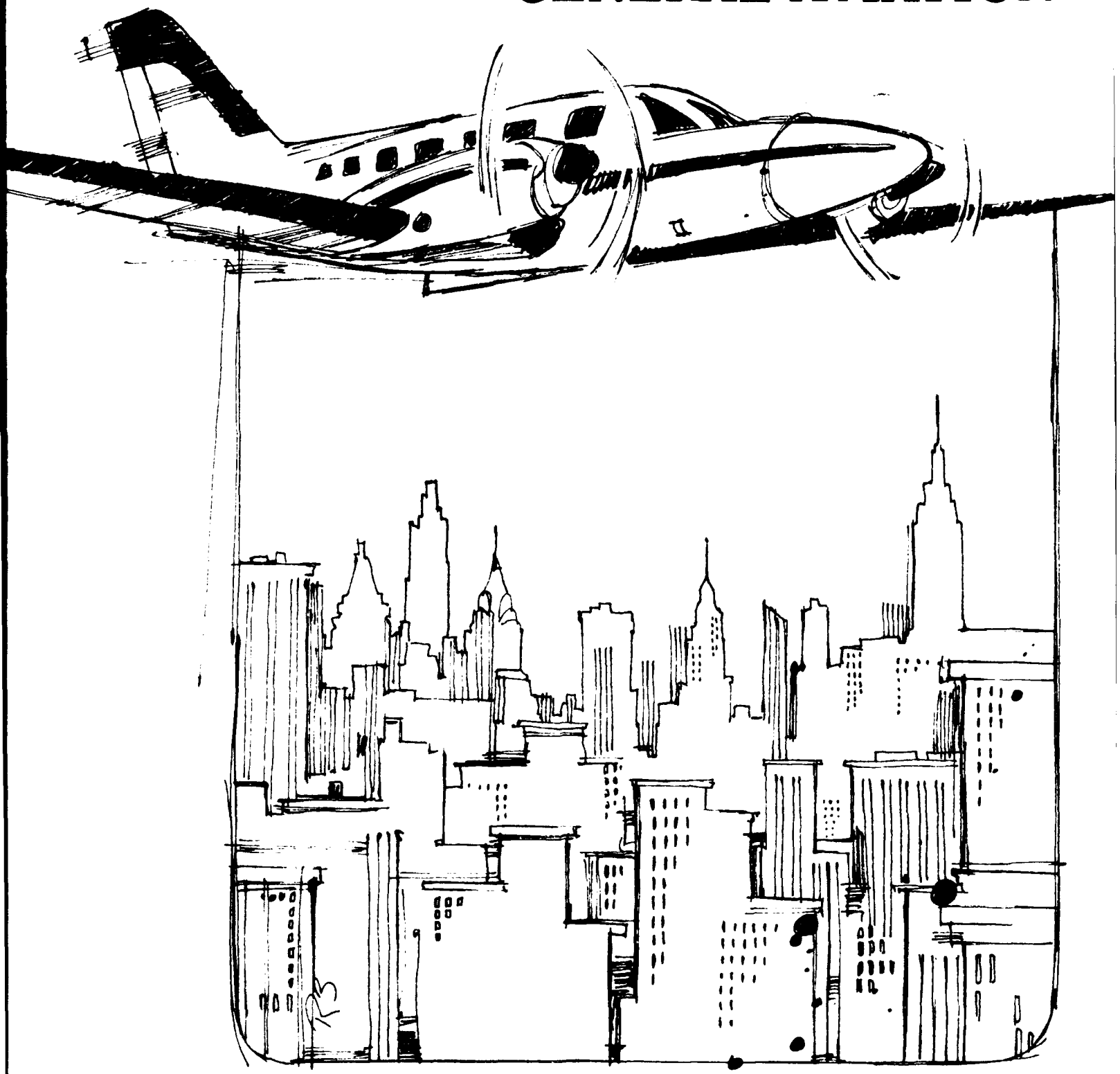
PERCENT BY AIRCRAFT SEAT SIZE



and 27.6 percent in the "greater than 40 seats"category. During the forecast period, aircraft in the "20 to 40 seats" category are expected to increase from 445 aircraft in 1991 to 928 in 2003, an average annual increase of 6.3 percent. Aircraft in the "greater than 40 seats" category are expected to increase from 154 1991 to 641 in 2003, an average annual growth of 12.6 percent.

CHAPTER V

GENERAL AVIATION



CHAPTER V

GENERAL AVIATION

HISTORY

In 1955 some 350 thousand pilots flew the 61 thousand general aviation aircraft for a total of 9 million hours; approximately 7.6 percent of the pilots were instrument rated. By 1980, there were 815 thousand pilots and 210 thousand general aviation aircraft which were flown for a total of 42 million hours; approximately 30.3 percent of these pilots were instrument rated.

Unfortunately, since 1980, the trend has not been as good, with the industry being buffeted by external factors that have inhibited its growth. In 1991, the total number of pilots decreased to 703 thousand and the active fleet had increased only marginally to 212 thousand general aviation aircraft. On the positive side, however, more pilots than ever were instrument rated (42.3 percent) and turbine-powered aircraft increased to 10.0 thousand, up from 8.9 thousand in 1980. Hours flown also dropped during the 80's, registering only 35.2 million hours in 1991, a 16 percent decrease since 1980.

Events that occurred during this period since 1955 that affected the general aviation industry were: eight economic recessions; three fuel crises; and three significant pieces of legislation -- the Airline Deregulation Act of 1978, repeal of the G. I. Bill of Rights in 1979, and the repeal of the investment tax credit in 1986.

Increases in product liability costs have also adversely affected the industry. Over the last 10 years, claims paid by manufacturers have increased from $24 million to over $210 million, despite an improved safety record.

Still another issue is related to environmental concerns and the continued availability of leaded fuel. The Clean Air Act of 1991 threatened the availability of aviation gasoline because it required the phase-out of leaded gasoline after December 1995. Initially, it was feared that the ban would include piston aircraft as well as automobiles. EPA clarified that the ban on lead-fuel-burning engines would not apply to general aviation. Though this was very good news, there still exists the possibility that market forces could lead refiners to stopping the production of 100 octane low lead aviation gasoline, or alternatively, lead to very high prices for leaded fuel.

While the present forecast assumes the continued availability of reasonably

priced leaded fuel, we need to keep our eye on this issue since mid- and long-term survival of the existing general aviation industry depends on the continued availability of reasonably priced 100 octane aviation gasoline.

The graph on page 111 illustrates the growth of the fixed wing general aviation fleet in total and by type of aircraft from 1955 to 1991. Single engine piston aircraft dominate the fixed wing fleet, comprising 83.4 percent of the total in 1991, down from a 90.6 percent share which it held in 1955. Since they were introduced in 1964, turbine-powered aircraft have grown to 5.1 percent of the fixed wing fleet, while the proportion of multi-engine aircraft has increased to 11.5 percent. As previously mentioned, in total the fleet has been relatively stable in size since 1980. The increasing sophistication of the fleet (turbine-powered aircraft), combined with an increasing proportion of the pilot population becoming instrument rated, implies more intensive use of FAA facilities (towers and enroute) even though the total fleet size remains basically unchanged.

Since 1978 there has been a dramatic decline in shipments of all types of general aviation aircraft. A number of reasons have been advanced for this, chief among them being rapid price increase (due in large part to increased manufacturers' liability), high interest rates, expensive fuel throughout this period, and more recently, the "luxury" tax.

DISCUSSION OF FACTORS AFFECTING GENERAL AVIATION

This section discusses three factors which affect the demand for general aviation activity: general growth in the economy; cost factors; and the deregulation of the commercial airline industry.

GENERAL ECONOMIC GROWTH

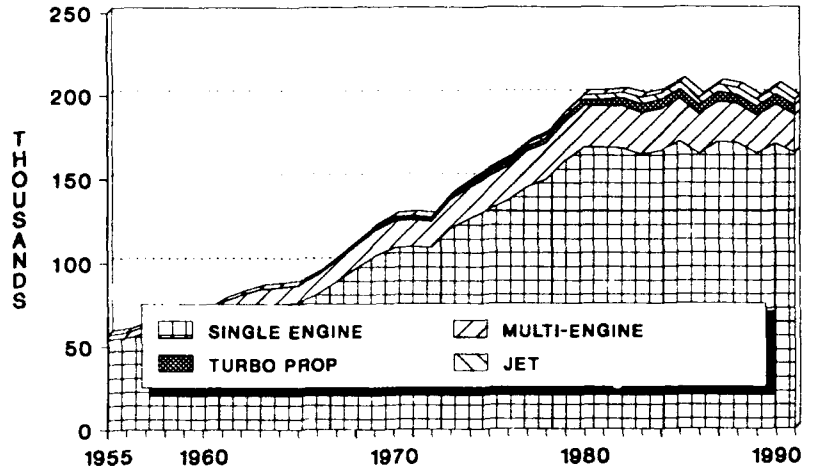
Fundamental changes may have taken place in the general aviation industry. Prior to 1978, changes in the general aviation industry generally paralleled changes in business activity. If business activity were up, so was general aviation. If down, so was general aviation. However, since the long and precipitous decline of aircraft shipments began in the late 1970s, this expected relationship has not held.

The graph on page 111 displays annual shipments of new general aviation aircraft and real gross national product. There were surges in sales during the late 1960's and during most of the 1970's. The introduction of the turbine-powered aircraft and the investment tax credit combined with general economic growth were sufficient to overcome a fuel crisis in 1973. What caused the decline that persists to this day? As shown, past declines in aircraft sales have often been associated with downturns in the national economy -- for example recessions in 1960, 1970, and 1975 -- but sales usually resumed as the recession subsided. However, this has not been the case since 1978. Some of the declines during these years of generally robust economic growth can probably be attributed to higher costs and the deregulation of the commercial aviation sector.

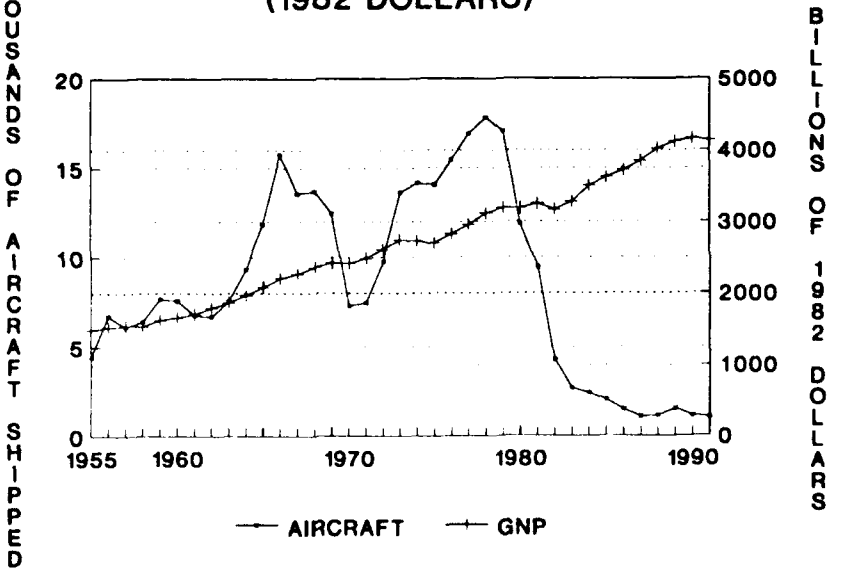
COST FACTORS

The total cost of owning (maintaining and operating) all classes of general

HISTORICAL TREND OF GENERAL AVIATION FIXED WING FLEET (IN THOUSANDS)



GENERAL AVIATION UNITS SHIPPED VERSUS GROSS NATIONAL PRODUCT (1982 DOLLARS)



aviation aircraft has been steadily increasing. As shown on pages 113 to 116 and detailed in Appendix F (page 245), the total nominal cost of owning and operating an aircraft has increased between 85 and 96 percent (4.8 and 5.3 percent annually) since 1978. However, these increases have largely been inflationary, comparing favorably to increases in the consumer price index over the same period. During the last two years, however, the increases have been somewhat higher, due in large part to higher fuel prices as a result of the Persian Gulf War.

In contrast (and as also detailed in Appendix F), the nominal cost of purchasing aircraft has also risen dramatically, far exceeding the rise in inflation. Since 1978, the cost of purchasing a single engine piston aircraft has increased by 126 percent (through 1986, the last year for which data are available for this particular aircraft category); the cost of purchasing a multi-engine piston aircraft has risen by 197 percent; the cost of purchasing a turboprop aircraft has risen by 171 percent; and the cost of purchasing a turbojet has risen by 144 percent. Over the last two years, these increases have continued, with the purchase price of multi-engine piston aircraft, turboprop aircraft and turbojet aircraft increasing by 12.5, 12.2, and 13.2 percent, respectively.

Clearly, these increases, especially those in the purchase price, have negatively affected general aviation. However, these economic and cost factors may not explain the total change we are witnessing.

DEREGULATION OF THE U.S. COMMERCIAL AIRLINE INDUSTRY

The deregulation of the U.S. commercial airline industry has also affected general aviation. Increased service and better connections by air carriers and regional/commuters has likely reduced the desirability of using private, general aviation aircraft when planning business or pleasure trips. On the other hand, if real fares and delays on short- and medium-haul markets increase, general aviation might again become an attractive alternative.

Other factors possibly affecting general aviation, especially the personal use of general aviation, may be: changes in disposable, discretionary income; increases in air space restrictions applied to VFR aircraft; reductions in leisure time; and shifts in personal preferences as to how free time is spent. All of these factors need to be more fully examined if we are to better understand the decline in the 1980's and better forecast future activity levels.

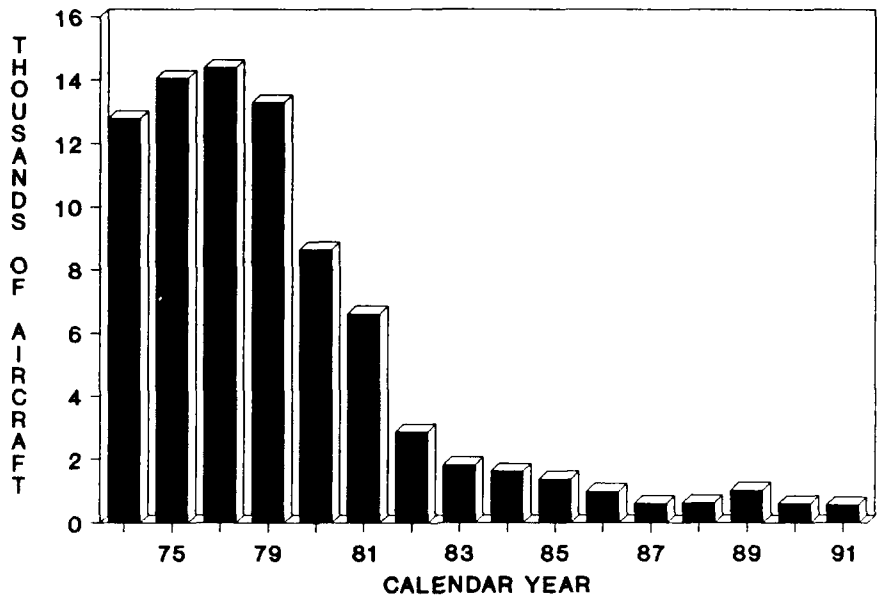
REVIEW OF 1991

FLEET COMPOSITION AND AIRCRAFT SHIPMENTS

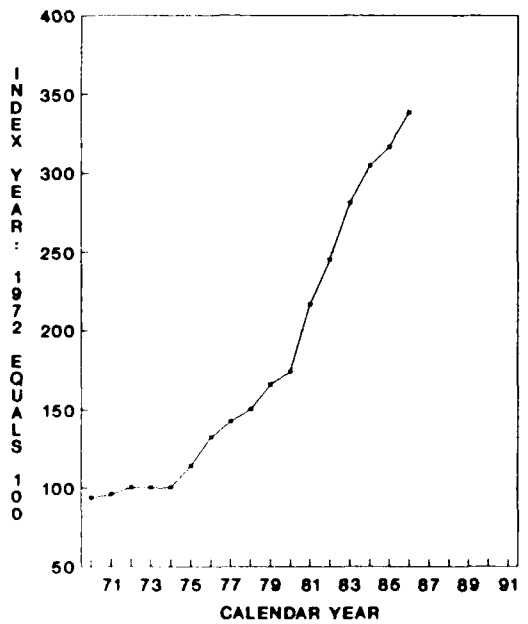
The total active general aviation fleet estimate was down 3.4 percent in 1991. (The "active fleet" consists of any aircraft flown at least one hour during the previous year, as reported by the registered owner in a sample survey of general aviation activity.) Based on this survey, the general aviation active fleet consisted of 212,210 aircraft on January 1, 1991. This compares to 219,737 aircraft reported a year earlier. The single engine piston active fleet decreased from 170,370 to 165,073 (down 3.1 percent); the multi-engine piston fleet decreased from 23,445 to 22,700 (down 3.2 percent); the turboprop fleet decreased from 6,324 to 5,634 (down 10.9 percent); and

SINGLE ENGINE PISTON AIRCRAFT TRENDS

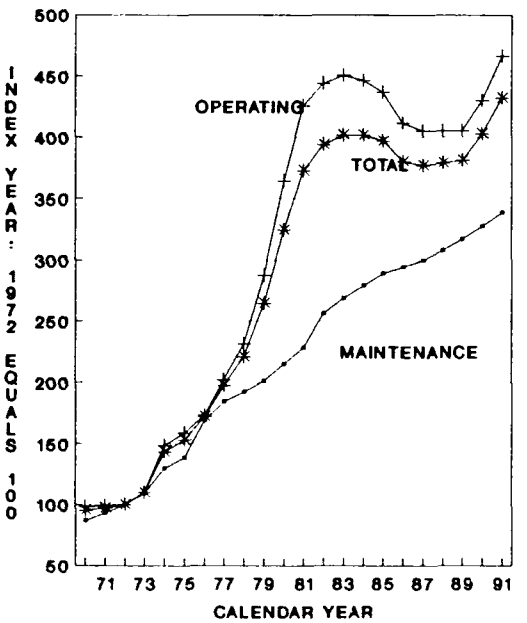
AIRCRAFT SHIPMENTS



AIRCRAFT PRICES

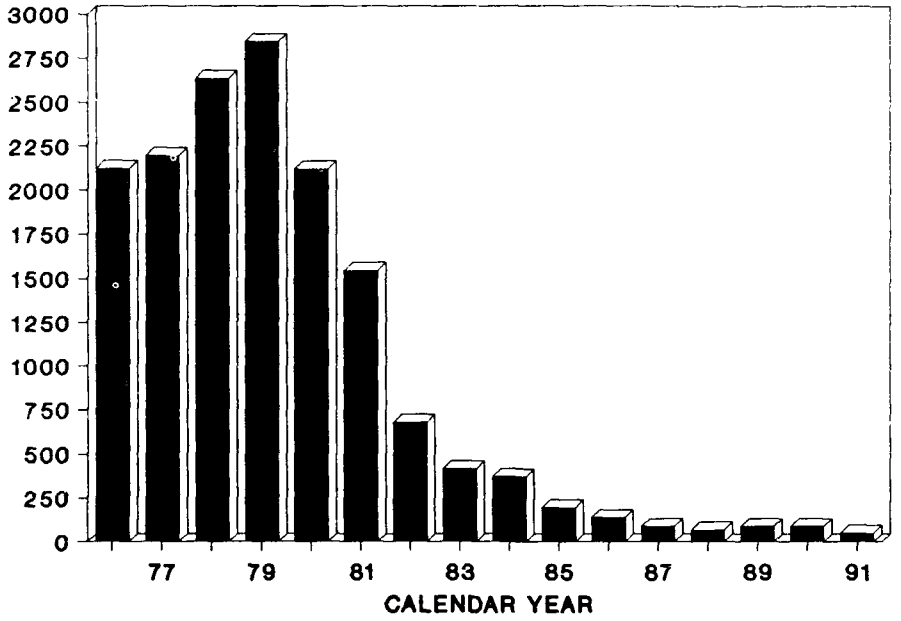


OPERATING AND MAINTENANCE COSTS

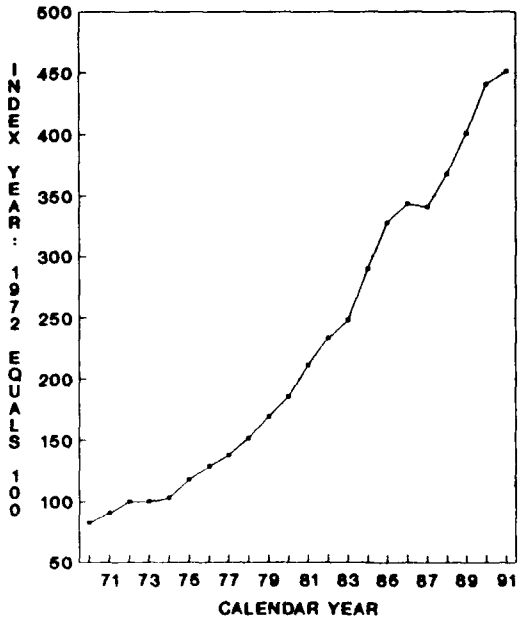


MULTI-ENGINE PISTON AIRCRAFT TRENDS

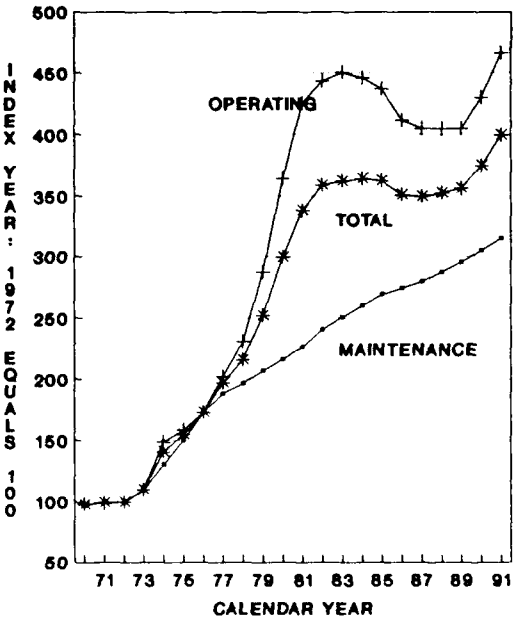
AIRCRAFT SHIPMENTS



AIRCRAFT PRICES

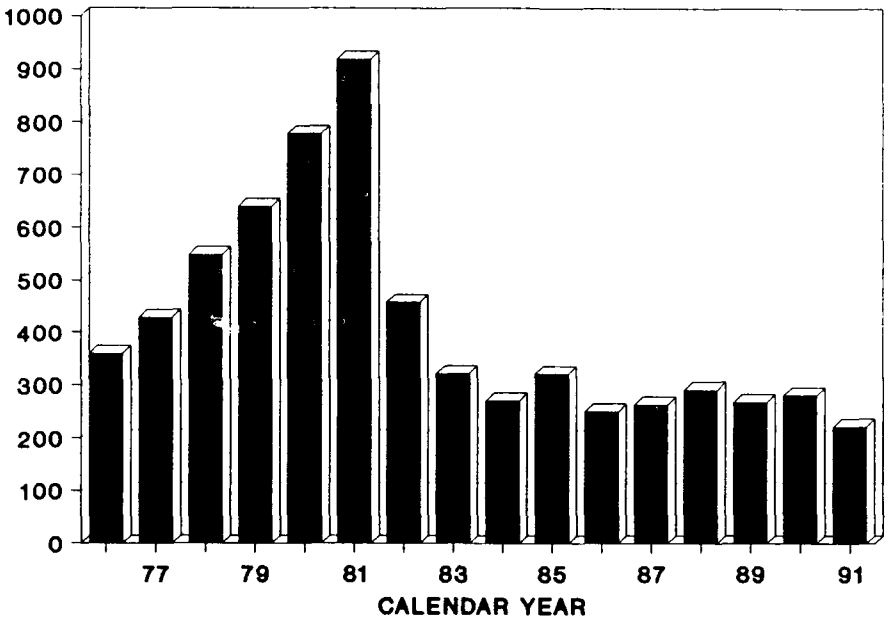


OPERATING AND MAINTENANCE COSTS



TURBOPROP AIRCRAFT TRENDS

AIRCRAFT SHIPMENTS



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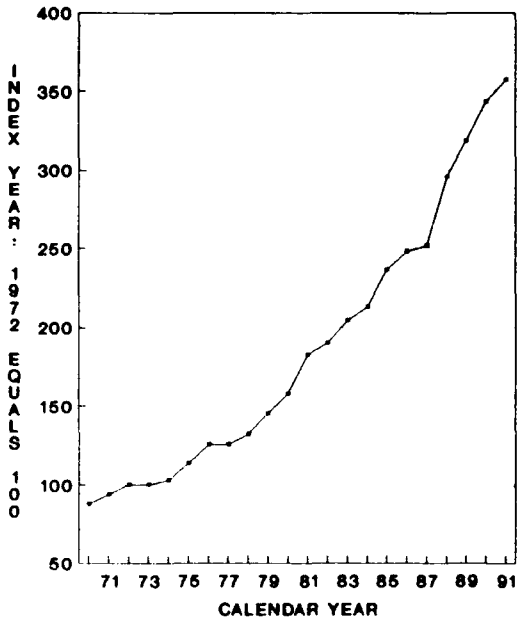
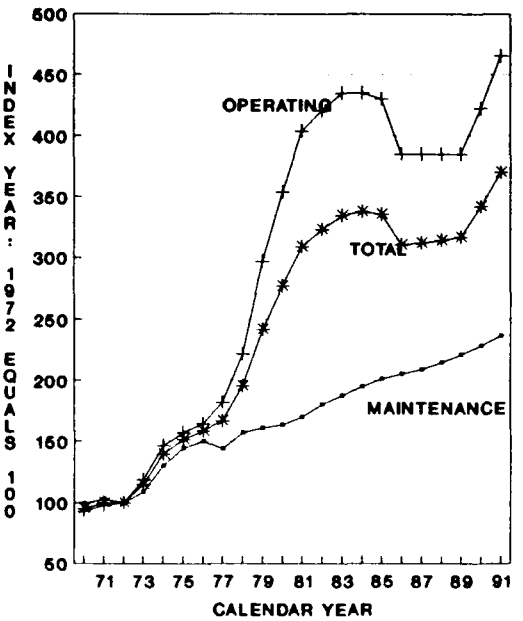
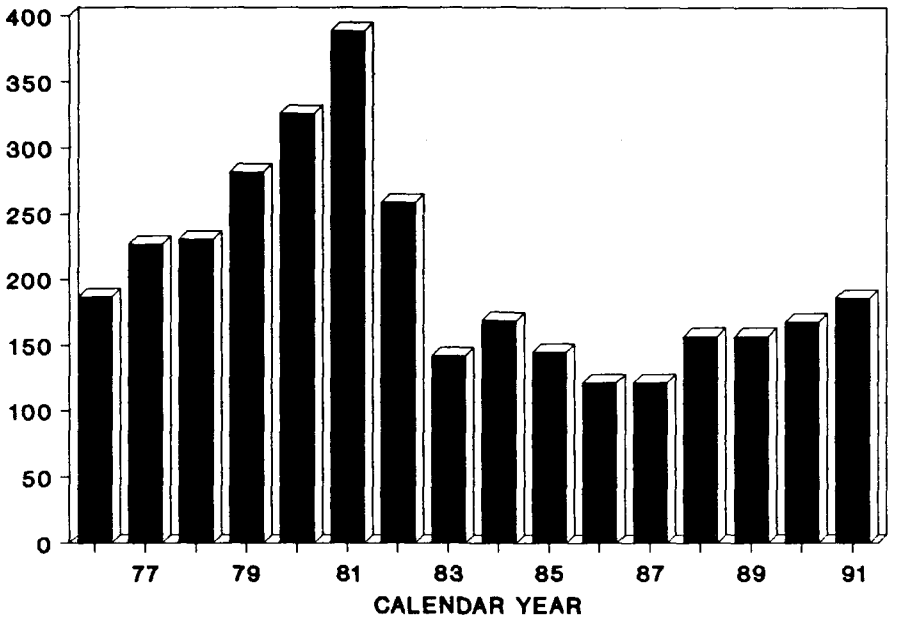


OPERATING AND MAINTENANCE COSTS

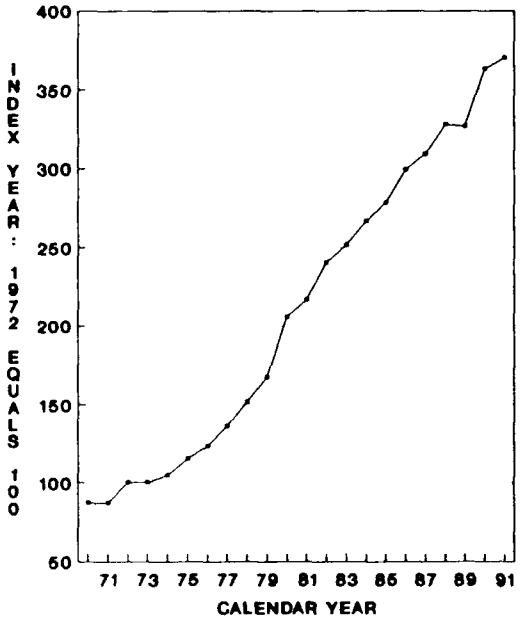


TURBOJET AIRCRAFT TRENDS

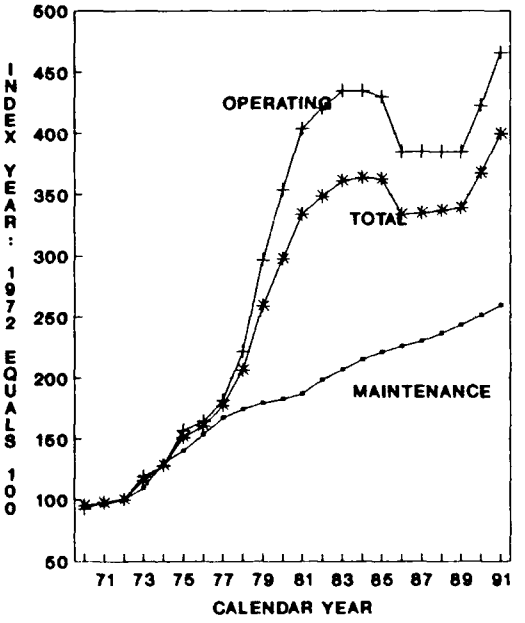
AIRCRAFT SHIPMENTS



AIRCRAFT PRICES



OPERATING AND MAINTENANCE COSTS



the turbojet fleet de-creased slightly from 4,402 to 4,374 (down 0.6 percent). The number of active rotorcraft (piston and turbine helicopters) was down 1.1 percent in 1991, from 7,476 to 7,397. In addition, the active general aviation fleet includes an "other category," which consists of 7,032 gliders and lighter-than-air aircraft (blimps, dirigibles, and balloons). Unfortunately, these fleet data are estimated using a sample from the FAA registry and are subject to variation due to errors in the registry and statistical sampling procedures. Consequently, variations of plus or minus 5 percent in any of the above categories are not necessarily significant.

HOURS FLOWN

Total hours flown were up over the previous year by 1.1 percent. Total hours flown increased from 34.8 million in 1990 to 35.2 million in fiscal year 1991. Hours flown in single engine piston aircraft increased 2.1 percent, hours flown in multi-engine piston aircraft decreased 2.3 percent, hours flown in turboprop aircraft decreased 3.7 percent, and hours flown in turbojet aircraft increased 6.7 percent. It is believed that increases in hours flown in turbine-powered aircraft reflect increased business usage of general aviation aircraft, as well as increased regional/commuter and air taxi operations. Hours flown by piston and turbine powered rotorcraft remained fairly constant in 1991.

PILOT POPULATION

As of January 1, 1991, the total pilot population was 702,659. This was 2,659 more pilots than a year earlier when the pilot population was 700,010, an increase of 0.3 percent. The pilot population consists of four major groups: student, private, commercial, and airline transport. Three of the four groups increased during the previous year: private pilots increased from 293,179 to 299,111 (up 2.0 percent); commercial pilots increased from 144,540 to 149,666 (up 3.5 percent); and airline transport increased from 102,087 to 107,732 (up 5.5 percent). The number of student pilots declined 9.7 percent in 1991, from 142,544 to 128,663. In addition, there are three other small categories (helicopter, glider, and recreational), which accounted for 17,487 pilots in 1991.

These changes follow the trends of previous years, reflecting the strong demand for airline transport pilots and the declining interest in, or ability to afford, recreational and private flying.

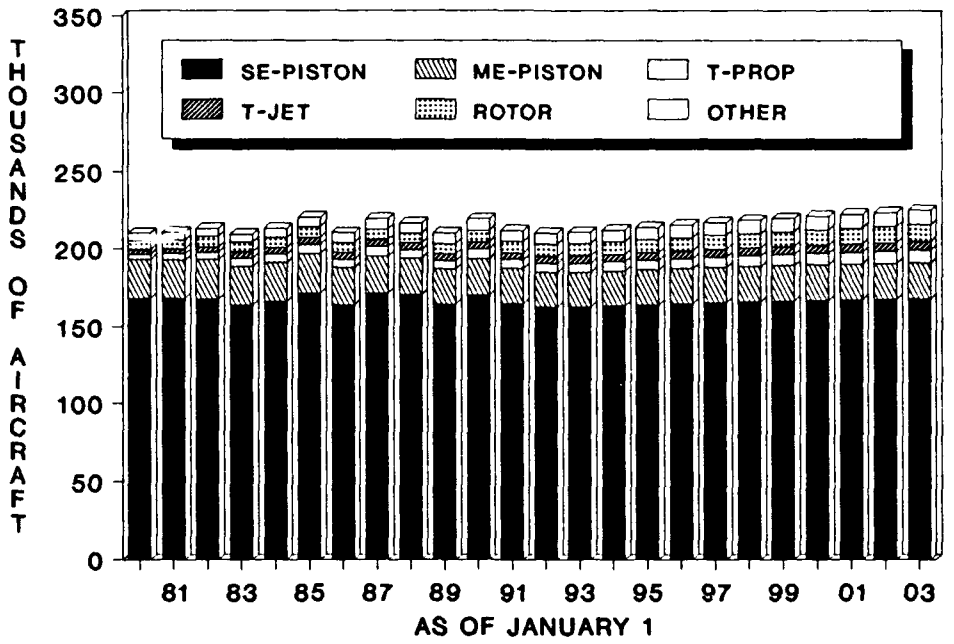
GENERAL AVIATION FORECASTS

FLEET COMPOSITION

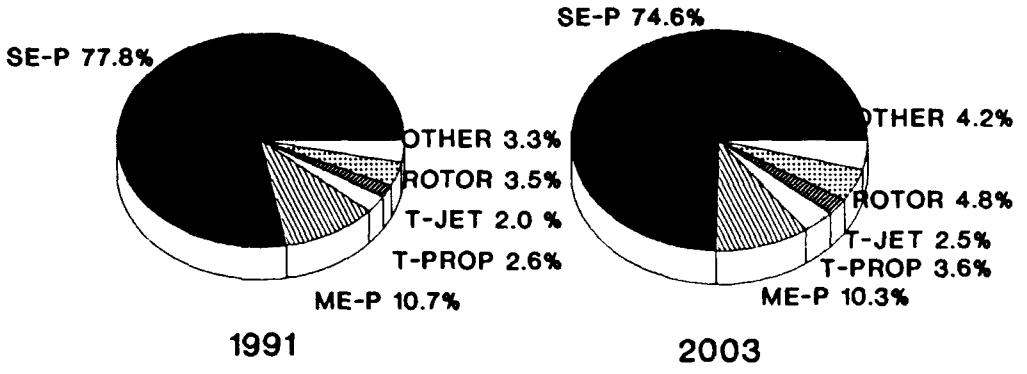
The FAA general aviation forecasts include only active aircraft. As shown in Table 21 and the graphs on page 118, the active general aviation fleet will grow slowly (up 0.5 percent annually) over the 12-year forecasting period, with the increase being driven primarily by greater business use of general aviation.

The number of active single engine piston aircraft is projected to remain almost constant over the 12-year forecast period, increasing from 165,073 in 1991 to 168,300 in 2003. The number of multi-engine piston aircraft is expected to increase slightly from 22,700 aircraft to 23,200 thousand in 2003, an average annual increase of 0.2 per-

ACTIVE GENERAL AVIATION AIRCRAFT



PERCENT BY AIRCRAFT TYPE



cent.

Reflecting the increasing sophistication of general aviation flying, turbine-powered aircraft are projected to increase from 10,008 in 1991 to 13,700 in 2003, an annual growth rate of approximately 2.6 percent. The turbine rotorcraft fleet is projected to increase at an annual rate of 6.1 percent over the 12-year period.

HOURS FLOWN

As shown in Table 23 and the graphs on page 120, growth in general aviation hours flown is expected to average only 1.2 percent annually over the 12-year forecast period, reaching an estimated 40.5 million hours flown in 2003. By contrast, the average annual growth rate in hours flown was about 6.0 percent during the 1960's and 1970's. Single engine piston aircraft hours flown are forecast to increase from 23.8 million hours in 1991 to 25.0 million in 2003, an annual rate of growth of only 0.4 percent. Turbine-powered aircraft hours flown are projected to increase from 4.2 million in 1991 to 5.6 million in 2003, an annual growth rate of 2.5 percent. Turbine rotorcraft hours flown are expected to increase at an annual rate of 6.5 percent over the same time period.

PILOT POPULATION

As shown in Table 24 and the graphs on page 121, the total pilot population is forecast to increase to 810,800 by 2003, a 1.2 percent annual growth rate. Airline transport pilots are projected to reach 153,900 in 2003, a 3.0 percent annual growth rate. This reflects the continuing demand for airline transport pilots as the commercial air carriers accommodate increased traffic demands and reflects our belief that the industry has not yet matured. (See Chapter II.) If, however, the commercial industry has matured, then these projected increases in total and transport pilots will be optimistic. As for private pilots, they are only projected to grow 0.4 percent annually over this same period.

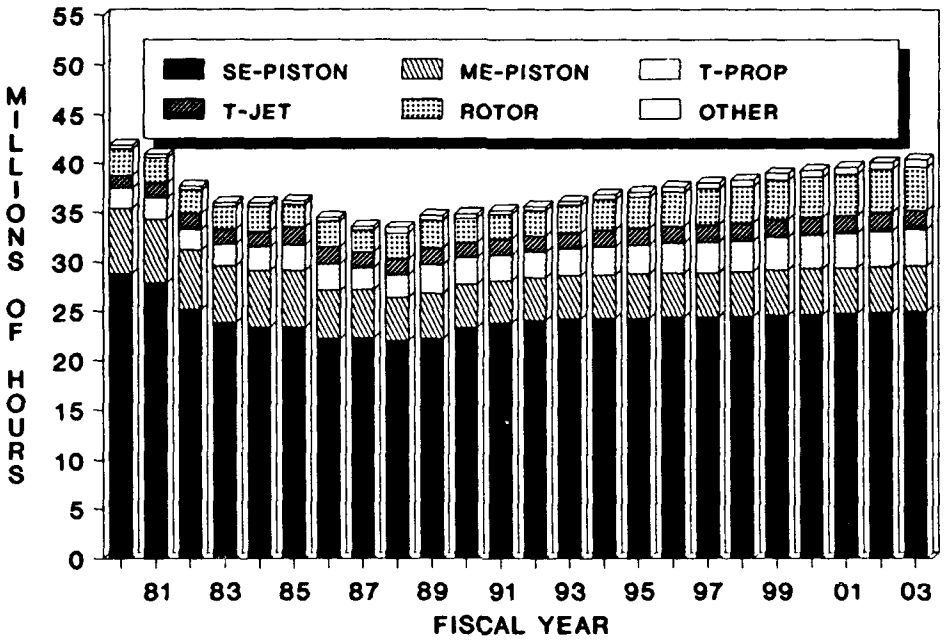
FAA INITIATIVES

FLEET ESTIMATES

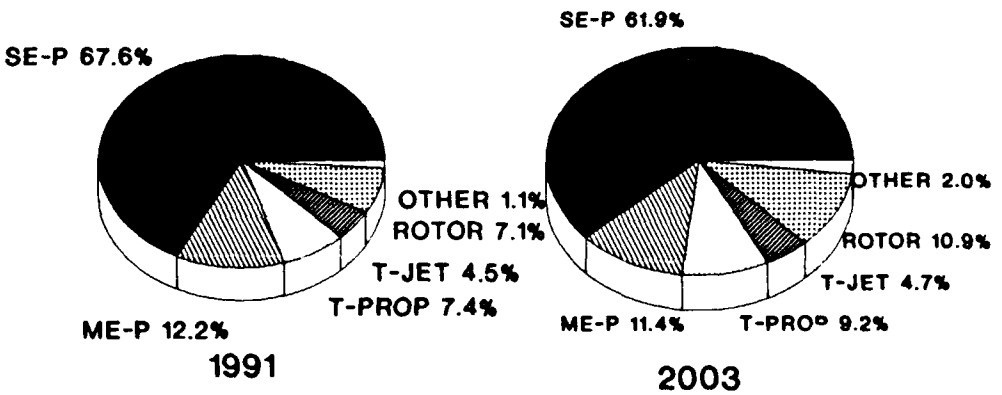
There have been some questions as to the accuracy of the FAA estimates of active general aviation aircraft, particularly during the decade of the eighties. For example, between 1989 and 1990 the fleet estimate increased by 10 thousand aircraft. New aircraft shipments had again declined during this period (1,144 units shipped) and used aircraft exports had increased to over a thousand units exported. This raised questions as to the validity of the increase in aircraft size. Therefore, we have undertaken an analysis of the current sampling procedures to see if more accurate estimates could be provided for an improved data base on which to base future fleet and activity projections for manpower and facility planning.

General aviation is an important component of both the aviation industry and our national economy. It provides aviation services that commercial aviation cannot or will not provide, while the production and sale of general aviation aircraft, avionics, and other equipment, along with the provision of support services such as flight schools, fixed base operators, finance, and insurance, make the general aviation industry an important contributor to the nation's economy. Unfortunately, the health of the general

GENERAL AVIATION HOURS FLOWN

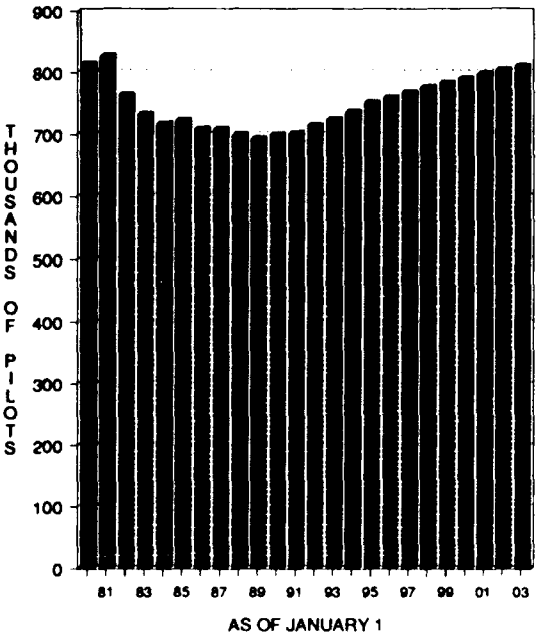


PERCENT BY AIRCRAFT TYPE

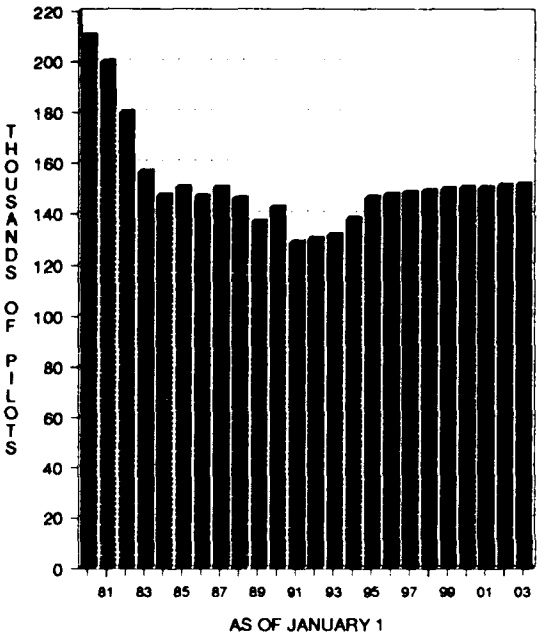


ACTIVE PILOT TRENDS AND FORECASTS

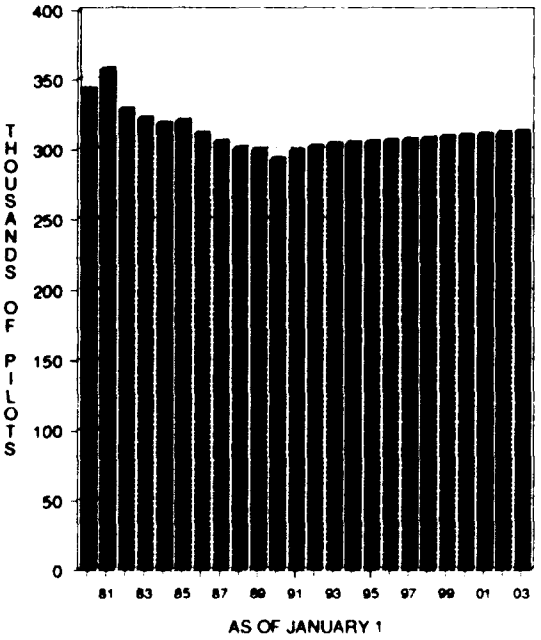
TOTAL PILOTS



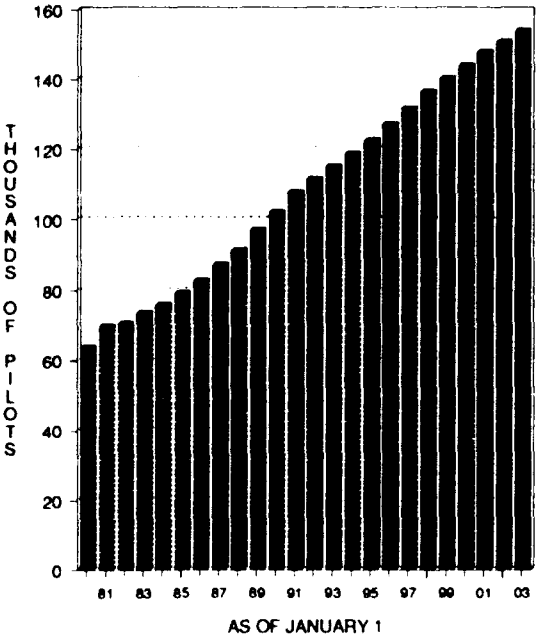
STUDENT PILOTS



PRIVATE PILOTS



AIRLINE TRANSPORT PILOTS



aviation industry continues to be mixed. The continuing decline in shipments of the single engine piston aircraft is a cause for concern as the single engine piston aircraft market is the base on which general aviation activity builds. Historically, new pilots are trained in single engine piston aircraft and work their way up through retractable landing gear and multi-engine piston to turbine aircraft. When the single engine piston market declines, as it has since 1978, it signals the slowing of expansion in the general aviation fleet and, consequently, a slowing in the rate of growth of activity at FAA facilities serving general aviation.

FORECAST CONFERENCE

Realizing that the general aviation industry faces new challenges and opportunities, the FAA has instituted a new forum to consult with the industry--the Second Annual FAA General Aviation Forecast Conference will be held in Newport Beach, California on March 12 and 13, 1992. This conference will be held in the late winter or early spring each year and will bring together industry experts to obtain their informed judgments on future trends and developments in the industry. This conference seeks to open new avenues of communication for the FAA with this significant segment of the aviation community to assure that the FAA meets general aviation demand in a way that provides safe and efficient transportation for those who use and depend upon the National Airspace System.

FORECAST MODEL REVIEW

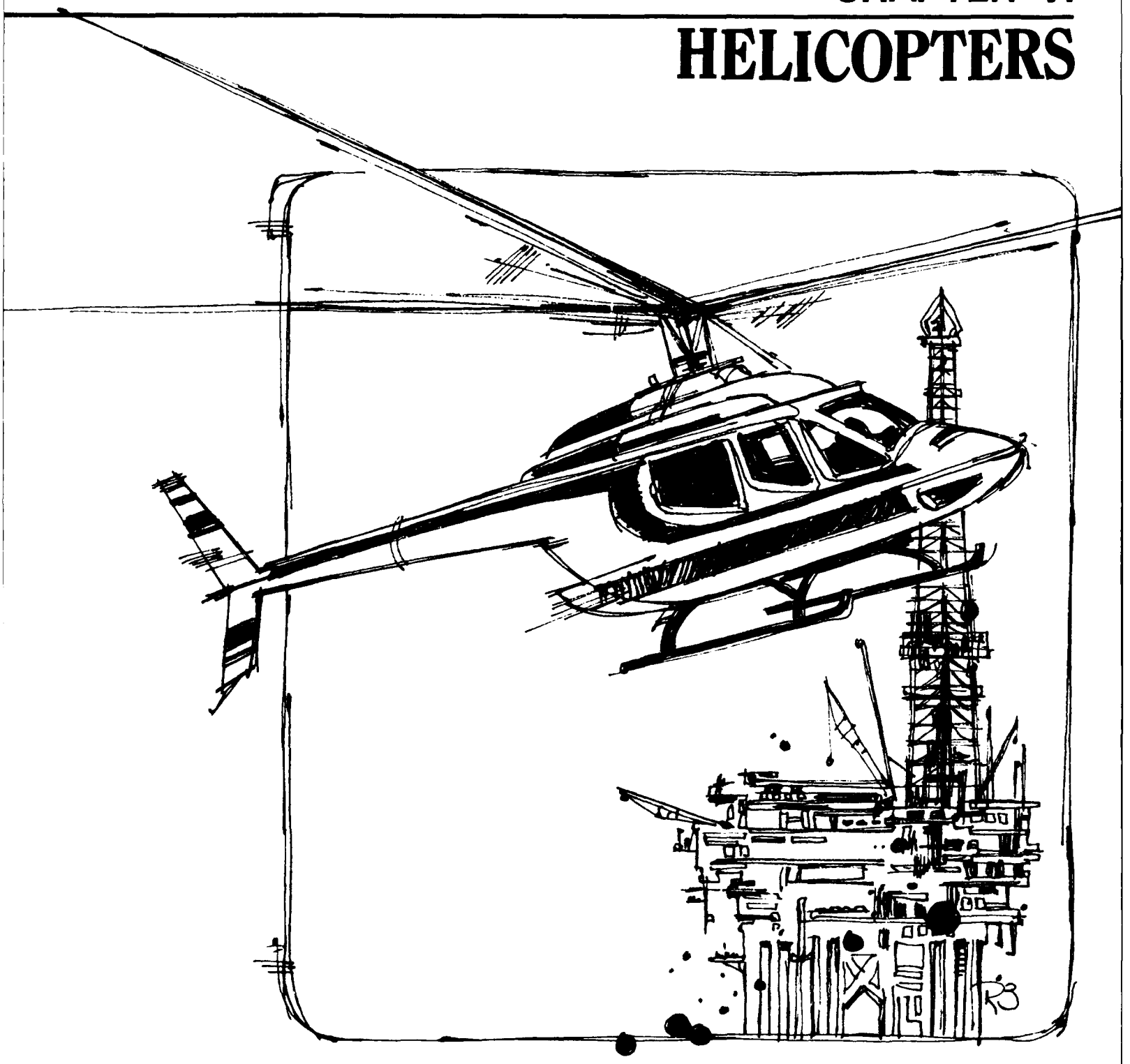
General aviation is the term used to describe all of the segments of the aviation industry, except for air carrier and military. It describes a diverse range of aviation activities from the training of beginning pilots to the long range jet transportation of executives. It includes agricultural flying, air taxis, and pleasure flying.

Just as the activities of general aviation are dissimilar, so are the reasons that motivate general aviation activity, many of which are not economic. It has been extremely difficult to forecast measures of general aviation activity in recent years because the relationships between measures of general aviation activity and the traditional economic variables appear no longer valid. The FAA Forecast Branch has deemed it necessary to review the general aviation forecasting methodology in order to develop a better understanding of the changing environment in which the industry operates.

A review was initiated in fiscal year 1990 to address this task. Though not yet completed, initial findings appear to suggest that segmentation may be important for analysis and that perhaps the pilot population should be divided into compensated and uncompensated flying. Further, use of delphi intervention may be appropriate in order to get input from general aviation experts to adjust forecasts. Pilot population cohort and time series analyses may also have merit. Medical records may also be a good way to deal with pilot information, from which hours flown and fleet might be estimated. This might avoid sampling problems that we currently have with the aircraft register and the avionics survey.

Even though reviews of FAA forecast methodologies for general aviation continue, we continue to have confidence in the forecasts presented in this document. The increases shown in the present forecast, while moderate, represent a turnaround from the stagnation of recent years.

CHAPTER VI
HELICOPTERS



CHAPTER VI
HELICOPTERS

REVIEW OF 1991

SHIPMENTS

Preliminary data for calendar year 1991 indicate that shipments of United States civil helicopters will total 596 units valued at $190 million. Compared to 1990, the number of helicopters shipped decreased slightly by 1.5 percent while the value of the shipments decreased significantly (down 25.2 percent) due in part to the production of a large number of smaller, less expensive units and to the softness of the economy over the course of the year. This slight decrease in the number of units shipped combined with large decreases in the value of these shipments indicate that the anticipated economic recovery of the industry did not occur in 1991.

In 1991, the value of helicopters exported increased by 7.5 percent to $173 million. Imports increased substantially by 58.6 percent to $257 million. Thus, there was a net loss in the foreign trade balance of helicopters of approximately $84 million. This net loss contrasts sharply with the previous year's net loss of only $1 million in the trade balance.

FLEET AND HOURS FLOWN

As of January 1, 1991, there were approximately 7,400 active civil rotorcraft in the United States, about the same number as were active in January 1990.

Active turbine helicopters numbered 3,900 in 1991, approximately 52.7 percent of the active fleet. The proportion of active turbine helicopters decreased slightly in 1991 relative to the 1990 proportion of 56.8 percent. The number of active piston-powered rotorcraft increased by 9.4 percent in 1991 to 3500. The number of active piston-powered helicopters in 1991 was 6.1 percent higher than the previous peak of 3,300 observed in 1982.

Rotorcraft flew an estimated 2.5 million hours in 1991. Turbine-powered rotorcraft flew 1.7 million hours, 68.0 percent of the total number of hours flown. In 1991, the number of hours flown by both turbine-powered and piston-powered rotorcraft remained unchanged relative to the final estimates for 1990.

HELICOPTER FORECASTS

The forecasts of rotorcraft fleet and hours flown presented in this section are derived from the general aviation forecasts and from econometric models and time series analyses undertaken previously. The models and analyses were developed by user category (executive, business, personal, etc.). Forecasts of helicopter activity were generated by user category and were added to obtain the national forecasts. The independent variables used in developing the estimates include the cost of owning a helicopter, total employment, and the cost of oil and gas relative to other prices. One of the underlying assumptions is that the cost of fuel would increase. As this occurred, increased petroleum production and exploration would be profitable, leading to increased rotorcraft usage, particularly in off-shore drilling operations. This. together with increased use of helicopters in the general economy, would lead to an increase in the fleet and in hours flown.

This year's forecasts maintain these assumptions and their rationale, by simply updating last year's effort to reflect data for calendar year 1990 and revised economic conditions in the industry. Of course, these forecasts could be affected by the severity and duration of the current economic downturn.

FLEET AND HOURS FLOWN

The active rotorcraft fleet is expected to reach 10,800 in the year 2003, an annual average increase of 3.2 percent over the 1991 level. In 2003, the turbine-powered portion of the fleet will number 8,000. This portion of the fleet will increase to 74.1 percent from the 1991 proportion of 52.7 percent. The piston-powered fleet will decrease to 2,800 from its current level of 3,500 helicopters, continuing the trend of piston-powered fleet decreases.

The anticipated growth in the fleet will be accompanied by growth in hours flown which will reach 4.4 million in 2003. This represents an annual average growth of 4.8 percent. Hours flown by turbine-powered helicopters will increase by approximately 117.6 percent and will reach 3.7 million by 2003. In contrast, hours flown by piston-powered rotorcraft will decrease slightly to approximately 700,000 hours during the latter part of the forecast period.

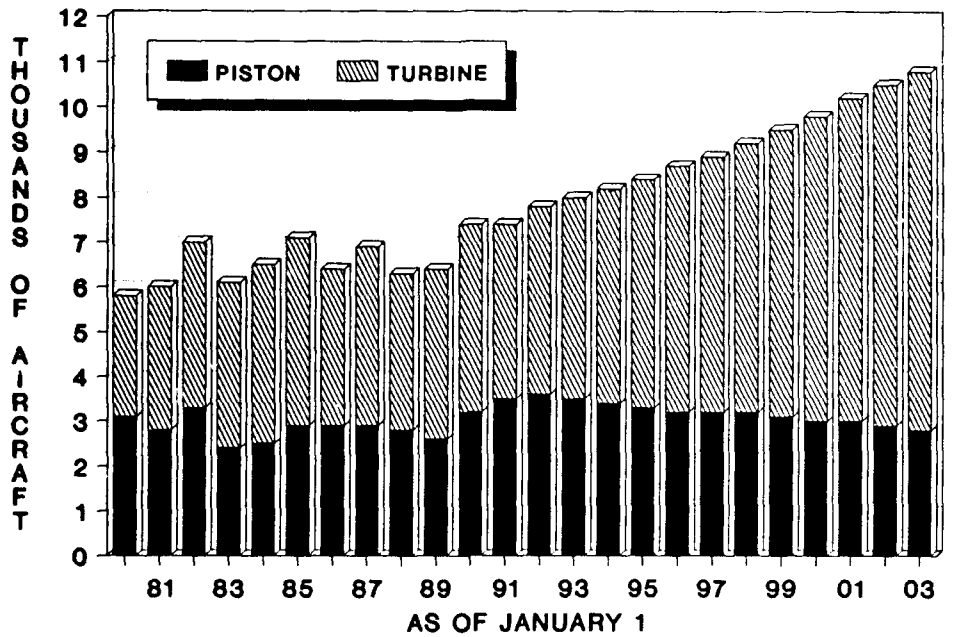
FUEL CONSUMED

In 1991, fuel consumed by rotorcraft totaled 68.8 million gallons. By 2003, fuel consumed will increase to about 135.7 million gallons, an average annual increase of 5.8 percent. More than 93.0 percent of the fuel consumed in 2003 will be used by turbine-powered rotorcraft compared with approximately 86.0 percent in 1991.

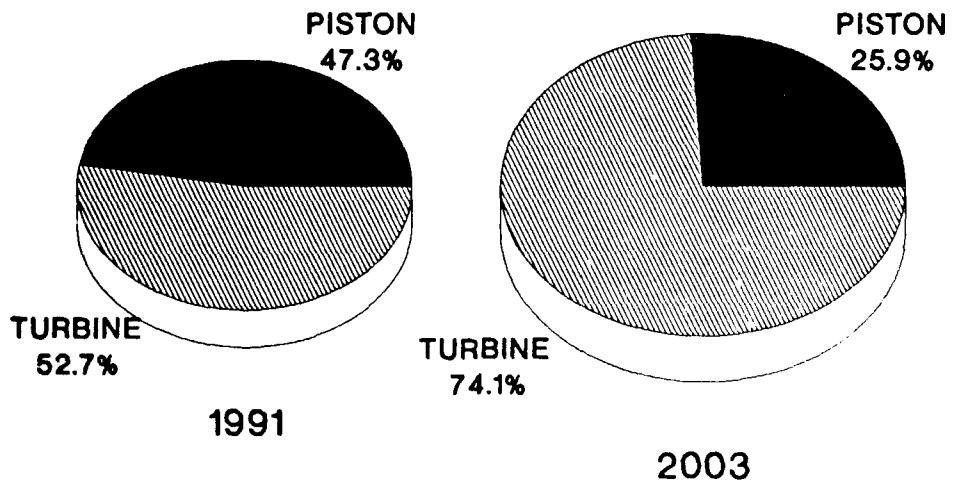
TILTROTOR DEVELOPMENT

The technology for a military tiltrotor aircraft has been demonstrated successfully. The aircraft can function as a helicopter on takeoffs and landings and is capable of flying like a conventional fixed-wing aircraft at cruising speeds of up to 300 knots. The aircraft recently completed two years of flight testing and has been given additional funding to move the program into the manufacturing development phase. While these aircraft may ulti-

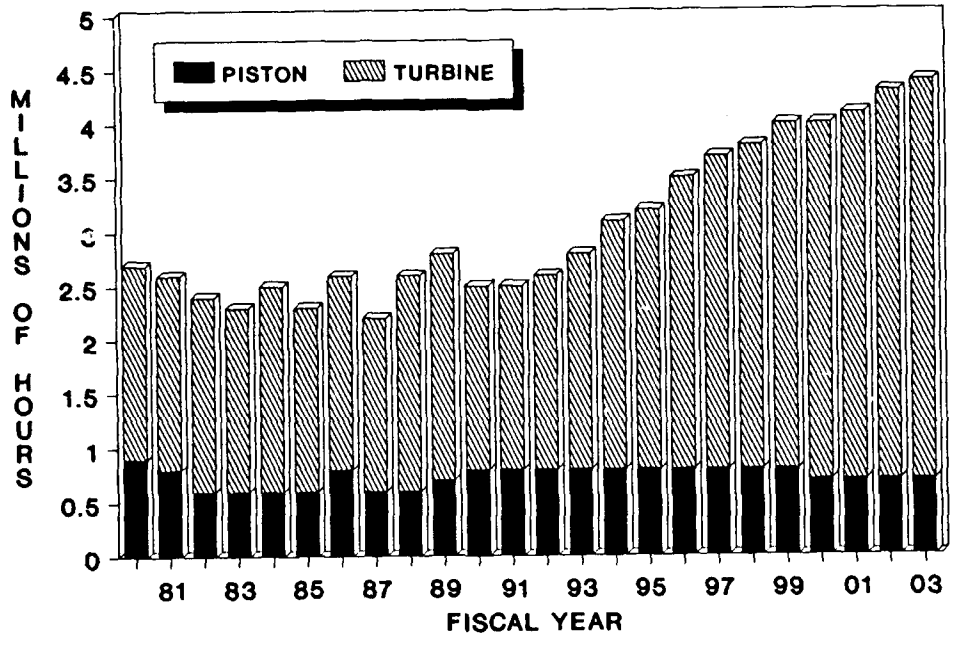
ACTIVE ROTORCRAFT



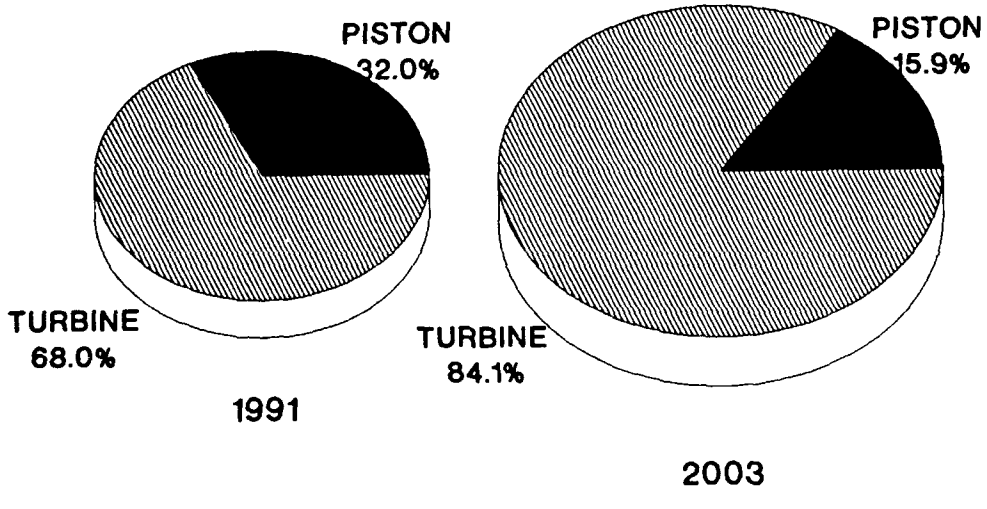
PERCENT BY AIRCRAFT TYPE



ROTORCRAFT HOURS FLOWN



PERCENT BY AIRCRAFT TYPE



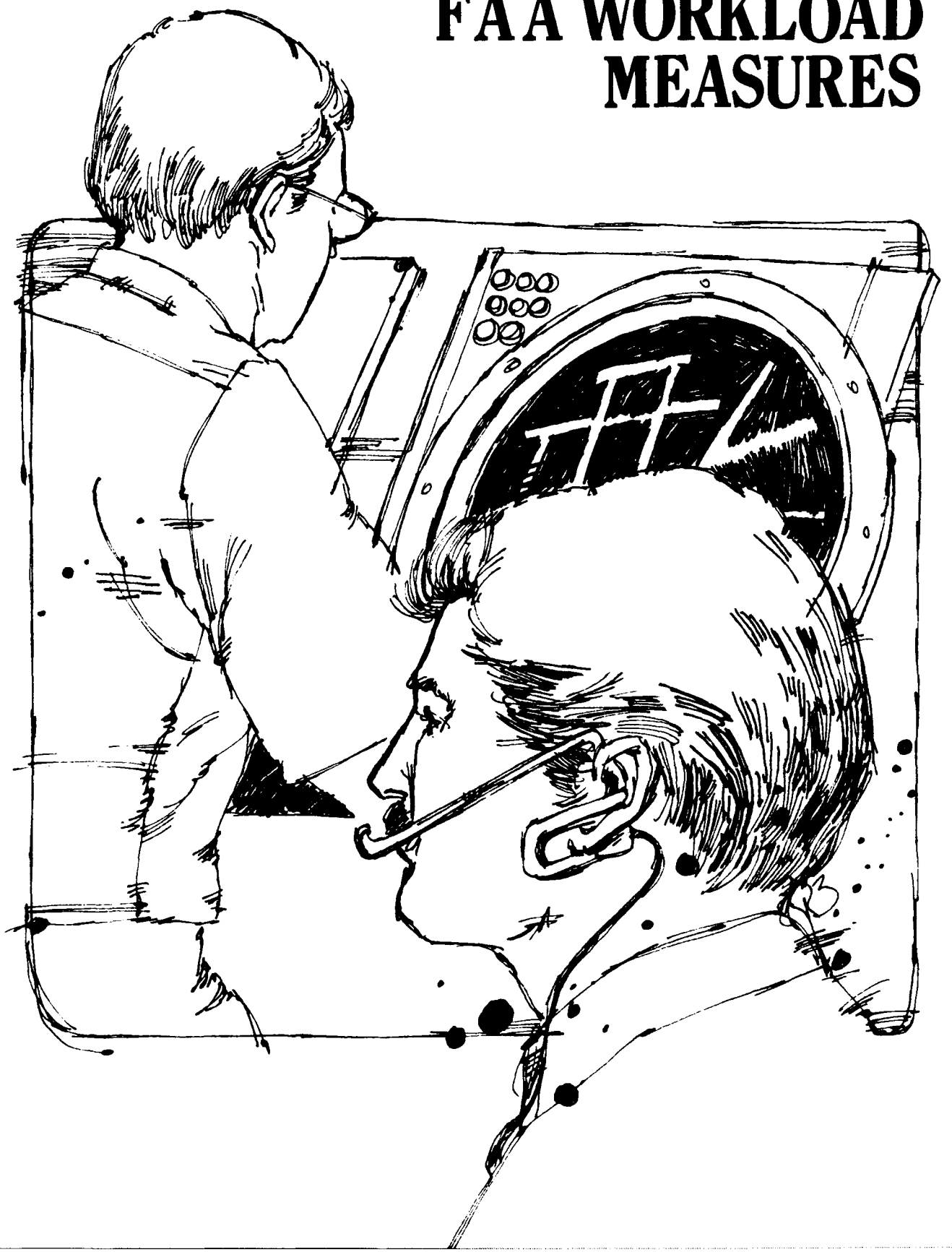
mately be ordered by the armed forces, their future is still uncertain. Without military production, it is very unlikely (though admittedly still possible) that tiltrotor aircraft would be introduced into the civilian market by the turn of the century.

Use of the tiltrotor aircraft in significant numbers has the potential to enhance the capacity of currently congested airports and airspace such as the Northeast Corridor of the United States. However, to realize that potential, tiltrotor operations may require dedicated routes and special procedures as well as infrastructure investment in heliports and vertiports.

The FAA continues to investigate ways to facilitate the introduction of the tiltrotor aircraft in the civilian market. In addition to needing changes in airspace procedures and needing supporting infrastructure, the use of tiltrotor is currently inhibited by relatively high operating costs. As technological improvements reduce operating costs, however, this may foster additional research and, eventually, increase the deployment of vertical lift aircraft for civilian use.

CHAPTER VII

FAA WORKLOAD MEASURES



CHAPTER VII

FAA WORKLOAD MEASURES

The FAA provides the aviation community with three distinct air traffic services: (1) air traffic control service at selected airports (400 in FY-91); (2) traffic surveillance and aircraft separation by Air Route Traffic Control Centers (22 in FY-91); and (3) flight planning and pilot briefings at Flight Service Stations (179 in FY-91). All four aviation system user groups--air carriers, commuters/air taxis, general aviation, and military--utilize these FAA operational services to enhance the flow and safety of aviation traffic.

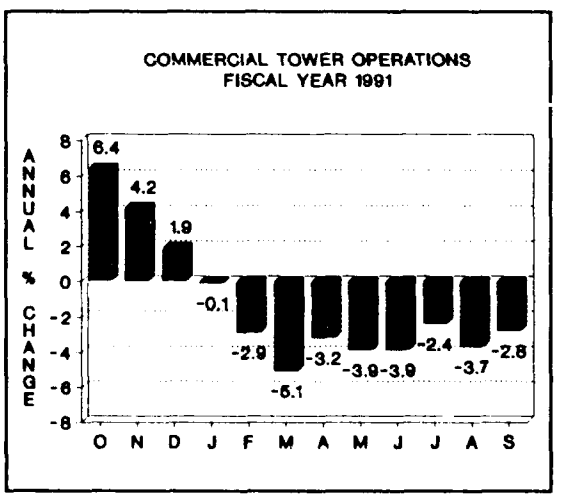
Since the four aviation system user groups differ in the demand they impose on the air traffic system, multiple indicators are used to describe the total FAA operational workload. No single measure typifies past trends or future demand for the services provided by the FAA. There have been, and will continue to be, different socioeconomic forces driving the growth of each of the aviation-user categories.

REVIEW OF 1991

FAA TOWER ACTIVITY

Aircraft activity at the 400 FAA towered airports (down from 403 in 1990) totaled 61.5 million in fiscal year 1991, a decline of 3.4 percent) over the 63.7 million operations recorded in fiscal year 1990. The decline in 1991 comes after eight consecutive years of growth (1982 to 1990), a period during which aircraft activity at FAA towers increased by 25.7 percent (2.9 percent annually). Despite the strong growth that has occurred since 1982, the level of activity recorded at FAA towered airports in 1991 remains 3.9 percent below the operation counts recorded (64.0 million) during the 12-month period immediately preceding the August 1981 air traffic controllers' strike (hereafter referred to as the pre-strike period).

Since 1982, there has been a strong demand for commercial aviation services. Commercial activity (the sum of air carrier and commuter/air taxi

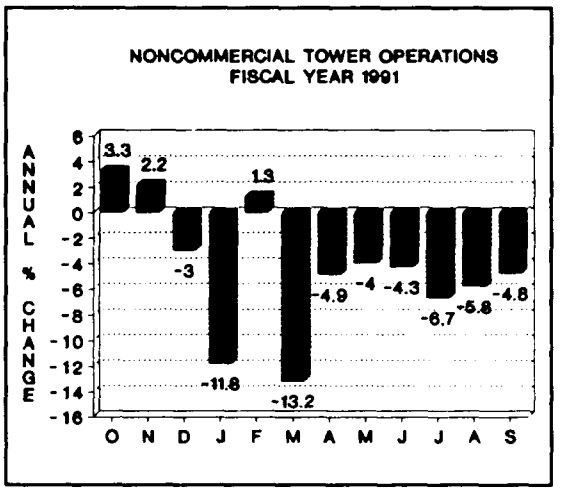


operations) is up 51.3 percent (4.7 percent annually) since 1982. However, commercial activity declined 1.4 percent in fiscal year 1991. A large part of this decline was due to the liquidation of Eastern Air Lines in January 1991, which accounted for approximately 2.6 percent of commercial operations and 0.9 percent of total towered operations in fiscal year 1990. This factor alone is estimated to have reduced the number of commercial operations at FAA towered airports by approximately 1.8 percent or 385,000 operations in 1991. Capacity cutbacks by other carriers, both in response to the U.S. economic recession and traffic loss caused by the threat of terrorism abroad, reduced operation counts still further.

Air carrier activity at FAA towered airports (12.5 million operations) declined by 2.8 percent in fiscal year 1991. Air carrier activity had been well on its way to recording its second consecutive year of growth (operations up 2.8 percent in 1st quarter FY-91) when a combination of factors--the Gulf conflict, the U.S. economic recession, and the liquidation of Eastern Air Lines--all conspired to drastically reduce air carrier operation counts.

Commuter/air taxi activity increased by 0.7 percent in fiscal year 1991. Despite the relatively slow growth, commuter/air taxis continue to be the fastest growing user group. Its activity level has increased in every year but one (down 3.3 percent in 1986) since the user category was first designated in 1972. Since 1980, commuter/air taxi activity at FAA towered airports has grown at an average annual rate of 6.2 percent, from 4.6 million operations in fiscal year 1980 to 8.9 million during the current year. Much of this growth has resulted from commuter code-sharing and schedule tie-in agreements with the larger commercial air carriers. The liquidation of Eastern Air Lines also adversely affected the operations of its code-sharing partners--Eastern Metro Express shut down its operations at Atlanta and Bar Harbor shut down its operations at Miami--thus contributing to the reduced commuter/air taxi activity counts in fiscal year 1991.

Noncommercial activity (the sum of general aviation and military operations), on the other hand, has increased by



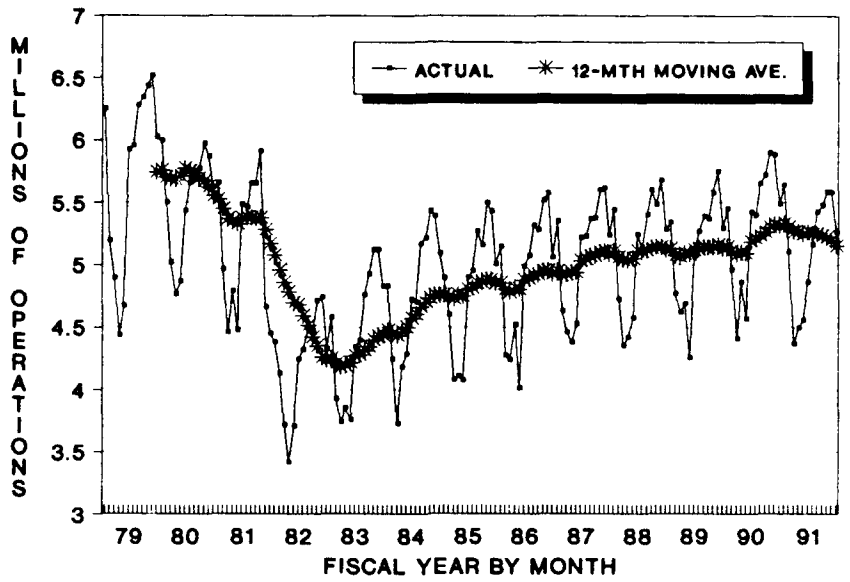
only 9.8 percent (1.0 percent annually) since 1982. In fiscal year 1991, noncommercial activity totaled 40,077,800 operations, down 4.5 percent from 1990 activity.

After recording increased activity counts in six of the nine years following the 1981 air traffic controllers strike, general aviation experienced its worst traffic year of the past decade. General aviation activity totaled 37.6 million operations in fiscal year 1991, a 4.1 percent decline from 1990 and its lowest operations count since 1985. The 1991 operations count was only 79.8 percent of general aviation's pre-strike level of 47.1 million operations.

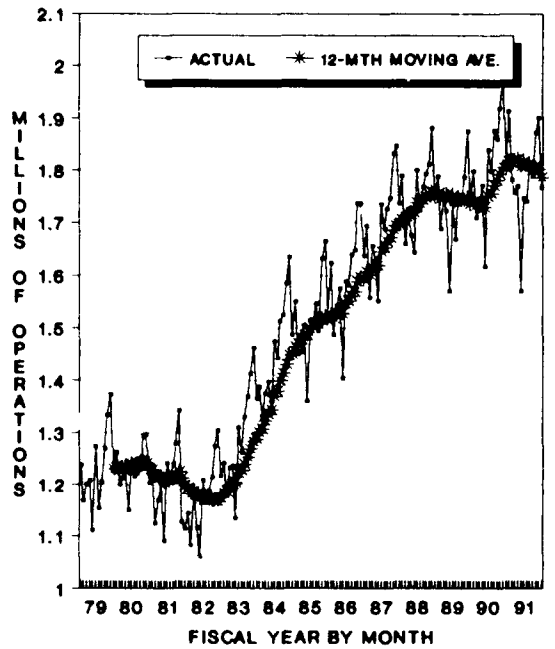
After increasing by 8.0 percent over the previous two years, the number of local general aviation operations declined 3.9 percent in fiscal year 1991 to 16.0 million, reflecting a decline in student training. Itinerant general aviation operations declined by 4.2 percent in fiscal year 1991 to 21.5 million, reflecting, in part, a

TOWERED AIRPORT OPERATIONS
ACTUAL AND 12-MONTH MOVING AVERAGE

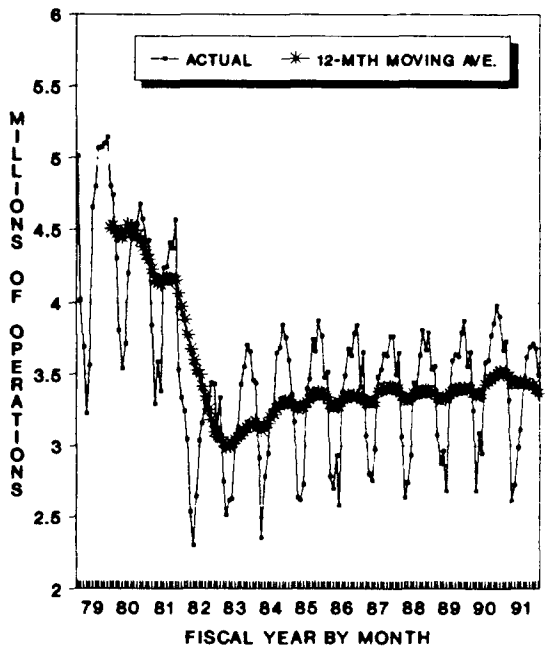
TOTAL OPERATIONS



COMMERCIAL OPERATIONS



NONCOMMERCIAL OPERATIONS



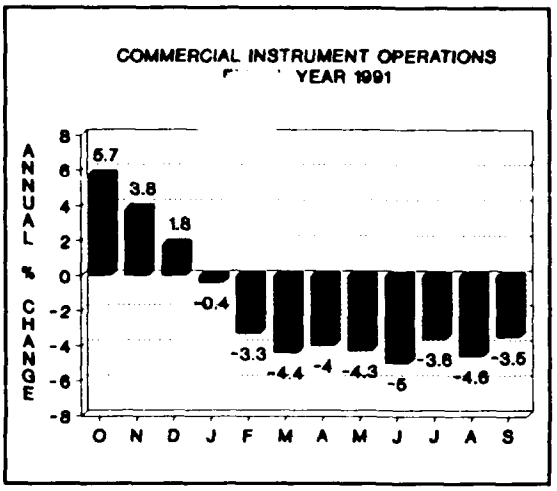
decline in corporate business flying as a result of the economic downturn. Itinerant operations in 1991 were at 78.3 percent of pre-strike activity levels (27.5 million), while local operations were at 83.1 percent of the pre-strike level (19.3 million).

Military operations totaled 2.5 million in fiscal year 1991, a 10.7 percent decline from 1990 levels. Most of the decline occurred after the January allied invasion of Kuwait (down 20.2 percent during the January-May period), reflecting, no doubt, the shift of a large percentage of military aircraft and personnel to the Middle East. Local military operations declined 12.5 percent in 1991 to 1.2 million while itinerant military operations declined by 9.0 percent to 1.3 million.

INSTRUMENT OPERATIONS

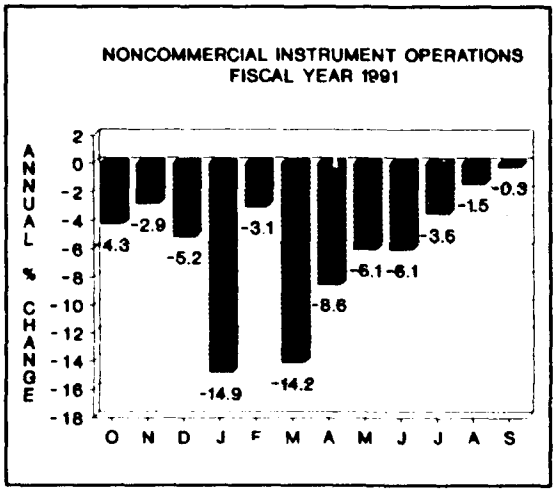
Instrument operations handled at FAA towers totaled 45.1 million in fiscal year 1991, 4.0 percent below the 1990 activity level, but still 16.1 percent above the level of activity recorded in the pre-strike period (38.8 million). A large part of the increase in instrument operations since 1982 (up 42.3 percent) can be attributed to the increase in commercial aircraft activity (up 62.4 percent) and to commuter code-sharing and schedule tie-in agreements with the larger commercial air carriers.

Commercial aircraft activity (23.0 million operations) declined by 1.9 percent in fiscal year 1991. As with tower activity, commercial instrument activity counts in 1991 were distorted by the liquidation of Eastern Air Lines and Metro Express. It is estimated that the shutdown by Eastern reduced commercial instrument operation counts by approximately 385,000 (1.7 percent) in 1991.



Air carrier instrument operations totaled 13.5 million (down 3.5 percent) in fiscal year 1991. Commuter/air taxi instrument operations totaled 9.5 million (up 0.6 percent) over the same time period.

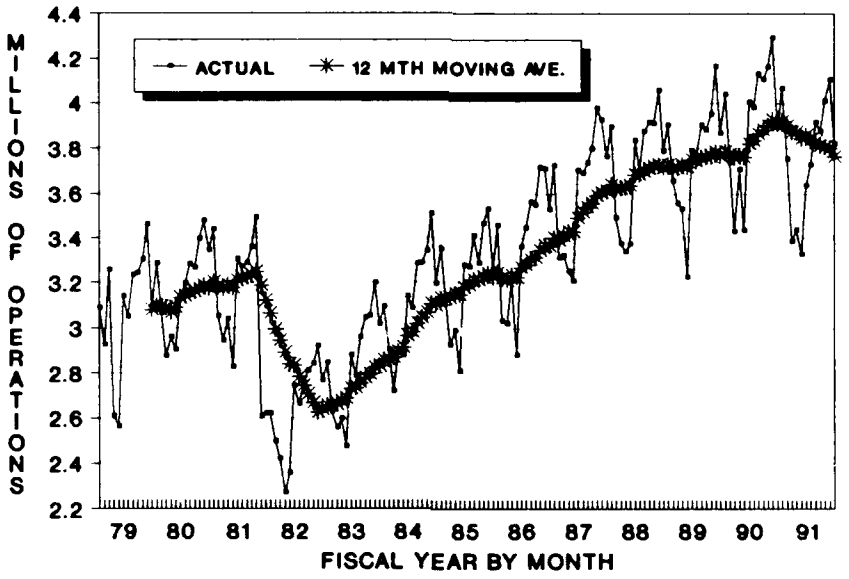
Noncommercial instrument operations (up 26.0 percent since 1982) declined by 6.1 percent in fiscal year 1991. General aviation activity totaled 18.1 million, up 30.1 percent over 1982 activity, but down 5.2 percent from



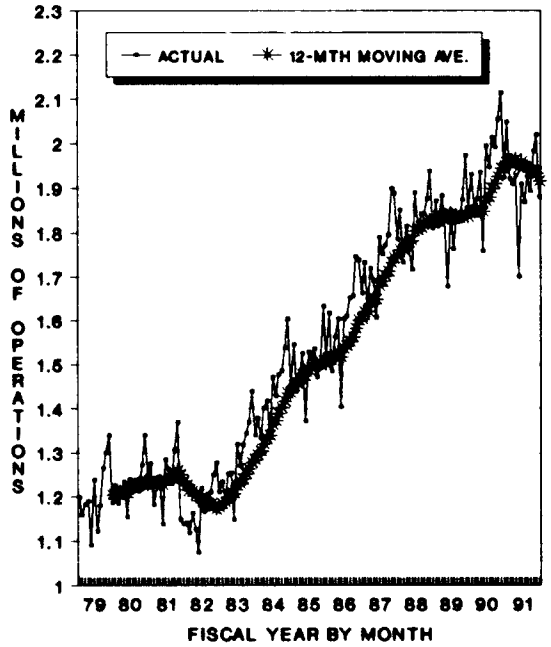
1990 activity levels. Most of the increase in general aviation activity since 1982 can be attributed to the formation of Airport Radar Service Areas (ARSA's) at 137 locations in the United States. Under the previous Terminal Radar Service Area (TRSA) concept, general aviation aircraft could

INSTRUMENT OPERATIONS
ACTUAL AND 12-MONTH MOVING AVERAGE

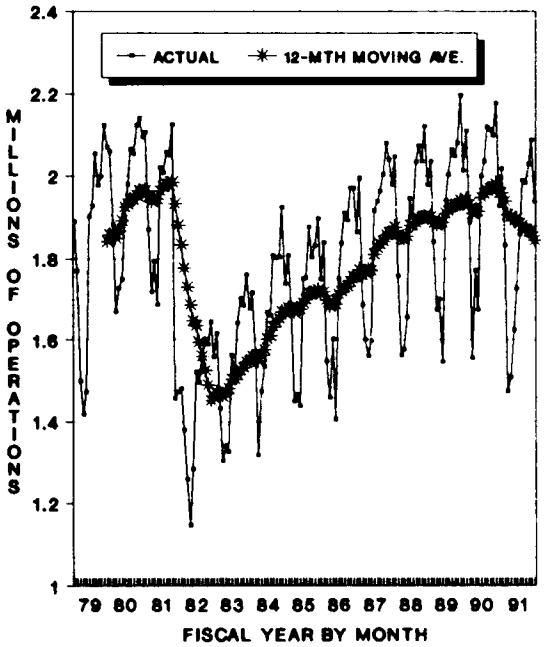
TOTAL OPERATIONS



COMMERCIAL OPERATIONS



NONCOMMERCIAL OPERATIONS

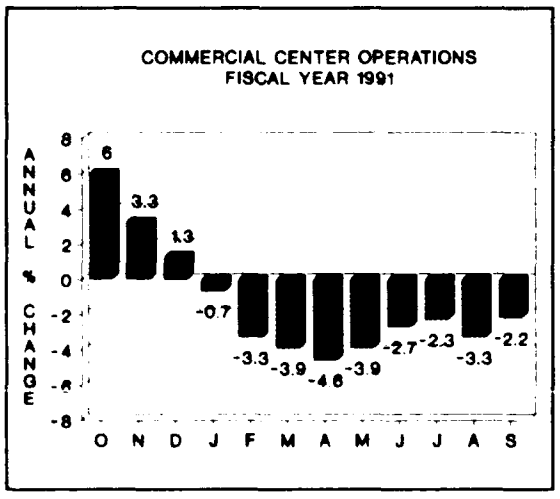


enter the TRSA without communicating with and without being counted by Air Traffic Control (ATC). Under the ARSA concept all aircraft must be in contact with ATC, and, hence, are now counted.

Military instrument operations totaled 4.0 million in fiscal year 1991, a 9.8 percent decline from 1990 operation counts. The large drop in military activity reflects a large shift in military aircraft and personnel to the Middle East during the Gulf conflict.

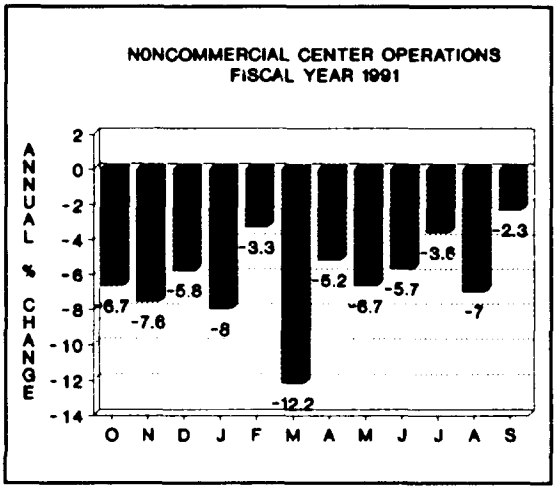
CENTER ACTIVITY

In fiscal year 1991, the number of aircraft flying under instrument rules handled by FAA Air Traffic Control Centers totaled 36.4 million, a decline of 3.1 percent from 1990 activity counts. Most of the increase that has occurred at en route centers since 1982 (up 32.1 percent) can be attributed to the growth in commercial aviation activity (up 48.7 percent). The number of commercial aircraft handled at the Centers (23,840,000) declined 1.4 percent in fiscal year 1990. The number of air carrier aircraft handled totaled 18,276,500 (down 1.4 percent), while



the number of commuter/air taxi aircraft handled totaled 5,563,300 (down 1.2 percent). As with both tower and instrument operations, the liquidations of Eastern Air Lines, Metro Express, and Bar Harbor depressed both air carrier and commuter/air taxi center activity counts for much of fiscal year 1991.

Noncommercial aircraft handled (up 6.1 percent since 1982) declined by 6.3 percent in fiscal year 1991. The number of general aviation aircraft handled totaled 7.4 million, down 6.8 percent over 1990 activity levels.



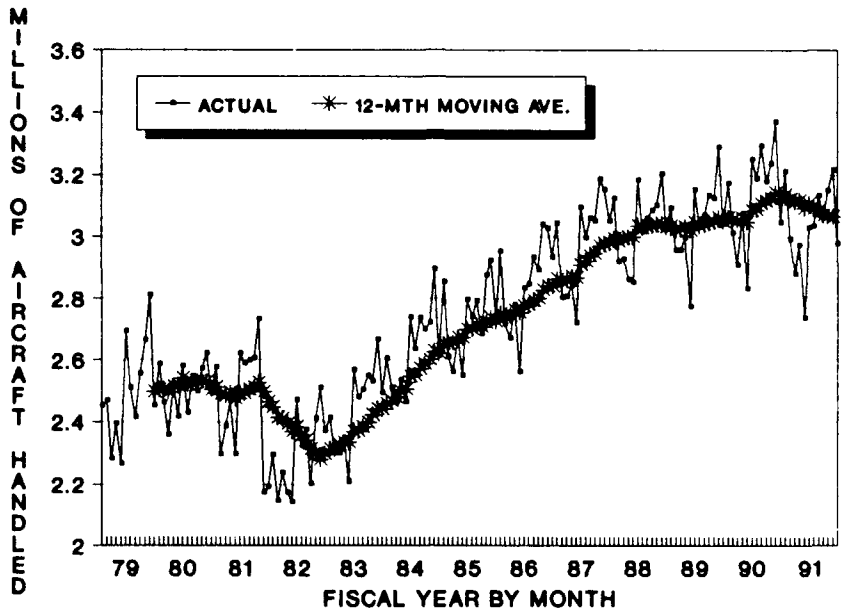
Military activity (5.1 million) also declined in 1991, down 5.5 percent from 1990 activity levels.

FLIGHT SERVICE STATION ACTIVITY

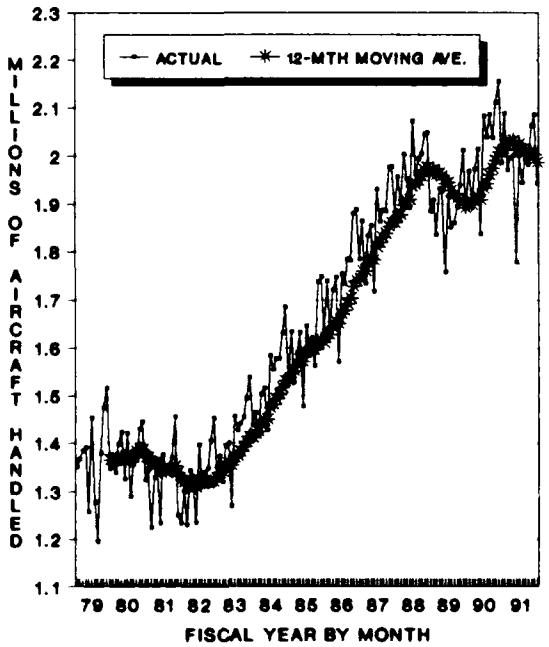
User demand at Flight Service Stations (FSS's)--pilot briefings, flight plans, and aircraft contacted--totaled 39.4 million in fiscal year 1991, a decline of 8.2 percent from 1990 activity levels. User demand declined in all of the flight service categories in 1991. The number of flight plans originated declined 10.1 percent to 6.2 million (IFR down 11.3 percent and VFR down 6.3 percent), the number of aircraft contacted declined 9.8 percent to 5.5 million, and the number of pilot briefings declined 7.0 percent to

IFR AIRCRAFT HANDLED
ACTUAL AND 12-MONTH MOVING AVERAGE

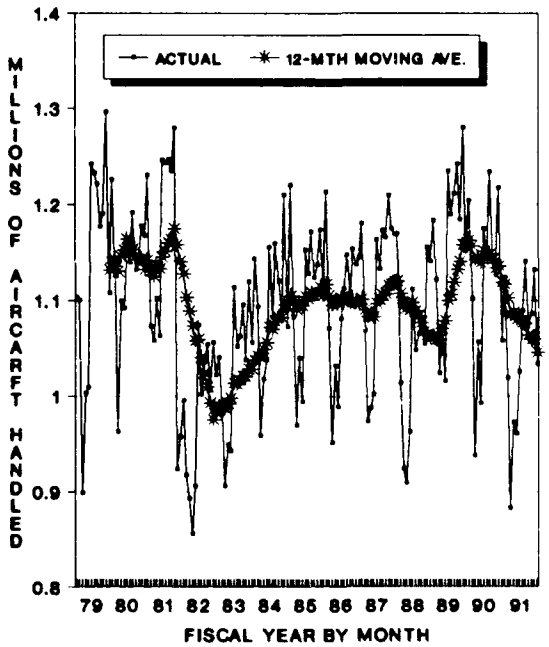
TOTAL AIRCRAFT HANDLED

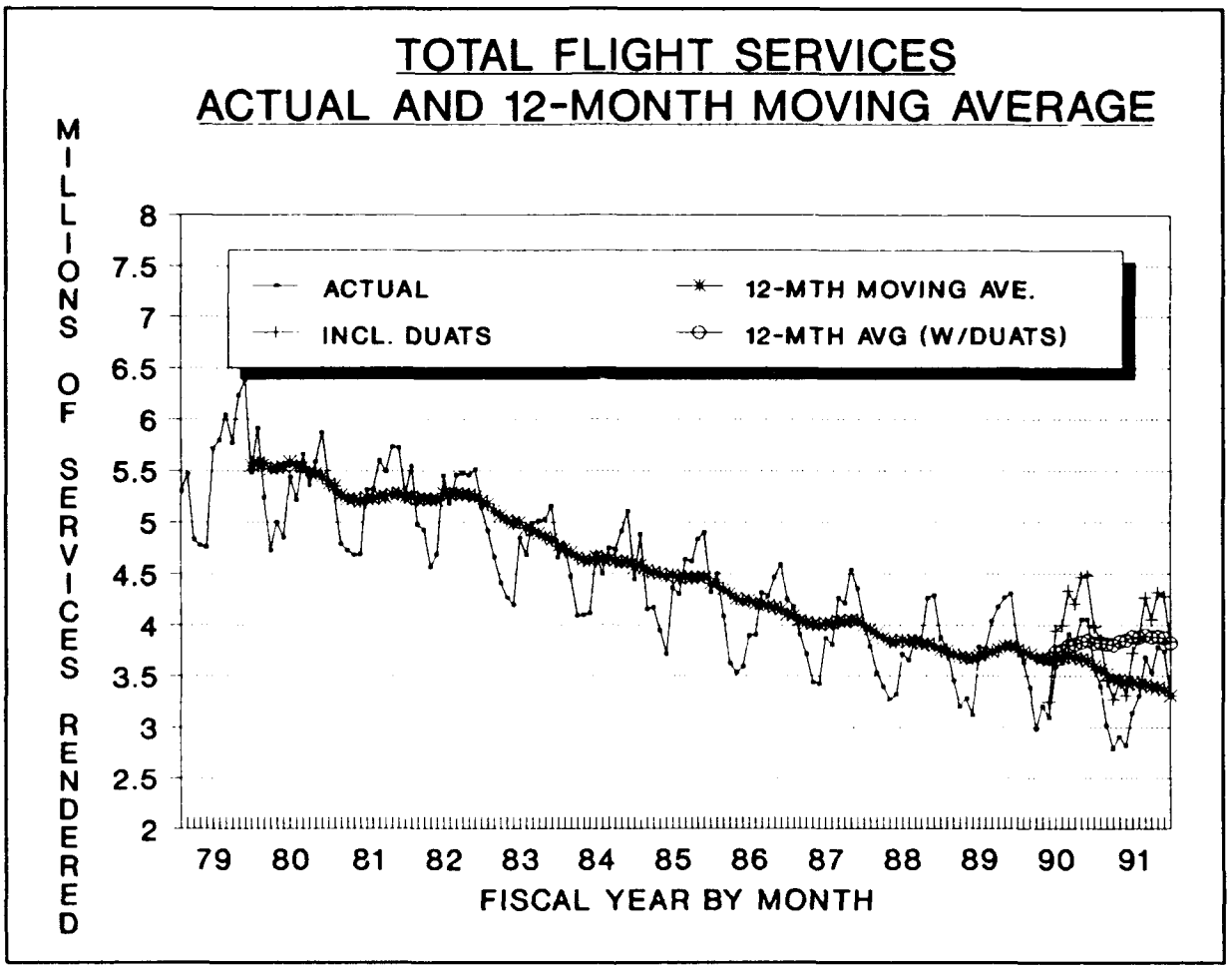


COMMERCIAL AIRCRAFT HANDLED



NONCOMMERCIAL AIRCRAFT HANDLED





10.7 million.

The decline in FSS activity understates the total level of services provided by the flight service system. The utilization of Direct User Access Terminal System (DUATS) provides an alternative to the FSS for obtaining pilot briefing information and filing flight plans. Given the growing acceptance of DUATS, if the services provided through DUATS were included with FSS services, total flight plans filed would have been down only 5.6 percent as opposed to 10.1 percent and pilot briefs would have increased 4.7 percent versus a decline of 6.7 percent. If these two alternative services were added to the total flight services as reported by the FAA FSS system, total flight services in 1991 would have declined only 0.2 percent instead of 8.2 percent (see graphic above).

During fiscal year 1991, 12 Automated Flight Service Station (AFSS) were commissioned, bringing the total to 59. Also in 1991, four FSS's were consolidated into the automated FSS's for a total of 173 facilities at the end of the year.

CONTRACT TOWERS

The FAA is currently contracting out "low activity towers", and the operation counts at these locations are no longer included in the FAA tower workload measures. There were 25 contract towers in operation during fiscal year 1991, three more than in 1990. The new contract towers added during 1991 were Valdosta Municipal Airport (Georgia), New Iberia Airport

(Louisiana), and Clinton Sherman Airport (Oklahoma).

Operations at contract towers totaled 1.5 million in fiscal year 1991, an increase of 5.0 percent over the number of operations recorded at contract towers in 1990. General aviation accounted for the vast majority (85.3 percent) of the activity at these contract towers, up 5.1 percent to 1.3 million operations. Commuter/air taxi operations totaled 142,451 (up 17.2 percent), while military operations totaled 76,354 (down 21.0 percent). Air carrier activity at contract towers declined by 18.2 percent to 6,056 operations in fiscal year 1991.

A listing of the current contract towers can be found in Appendix I, beginning on page 271. Operation counts for the 400 FAA towered airports and the 25 contract towers, by user group, can be found in the publication FAA Air Traffic Activity FY 1991, compiled by the FAA's Office of Management Systems (AMS-420).

FORECAST ASSUMPTIONS

Growth in FAA workload measures includes not only the demand imposed on the existing National Airspace System, but also aviation activity at new locations not previously provided FAA services. Aviation activity at contract towers is excluded from the workload measures.

NUMBER OF FAA FACILITIES

There were no new FAA towered airports commissioned during fiscal year 1991. In fact, the number of FAA towered airports fell from 403 in 1990 to 400 in 1991. (One of the towered airports included in the 1990 operation counts became a contract towers in 1991--Valdosta, Georgia.)

The current forecast assumes that the number of FAA towered airports will remain at the 1991 level of 400 airports throughout the 12-year forecast period.

There are currently 29 Terminal Control Areas (TCA's) and 121 ARSA's. This forecast assumes that there will be one additional TCA and 5 additional ARSA's added to the system over the next two years. This expansion of controlled airspace is reflected in the forecast for instrument operations at airports with FAA traffic control service.

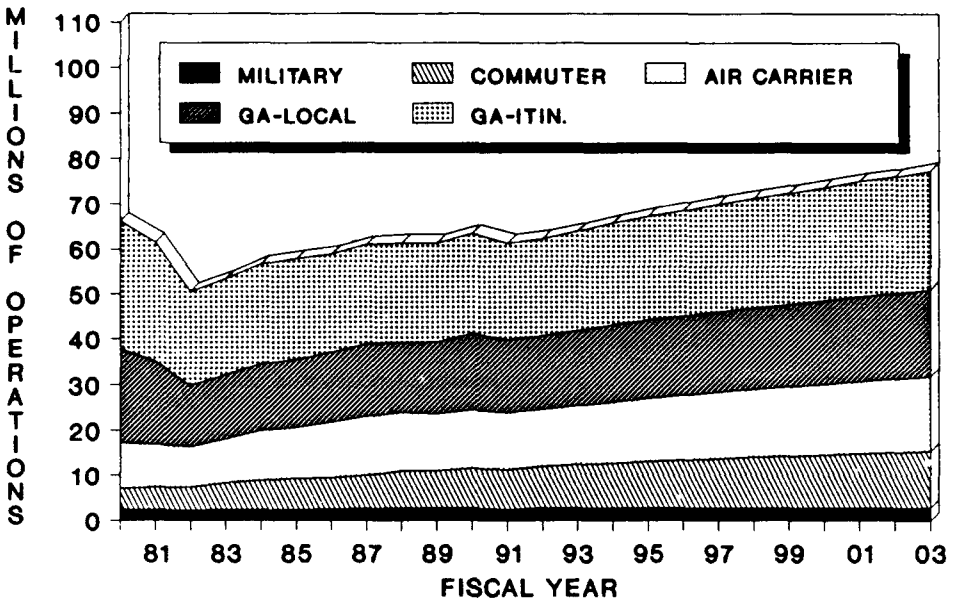
The number of flight service stations and automated flight service stations totaled 173 at the end of fiscal year 1991, 59 AFSS's and 114 FSS's. Of the remaining FSS's, 83 will be closed and 31 will continue in operation as auxiliary flight service stations. This is in addition to the 61 AFSS's which will remain open due to unique weather or operational conditions. The current schedule calls for all 61 automated AFSS's to be commissioned by 1993.

WORKLOAD FORECASTS

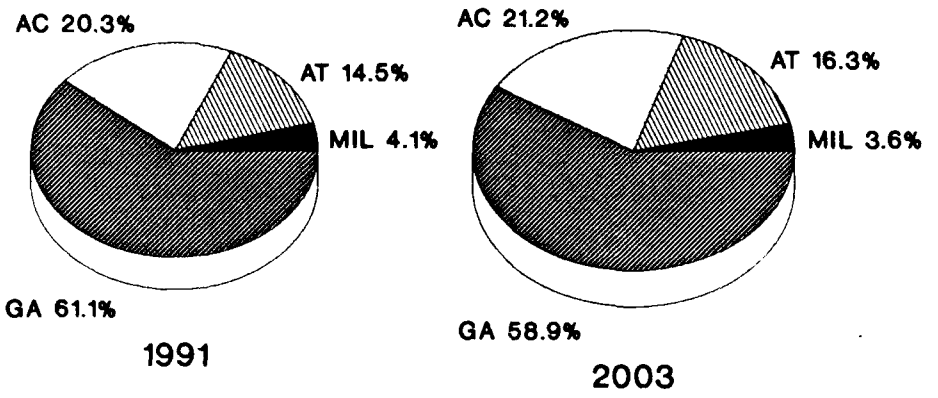
FAA TOWER ACTIVITY

Activity at FAA towered airports is expected to equal the pre-strike level of 64.0 million operations in 1993 and will exceed the 1979 all-time peak (69.0 million) in 1997.

AIRCRAFT OPERATIONS AT AIRPORTS WITH FAA TRAFFIC CONTROL SERVICE



DISTRIBUTION OF WORKLOAD BY USER GROUP



Operations at FAA towered airports are forecast to increase by only 1.5 percent (to 62.4 million) in fiscal year 1992. The slow growth in 1992 is, in large part, due to two factors. First, the U.S. economy is not expected to recover from its relatively slow growth until the latter half of 1992, thus slowing the growth of both commercial activity and corporate business flying and delaying or slowing any recovery in student pilot training. Second, the recent shutdown of both Midway and Pan American (in addition to Eastern Air Lines in January 1991), is expected to reduce air carrier operations by an estimated 350,000 operations (2.8 percent) in fiscal year 1992. This will result in little or no growth in air carrier activity in 1992.

As the U.S. economic recovery gathers momentum during the latter stages of 1992, so will activity at FAA towered airports. FAA tower activity is forecast to increase to 64.0 million operations (up 2.6 percent) in 1993 and to 65.8 million operations (up 2.8 percent) in 1994. Over the 12-year forecast period, operations at FAA towered airports are projected to increase by 1.9 percent annually. In absolute numbers, towered operations are projected to total 77.3 million in fiscal year 2003.

The mix of aircraft using FAA towered airports is expected to remain fairly stable over the forecast period. This results from the fact that the combined total of general aviation and commuter/air taxi operations (i.e., operations performed by smaller aircraft) is expected to grow at a somewhat slower pace than the number of air carrier operations (25.0 percent compared with 31.2 percent). The combined activities of general aviation and commuters/air taxis are expected to account for 75.1 percent of total tower operations in fiscal year 2003, down only slightly from 75.6 percent in 1991. Air carrier operations' share of towered airport activity is expected to increase slightly over the forecast period, from 20.3 percent in 1991 to 21.2 percent in fiscal year 2003.

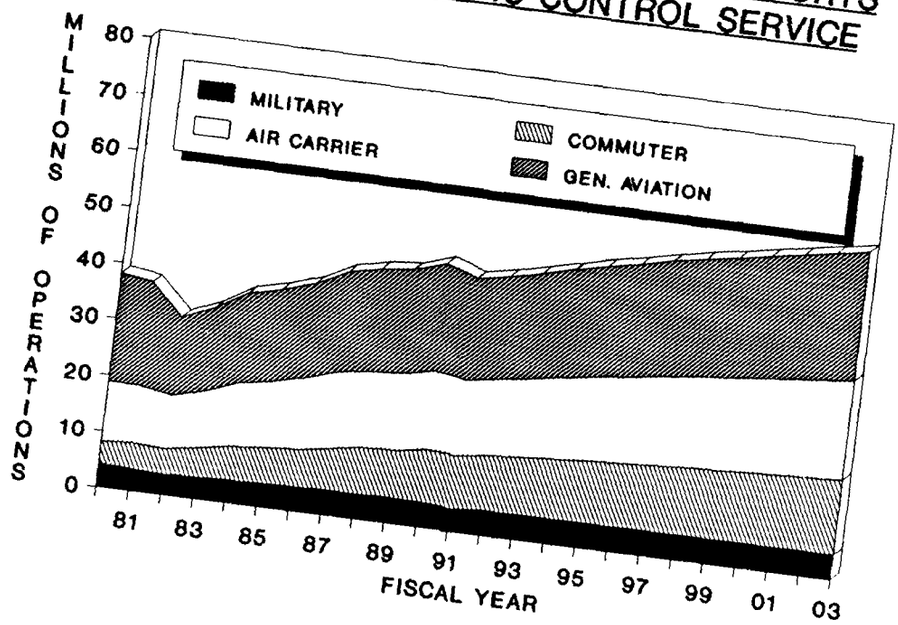
The forecasted activity levels and average annual growth rates for each aviation user group from the year 1991 to the year 2003 is: commuter/air taxi, from 8.9 to 12.6 million operations (2.9 percent annual growth); air carrier, from 12.5 to 16.4 million operations (2.3 percent); and general aviation, from 37.6 to 45.5 million operations (1.6 percent). Itinerant general aviation operations are forecast to increase from 21.5 to 26.2 million operations (1.7 percent annually), local general aviation operations from 16.0 to 19.3 million operations (1.6 percent annually). Military operations are expected to return to the 1990 level of activity (2.8 million) and to remain at this level throughout the 12-year forecast period.

Commercial aircraft activity at FAA towered airports is expected to grow at an average annual rate of 2.6 percent over the 12-year forecast period, from 21.4 to 29.0 million. Noncommercial activity is forecast to increase from 40.1 million in 1991 to 48.3 million in fiscal year 2003, an average annual increase of 1.6 percent.

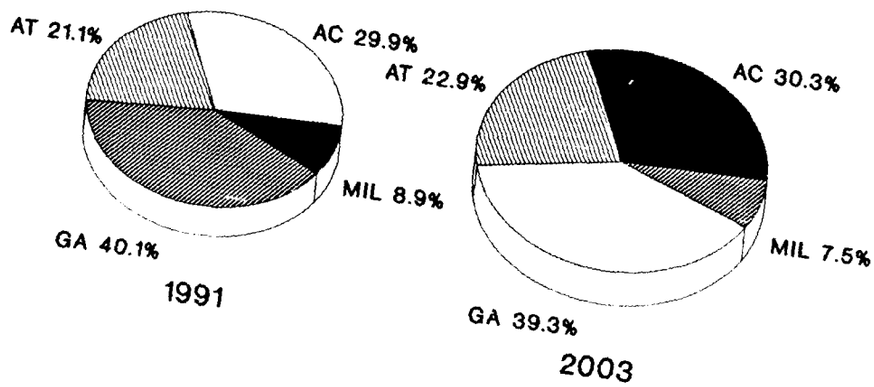
INSTRUMENT OPERATIONS

An increase in the number of TCA's and TRSA's in both 1992 and 1993 is expected to result in growth somewhat higher than that forecast at FAA towered airports. Instrument operations are forecast to grow by 2.2 percent in 1992, by 2.8 percent in 1993, and by 3.0 percent in 1994. Over the entire 12-year forecast period, instrument operations are expected to increase at an average annual rate of 2.2 percent, growing from a total of 45.1 million operations in 1991 to 58.5 million operations in fiscal

INSTRUMENT OPERATIONS AT AIRPORTS WITH FAA TRAFFIC CONTROL SERVICE



DISTRIBUTION OF WORKLOAD BY USER GROUP



year 2003.

The mix of instrument operations is not expected to change dramatically over the forecast period. The number of commuter/air taxi and general aviation operations performed by smaller aircraft will increase only slightly faster than the number of operations performed by the larger, more sophisticated air carrier aircraft (31.9 versus 31.1 percent). By fiscal year 2003, 62.2 percent of all instrument operations are expected to be performed by commuter/air taxi and general aviation aircraft, up from 61.2 percent in 1991.

The projected activity levels and average annual growth rate for each user group from the year 1991 to 2003 is: commuter/air taxi, from 9.5 to 13.4 million operations (2.9 percent annual growth); air carrier, from 13.5 to 17.7 million operations (2.3 percent); and general aviation, from 18.1 to 23.0 million operations (2.0 percent). Military activity is expected to return to the 1990 operations level (4.4 million) and to maintain this level throughout the forecast period.

Over the 12-year forecast period, commercial activity is expected to increase at an average rate of 2.5 percent annually, from 23.0 to 31.1 million. Noncommercial activity is forecast to increase from 22.1 million in 1991 to 27.4 million in fiscal year 2003, an average annual growth rate of 1.8 percent.

CENTER ACTIVITY

The workload at FAA Air Route Traffic Control Centers is expected to exhibit relatively strong growth throughout the forecast period, increasing by 2.5 percent in 1992, by 2.7 percent in 1993, and 2.9 percent in 1994. Over the 12-year forecast period, the number of aircraft handled at enroute centers is forecast to increase at an average annual rate of 2.1 percent. In absolute numbers, the center workload is forecast to increase from 36.4 million aircraft handled in 1991 to 46.7 million in fiscal year 2003.

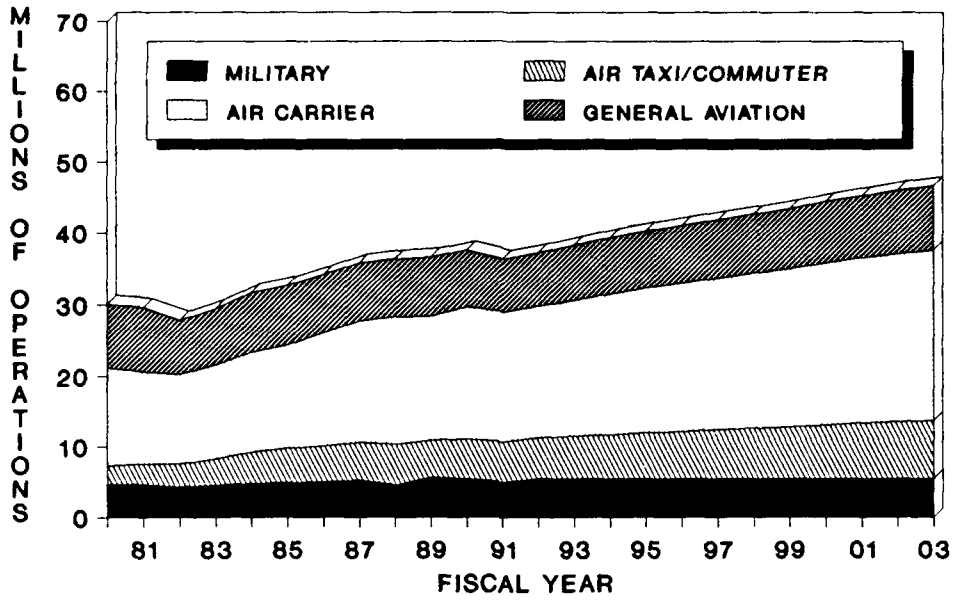
Commercial aircraft activities' share of center workload is forecast to increase from 65.7 percent in 1991 to 68.7 percent in 2003. Between 1991 and the year 2003, air carrier's share is forecast to increase from 50.3 percent to 51.2 percent. Commuter/air taxi's share is expected to increase from 15.4 percent to 17.6 percent over the same time period.

The projected activity levels and average annual growth rates for each user group from 1991 to 2003 is: commuter/air taxi, from 5.6 to 8.2 million aircraft handled (3.2 percent annual growth); air carrier, from 18.3 to 23.9 million aircraft handled (2.3 percent); and general aviation, from 7.4 to 9.1 million aircraft handled (1.7 percent). The number of military operations is expected to return to its 1990 level of activity (5.5 million) and to remain at this level over the entire forecast period.

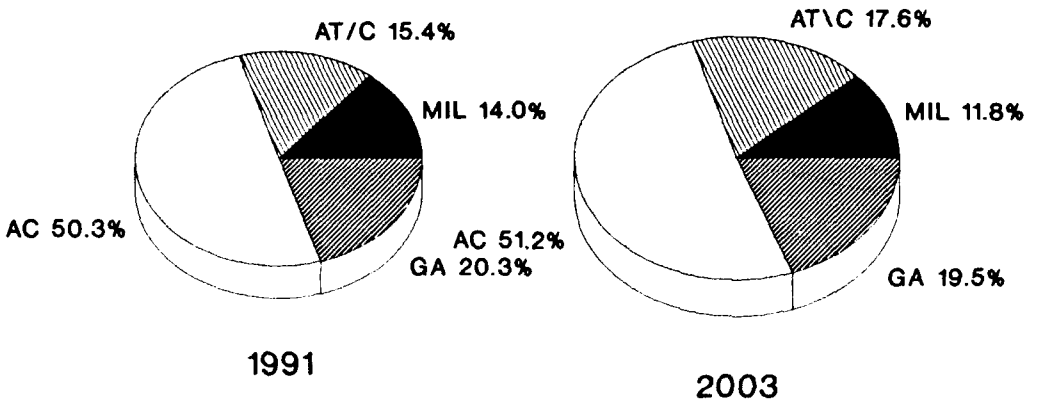
Commercial activity is expected to grow at an average annual rate of 2.5 percent over the 12-year forecast period, from 23.9 to 32.1 million. Noncommercial activity is forecast to increase by 1.3 percent annually, from 12.5 million in 1991 to 14.6 million in fiscal year 2003.

Forecasts for individual Centers are available upon request from the Forecast Branch, Office of Aviation Policy and Plans (APO-110), phone (202) 267-3355.

IFR AIRCRAFT HANDLED AT FAA AIR ROUTE TRAFFIC CONTROL CENTERS



DISTRIBUTION OF WORKLOAD BY USER GROUP



FLIGHT SERVICE STATION ACTIVITY

Forecast

Total flight services originating at FAA Flight Service Stations are projected to decline to 38.2 million (down 3.1 percent) in fiscal year 1992 and then increase to 38.8 million (up 1.6 percent) in 1993 and to 39.2 million (up 1.0 percent) in 1994. Total flight services are expected to increase only 4.8 percent (0.4 percent annually) over the 12-year forecast period. In actual numbers, flight services rendered are forecast to increase from 39.4 million in 1991 to 41.3 million in fiscal year 2003.

The number of pilot briefings is forecast to decline by 2.8 percent (to 10.4 million) in 1992, then increase gradually over the remainder of the forecast period. In fiscal year 2003, pilot briefings are forecast to total 11.0 million, an average annual growth rate 0.2 percent over the 12-year period.

The number of flight plans originated is projected to decline to 6.0 million (down 3.2 percent) in 1992 and then increase by 1.3 percent annually over the remaining 11 years of the forecast period. The number of flight plans originated in fiscal year 2003 is projected to total 6.9 million.

The number of aircraft contacted is forecast to decline to 5.4 million (down 1.8 percent) in 1992 and to remain at this level through 1997. The number of aircraft contacted is forecast to increase to 5.5 million in 1998 and then remain at this level throughout the remainder of the forecast period.

Additional Flight Service Activity Data

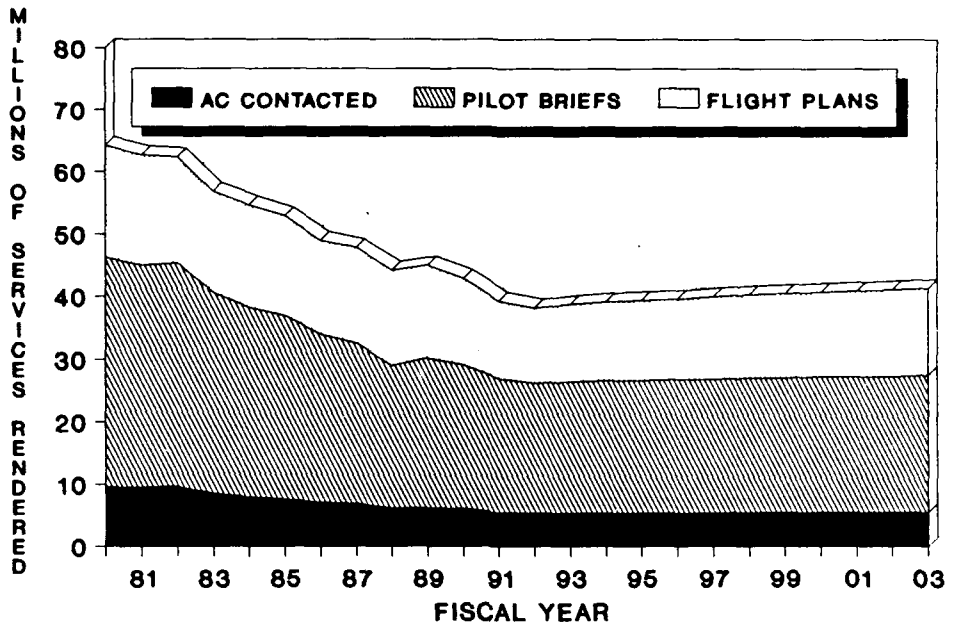
The introduction of new technology to flight service applications has significantly changed the operating environment of the flight service system. Viewed in the larger context of the total National Airspace System (NAS), the recent workload trends do not necessarily indicate declining demand for flight planning services. Rather they may indicate that demand is being met through increased use of automation and new system capabilities resulting in increased system efficiencies and productivity.

Specifically, several factors resulting from automation will tend to dampen the growth in FSS workload measures, as currently defined. First, pilots can now obtain weather briefings through the Telephone Information Briefing System (TIBS), which does not require contact with a flight service specialist, and is not, therefore, included in the FSS pilot briefings count. Second, private weather briefing vendors, participating in recently implemented memorandums of agreement, can also file flight plans for their customers without going through an FSS. Third, starting February 1990, DUATS became operational. Utilizing DUATS, pilots with access to a computer, modem and telephone can directly access a national weather data base for weather briefings and flight plan filing without ever going through an FSS.

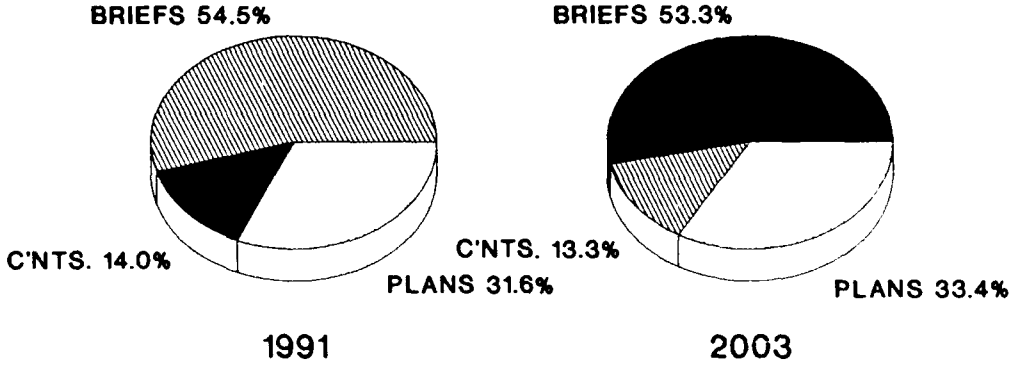
This automated access may be through the pilots' own computer or through those of field based operators offering the service to their customers. None of the flight planning services provided through the above sources is included in the FSS workload measures.

During fiscal year 1991, there was a total of 2.7 million DUATs transactions. If it is assumed that each transaction involved a weather briefing, this represents 2.7 million

FLIGHT SERVICES ORIGINATED AT FAA FLIGHT SERVICE STATIONS



DISTRIBUTION BY TYPE OF SERVICE RENDERED



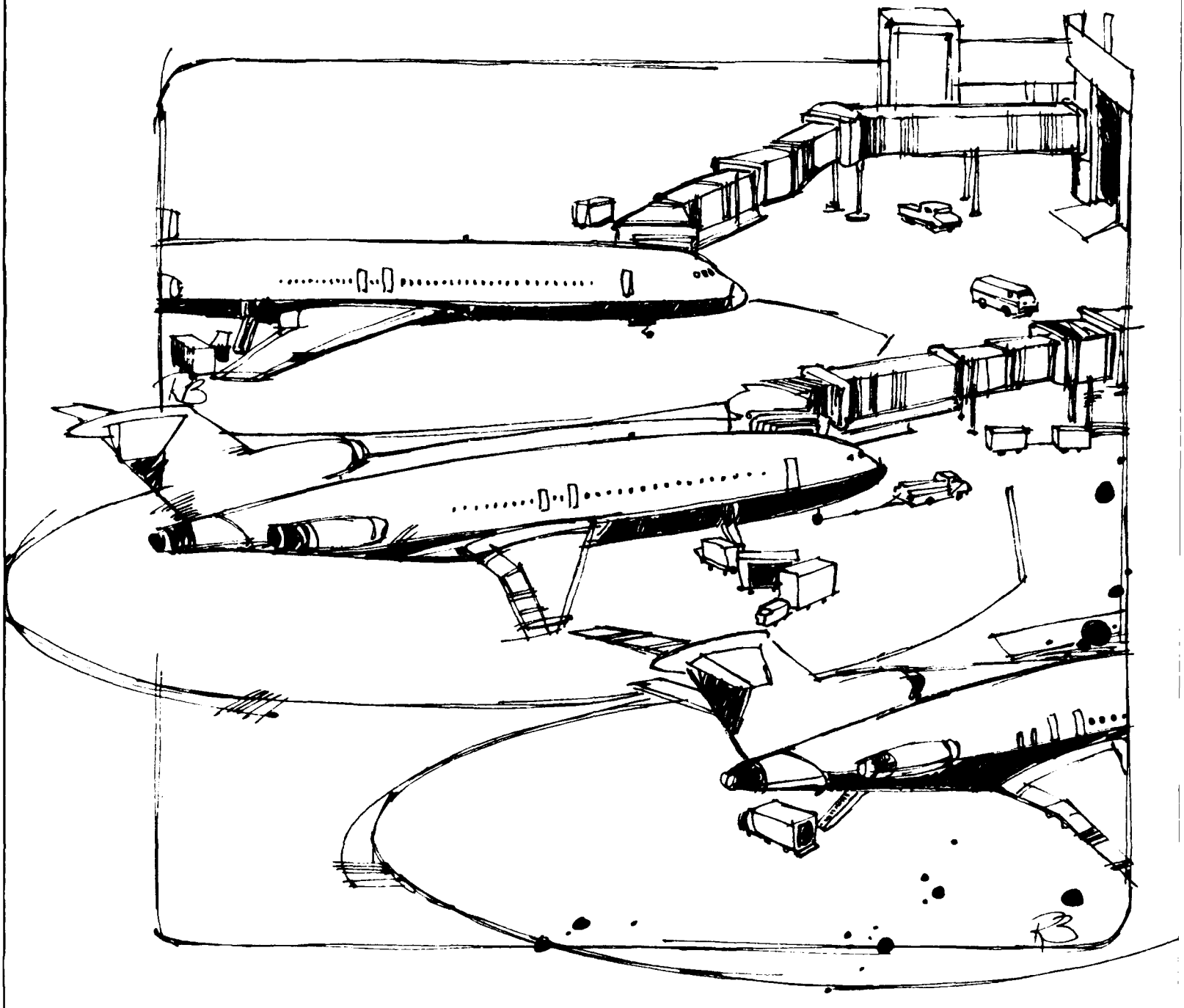
pilot briefs. Additionally, just under 470,000 flight plans were filed through the DUATS system. Using the weighted total Flight Services formula (two times pilot briefs plus flight plans filed), this translates into approximately 6.4 million total flight services which are not included in the FAA flight services station workload measure.

Forecasts for individual Flight Service Stations are available upon request from the Forecast Branch, Office of Aviation Policy and Plans (APO-110), phone (202) 267-3355.

CHAPTER VIII

TERMINAL AREA FORECASTS

LARGE HUBS



CHAPTER VIII

TERMINAL AREA FORECASTS LARGE HUBS

This chapter discusses: (1) the top 50 airports in the United States ranked by total enplanements in fiscal year 1990; (2) the top 50 airports ranked by total operations in 1990; (3) forecasts of total enplanements and total operations at 29 large hub airports; (4) summary data for large, medium, and small hub airports; and (5) selected data by user category for five airports where special studies were conducted in 1991. (For analytical purposes, airport hub size is consistent with the enplanement percentages indicated in the definition for air traffic hubs on page 237 of the Glossary of Terms.)

The preliminary forecasts in this chapter are currently undergoing regional review. The final forecasts will be available in FAA Terminal Area Forecasts FY 1992-2005 during the summer of 1992 from the FAA Office of Aviation Policy and Plans.

REVIEW OF 1990

TOP 50 AIRPORTS

In fiscal year 1990, Chicago O'Hare and Dallas/Fort Worth were the busiest airports in the United States when ranked by total enplanements (air carrier, commuter, and air taxi). Chicago O'Hare had 27.9 million passenger enplanements and 810,900 aircraft operations. Dallas/Fort Worth had 24.3 million enplanements and 724,800 operations. Thus, Chicago ranked first in both total enplanements and total operations. Dallas/Fort Worth ranked second in total enplanements and third in total operations. In 1990, Atlanta ranked third in total enplanements (24.1 million) and second (ahead of Dallas/Fort Worth) in total operations (779,500).

Other airports among the top five ranked by total enplanements in 1990 were Los Angeles International Airport and San Francisco International Airport, which replaced New York's John F. Kennedy International Airport. The changes in ranks in 1990 relative to the ranks in 1989 for enplanements and operations at these and other top 50 airports are shown in the tables on pages 154 through 157.

Prior to 1985, Van Nuys, a general aviation only airport, was consistently among the top five in total aircraft operations. In subsequent years, operations at the airport declined and Van Nuys' rank dropped to eighth in 1988 when it was surpassed by Santa Ana, Denver, and San Francisco.

TOP 50 AIRPORTS
BY TOTAL ENPLANEMENTS IN 1990
(IN THOUSANDS)

Airport	Total Enplanements*	Percent**	Cumulative Percent	FY-89 Rank
1. Chicago O'Hare	27,949	5.78	5.78	1
2. Dallas/Ft. Worth	24,270	5.02	10.80	2
3. Atlanta	24,134	4.99	15.79	4
4. Los Angeles Int'l	22,277	4.61	20.40	3
5. San Francisco Int'l	14,694	3.04	23.44	6
6. New York Kennedy	14,451	2.99	26.43	5
7. Denver	12,767	2.64	29.07	7
8. Miami	12,192	2.52	31.59	8
9. New York LaGuardia	11,410	2.36	33.95	9
10. Boston	11,085	2.29	36.25	10
11. Newark	11,012	2.28	38.53	11
12. Phoenix	10,877	2.25	40.78	12
13. Detroit	10,555	2.18	42.96	13
14. Honolulu	10,417	2.15	45.11	14
15. St. Louis Int'l	10,057	2.08	47.19	15
16. Minneapolis/St. Paul	9,715	2.01	49.20	16
17. Las Vegas	9,301	1.92	51.13	19
18. Orlando	8,684	1.80	52.90	18
19. Pittsburgh	8,531	1.76	54.67	17
20. Houston Intercont'l	8,127	1.68	56.35	22
21. Philadelphia	8,001	1.66	58.00	24
22. Seattle-Tacoma	7,863	1.63	59.63	20
23. Washington National	7,809	1.62	61.27	23
24. Charlotte	7,784	1.61	62.88	21
25. Salt Lake City	5,580	1.15	63.95	25
26. San Diego	5,488	1.14	65.08	26
27. Tampa	5,307	1.10	66.18	30
28. Washington Dulles Int'l	5,112	1.06	67.32	28
29. Baltimore	5,028	1.04	68.36	27
30. Raleigh/Durham Int'l	4,601	.95	69.32	32

(Continued on next page)

TOP 50 AIRPORTS
BY TOTAL ENPLANEMENTS IN 1990
(IN THOUSANDS)
(continued)

Airport	Total Enplanements*	Percent**	Cumulative Percent	FY-89 Rank
31. Cincinnati	4,538	.94	70.25	31
32. Fort Lauderdale	4,427	.92	71.17	33
33. Memphis	4,231	.88	72.05	34
34. Cleveland	4,188	.87	72.91	35
35. Houston - Hobby	3,990	.83	73.74	38
36. San Juan	3,923	.81	74.55	36
37. Chicago Midway	3,855	.80	75.35	39
38. Nashville	3,662	.76	76.10	37
39. Kansas City	3,478	.72	76.82	29
40. New Orleans	3,439	.71	77.53	40
41. San Jose	3,345	.69	78.23	41
42. Portland	3,179	.66	78.88	42
43. Dallas Love Field	2,885	.60	79.48	43
44. Indianapolis	2,831	.59	80.07	44
45. West Palm Beach	2,787	.58	80.64	47
46. Oakland	2,721	.56	81.21	
47. San Antonio	2,682	.55	81.76	46
48. Ontario	2,670	.55	82.31	45
49. Albuquerque	2,516	.52	82.83	48
50. Windsor Locks (Bradley)	2,475	.51	83.35	49

Source: FAA TERMINAL AREA FORECASTS FY 1992-2005.

* Includes U.S. certificated route air carriers, foreign flag carriers, supplementals, air commuters, and air taxis.

** Based on 483.398 million passenger enplanements.

TOP 50 AIRPORTS
BY TOTAL OPERATIONS IN 1990
(IN THOUSANDS)

Airport	Total Operations*	Percent**	Cumulative Percent	FY-89 Rank
1. Chicago O'Hare	810.9	1.27	1.27	1
2. Atlanta	779.5	1.22	2.49	3
3. Dallas/Ft. Worth	724.8	1.14	3.63	2
4. Los Angeles Int'l	668.8	1.05	4.68	4
5. Santa Ana/Orange County	522.8	.82	5.50	5
6. Van Nuys	516.7	.81	6.32	6
7. Phoenix	497.1	.78	7.10	8
8. Long Beach	482.5	.76	7.85	10
9. Denver	474.9	.75	8.60	9
10. Miami	463.1	.73	9.33	21
11. Charlotte Douglas	452.4	.71	10.04	13
12. Boston	448.1	.70	10.74	14
13. St. Louis Int'l	442.6	.70	11.44	12
14. San Francisco Int'l	437.0	.69	12.12	11
15. Fort Worth Meachum	435.0	.68	12.81	7
16. Seattle Boeing Field	425.5	.67	13.48	16
17. Honolulu	406.8	.64	14.11	15
18. Philadelphia	405.1	.64	14.75	19
19. Las Vegas	394.9	.62	15.37	22
20 Detroit	391.2	.61	15.99	25
21. Oakland	389.1	.61	16.60	17
22. Pittsburgh	384.5	.60	17.20	20
23. Newark	384.1	.60	17.80	23
24. Minneapolis/St. Paul	382.0	.60	18.40	24
25. Pontiac	373.7	.59	18.99	18
26. Denver Centennial	370.1	.58	19.57	26
27. New York LaGuardia	365.0	.57	20.15	27
28. Miami Tamiami	362.1	.57	20.71	28
29. Seattle Takoma Int'l	354.4	.56	21.27	31
30. New York Kennedy	342.3	.54	21.81	29

(Continued on next page)

TOP 50 AIRPORTS
BY TOTAL OPERATIONS IN 1990
(IN THOUSANDS)
(continued)

Airport	Total Operations	Percent*	Cumulative Percent	FY-89 Rank
31. Memphis	329.9	.52	22.33	30
32. Daytona Beach	323.6	.51	22.84	44
33. Chicago Midway	322.2	.51	23.35	34
34. Washington National	320.4	.50	23.85	33
35. San Jose	319.6	.50	24.35	32
36. Tulsa	313.2	.49	24.84	42
37. Houston Intercont'l	310.5	.49	25.33	36
38. Grand Forks Int'l	305.3	.48	25.80	39
39. Baltimore	303.5	.48	26.28	35
40. Salt Lake City	302.1	.47	26.76	37
41. Concord	300.8	.47	27.23	47
42. Prescott	287.7	.45	27.68	52
43. Cincinnati	284.5	.45	28.13	46
44. Raleigh Durham	283.4	.45	28.57	41
45. La Verne	278.8	.44	29.01	81
46. Orlando	277.8	.44	29.45	38
47. Melbourne	276.9	.43	29.88	48
48. Cleveland Hopkins Int'l	273.1	.43	30.31	50
49. Portland	271.8	.43	30.74	43
50. Phoenix Deer Valley	268.6	.42	31.16	66

Source: FAA TERMINAL AREA FORECASTS FY 1992-2005.

* Based on 63.669 million operations at 400 FAA-operated airport traffic control towers.

In 1989, Van Nuys rebounded to sixth place with an 8.6 percent increase in total aircraft operations. In 1990, Van Nuys remained in the sixth position.

In fiscal year 1990, the top 50 commercial airports accounted for 83.4 percent of the total number of enplanements which occurred at airports with 1,000 or more enplanements. In fact, the top five airports (Chicago, Dallas/Fort Worth, Atlanta, Los Angeles, and San Francisco) accounted for 23.4 percent of total passenger enplanements. The top 20 airports had 56.4 percent of total enplanements. These percentages are slightly higher than those observed in 1989.

LARGE/MEDIUM/SMALL HUB AIRPORTS

In fiscal year 1990, there were 29 large hub airports, 42 medium hub airports, and 64 small hub airports. The large hub airports accounted for 330.5 million enplanements, 68.4 percent of the approximately 483.4 million passengers enplaned nationally. The medium hub airports enplaned 107.9 million passengers and the small hubs enplaned 36.2 million, 22.3 percent and 7.5 percent of the total, respectively. In 1990, enplanements at the large hub airports were 10.3 percent higher than the 1989 enplanement total. Enplanements at the medium hub airports grew by 1.8 percent; at the small hub airports, enplanements increased by 4.7 percent.

In 1990, aircraft operations at the large hub airports totaled 12.2 million, about 4.7 percent above the 1989 level. At the medium and small hub airports, there were 9.3 and 8.9 million operations, respectively. The 1990 operations at the medium and small hub airports were slightly higher than the 1989 levels.

LARGE HUB FORECASTS

Using fiscal year 1990 as the base year, forecasts for airports in the Terminal Area Forecasts (TAF) were generated for each year to 2005. The total enplanements and related operations forecasts for the 29 large hub airports for fiscal years 1995, 2000, and 2005 are presented on pages 159 and 161. By 2005, Chicago O'Hare is expected to reach 45.3 million enplanements and Dallas/Fort Worth is expected to reach 40.9 million. It is anticipated that Atlanta and Los Angeles will reach 35.7 million and 34.3 million enplaned passengers, respectively, by the year 2005.

Total aircraft operations will reach 848,000 at Chicago O'Hare and 1,198,000 at Dallas/Fort Worth. (For purposes of these forecasts, we made no assumptions about new airports in Chicago or elsewhere.) Atlanta will reach 950,000 operations. These projections suggest that by the year 2005 Dallas/Fort Worth will become the busiest airport in the United States in terms of landings and takeoffs and the first airport to reach one million operations annually.

The average annual growth rates expected for the large hub airports for enplanements and operations for the 1990 to 2005 period are shown in the graphs on pages 160 and 162. Because of differences in the growth rates among airports, the relative ranks of the 29 hub airports in 2005 will differ from the rankings in 1990. For example, Phoenix and Las Vegas will be ranked 7th and 11th, considerably higher than the 12th and 17th places observed in 1990. Conversely, some airports (like New York LaGuardia, Boston, and Washington National Airport) which are experiencing some form of environmental or capacity constraints are expected to be ranked lower than their 1990 positions.

TOTAL PASSENGER ENPLANEMENTS AT LARGE HUB AIRPORTS*
(IN THOUSANDS)

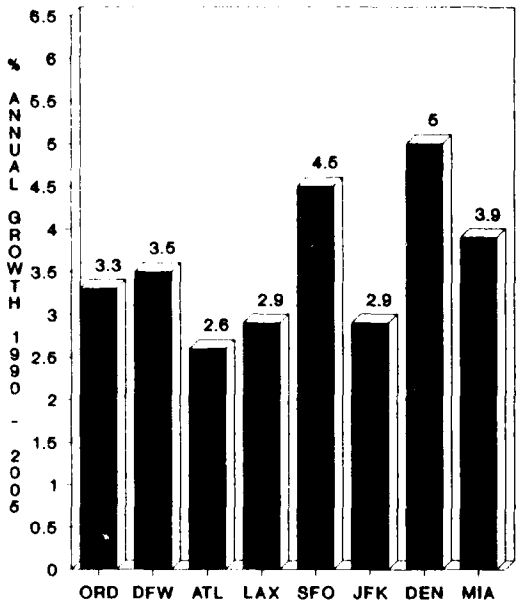
Airport	FY 1990	FY 1995	FY 2000	FY 2005
Chicago O'Hare	27,949	33,675	41,042	45,250
Dallas/Ft.Worth	24,270	31,255	36,319	40,860
Atlanta	24,134	29,339	32,743	35,678
Los Angeles	22,277	26,278	30,278	34,277
San Francisco	14,694	19,330	23,905	28,570
New York Kennedy	14,451	17,023	20,224	22,283
Denver	12,767	17,225	21,440	26,555
Miami	12,192	15,413	18,657	21,672
New York LaGuardia	11,410	12,628	14,510	16,371
Boston	11,085	14,126	16,550	18,888
Newark	11,012	15,407	19,227	23,048
Phoenix	10,877	15,542	19,912	24,281
Detroit	10,555	13,126	16,624	19,304
Honolulu	10,417	12,137	13,876	15,546
St. Louis	10,057	12,780	16,159	18,838
Minneapolis/St. Paul	9,715	12,179	14,564	17,005
**Las Vegas	9,301	12,421	15,867	19,832
Orlando	8,684	11,267	14,000	16,733
Pittsburgh	8,531	12,585	14,582	16,628
Houston Intercont'l	8,127	11,144	13,507	15,164
Philadelphia	8,001	10,925	13,017	15,206
Seattle-Tacoma	7,863	11,078	12,414	14,565
**Washington National	7,809	8,357	8,949	9,452
Charlotte	7,784	9,534	11,416	13,298
Salt Lake City	5,580	6,630	8,221	9,605
San Diego	5,488	7,244	9,630	11,725
Tampa	5,307	7,967	10,012	12,059
**Washington Dulles Int'l	5,112	7,532	10,899	13,256
**Baltimore	5,028	5,903	7,144	8,469

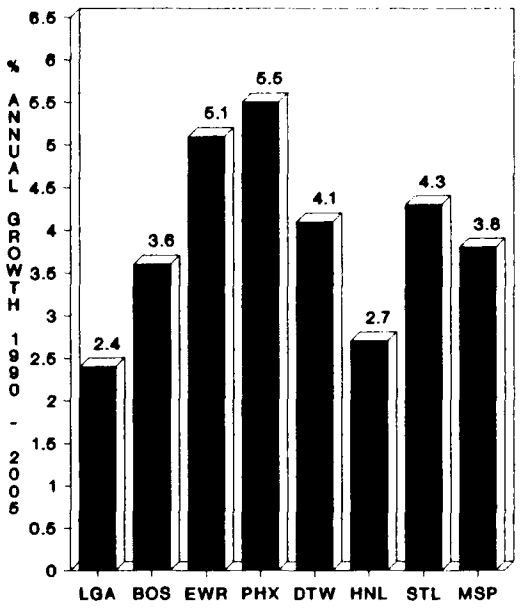
Source: FAA TERMINAL AREA FORECASTS FY 1992-2005.

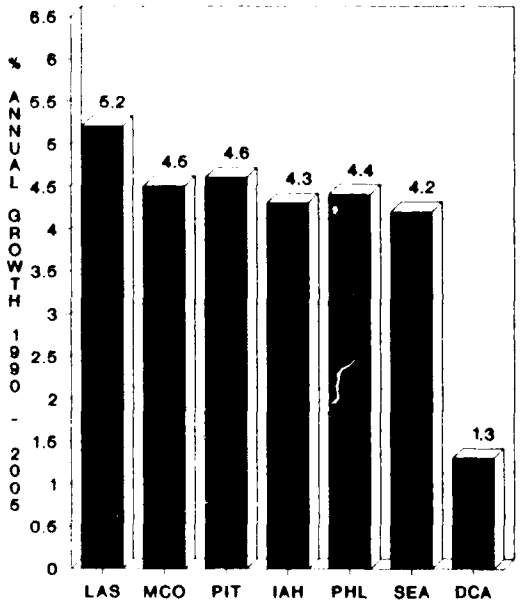
* Includes U.S. certificated route air carriers, foreign flag carriers, supplementals, air commuters and air taxis.

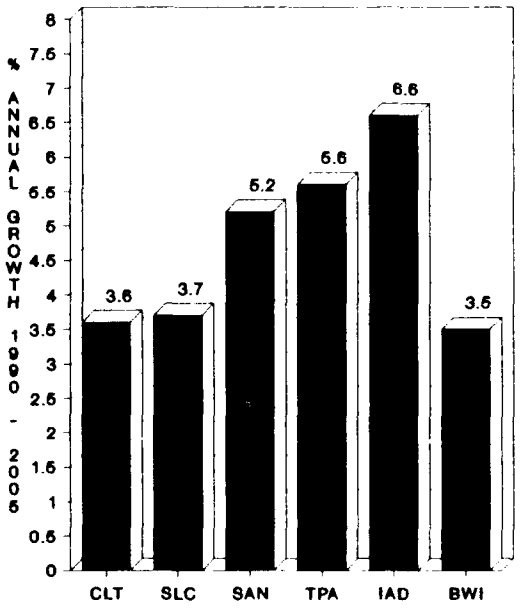
** Forecasts are based on individual hub forecast reports.

PASSENGER ENPLANEMENT GROWTH AT LARGE HUB AIRPORTS









TOTAL AIRCRAFT OPERATIONS AT LARGE HUB AIRPORTS*
(IN THOUSANDS)

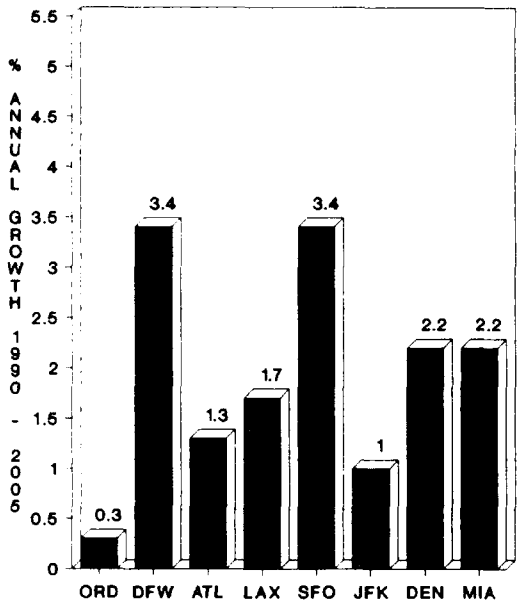
Airport	FY 1990	FY 1995	FY 2000	FY 2005
Chicago O'Hare	811	822	842	848
Dallas/Ft. Worth	725	877	1,060	1,198
Atlanta	779	833	894	950
Los Angeles	669	762	817	856
San Francisco	437	520	625	722
New York Kennedy	342	345	380	397
Denver	475	543	599	655
Miami	463	526	588	644
New York LaGuardia	365	381	381	381
Boston	448	474	515	552
Newark	384	401	425	449
Phoenix	497	549	598	646
Detroit	391	442	514	543
Honolulu	407	429	480	509
St. Louis	443	459	506	550
Minneapolis/St. Paul	382	435	503	579
**Las Vegas	395	441	467	509
Orlando	278	372	481	589
Pittsburgh	385	434	490	547
Houston	310	355	410	458
Philadelphia	405	447	523	597
Seattle/Tacoma	354	373	413	453
**Washington National	320	334	345	356
Charlotte	452	480	528	566
Salt Lake City	302	332	375	405
San Diego	212	248	300	345
Tampa	227	272	320	367
**Washington Dulles	240	295	361	394
**Baltimore	304	322	367	416

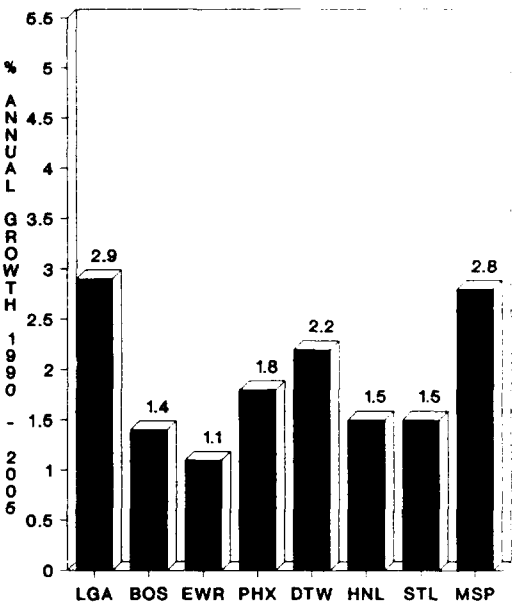
Source: FAA TERMINAL AREA FORECASTS FY 1992-2005.

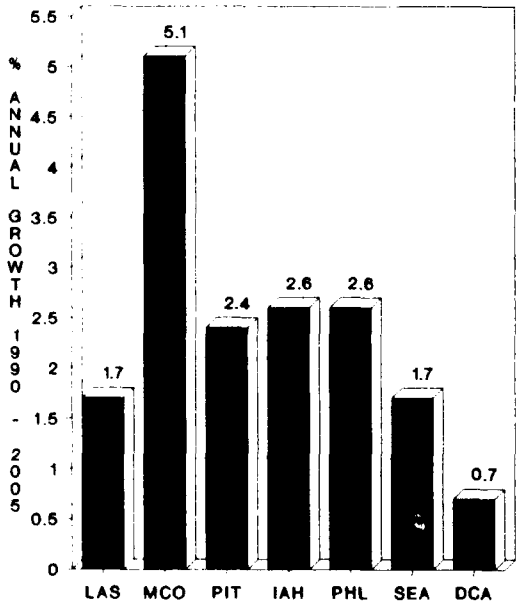
* Includes total itinerant and local operations performed by commercial air carriers, air taxis, military, and general aviation.

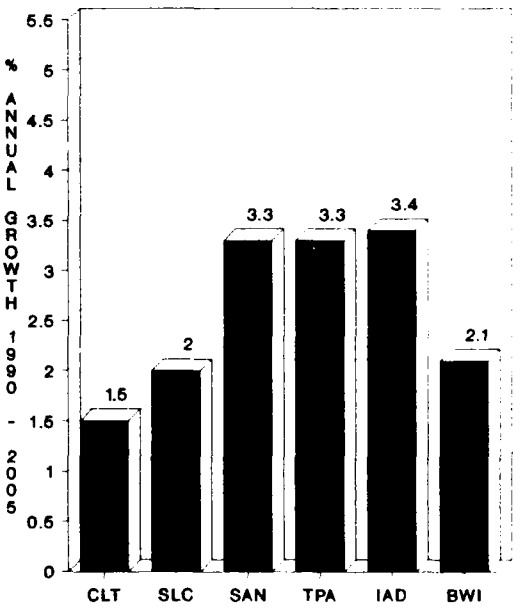
** Forecasts are based on individual hub forecast reports.

TOTAL AIRCRAFT OPERATION GROWTH AT LARGE HUB AIRPORTS









Large shifts could also occur if a major airline decides to use a small or medium size airport as a hub, or to cease hubbing at an airport. (For purposes of this forecast, we have not assumed any new airport-specific hubs, nor have we assumed that any existing airport-specific hubs would cease to exist.) Airline mergers, consolidations, and restructuring of routes may also affect the enplanements and operations forecasts, and, consequently, the relative ranks of the major hubs discussed in this section.

MEDIUM/SMALL HUB FORECASTS

The growth of enplanements and operations at the 42 medium and 64 small hub airports (relative to growth at the large hub airports) are compared in the tables on page 164. The first table shows that passenger enplanements at the medium hub airports are expected to increase somewhat faster than at the large hub airports. It is anticipated that some carriers will continue to develop or establish hubbing operations at medium or small hubs as alternatives to the larger more congested hubs. At the medium hubs, enplanements are forecast to grow at an annual average rate of 7.2 percent during the 1990 to 1995 period and at 4.5 percent between 1995 and 2005. Passenger enplanements at the small hubs are expected to increase at a slower rate than the medium hubs during the forecast period. The expected increases are 6.0 percent between 1990 and 1995 and 3.9 percent between 1995 and 2005.

As indicated in the second table, aircraft operations at both the medium and small hub airports are expected to grow faster than the large hubs during the 15-year period. Between 1990 and 1995, aircraft operations are expected to grow at 3.0 percent at the medium hubs and at 1.5 percent at the small hubs. During the 1995-2005 period, the growth rates are expected to be about 3.1 percent and 2.7 percent, respectively. The medium and small hubs are listed alphabetically by cities in Appendices K and L on pages 277 and 279.

SPECIAL HUB FORECASTS

Since 1978, FAA has sponsored a number of individual hub reports. The most recent studies were Columbus, Las Vegas, and Washington/Baltimore which were completed during the latter part of 1991. These studies were conducted in conjunction with FAA regions, state and local planners, regional aviation officials, chambers of commerce, universities, and other interested parties.

These groups provide local aviation data, discuss general economic conditions, sponsor and attend local seminars, and review preliminary reports. This procedure keeps the public informed of aviation activity in the local community, encourages local input and public participation in the planning process, and, consequently, enhances the final product.

The hub forecast studies examine the metropolitan statistical areas or standard consolidated statistical areas comprehensively. The areas generally have at least one major air carrier airport and several general aviation airports. Major objectives of these studies include: (1) examination of the interplay between the growth of aviation activity at the major airport and other airports in the area; (2) assessment of the possible results of aviation growth in the area; and (3) examination of possible plans to accommodate the growth in aviation. Such plans may include reviews of

possible distribution or redistribution of commercial air traffic and general aviation activity and the development of reliever or satellite airports.

The graphics on the following pages depict the relative size and growth of enplanements and operations, at the major airports with commercial service in the hubs discussed.

SUMMARY OF PASSENGER ENPLANEMENTS AT HUB AIRPORTS
(Millions)

	1990	1995	2005	AVERAGE ANNUAL PERCENT CHANGE 1990-1995	1995-2005
Large Hubs	330.5	420.1	584.4	4.9%	3.4%
Medium Hubs	107.9	152.4	236.3	7.2	4.5
Small Hubs	36.2	48.5	71.2	6.0	3.9

SUMMARY OF AIRCRAFT OPERATIONS AT HUB AIRPORTS
(Millions)

	1990	1995	2005	AVERAGE ANNUAL PERCENT CHANGE 1990-1995	1995-2005
Large Hubs	12.2	13.5	16.5	2.1%	2.0%
Medium Hubs	9.3	10.8	14.6	3.0	3.1
Small Hubs	8.9	9.6	12.5	1.5	2.7

COLUMBUS HUB

The Columbus hub is contained within a Metropolitan Statistical Area (MSA) that covers seven counties in Ohio. The Columbus MSA is near the geographic center of Ohio. It is the twenty-ninth largest metropolitan area in the nation. Since 1950, its population growth has exceeded the national growth rate (89 percent versus 65 percent). The MSA population was 1,377,419 in 1990. According to the Bureau of Economic Analysis, U.S. Department of Commerce, the population will continue to increase at a rate slightly higher than the U.S. population; it will reach nearly 1.6 million by 2010.

Columbus was founded in 1797 and it became the capital of the state in 1816. In 1873, the state university was founded. Today, Ohio State University is the largest university in the country. The city became an important rail center by the 1880's, and, by 1900, it became a transportation and commercial center. The growth of the city is based on its location close to natural resources such as coal, iron, and natural gas.

Columbus has one of the most diversified economies of any large metropolitan area. As a result, the MSA has enjoyed relative immunity from the serious job losses that have plagued some of the larger cities over the last two decades. Over the last 20 years, employment has grown at an average annual rate of 2.6 percent, and, since 1982, the growth rate has been at a four percent average annual rate. The greatest growth in employment between 1980 and 1990 has been in services, finance, insurance, and real estate.

The MSA is currently served by 48 airports. Four provide air traffic control services. Two are FAA towers and two are privately owned towers. The Port Columbus International Airport (CMH) is the principal air carrier airport in the MSA. It is located six miles from the center of Columbus. The airport provides facilities for U.S. domestic carriers (including charter and commuter) as well as international charter flights serving the hub.

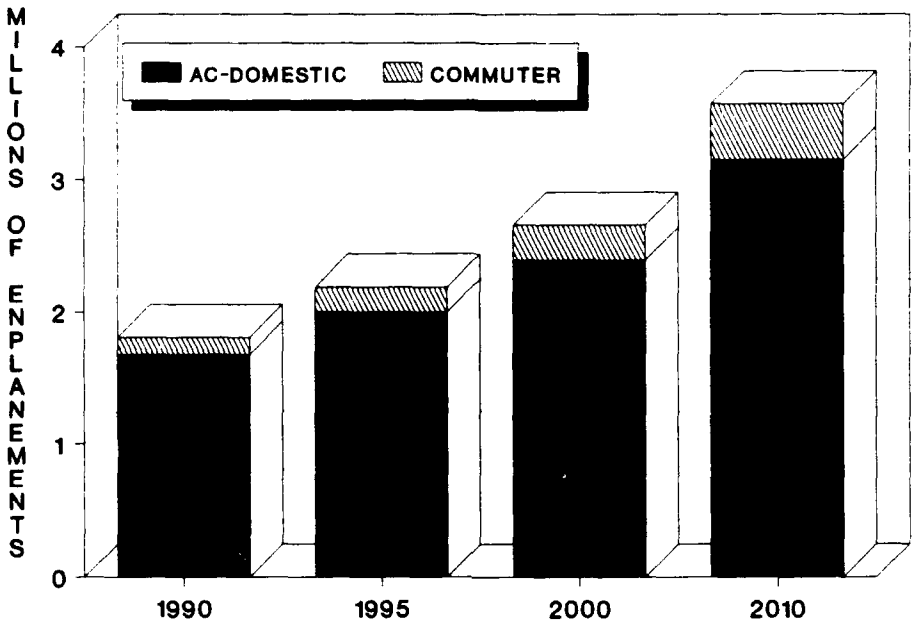
Port Columbus International is served by 18 air carriers that provide scheduled air carrier service. Eight of these carriers operate aircraft with more than 60 seats. The remaining ten (with aircraft less than 60 seats) are classified as regional/commuter air carriers. In addition, five carriers provide scheduled cargo service at Port Columbus.

Other towered airports in the Columbus MSA are: The Ohio State University Airport (FAA tower), and Bolton Field and Rickenbacker Airport (both private towers).

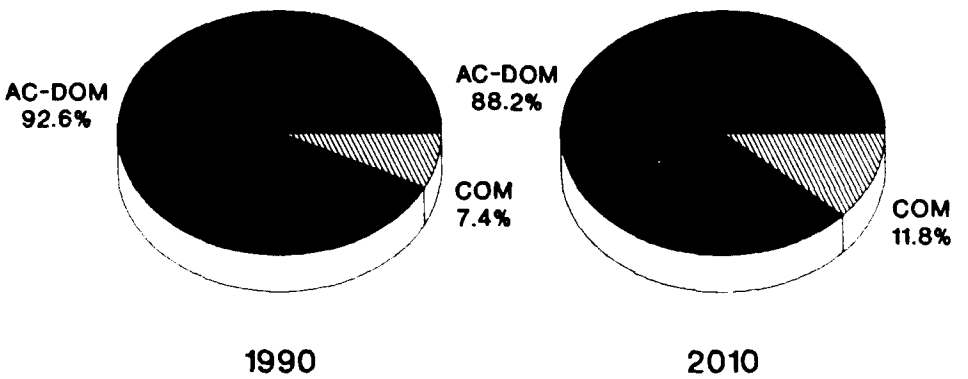
Based largely on the demise of Eastern Airlines, TWA's present financial difficulties, and the proximity to other hubs, we anticipate moderate aviation growth for the Columbus MSA. Passenger enplanements in the Columbus Hub are forecast to reach nearly 3.6 million by the year 2010. This is double the 1.8 million recorded in 1990. Commercial aircraft operations are expected to number 169,100 in the Columbus Hub in the year 2010. This is a 45 percent increase over the 116,800 operations handled in 1990. Itinerant general aviation aircraft operations in the Columbus Hub are expected to reach 291,800 in 2010, compared to 213,100 in 1990, an increase of almost 37 percent. Local general aviation operations are expected to increase to 393,700 in 2010, compared to 290,700 in 1990, an increase of 35 percent.

PORT COLUMBUS INTERNATIONAL AIRPORT

PASSENGER ENPLANEMENTS

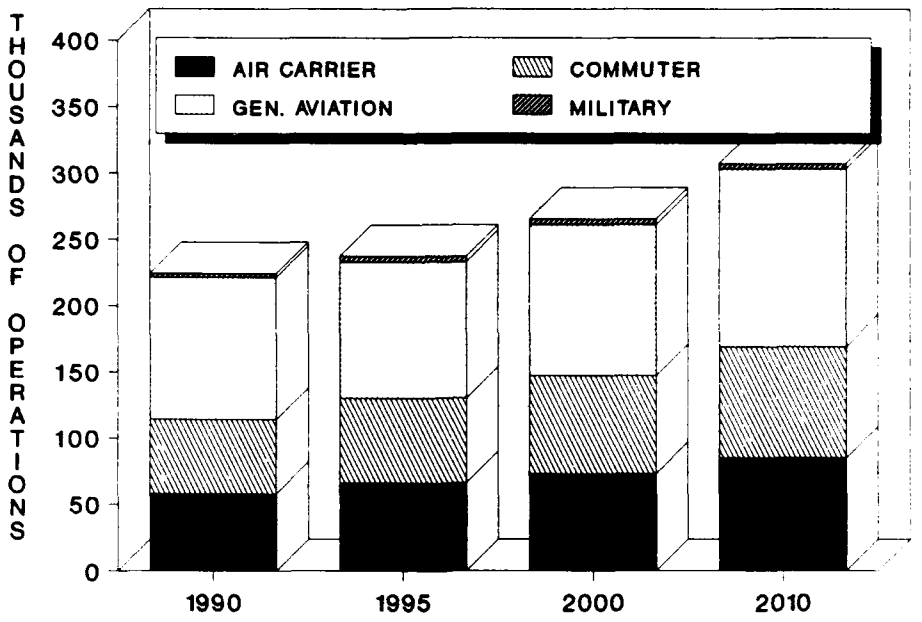


PERCENT OF TOTAL ENPLANEMENTS

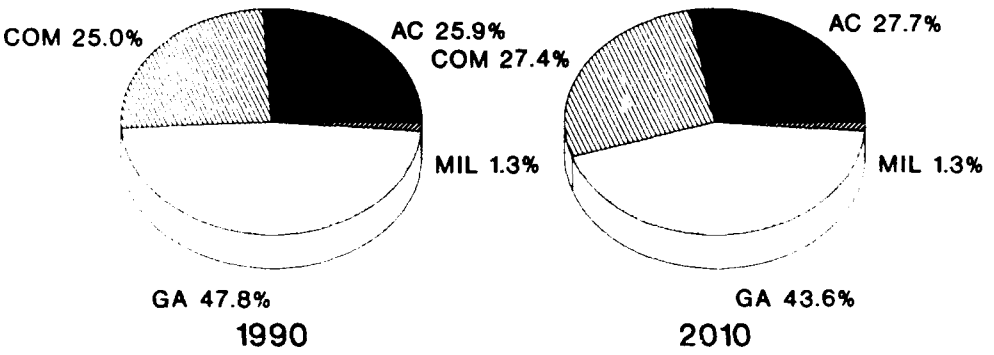


PORT COLUMBUS INTERNATIONAL AIRPORT

TOTAL OPERATIONS



PERCENT OF TOTAL OPERATIONS



LAS VEGAS HUB

The Las Vegas MSA is located at the southern tip of Nevada, and is the 53rd largest MSA in the United States. The current estimated population of 741,459 is nearly three times its 1970 population of 273,288. The population is expected to increase 68 percent by 2010 to 1,248,300 persons, according to the Bureau of Economic Analysis, U.S. Department of Commerce.

Las Vegas, in the early 19th century, was initially a resting place for settlers travelling to California. It was settled in 1855 and became the regional maintenance point for the Union Pacific Railroad in 1905. The silver rush of the 1860's made Las Vegas a commercial center. By the end of the century, ranching had become the main business of the city. When it was chartered in 1911, the City of Las Vegas covered 14 square miles. Today, the City of Las Vegas spans 53.9 square miles, while the MSA (consisting of Clark County) covers 7,874 square miles.

Presently, Las Vegas has become a major entertainment and gambling center. The city is the national leader in job growth among major metropolitan areas, adding 9 percent to its workforce in 1990 alone. By 1990, Las Vegas had experienced an eighteenfold increase in employment since 1950 (365,400 versus 20,701) and the number of jobs is expected to reach 554,600 in 2010.

Accompanying the growth in jobs is a parallel increase in new businesses, 3500 over the past five years --an increase of 31 percent.

While the economy of the Las Vegas MSA is oriented primarily toward the entertainment and gambling trade, the area also maintains a broad economic base. Retail and wholesale trades, tourism, and the convention trade are very strong. Because of the large influx of residents, the construction industry employed some 35,500 people in 1990 and generated a payroll of almost $850 million.

The Las Vegas MSA is served by 15 airports. Of these, four provide air traffic control facilities: two are FAA towered and two are military.

Las Vegas McCarran International Airport (LAS) is the principal air carrier airport in the MSA. McCarran is located five miles from downtown Las Vegas and provides facilities for U.S. domestic carriers (including commuter and charter), as well as foreign flag carriers (largely charter) serving the hub.

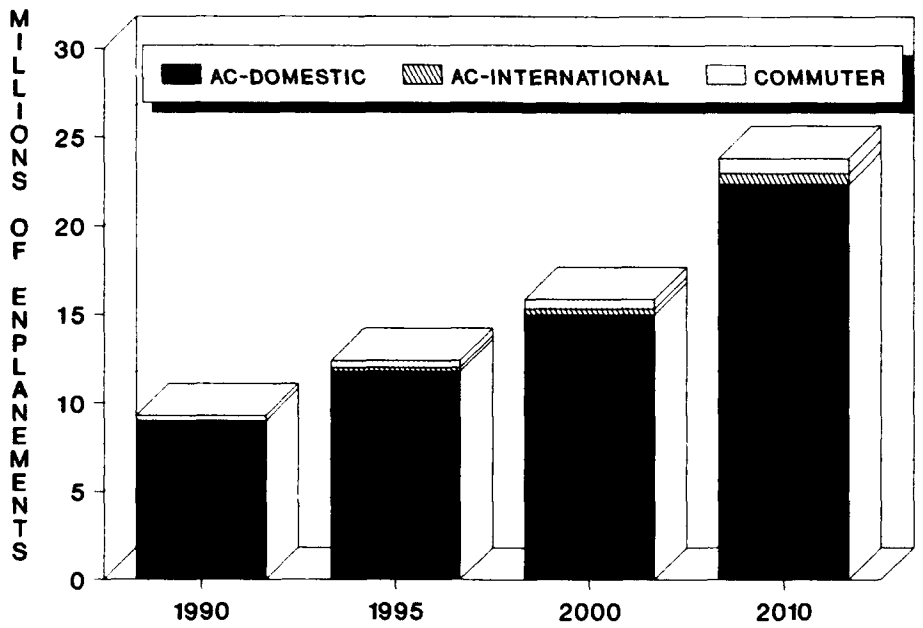
Las Vegas McCarran International Airport is served by 37 scheduled and/or chartered passenger air carriers. Thirty-one of these air carriers operate aircraft with more than 60 seats. The remaining six air carriers are classified as regional/commuter air carriers. An additional seven air carriers provide cargo service at the airport.

Other towered airports in the Las Vegas MSA are: North Las Vegas (FAA tower), Nellis Air Force Base (Military), and Indian Springs Air Force Auxiliary (Military).

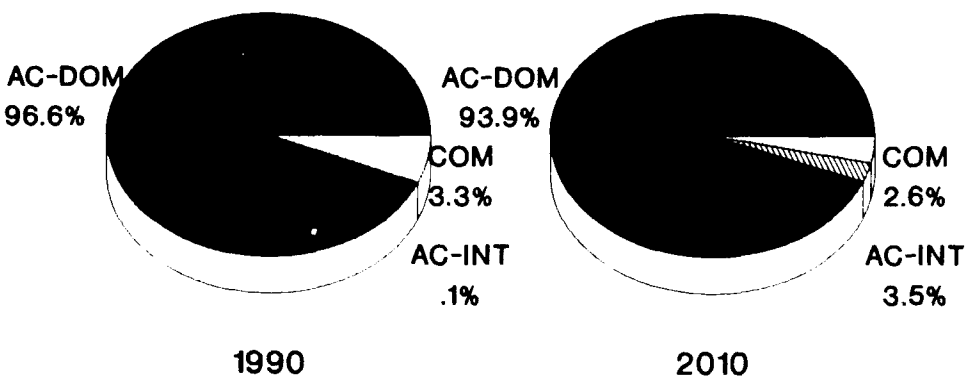
Based largely on the strong growth of the regional economy, which seems immune to the national recession, and the anticipated growth in the region's population, we anticipate strong aviation growth in the Las Vegas MSA. Passenger enplanements in the Las Vegas Hub are forecast to reach almost 23.8 million by the year 2010, an increase of 156 percent over the 9.3 million enplanements recorded in 1990. Commercial aircraft operations in the Las Vegas Hub are expected to reach 496,700 in the year 2010 compared to 272,900 in 1990, an increase of 82 percent. Itinerant general aviation operations in the hub are expected to

MC CARRAN INTERNATIONAL AIRPORT

PASSENGER ENPLANEMENTS

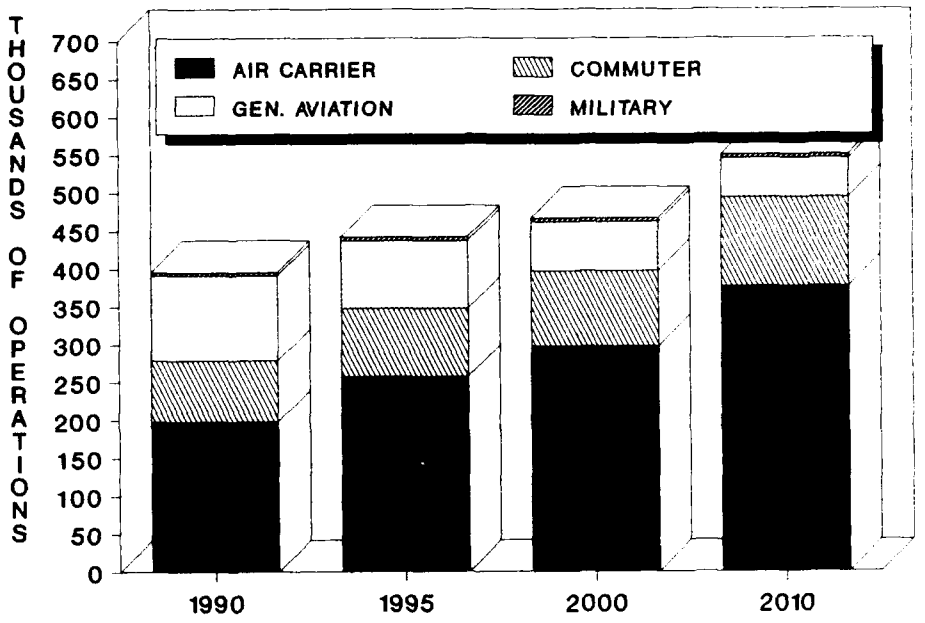


PERCENT OF TOTAL ENPLANEMENTS

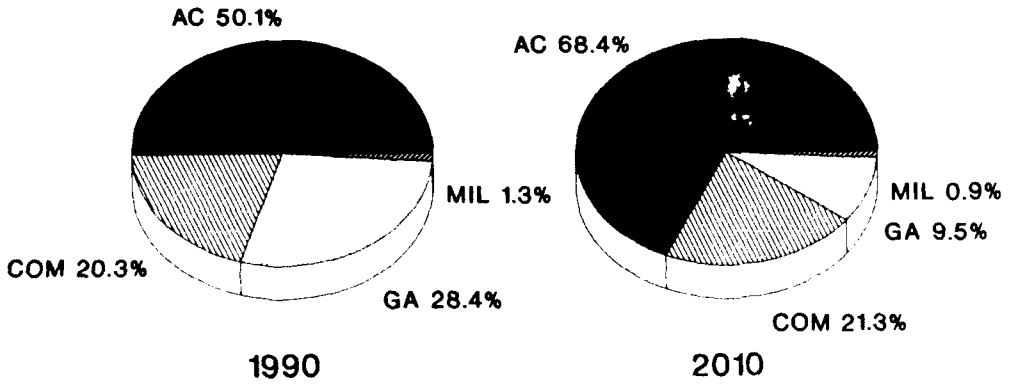


MC CARRAN INTERNATIONAL AIRPORT

TOTAL OPERATIONS



PERCENT OF TOTAL OPERATIONS



reach 296,000 by year 2010, compared to 179,400 in 1990, an increase of 65 percent. Local general aviation operations are forecast to be 250,900 in the year 2010, compared to 140,800 operations in 1990, an increase of 78 percent over the period.

WASHINGTON/BALTIMORE HUB

The Washington/Baltimore Hub serves Maryland, Northern Virginia, and the District of Columbia, and comprises the Washington and Baltimore MSA's. Washington, D.C. is bounded on three sides by the State of Maryland and on the fourth, across the Potomac River, by the Commonwealth of Virginia. Washington is the center of the seventh most populous MSA in the nation. The city's first significant period of growth was during the Civil War when the population grew to 120,000. The continued growth of the city was tied to the expansion of the Government. The population of the city peaked in 1950 and has since decreased as population growth moved to the suburbs.

Washington D.C. is the focus of Federal Government activity which, in the past, has provided a high degree of stability to the economy of the area. With the slower growth in the Federal sector, future economic growth in the area will rely more on the private sector, particularly the high-tech industries.

The Baltimore area was settled in 1661, but the city itself was not founded until 1729 and was incorporated in 1796. In the early 1800's, Baltimore became the leading port for trade with Midwest markets. Railroads that were built in the 1830's helped Baltimore to maintain its trade status. As a result, the Port of Baltimore became a center for agricultural trade with Europe and South America. During World War II, the city was a center for the manufacture of airplanes, chemicals, electronic equipment, ships, and steel. In recent years, heavy industry has declined, while the economy has diversified. The city has undertaken a major urban renewal program, including major renovations of the downtown area and the inner-harbor.

The Washington/Baltimore Hub population has increased from 4,034,100 in 1960 to 6,305,700 in 1990, an increase of 56 percent compared to 39 percent for the U.S. population during the same period. The hub's population is expected to grow at a faster rate than the national population. According to the Bureau of Economic Analysis, U.S.Department of Commerce, the area's population will be 7,504,100 by 2010, an increase of 19 percent, compared to an increase of 13 percent for the national population.

Total employment in the hub increased from 2,533,000 in 1970 to an estimated 4,167,000 in 1990. This is an increase of 65 percent during the period. The hub employment number is expected to reach nearly 5.6 million by the year 2010, an increase of approximately 34 percent. The diverse economy was led by jobs in the service sector (33.2 percent), government (23.5 percent), and retail (14.8 percent).

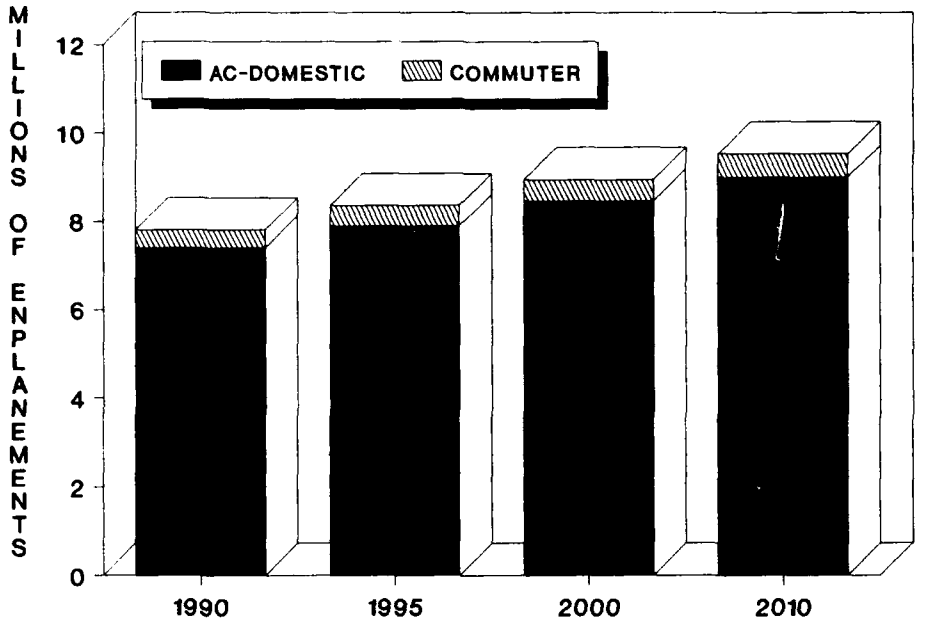
The hub is currently served by 28 airports. Of these 28 airports, five provide air traffic control services: four have FAA towers; one has a state tower.

There are three principal air carrier airports in the hub: Washington National Airport, Washington Dulles International Airport, and Baltimore/Washington International Airport.

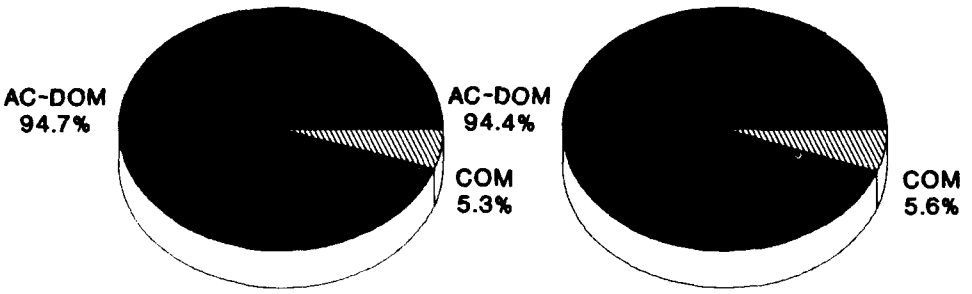
Washington National Airport (DCA) is located three miles south of downtown Washington D.C. and serves primarily origination and destination (non-hub) passenger traffic in the Washington D.C. area. As of March, 1991, 18 air carriers provided scheduled passenger service to Washington National Airport.

WASHINGTON NATIONAL AIRPORT

PASSENGER ENPLANEMENTS



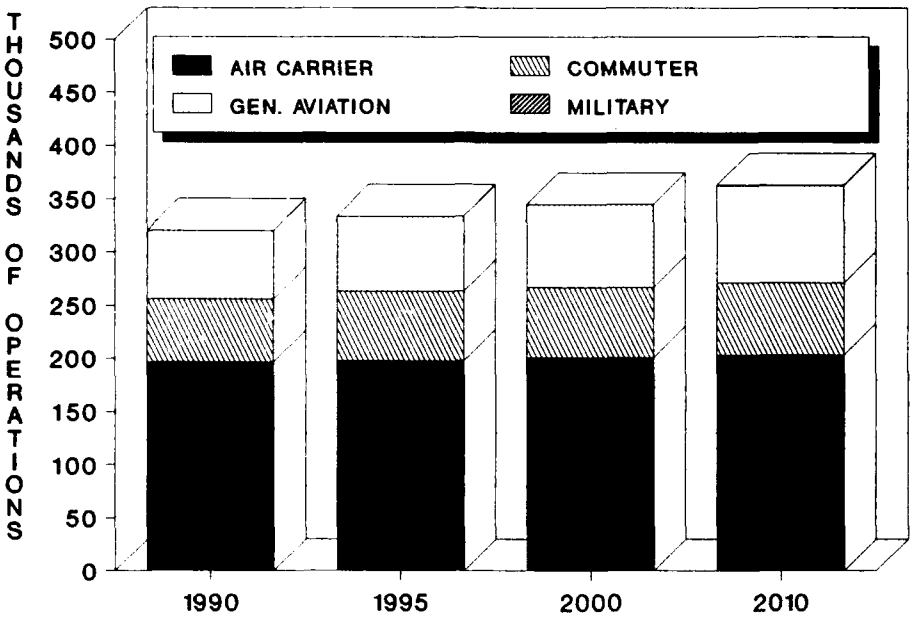
PERCENT OF TOTAL ENPLANEMENTS



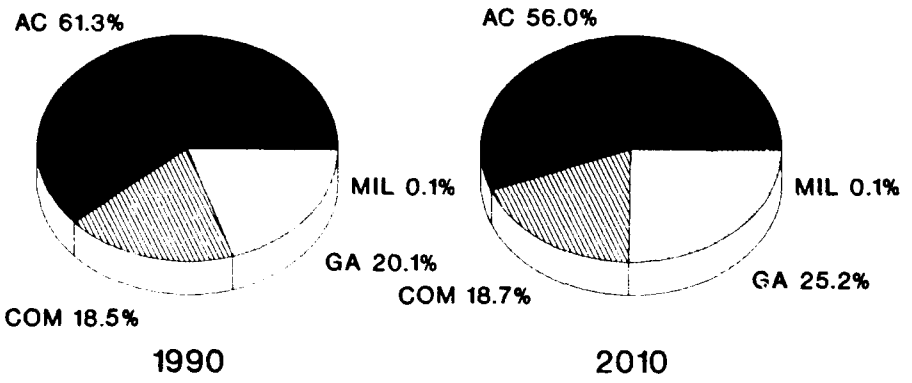
1990 2010

WASHINGTON NATIONAL AIRPORT

TOTAL OPERATIONS

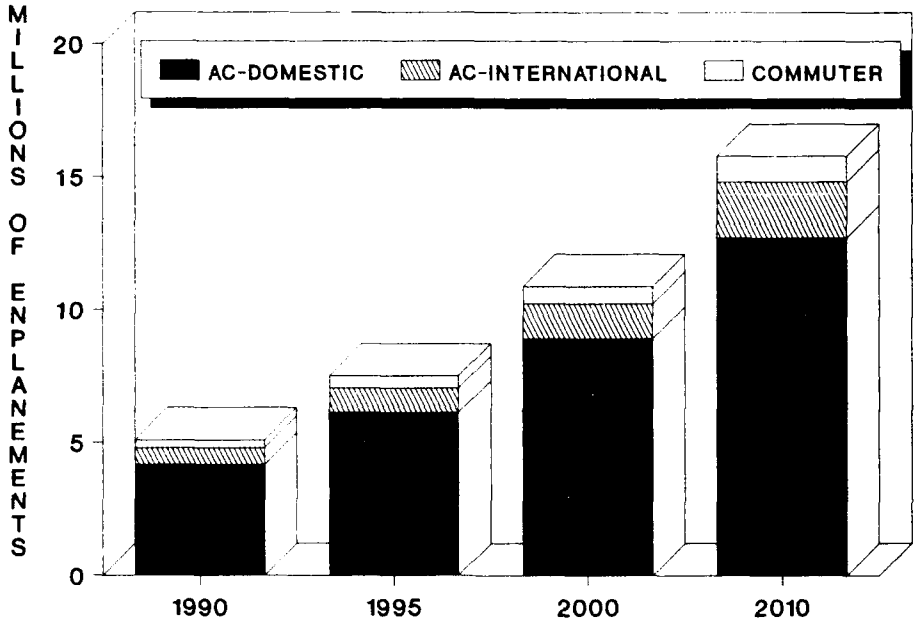


PERCENT OF TOTAL OPERATIONS



WASHINGTON DULLES INT'L AIRPORT

PASSENGER ENPLANEMENTS



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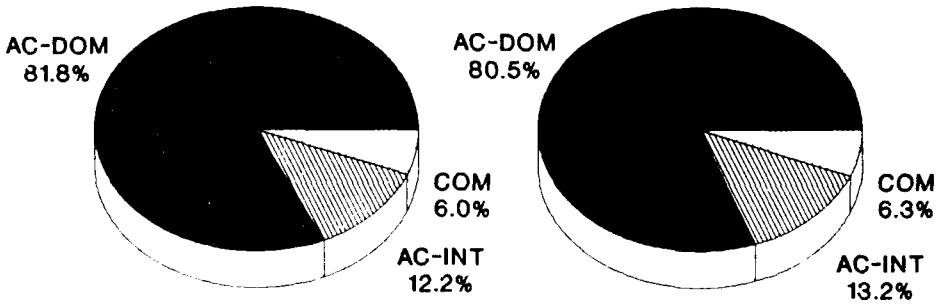
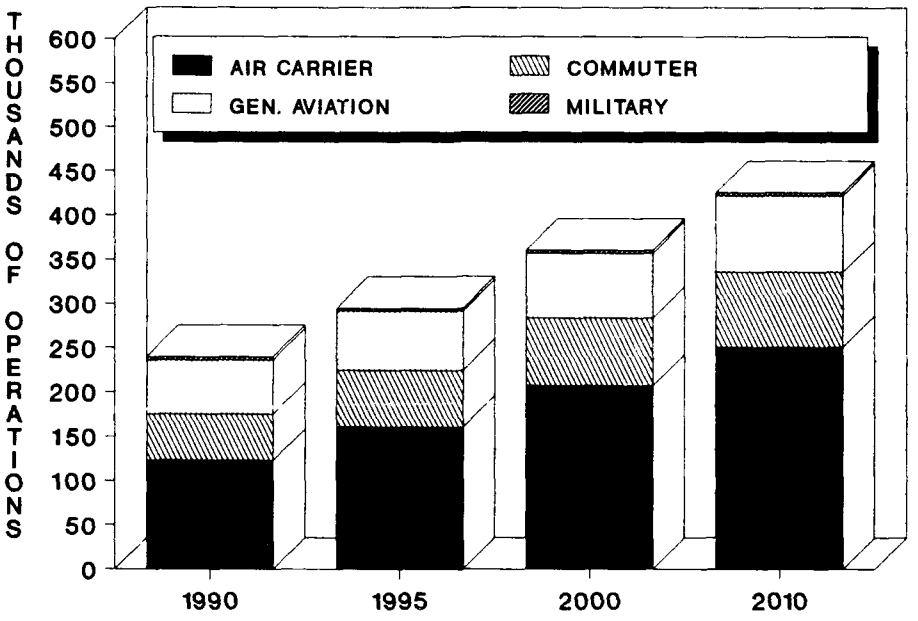


WASHINGTON DULLES INT'L AIRPORT

TOTAL OPERATIONS



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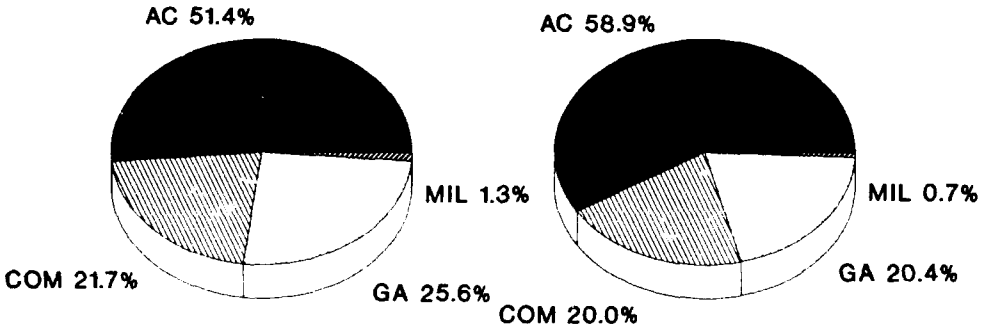
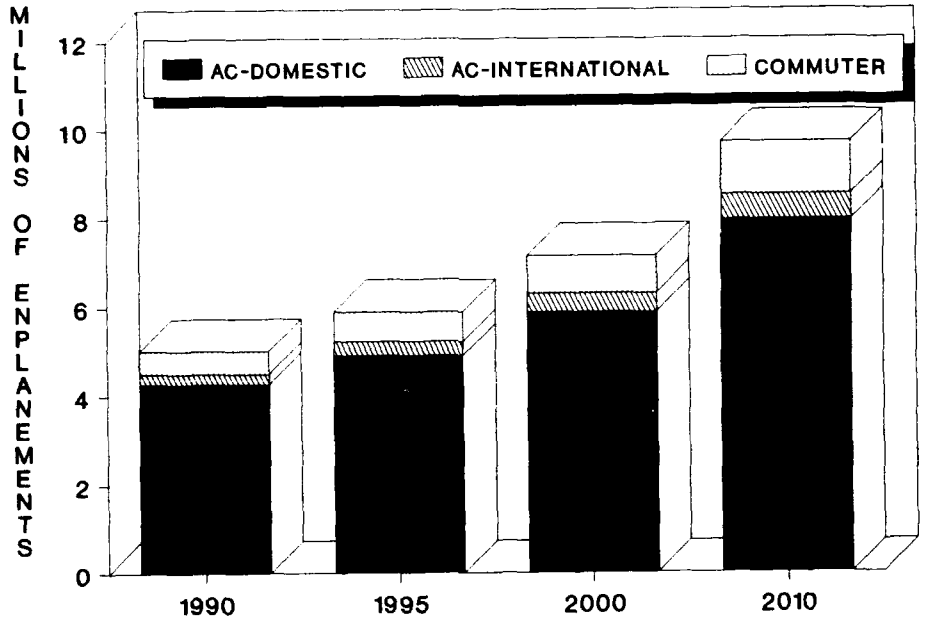


BALTIMORE/WASHINGTON INT'L AIRPORT

PASSENGER ENPLANEMENTS



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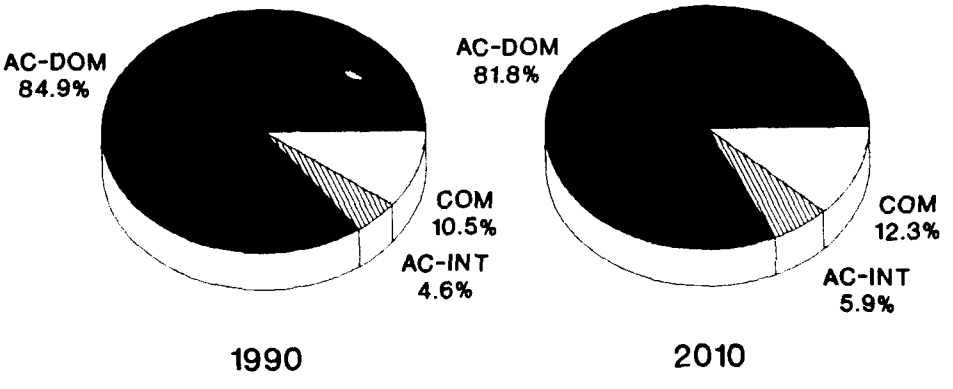
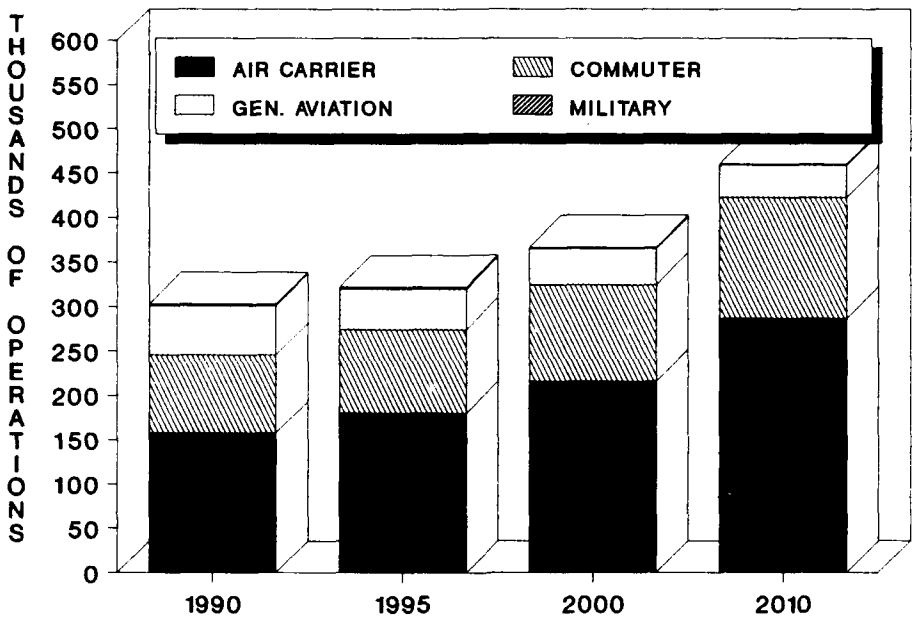
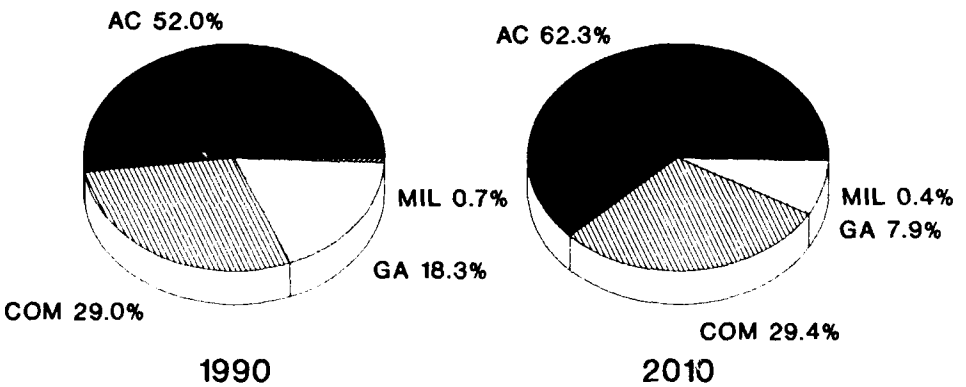


BALTIMORE/WASHINGTON INT'L AIRPORT

TOTAL OPERATIONS



PERCENT OF TOTAL OPERATIONS



Six of the 18 air carriers operate aircraft with 60 seats or less and are classified as regional/commuter air carriers.

Washington Dulles International (IAD) is located 26 miles from downtown Washington D.C. It is a major terminating point as well as a connecting point for domestic and international flights. As of March 1991, 24 air carriers provided scheduled passenger service at Washington Dulles International Airport. Five of these 24 carriers operate aircraft with 60 seats or less and are classified as regional/commuter air carriers.

Baltimore/Washington International Airport is located 10 miles from downtown Baltimore. It serves as a connecting point for domestic and international flights as well as a major terminating point. As of April 1991, 19 air carriers provided scheduled passenger service at Baltimore/Washington International Airport. Seven of these 19 air carriers operate aircraft with 60 seats or less and are classified as regional/commuter air carriers.

In addition to the three principal commercial airports, there is a small amount of civilian passenger activity at Andrews Air Force Base in Camp Springs, MD, associated with press personnel who travel with the President of the United States.

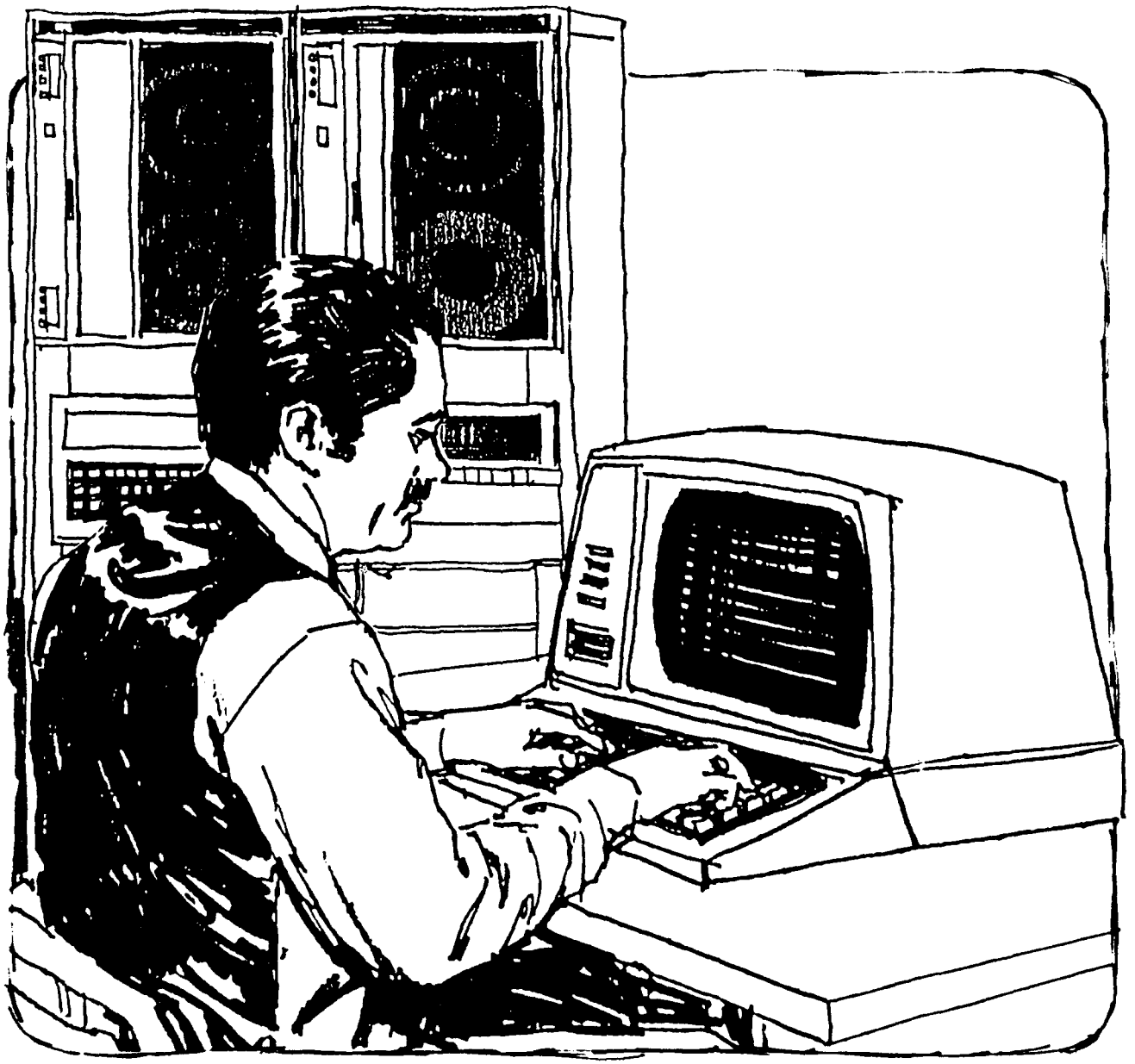
Based largely on capacity limitations at Washington National and the current financial troubles of USAir, which uses Baltimore/Washington International as a hub, we anticipate slow growth for the Washington/Baltimore MSA. Enplanements in the Washington/Baltimore Hub are expected to total nearly 35.1 million by the year 2010. This is a 95 percent increase over the 1990 total of 18.0 million.

The increase in enplanements at the Washington/Baltimore Hub is at a slower rate than that expected for the total U.S. enplanements (119 percent over the same period). Commercial aircraft operations are expected to number 1,029,500 by the year 2010. This represents a 52 percent increase over the 677,000 commercial aircraft operations handled in 1990 . Itinerant general aviation operations in the Washington/Baltimore Hub are expected to reach 1,085,000 in 2010, an increase of 67 percent over estimated itinerant operations in 1990. Local general aviation operations are expected to reach 1,112,600 in 2010, an increase of 43 percent over the 778,200 estimated for 1990.

Copies of the Columbus, Las Vegas, and Washington/Baltimore hub studies are available from the Forecast Branch, Office of Aviation Policy and Plans, APO-110 (Phone 202-267-3355).

CHAPTER IX

FORECAST ACCURACY



CHAPTER IX

FORECAST ACCURACY

The Federal Aviation Administration (FAA) provides 12-year forecasts of workload measures annually for manpower and facility planning. The FAA has developed forecast models and established a forecast process that attempts to anticipate external events that may affect the industry. For example, the National Academy of Sciences, Transportation Research Board (TRB) organized the seventh bi-annual workshop on aviation forecasting in September of 1991. This workshop was sponsored by the FAA for the purpose of continuing its examination of the techniques and practices currently used by the FAA and other aviation forecasters, and to examine the outlook for the aviation industry and its prospects for future growth. The workshop again focused on the forecasting process and ways to improve the reliability and utility of forecasting results.

The two tables on pages 183 and 184, provide some measure of the accuracy of FAA workload forecasts. The tables compare forecast data for both the short-term and the long-term periods. The short-term, one to five years, is the critical period for manpower planning, the long-term period is for ten years out. The two key FAA workload measures employed are instrument operations and aircraft handled. For short-term trends, the forecast errors normally tend to be minimal, however, the 1991 forecast for instrument operations was 6.0 percent higher than the actual number recorded. This unusually high forecast error is a special case that can be attributed to the double negative impact of severe traffic losses resulting from the Gulf War turmoil and the failure of the U.S. economy to rebound from the recession as quickly as expected. The continuing economic recession in 1991 contributed to the demise of three air carriers--Pan Am, Midway, and Eastern, which in turn resulted in traffic losses.

The ten-year out forecast error has remained high because of two external events that were not anticipated, but which had long-term impacts on the aviation system--the more than doubling of aviation fuel prices caused by OPEC actions taken in 1979-1980, and the failure of general aviation to respond to the economic recovery of the 1980's.

THE FAA AVIATION FORECASTING PROCESS

INTRODUCTION

The FAA's forecasting process is a continuous and interactive one that involves the FAA Forecast Branch, other FAA Offices and Services, other Government agencies, and aviation industry groups. In addition, the process uses various economic and aviation data bases, econometric models and equa-

tions, and other analytical techniques.

Forecasting aviation activity is an essential component of the FAA's planning process. The forecasts are used to determine staffing levels and capital expenditures that will be needed to accommodate growth of activity commensurate with a safe and efficient environment. The forecasts are also used for short-term budget preparation, cost-benefit analyses, and safety analyses. The relative importance of the forecasting function in the planning process can be gauged by examining the major changes being made to the National Airspace System during the next 10 years. These changes are being made, in large part, to accommodate the projected growth in air traffic.

In rebuilding the air traffic control and air navigation systems, the FAA is installing new aircraft landing systems, developing new radar and communication systems, and upgrading the weather services it provides to aircraft operators. Because of the sizeable investments being made in the National Airspace System, it is essential that the FAA develop and utilize the most accurate and reliable forecasts possible. Consistently large forecast errors will lead to inefficient allocation of scarce resources. Thus, the periodic review and evaluation of the FAA forecasting procedures, models, forecast assumptions, and forecast results constitute an essential part of the process.

SYSTEM BACKGROUND

As part of the need for ensuring safe and efficient operation of the National Airspace System, FAA operates 400 airports with air traffic control towers, 21 air route traffic control centers, and as of October 1, 1991, 173 flight service stations. Many of the nonautomated flight service stations (FSS's) will be absorbed into 61 new automated facilities (AFSS's). However, given the recent Congressional mandate to implement a system of auxiliary flight service stations in addition to the 61 AFSS's, 36 of the FSS's which were scheduled to be closed will remain open. Thus, the FAA facilities perform a large and diverse number of services for the aviation community.

The FAA towers provide sequencing and separation services to pilots and aircraft arriving at or departing from individual airport facilities. These services are provided to various categories of aircraft: air carriers, commuters, air taxis, general aviation, and military. The arrivals and departures (landings and takeoffs) are generally referred to as aircraft operations. The arrivals and departures are further classified as itinerant or local operations depending on the purpose of the flight or the distance between the airports from which the landings and takeoffs were made. These operations are measures of workload or activity at individual airports. The sum of these operations at all towered airports make up the national counts of aircraft operations.

Another important workload measure at FAA tower airports is the number of instrument operations. This is essentially an aircraft operation performed in accordance with an instrument flight rule (IFR) flight plan or an aircraft flight where IFR separation between aircraft is provided by the facility. At times, advisory services may be offered to aircraft flying under visual flight rules (VFR). Instrument operations are further subdivided into (1) primary instrument operations (separation and sequencing services provided to aircraft landing at the airport providing the service), (2) secondary instrument operations (services provided to aircraft landing at a nearby airport), and (3) overs (services provided to aircraft which are transiting the facility's controlled airspace without landing in the area).

FAA INSTRUMENT OPERATIONS FORECAST EVALUATION
(Millions)

		Forecast - Years Out					
Year	Actual	1	2	3	4	5	10
1986	40.5	40.6	40.9	40.8	42.6	44.8	46.2
1987	43.4	41.7	42.3	42.3	42.4	44.3	45.9
1988	44.3	45.4	43.0	43.8	43.6	44.2	49.9
1989	45.2	45.8	47.2	44.2	45.7	45.5	53.9
1990	46.8	46.4	47.7	49.1	45.4	47.3	54.2
1991	45.1	47.8	48.0	49.5	50.7	46.4	52.4
1992		46.1	48.9	49.6	51.3	51.8	51.5
1993			47.4	50.1	50.8	52.5	50.3
1994				48.8	51.4	52.2	52.0
1995					50.1	52.9	52.2
1996						51.2	54.4
2001							56.6

PERCENT ERROR
(Forecast/Actual)

1986		0.3	1.0	0.7	5.2	10.6	14.1
1987		(3.9)	(2.5)	(2.5)	(2.3)	2.1	5.8
1988		2.5	(2.9)	(1.1)	(1.6)	(0.2)	12.6
1989		1.3	4.4	(2.2)	1.1	0.6	19.2
1990		(0.8)	1.9	4.9	(3.0)	1.1	13.6
1991		6.0	6.4	9.8	12.4	2.9	16.2

Note on how to read this table: In 1989 we forecast 46.4 million operations would occur in 1990. In fact 46.8 million operations were recorded meaning the forecast was 0.8 percent lower than actual. In 1988 we forecast 47.7 million operations would occur in 1990. This forecast was 1.9 percent higher than actual.

FAA ARTCC AIRCRAFT HANDLED FORECAST EVALUATION (Millions)

Year	Actual	Forecast - Years Out 1	2	3	4	5	10
1986	34.2	34.0	33.9	33.1	32.8	33.6	36.3
1987	35.8	35.4	35.1	35.0	34.0	34.0	39.6
1988	36.0	37.0	36.6	36.1	36.1	35.1	42.8
1989	36.6	37.2	38.0	37.6	37.2	37.4	42.0
1990	37.4	37.8	38.2	39.2	38.7	38.4	42.2
1991	36.4	38.5	39.1	39.7	40.3	39.6	40.3
1992		37.3	39.6	40.1	40.8	41.4	39.3
1993			38.3	40.6	41.0	41.6	40.7
1994				39.4	41.5	41.9	43.6
1995					40.3	42.7	43.6
1996						41.1	43.7
2001							46.7

PERCENT ERROR
(Forecast/Actual)

1986		(0.6)	(0.9)	(3.2)	(4.1)	(1.7)	6.1
1987		(1.1)	(2.0)	(2.2)	(5.0)	(5.0)	10.6
1988		2.8	1.7	0.3	0.3	(2.5)	18.9
1989		1.6	3.8	2.7	1.6	2.2	14.7
1990		1.1	2.1	4.8	3.5	2.7	12.8
1991		5.8	7.4	9.1	10.7	8.8	10.7

Each air route traffic control center (ARTCC) controls aircraft which are flying under instrument flight rules in the center's designated geographic control area. The workload measures for the centers are the numbers of IFR aircraft handled. The IFR counts are categorized by user groups.

Flight service stations provide a variety of services to the aviation community. They collect and disseminate meteorological and weather information, provide briefings to pilots, and provide assistance in emergencies to lost, disoriented, or downed airmen. The workload measures at flight service stations are weighted sums of the number of flight plans filed, pilot briefings provided, and aircraft contacted.

This document, "FAA Aviation Forecasts, Fiscal Years 1992-2003, February 1992," lists 133 distinct time-series variables. (The number does not include derived subtotals and totals.) Of these, four economic independent variables are obtained from sources external to the FAA. The FAA analysts or forecasters have no control over these truly exogenous variables. There are 12 quantifiable air carrier forecast assumptions and four quantifiable regional/commuter carrier forecast assumptions. Within justifiable limits, these forecast assumptions are under the control of the analysts. There are 83 aviation variables that, strictly speaking, are not FAA workload measures; but these influence the true workload measures in one way or another. Finally, there are 30 aviation variables which are the workload measures used by the FAA for policy and planning considerations and for manpower and investment planning.

The table at the end of this chapter contains a list of the variables and the sources for the historical data and their relationship to different aspects of the forecast process. Forecasts of the economic variables and the military fleet and hours flown are developed outside the FAA. All other forecasts are developed by the FAA. From the preceding discussion, it follows that the FAA must explicitly consider at least 133 variables when producing a set of national forecasts.

Research undertaken in the early-and mid-1970's indicated that some measures of economic activity (such as gross national product or total employment) and some measures of prices (for example, aircraft prices and aviation fuel prices) were useful predictors of aviation activity. Some unique events (including the strike in August 1981 and the prolonged depressed state of the general aviation manufacturing industry) have altered the relationships between the key aviation variables and the economic variables used previously. It has been difficult, therefore, to produce economic or econometric models which predict aviation activity with the same degree of reliability as the models which were developed in earlier periods. Thus, for the present, the forecasters must rely to a greater degree on subjective judgment, evaluation, and expertise than was required previously. This is not at all unusual in times of significant changes in a volatile industry.

THE FAA FORECASTING PROCESS

The FAA forecasting process is an interactive system that combines econometric and time series model results with aviation industry forecasts, expert opinions, and anticipated policy impacts to derive a set of FAA aviation forecasts that are used in the decisionmaking process. The following flow diagram shows a generalized version of the FAA aviation forecasting process.

The first step in developing the fore-

casts is to enter the economic and demographic variables into a set of econometric models or equations that represents a simplified version of the real world. The economic and demographic variables (the truly independent and exogenous variables) are developed outside the FAA and, therefore, are not within the analysts' control. The degree of accuracy of the forecasts of aviation activities depends on both the accuracy of the forecasts of the independent variables and the ability of the models to portray activities in the real world.

The mechanical execution of forecast models is only the first step in producing a set of forecasts. In general, these models and equations are simple portrayals of a complex system. They cannot account for a number of political, social, psychological, and economic variables and all the interrelated actions and reactions that eventually lead to a particular set of results. It is particularly important, therefore, that the initial model results are reviewed, revised, and adjusted to reflect the analysts' best judgment of the impacts of the events which are occurring or are expected to occur during the forecast period.

The FAA forecasting process is both continuous and iterative. As such, it is important to evaluate the forecast results and to determine the basis of the deviations of the forecast values from the actual values observed in the real world. The analysis of the errors generally identifies the causes of the deviations and helps in determining the proportion due to improper model specifications, erroneous forecasts of independent variables, erroneous forecast assumptions, or incorrect analysts' judgments and opinions. If warranted, the forecast error analysis may lead to a reformulation of the model and to additions or deletions of independent variables, revisions of forecast assumptions, and/or changes in analysts' opinions and judgments about future events.

FORECAST EVALUATION

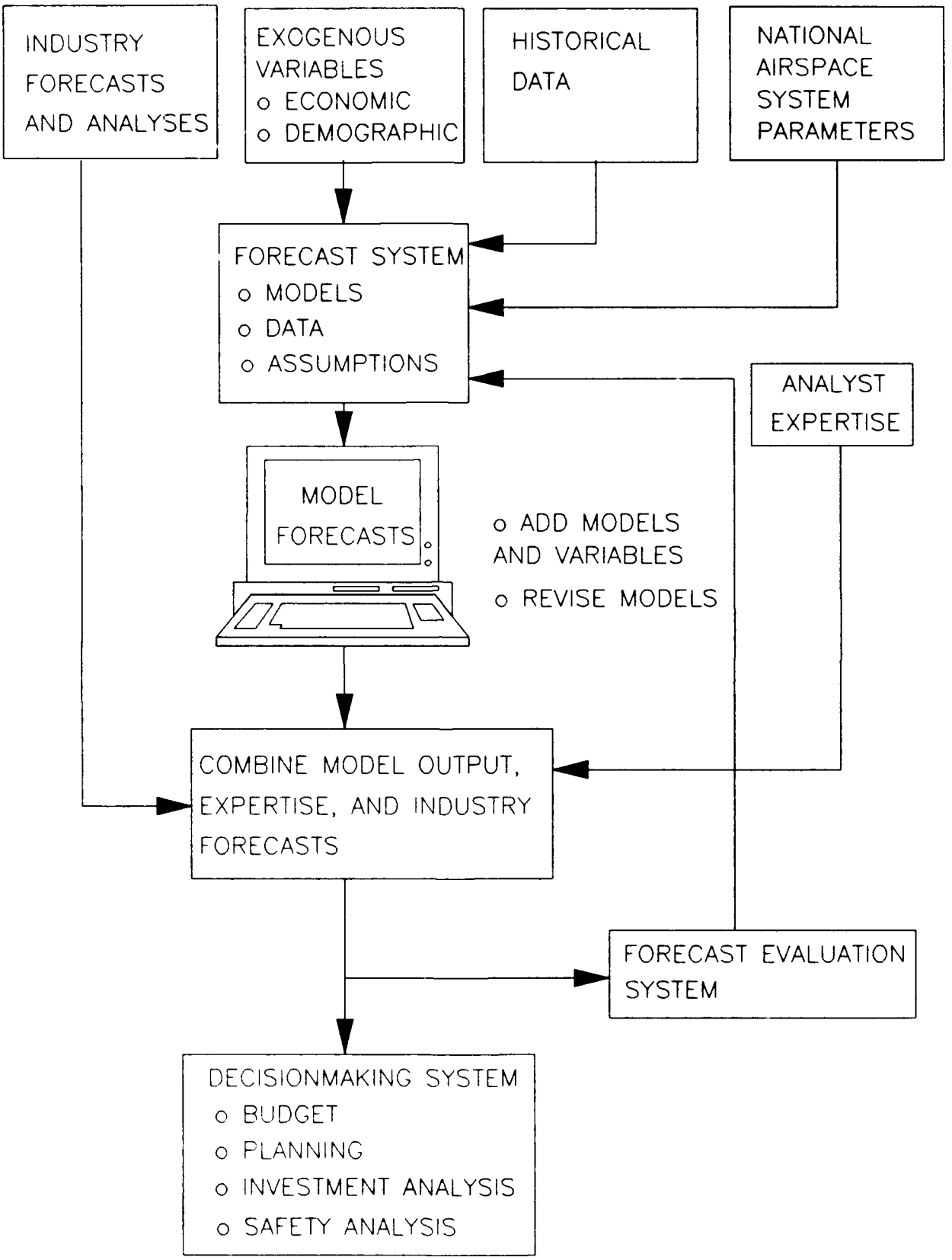
It is essential that the FAA forecasts of the demand for services at the FAA towers, air route traffic control centers, and the flight service stations be accurate. Large forecast errors can lead to inefficient allocation of resources which, in turn, could lead to capacity constraints and delays or to excess capacity in the National Airspace System. For this reason, FAA must continuously evaluate the forecasting process and its results.

The evaluation of the forecast process proceeds on several fronts. On a monthly basis, FAA tracks its short-term forecasts of aircraft operations, instrument operations, aircraft handled, and flight services vis-a-vis the actual counts at the facilities. This tracking system alerts FAA management to unexpected deviations from the trends suggested by the forecasts. Inquiries are then initiated to determine the cause(s) of the differences and revised short-term forecasts may be generated, if necessary.

To help the analysts make correct decisions and informed judgments when developing the forecast assumptions, FAA holds a series of meetings with industry representatives to discuss industry trends, recent developments, and possible future courses of events. Every two years, for example, FAA, in cooperation with the National Academy of Sciences, Transportation Research Board (TRB), sponsors a "forecast assumptions workshop." This workshop is attended by 70 to 80 industry planners and forecasters representing the airlines, aircraft manufacturers, engine manufacturers, and other industry groups.

The participants in various subgroups identify specific assumptions about the short-term and long-term future trends of the economic and aviation variables

FAA FORECASTING SYSTEM



that are important to their segments of the industry, indicate why these are considered important, and show why specific trends are anticipated. After discussing the assumptions, the entire group attempts to reach a consensus about the key variables affecting the industry and the most likely future courses of these variables. Finally, the TRB prepares and publishes a workshop report. The participants benefit from the discussions and the analysts have the TRB workshop report as a benchmark for preparing forecasts or for evaluating forecasts prepared by other organizations. FAA uses this forum and the workshop report in preparing and in evaluating its aviation forecasts.

Formal and informal meetings with individuals and representatives of specific industry groups represent other avenues used by the FAA to promote dialogue and discussion with the aviation community and to solicit input and comments. Separate meetings are held regularly with the aircraft manufacturers, as a group, with members of the Air Transport Association, and with members of the General Aviation Manufacturers Association. In addition, FAA analysts maintain one-on-one contact with industry representatives.

Another intermediate step in the FAA aviation forecast process is the public dissemination of the forecast results, solicitation of industry comments, and critique of the forecasts. The main avenue used for this purpose is the "FAA Aviation Forecast Conference" held annually in February or March. The 500 to 600 participants at the conference generally include airline executives, aircraft and engine manufacturers, consumer groups and other industry representatives, and the news media. To the maximum extent possible, FAA responds to questions raised about the forecasts both during and after the conference.

An important part of the conference is the opportunity for various segments of the aviation community to make technical presentations on a variety of topics of interest to the aviation community. The FAA aviation forecast conference establishes avenues of communication through which FAA releases its forecast to the aviation community and the public and receives comments, criticisms, and feedback about the forecasts. The FAA also receives valuable information and insights through the papers presented at the forecast conferences.

Because the U.S. general aviation industry has now entered a stage of growth that should be examined by the industry and FAA, the FAA sponsored the First Annual FAA General Aviation Conference in March, 1991, and has scheduled a second in March, 1992. There are likely to be both opportunities as well as alternatives to be examined and, perhaps, avoided. Increasing concentration in the air carrier industry and congestion at hub airports have resulted in a favorable climate for growth of business aviation. Increased air carrier and commuter activity have placed additional demand for commercial pilots. This has resulted in additional training requirements. The pilot training process is an important step in aviation growth quite apart from the demand generated for replacement single engine piston training aircraft. It is the source of future commercial, airline transport, and perhaps, military pilots. This conference has opened new avenues of communication for the FAA with this significant segment of the aviation community.

FAA also seeks to improve the forecast accuracy and credibility by inviting FAA regional and state participation in the forecast process. For example, facility level terminal area forecasts and flight service station forecasts are circulated to FAA regions for review and comments. The comments and suggested changes are incorporated in the final facility level reports. In the case of the terminal area fore-

casts, the FAA regions have the capability to make changes by computer. The final facility level forecasts derived by this procedure must be consistent with the national forecasts.

Periodically, FAA prepares a technical report that compares the accuracy of the forecasts of key workload measures with the accuracy of forecasts of economic variables prepared by major forecasting services. Based on the results of these studies, the FAA forecasts compare quite favorably with those produced by these major forecasting services. (For details, see APO Bulletin, "Accuracy of FAA Forecasts," APO-88-1, May 1988.)

FAA AVIATION FORECAST VARIABLES AND DATA SOURCES

TYPES OF VARIABLES AND VARIABLE NAMES	DATA SOURCES
ECONOMIC:	
Gross national product (GNP)	OMB, DRI, Evans, WEFA
Consumer price index (CPI)	OMB, DRI, Evans, WEFA
Oil and gas deflator	OMB, DRI, Evans, WEFA
Fuel price index	OMB, DRI, Evans, WEFA
AIR CARRIER:	
FORECAST ASSUMPTIONS	
Domestic Operations:	
Average seats per aircraft	RSPA
Average passenger trip length	RSPA
Revenue per passenger mile (current $)	RSPA
Revenue per passenger mile (1982-84 $)	Computed
Average jet fuel prices (current $)	RSPA
Average jet fuel prices (1982-84 $)	Computed
International Operations:	
(Same as Domestic)	(Same)
SCHEDULED PASSENGER TRAFFIC	
Domestic:	
Revenue passenger miles (RPM's)	RSPA
Revenue passenger enplanements	RSPA
Available seat miles	RSPA
Load factors	RSPA
International:	
Revenue passenger miles by Regions	RSPA
Revenue passenger enplanements by Regions	RSPA
Available seat miles	RSPA
Load factors	RSPA
FLEET	
2-Engine narrowbody	FAA/AVN-120
3-Engine narrowbody	FAA/AVN-120
4-Engine narrowbody	FAA/AVN-120
2-Engine widebody	FAA/AVN-120
3-Engine widebody	FAA/AVN-120
4-Engine widebody	FAA/AVN-120

FAA AVIATION FORECAST VARIABLES AND DATA SOURCES (Continued)

TYPES OF VARIABLES AND VARIABLE NAMES	DATA SOURCES
HOURS FLOWN BY EQUIPMENT	
(Same as Fleet)	RSPA
FUEL CONSUMED	
Jet:	
Domestic air carriers	RSPA
International air carriers	RSPA
General aviation	FAA/APO-110
Aviation Gasoline:	
Air carriers	FAA/APO-110
General aviation	FAA/APO-110
REGIONAL/COMMUTER:	
FORECAST ASSUMPTIONS	
Average seats per aircraft	RSPA
Average passenger trip length (48 states)	RSPA
Average passenger trip length (Hawaii, Puerto Rico, Virgin Islands)	RSPA
Average load factor	RSPA
PASSENGER TRAFFIC	
Revenue passenger enplanements (48 states)	RSPA
Revenue passenger enplanements (Hawaii, Puerto Rico, Virgin Islands)	RSPA
Revenue passenger miles (48 states)	RSPA
Revenue passenger miles (Hawaii, Puerto Rico, Virgin Islands)	RSPA
FLEET	
Less than 15 seats	FAA/AVN-120
15 to 19 seats	FAA/AVN-120
20 to 40 seats	FAA/AVN-120
More than 40 seats	FAA/AVN-120
GENERAL AVIATION:	
FLEET	
Single engine piston aircraft	FAA/AMS-420
Multi-engine piston aircraft	FAA/AMS-420
Turboprop aircraft	FAA/AMS-420
Turbojet aircraft	FAA/AMS-420
Piston-powered rotorcraft	FAA/AMS-420
Turbine-powered rotorcraft	FAA/AMS-420
Other general aviation aircraft	FAA/AMS-420

FAA AVIATION FORECAST VARIABLES AND DATA SOURCES (Continued)

TYPES OF VARIABLES AND VARIABLE NAMES	DATA SOURCES
NUMBER OF AIRCRAFT BY REGION	
Total aircraft in each of nine FAA Regions	FAA/AMS-420
HOURS FLOWN	
Hours flown by equipment type (See general aviation fleet)	FAA/AMS-420
FUEL CONSUMED	
Fuel consumed by equipment type (See general aviation fleet)	FAA/APO-110
ACTIVE PILOTS:	
Students	FAA/AMS-420
Private pilots	FAA/AMS-420
Commercial	FAA/AMS-420
Airline transport	FAA/AMS-420
Helicopter	FAA/AMS-420
Glider	FAA/AMS-420
Other	FAA/AMS-420
Instrument rated	FAA/AMS-420
FAA WORKLOAD MEASURES:	
FAA TOWERS	
Number of FAA Towers	FAA/AMS-420
Aircraft Operations:	
Air carrier itinerant operations	FAA/AMS-420
Air taxi/commuter itinerant operations	FAA/AMS-420
General aviation itinerant operations	FAA/AMS-420
Military itinerant operations	FAA/AMS-420
General aviation local operations	FAA/AMS-420
Military local operations	FAA/AMS-420
Instrument Operations:	
Air carrier	FAA/AMS-420
Air taxi/commuter	FAA/AMS-420
General aviation	FAA/AMS-420
Military	FAA/AMS-420
Non-IFR Instrument Operations:	
Terminal control areas	FAA/AMS-420
Expanded radar service areas	FAA/AMS-420

FAA AVIATION FORECAST VARIABLES AND DATA SOURCES (Continued)

TYPES OF VARIABLES AND VARIABLE NAMES	DATA SOURCES
AIR ROUTE TRAFFIC CONTROL CENTERS	
IFR Departures:	
Air carrier	FAA/AMS-420
Air taxi/commuter	FAA/AMS-420
General aviation	FAA/AMS-420
Military	FAA/AMS-420
IFR Overs:	
(Same as IFR departures)	FAA/AMS-420
FLIGHT SERVICE STATIONS	
IFR-DVFR flight plans originated	FAA/AMS-420
VFR flight plans originated	FAA/AMS-420
Pilot briefings	FAA/AMS-420
Air carrier aircraft contacted	FAA/AMS-420
Air taxi/commuter aircraft contacted	FAA/AMS-420
General aviation aircraft contacted	FAA/AMS-420
Military aircraft contacted	FAA/AMS-420
IFR-DVFR aircraft contacted	FAA/AMS-420
VFR aircraft contacted	FAA/AMS-420
MILITARY:	
FLEET	
Jet	DOD
Turboprop	DOD
Piston	DOD
Helicopter	DOD
HOURS	
Hours flown by equipment (See Fleet)	DOD

CHAPTER X

YEAR-BY-YEAR DATA FOR FAA AVIATION FORECASTS FISCAL YEARS 1992 - 2003

Chapter X provides the detailed data for the National Aviation and FAA workload series forecasted by the FAA Office of Aviation Policy and Plans. The following should be noted:

- o Table 10 - Contains the unduplicated passenger traffic reported by U.S. scheduled air carriers reporting on RSPA Form 41 and commuter carriers reporting on RSPA Form 298-C.

- o Table 11 - Those carriers contained in the Air Carrier forecast data base are listed in Appendices A and B.

  - Includes the following traffic which is also reported as commuters/regionals traffic in Table 19.

	ENPLANEMENTS (Millions)	RPM'S (Millions)		ENPLANEMENTS (Millions)	RPM'S (Millions)
1986	6.537	1,089.0	1989	4.072	861.2
1987	4.100	683.6	1990	4.674	984.9
1988	3.117	583.3	1991E	6.559	1,315.3

- o Table 19 - Includes the duplicated traffic listed above for those air carriers and commuters/regionals reporting on both RSPA Forms 41 and 298-C.

  - Forecasts and historical data exclude Alaska and foreign territory traffic.

  - The forecasts exclude the following carriers because of the predominance of jet aircraft in their fleets : Altair (beginning in 1982), Empire (1985), and Air Wisconsin (1987).

- Table 20 - Includes only aircraft with 60 seats or less. Aircraft also included with general aviation fleet shown in Tables 21 and 22.

- Table 26 - Includes the rotorcraft fleet and hours flown shown in Tables 21 and 23.

TABLE 1

U.S. SHORT-TERM ECONOMIC FORECASTS

ECONOMIC VARIABLE	FISCAL YEAR 1992				FISCAL YEAR 1993			
	1ST. QTR.	2ND. QTR.	3RD QTR.	4TH QTR.	1ST QTR.	2ND QTR.	3RD QTR.	4TH QTR.
REAL GNP (1987 $)								
DRI/McGRAW-HILL	4,879.4	4,875.1	4,906.7	4,958.7	5,012.0	5,062.5	5,100.0	5,127.0
EVANS ECONOMETRICS	4,866.2	4,847.9	4,845.1	4,881.2	4,931.8	4,978.2	5,001.2	5,018.8
THE WEFA GROUP	4,877.4	4,869.4	4,900.8	4,940.6	4,981.8	5,017.0	5,052.2	5,089.4
OMB	4,876.0	4,886.9	4,917.1	4,951.2	4,989.1	5,027.4	5,065.9	5,103.5
OIL AND GAS DEFLATOR (1987 EQUALS 100)								
DRI/McGRAW-HILL	121.8	123.6	123.0	123.8	125.1	127.0	128.5	130.7
EVANS ECONOMETRICS	122.2	121.9	121.9	122.1	122.4	122.8	123.0	123.1
THE WEFA GROUP	123.3	122.5	117.8	118.0	119.7	120.8	115.9	117.0
OMB	122.5	119.2	119.2	119.2	122.5	123.8	125.0	126.3
CONSUMER PRICE INDEX (1982-84 EQUALS 100)								
DRI/McGRAW-HILL	137.7	139.0	140.2	141.5	142.8	144.0	145.3	146.5
EVANS ECONOMETRICS	137.7	139.3	140.6	141.9	143.2	144.5	146.2	147.5
THE WEFA GROUP	137.6	138.4	139.1	140.1	141.2	142.5	143.5	144.8
OMB	137.6	138.6	139.7	140.8	141.9	143.1	144.2	145.4

Source: DRI/McGraw-Hill, Inc., December 1991; Evans Econometrics, January 1992; The WEFA Group, January 1992; and OMB, December 1991.

TABLE 2

U.S. LONG-TERM ECONOMIC FORECASTS

OMB (1992-1997) AND CONSENSUS (1998-2003)

FISCAL YEAR	GROSS NATIONAL PRODUCT (Billions 1987$)	CONSUMER PRICE INDEX (1982-84 = 100)	OIL AND GAS DEFLATOR (1987 = 100)
Historical			
1986	3,693.1	109.2	82.4
1987	4,494.0	112.5	95.8
1988	4,687.3	117.1	101.3
1989	4,820.6	122.7	108.4
1990	4,892.5	128.7	116.2
1991	4,860.4	135.2	129.9
Forecast			
1992	4,907.8	139.1	120.1
1993	5,046.5	143.6	124.4
1994	5,198.8	148.3	129.2
1995	5,354.5	153.0	133.8
1996	5,511.6	157.9	139.1
1997	5,667.2	162.9	143.1
1998	5,834.0	170.4	153.2
1999	5,993.4	178.6	163.0
2000	6,147.1	187.5	173.6
2001	6,302.9	196.9	186.2
2002	6,460.4	206.8	198.5
2003	6,620.5	217.2	210.9

Source: 1992-1997; Office of Management and Budget, December 1991

1998-2003; Consensus forecast based on average growth rates of DRI/McGraw-Hill, Evans, and WEFA forecasts (See Table 3), adjusted to fiscal year basis.

TABLE 3

ALTERNATIVE U.S. LONG-TERM ECONOMIC FORECASTS

CALENDAR YEAR	GROSS NATIONAL PRODUCT (Billions 1982$)			CONSUMER PRICE INDEX (1982-84 = 100)			FUEL PRICE INDEX (1982 = 100)		
	DRI	EVANS	WEFA	DRI	EVANS	WEFA	DRI	EVANS	WEFA
Historical									
1986	3,721.7	3,717.9	3,721.7	109.6	109.6	109.6	75.3	75.3	75.3
1987	3,845.3	3,845.3	3,845.3	113.6	113.6	113.6	79.5	78.7	79.4
1988	4,016.8	4,016.9	4,016.8	118.2	118.2	118.4	79.1	79.3	79.4
1989	4,117.7	4,117.7	4,117.7	124.0	124.0	124.0	86.7	86.7	86.7
1990	4,157.3	4,157.3	4,157.3	130.7	130.7	130.7	98.9	98.9	98.9
1991	4,136.1	4,127.6	4,147.7	136.3	136.3	136.3	97.3	97.9	98.8
Forecast									
1992	4,236.0	4,171.0	4,292.0	140.9	142.9	140.8	97.8	102.8	98.0
1993	4,384.0	4,285.5	4,411.4	146.0	149.5	146.8	102.4	107.2	98.9
1994	4,515.0	4,390.3	4,548.9	151.2	156.7	154.0	109.3	111.8	103.8
1995	4,649.0	4,461.7	4,697.1	156.4	164.7	161.8	115.5	116.6	112.2
1996	4,763.0	4,561.7	4,839.1	162.2	173.0	169.9	126.3	121.6	122.3
1997	4,901.0	4,689.3	4,976.0	168.3	181.2	178.3	133.6	126.8	141.8
1998	5,039.0	4,822.0	5,108.2	174.9	190.3	187.1	141.7	132.3	153.2
1999	5,171.0	4,946.3	5,243.1	181.9	200.8	196.2	151.1	138.0	165.1
2000	5,294.0	5,063.0	5,376.3	189.5	212.2	205.8	161.7	143.9	177.7
2001	5,425.0	5,184.5	5,508.0	197.9	222.8*	215.8	177.2	150.[illegible]	190.1*
2002	5,570.0	5,308.9	5,637.4	206.7	234.0*	226.3	188.8	156.5*	203.4*
2003	5,692.0*	5,436.4*	5,765.9	215.8*	245.6*	237.3	201.1*	163.3*	215.7*

Source: DRI/McGraw-Hill, November, 1991; Evans Economics, Inc., October 1991; and The WEFA Group, November 1991

* Extrapolated to 2003 for forecast purposes

TABLE 4

INTERNATIONAL GDP FORECASTS

CALENDAR YEAR	GROSS DOMESTIC PRODUCT (In Billions of 1985 U.S. Dollars) EUROPE/ AFRICA/ MIDDLE EAST	LATIN AMERICA	JAPAN/ PACIFIC BASIN/ AUSTRALIA/N. ZEALAND	WORLD
Historical*				
1986	4,175.3	891.5	1,990.0	14,229.9
1987	4,298.6	919.1	2,093.2	14,717.2
1988	4,447.7	929.6	2,230.0	15,356.9
1989	4,612.3	939.9	2,345.7	15,809.6
1990	4,825.1	939.1	2,472.1	15,913.1
1991E	4,889.7	962.9	2,584.6	15,880.0
Forecast				
1992	5,010.5	972.3	2,687.1	16,145.2
1993	5,166.7	999.9	2,811.4	16,599.2
1994	5,328.4	1,042.2	2,964.9	17,160.1
1995	5,484.7	1,087.8	3,112.7	17,779.9
1996	5,656.0	1,136.2	3,258.2	18,410.0
1997	5,829.6	1,186.2	3,394.4	18,999.1
1998	6,005.7	1,241.9	3,549.0	19,626.1
1999	6,201.0	1,296.6	3,713.3	20,273.8
2000	6,392.4	1,349.7	3,887.9	20,942.8
2001	6,579.4	1,407.8	4,051.7	21,592.0
2002	6,770.6	1,469.7	4,216.8	22,261.4
2003	6,978.3	1,535.9	4,388.8	22,973.7

Source: The WEFA Group, World Economic Outlook, December 1991

TABLE 5

INTERNATIONAL EXCHANGE RATE FORECASTS

CALENDAR YEAR	FOREIGN EXCHANGE RATES (US$/Local Currency, End of Year) UNITED KINGDOM	WEST*/UNITED GERMANY	JAPAN 1/	UNITED STATES EFFECTIVE EXCHANGE RATE (1985 EQUALS 100)
Historical*				
1986	1.474	.515*	6.285	81.6
1987	1.871	.632*	8.097	72.0
1988	1.809	.562*	7.946	67.9
1989	1.605	.589*	6.971	70.9
1990	1.928	.669	7.440	66.1
1991E	1.829	.633	6.944	65.9
Forecast				
1992	1.765	.617	7.143	63.2
1993	1.844	.645	7.519	66.1
1994	1.961	.689	7.832	63.9
1995	2.057	.719	8.403	61.8
1996	2.124	.743	8.658	60.2
1997	2.149	.750	8.745	61.0
1998	2.171	.756	8.834	60.5
1999	2.192	.765	8.923	60.0
2000	2.214	.773	9.013	59.5
2001	2.238	.781	9.081	59.1
2002	2.259	.788	9.145	58.7
2003	2.281	.796	9.217	58.3

Source: The WEFA Group, World Economic Outlook, January 1991

1/ US $/1,0000 Local Currency

TABLE 6

BASELINE AIR CARRIER FORECAST ASSUMPTIONS

TOTAL SYSTEM OPERATIONS

FISCAL YEAR	AVERAGE SEATS PER AIRCRAFT (Seats)	AVERAGE PASSENGER TRIP LENGTH (Miles)	REVENUE PER PASSENGER MILE CURRENT $ (Cents)	REVENUE PER PASSENGER MILE FY 1991 $ (Cents)	AVERAGE JET FUEL PRICE CURRENT $ (Cents)	AVERAGE JET FUEL PRICE FY 1991 $ (Cents)
Historical*						
1986	167.4	874.6	11.02	13.63	64.6	79.9
1987	166.6	895.0	10.93	13.13	52.0	62.5
1988	168.4	927.8	11.82	13.65	56.2	64.8
1989	168.8	948.4	12.43	13.70	56.4	62.2
1990	169.0	976.0	12.61	13.24	67.6	71.0
1991	167.9	986.8	12.85	12.85	79.4	79.4
Forecast						
1992	171	1,011	13.18	12.75	73.4	71.0
1993	174	1,022	13.64	12.71	76.1	70.9
1994	176	1,032	14.09	12.69	79.0	71.2
1995	178	1,041	14.65	12.68	81.8	70.7
1996	180	1,049	15.28	12.66	85.0	70.4
1997	183	1,056	15.96	12.65	87.5	69.3
1998	187	1,063	16.70	12.65	93.6	70.9
1999	190	1,070	17.51	12.65	99.6	72.0
2000	193	1,078	18.37	12.65	106.1	73.1
2001	196	1,085	19.30	12.66	113.8	74.6
2002	199	1,093	20.28	12.66	121.3	75.7
2003	201	1,100	21.30	12.66	128.9	76.6

* Source: RSPA, Form 41

TABLE 7

BASELINE AIR CARRIER FORECAST ASSUMPTIONS

DOMESTIC OPERATIONS

FISCAL YEAR	AVERAGE SEATS PER AIRCRAFT (Seats)	AVERAGE PASSENGER TRIP LENGTH (Miles)	REVENUE PER PASSENGER MILE CURRENT $ (Cents)	REVENUE PER PASSENGER MILE FY 1991 $ (Cents)	AVERAGE JET FUEL PRICE CURRENT $ (Cents)	AVERAGE JET FUEL PRICE FY 1991 $ (Cents)
Historical*						
1986	153.0	764.1	11.33	14.01	63.5	78.5
1987	152.5	775.4	11.20	13.46	50.9	61.1
1988	153.0	785.9	12.23	14.12	55.1	63.6
1989	152.0	790.2	13.07	14.40	55.4	61.0
1990	151.7	799.7	13.26	13.93	66.8	70.1
1991E	151.1	807.0	13.35	13.35	76.6	76.6
Forecast						
1992	153	810	13.77	13.32	70.8	68.4
1993	155	814	14.29	13.32	73.3	68.3
1994	157	818	14.79	13.32	76.2	68.6
1995	159	821	15.42	13.34	78.8	68.2
1996	161	824	16.12	13.35	82.0	67.9
1997	164	827	16.88	13.38	84.4	66.9
1998	167	830	17.70	13.41	90.3	68.4
1999	170	833	18.61	13.45	96.1	69.4
2000	173	836	19.58	13.49	102.4	70.5
2001	176	839	20.63	13.53	109.8	72.0
2002	178	842	21.74	13.57	117.0	73.0
2003	180	845	22.90	13.61	124.3	73.9

* Source: RSPA, Form 41

TABLE 8

BASELINE AIR CARRIER FORECAST ASSUMPTIONS

INTERNATIONAL OPERATIONS (PART 1)

FISCAL YEAR	AVERAGE SEATS PER AIRCRAFT (Seats)	AVERAGE PASSENGER TRIP LENGTH (Miles)	REVENUE PER PASSENGER MILE CURRENT $ (Cents)	REVENUE PER PASSENGER MILE FY 1991 $ (Cents)	AVERAGE JET FUEL PRICE CURRENT $ (Cents)	AVERAGE JET FUEL PRICE FY 1991 $ (Cents)
Historical*						
1986	291.8	2,614.6	9.61	11.89	69.1	85.5
1987	283.0	2,586.7	9.77	11.74	56.9	68.4
1988	278.9	2,644.2	10.35	11.95	60.2	69.5
1989	275.8	2,734.5	10.36	11.42	59.9	66.0
1990	273.3	2,786.2	10.68	11.22	70.5	74.1
1991E	262.8	2,856.4	11.38	11.38	87.7	87.7
Forecast						
1992	263	2,919	11.64	11.26	81.0	78.4
1993	262	2,925	12.00	11.18	84.0	78.3
1994	261	2,925	12.35	11.12	87.2	78.6
1995	262	2,942	12.80	11.08	90.3	78.1
1996	262	2,961	13.30	11.02	93.9	77.8
1997	264	2,969	13.83	10.96	96.6	76.6
1998	265	2,980	14.40	10.91	103.4	78.3
1999	268	2,990	15.03	10.86	110.0	79.5
2000	270	3,001	15.69	10.81	117.2	80.7
2001	272	3,012	16.41	10.76	125.7	82.4
2002	275	3,016	17.15	10.70	134.0	83.6
2003	277	3,027	17.92	10.65	142.3	84.6

* Source: RSPA, Form 41

TABLE 9

BASELINE AIR CARRIER FORECAST ASSUMPTIONS

INTERNATIONAL OPERATIONS (PART 2)

FISCAL YEAR	AVERAGE SEATS PER AIRCRAFT			REVENUE PER PASSENGER MILE					
				ATLANTIC		LATIN AMERICA		PACIFIC	
	ATLANTIC (Seats)	LATIN AMERICA (Seats)	PACIFIC (Seats)	CURRENT $ (Cents)	FY 1991 $ (Cents)	CURRENT $ (Cents)	FY 1991 $ (Cents)	CURRENT $ (Cents)	FY 1991 $ (Cents)
Historical*									
1986	330.9	220.2	283.7	8.98	11.10	11.44	14.15	9.69	11.98
1987	319.0	217.4	282.6	8.99	10.80	11.23	13.50	10.24	12.30
1988	301.9	210.3	293.1	9.31	10.75	11.35	13.10	11.47	13.24
1989	290.3	203.6	302.9	8.97	9.88	11.59	12.77	11.74	12.94
1990	278.6	194.0	318.6	9.56	10.04	12.01	12.62	11.55	12.13
1991E	257.7	187.0	321.9	9.98	9.98	12.06	12.06	12.50	12.50
Forecast									
1992	253	184	327	10.18	9.85	12.37	11.96	12.79	12.37
1993	250	180	332	10.46	9.75	12.72	11.85	13.19	12.29
1994	247	176	336	10.74	9.67	13.05	11.75	13.56	12.21
1995	245	174	340	11.11	9.61	13.52	11.69	14.03	12.14
1996	243	172	344	11.52	9.54	14.05	11.64	14.55	12.05
1997	243	172	348	11.97	9.49	14.62	11.59	15.10	11.97
1998	243	172	351	12.45	9.43	15.22	11.53	15.70	11.89
1999	244	173	354	12.99	9.39	15.87	11.47	16.35	11.81
2000	245	174	357	13.56	9.34	16.56	11.41	17.05	11.74
2001	246	176	360	14.17	9.29	17.30	11.34	17.80	11.67
2002	247	178	363	14.81	9.24	18.08	11.29	18.58	11.60
2003	248	180	366	15.47	9.19	18.90	11.23	19.40	11.53

* Source: RSPA, Form 41

TABLE 10

UNITED STATES COMMERCIAL AIR CARRIERS AND REGIONALS/COMMUTERS

TOTAL SCHEDULED PASSENGER TRAFFIC [1/]

FISCAL YEAR	REVENUE PASSENGER ENPLANEMENTS (Millions)			REVENUE PASSENGER MILES (Billions)		
	DOMESTIC	INTERNATIONAL	TOTAL	DOMESTIC	INTERNATIONAL	TOTAL
Historical*						
1986	404.7	24.4	429.3	297.4	64.0	361.5
1987	441.2	29.4	470.6	325.8	76.0	401.8
1988	441.2	34.3	475.5	329.9	90.5	420.4
1989	443.6	36.8	480.4	333.2	100.6	433.8
1990	456.7	41.3	497.9	344.9	115.1	460.0
1991E	444.7	39.7	484.4	339.3	113.5	452.8
Forecast						
1992	457.0	44.6	501.6	349.0	130.2	479.2
1993	477.5	48.2	525.7	365.8	141.0	506.8
1994	498.2	51.8	550.0	382.9	151.5	534.4
1995	518.5	55.1	573.6	399.4	162.1	561.5
1996	541.5	58.3	599.8	418.1	172.6	590.7
1997	564.4	61.7	626.1	436.8	183.2	620.0
1998	587.2	65.1	652.3	455.3	194.0	649.3
1999	611.5	68.8	680.3	474.4	205.7	680.1
2000	633.9	72.5	706.4	493.7	217.6	711.3
2001	657.8	76.3	734.1	513.3	229.8	743.1
2002	682.5	80.5	763.0	533.6	242.8	776.4
2003	708.4	84.5	792.9	555.4	255.8	811.2

* Source: RSPA, Forms 41 and 298-C

1/ Sum of Table's 8 and 15 less duplicated traffic. See note on page 123.

TABLE 11

UNITED STATES COMMERCIAL AIR CARRIERS

SCHEDULED PASSENGER TRAFFIC

FISCAL YEAR	REVENUE PASSENGER ENPLANEMENTS (Millions)			REVENUE PASSENGER MILES (Billions)		
	DOMESTIC	INTERNATIONAL	TOTAL	DOMESTIC	INTERNATIONAL	TOTAL
Historical*						
1986	385.2	24.4	409.6	294.4	64.0	358.4
1987	415.5	29.4	444.9	322.1	76.0	398.1
1988	414.2	34.3	448.5	325.5	90.5	416.0
1989	415.6	36.8	452.4	328.4	100.6	429.0
1990	424.1	41.3	465.4	339.2	115.1	454.3
1991E	413.3	39.7	453.0	333.6	113.5	447.1
Forecast						
1992	423.1	44.6	467.7	342.7	130.2	472.9
1993	440.8	48.2	489.0	358.8	141.0	499.8
1994	458.8	51.8	510.6	375.3	151.5	526.8
1995	476.4	55.1	531.5	391.1	162.1	553.2
1996	496.5	58.3	554.8	409.1	172.6	581.7
1997	516.4	61.7	578.1	427.1	183.2	610.3
1998	536.1	65.1	601.2	445.0	194.0	639.0
1999	556.2	68.8	625.0	463.3	205.7	669.0
2000	576.3	72.5	648.8	481.8	217.6	699.4
2001	596.7	76.3	673.0	500.6	229.8	730.4
2002	617.7	80.5	698.2	520.1	242.8	762.9
2003	640.1	84.5	724.6	540.9	255.8	796.7

* Source: RSPA, Form 41

TABLE 12

UNITED STATES COMMERCIAL AIR CARRIERS

SCHEDULED INTERNATIONAL PASSENGER TRAFFIC

	REVENUE PASSENGER ENPLANEMENTS (MIL)				REVENUE PASSENGER MILES (BIL)			
FISCAL YEAR	ATLANTIC	LATIN AMERICA	PACIFIC	TOTAL	ATLANTIC	LATIN AMERICA	PACIFIC	TOTAL
Historical*								
1986	10.5	8.5	5.4	24.4	32.6	11.1	20.3	64.0
1987	12.4	10.4	6.6	29.4	38.5	13.0	24.5	76.0
1988	14.6	11.5	8.2	34.3	46.1	14.2	30.2	90.5
1989	15.0	11.8	10.0	36.8	49.1	14.7	36.8	100.6
1990	16.1	13.0	12.2	41.3	53.7	16.0	45.4	115.1
1991E	12.2	14.7	12.8	39.7	47.1	18.3	48.1	113.5
Forecast								
1992	14.1	15.5	15.0	44.6	54.3	19.4	56.5	130.2
1993	15.0	16.7	16.5	48.2	57.8	21.0	62.2	141.0
1994	15.8	18.0	18.0	51.8	61.0	22.6	67.9	151.5
1995	16.5	18.9	19.7	55.1	63.9	23.8	74.4	162.1
1996	17.3	19.8	21.2	58.3	67.2	25.0	80.4	172.6
1997	18.1	20.7	22.9	61.7	70.3	26.2	86.7	183.2
1998	18.9	21.7	24.5	65.1	73.4	27.5	93.1	194.0
1999	19.8	22.7	26.3	68.8	76.9	28.9	99.9	205.7
2000	20.6	23.8	28.1	72.5	80.4	30.3	106.9	217.6
2001	21.5	24.9	29.9	76.3	83.9	31.8	114.1	229.8
2002	22.5	26.1	31.9	80.5	87.8	33.4	121.6	242.8
2003	23.4	27.3	33.8	84.5	91.6	35.0	129.2	255.8

* Source: RSPA, Form 41

TABLE 13

UNITED STATES COMMERCIAL AIR CARRIERS

SCHEDULED PASSENGER CAPACITY, TRAFFIC AND LOAD FACTORS

FISCAL YEAR	DOMESTIC ASM'S (BIL)	DOMESTIC RPM'S (BIL)	DOMESTIC % LOAD FACTOR	INTERNATIONAL ASM'S (BIL)	INTERNATIONAL RPM'S (BIL)	INTERNATIONAL % LOAD FACTOR
Historical*						
1986	488.4	294.4	60.3	108.1	64.0	59.1
1987	521.9	322.1	61.7	117.5	76.0	64.7
1988	533.3	325.5	61.0	135.4	90.5	66.9
1989	529.5	328.4	62.0	151.1	100.6	66.6
1990	557.6	339.2	60.8	166.2	115.1	69.2
1991E	548.4	333.6	60.8	169.3	113.5	67.0
Forecast						
1992	559.4	342.7	61.3	192.4	130.2	67.7
1993	584.5	358.8	61.4	208.6	141.0	67.6
1994	610.8	375.3	61.4	224.5	151.5	67.5
1995	638.3	391.1	61.3	240.6	162.1	67.4
1996	667.0	409.1	61.3	255.6	172.6	67.5
1997	696.4	427.1	61.3	271.1	183.2	67.6
1998	726.0	445.0	61.3	287.1	194.0	67.6
1999	756.9	463.3	61.2	303.7	205.7	67.7
2000	788.3	481.8	61.1	320.9	217.6	67.8
2001	819.8	500.6	61.1	338.4	229.8	67.9
2002	852.6	520.1	61.0	356.9	242.8	68.0
2003	886.7	540.9	61.0	376.3	255.8	68.0

* Source: RSPA, Form 41

TABLE 14

UNITED STATES COMMERCIAL AIR CARRIERS

SCHEDULED PASSENGER CAPACITY, TRAFFIC AND LOAD FACTORS BY INTERNATIONAL TRAVEL REGIONS

	ATLANTIC			LATIN AMERICA			PACIFIC		
FISCAL YEAR	ASM'S (BIL)	RPM'S (BIL)	% LOAD FACTOR	ASM'S (BIL)	RPM'S (BIL)	% LOAD FACTOR	ASM'S (BIL)	RPM'S (BIL)	% LOAD FACTOR
Historical*									
1986	58.2	32.6	56.0	18.4	11.1	60.2	31.5	20.3	64.4
1987	59.0	38.5	65.3	21.9	13.0	59.3	36.6	24.5	67.0
1988	70.1	46.1	65.8	22.7	14.2	62.5	42.5	30.2	71.0
1989	74.8	49.1	65.7	23.7	14.7	61.9	52.6	36.8	70.1
1990	77.0	53.7	69.8	25.7	16.0	62.3	63.6	45.4	71.4
1991E	67.8	47.1	69.5	29.4	18.3	62.3	72.1	48.1	66.7
Forecast									
1992	78.0	54.3	69.6	31.2	19.4	62.2	83.2	56.5	67.9
1993	83.4	57.8	69.3	33.7	21.0	62.3	91.5	62.2	68.0
1994	88.5	61.0	68.9	36.2	22.6	62.4	99.8	67.9	68.0
1995	92.9	63.9	68.8	38.0	23.8	62.6	109.7	74.4	67.8
1996	97.2	67.2	69.1	39.9	25.0	62.7	118.5	80.4	67.8
1997	101.6	70.3	69.2	41.7	26.2	62.5	127.6	86.7	67.9
1998	106.2	73.4	69.1	43.9	27.5	62.6	137.0	93.1	68.0
1999	111.0	76.9	69.3	46.0	28.9	62.8	146.7	99.9	68.1
2000	116.0	80.4	69.3	48.2	30.3	62.9	156.7	106.9	68.2
2001	121.1	83.9	69.3	50.5	31.8	63.0	166.8	114.1	68.4
2002	126.4	87.8	69.5	53.0	33.4	63.0	177.5	121.6	68.5
2003	132.0	91.6	69.4	55.6	35.0	62.9	188.7	129.2	68.5

* Source: RSPA, Form 41

TABLE 15

UNITED STATES COMMERCIAL AIR CARRIERS

LARGE JET AIRCRAFT

AS OF JANUARY 1	NARROW BODY			WIDE BODY			TOTAL
	2 ENGINE	3 ENGINE	4 ENGINE	2 ENGINE	3 ENGINE	4 ENGINE	
Historical*							
1986	1,238	1,195	171	111	293	160	3,168
1987	1,460	1,160	193	130	298	160	3,401
1988	1,578	1,135	221	153	296	159	3,542
1989	1,764	1,191	257	187	300	171	3,870
1990	1,911	1,185	257	197	283	184	4,017
1991E	2,113	1,194	249	210	290	196	4,252
Forecast							
1992	2,197	1,103	217	215	310	200	4,242
1993	2,360	997	218	244	328	182	4,329
1994	2,534	923	224	275	346	202	4,504
1995	2,702	840	227	295	353	241	4,658
1996	2,886	743	226	320	347	269	4,791
1997	3,084	684	230	341	355	285	4,979
1998	3,311	629	233	368	368	295	5,204
1999	3,498	574	233	394	379	308	5,386
2000	3,685	502	236	418	392	315	5,548
2001	3,831	470	235	437	404	322	5,699
2002	3,935	450	238	457	414	338	5,832
2003	4,073	413	239	469	422	349	5,965

* Source: FAA Aircraft Utilization and Propulsion Reliability Report

TABLE 16

UNITED STATES COMMERCIAL AIR CARRIERS

TOTAL AIRBORNE HOURS

(In Thousands)

	NARROW BODY			WIDE BODY			
FISCAL YEAR	2 ENGINE	3 ENGINE	4 ENGINE	2 ENGINE	3 ENGINE	4 ENGINE	TOTAL
Historical*							
1986	3,644	2,985	323	381	890	551	8,774
1987	4,051	2,968	412	458	943	565	9,397
1988	4,392	2,884	439	557	957	613	9,842
1989	4,691	2,704	546	655	939	641	10,176
1990	5,272	2,605	408	701	951	671	10,608
1991E	5,566	2,244	296	745	906	648	10,405
Forecast							
1992	5,800	1,994	243	805	955	690	10,487
1993	6,335	1,775	242	905	1,012	635	10,904
1994	6,696	1,618	246	1,027	1,070	696	11,353
1995	7,160	1,422	248	1,099	1,086	838	11,853
1996	7,662	1,210	247	1,191	1,063	940	12,313
1997	8,161	1,076	249	1,268	1,083	992	12,829
1998	8,768	958	250	1,368	1,122	1,022	13,488
1999	8,283	836	249	1,464	1,154	1,064	14,050
2000	9,818	665	251	1,551	1,194	1,084	14,563
2001	10,148	581	248	1,618	1,229	1,103	14,927
2002	10,427	527	248	1,689	1,257	1,157	15,305
2003	10,809	446	246	1,728	1,285	1,192	15,706

* Source: RSPA, Form 41

TABLE 17

TOTAL JET FUEL AND AVIATION GASOLINE FUEL CONSUMPTION

UNITED STATES CIVIL AVIATION AIRCRAFT

(In Millions of Gallons)

FISCAL YEAR	JET FUEL					AVIATION GASOLINE			TOTAL FUEL CONSUMED
	U.S. AIR CARRIERS			GENERAL AVIATION	TOTAL	AIR CARRIER	GENERAL AVIATION	TOTAL	
	DOMESTIC	INT'L.	TOTAL						
Historical*									
1986	10,733	2,525	13,258	738	13,996	5	411	416	14,412
1987	11,487	2,765	14,252	662	14,914	4	395	399	15,313
1988	11,902	3,192	15,094	654	15,748	4	394	398	16,146
1989	12,087	3,537	15,624	766	16,390	3	333	336	16,726
1990	12,439	3,812	16,251	700	16,951	3	337	340	17,291
1991E	11,657	3,998	15,655	699	16,354	2	338	340	16,694
Forecast									
1992	11,832	4,453	16,285	717	17,002	2	340	342	17,344
1993	12,271	4,734	17,005	738	17,743	2	344	346	18,089
1994	12,696	4,995	17,691	760	18,451	2	345	347	18,798
1995	13,136	5,248	18,384	775	19,159	2	347	349	19,508
1996	13,524	5,465	18,989	800	19,789	2	348	350	20,139
1997	13,911	5,684	19,595	822	20,417	2	351	353	20,770
1998	14,253	5,901	20,154	843	20,997	2	352	354	21,351
1999	14,568	6,120	20,688	866	21,554	2	356	358	21,912
2000	14,912	6,340	21,252	886	22,138	2	356	358	22,496
2001	15,316	6,554	21,870	907	22,777	2	356	358	23,135
2002	15,771	6,777	22,548	931	23,479	2	357	359	23,838
2003	16,240	7,005	23,245	953	24,198	2	358	360	24,558

* Source: Air carrier jet fuel, RSPA Form 41; All others, FAA APO estimates

TABLE 18

BASELINE REGIONALS/COMMUTERS FORECAST ASSUMPTIONS

FISCAL YEAR	AVERAGE SEATS PER AIRCRAFT (Seats)	AVERAGE PASSENGER TRIP LENGTH 48 STATES (Miles)	AVERAGE PASSENGER TRIP LENGTH HA/P.R./V.I. (Miles)	AVERAGE PASSENGER LOAD FACTOR (Percent)
Historical*				
1986	20.2	158.9	99.1	45.6
1987	19.7	161.2	97.6	46.0
1988	19.2	171.6	84.3	46.6
1989	20.4	179.3	89.8	47.8
1990	20.8	183.5	82.8	47.1
1991E	21.5	190.7	83.1	46.4
Forecast				
1992	22.5	194.0	83.0	46.8
1993	27.7	198.0	83.0	47.1
1994	28.8	202.0	83.0	47.3
1995	26.4	205.0	83.0	47.3
1996	27.7	208.0	83.0	47.4
1997	28.8	210.0	83.0	47.7
1998	29.9	212.0	83.0	47.9
1999	30.9	214.0	83.0	48.1
2000	31.8	216.0	83.0	48.3
2001	32.7	218.0	83.0	48.5
2002	33.6	220.0	83.0	48.7
2003	34.4	222.0	83.0	48.9

* Source: RSPA, Form's 298-C and 41

TABLE 19

UNITED STATES REGIONALS/COMMUTERS

SCHEDULED PASSENGER TRAFFIC

(In Millions)

	REVENUE PASSENGER ENPLANEMENTS			REVENUE PASSENGER MILES		
FISCAL YEAR	48 STATES	HAWAII/ PUERTO RICO/ VIRGIN ISLANDS	TOTAL	48 STATES	HAWAII/ PUERTO RICO/ VIRGIN ISLANDS	TOTAL
Historical*						
1986	23.3	2.7	26.0	3,769.0	267.7	4,036.7
1987	25.6	2.4	28.0	4,127.2	234.2	4,361.4
1988	28.4	1.7	30.1	4,875.3	152.6	5,027.9
1989	30.7	1.4	32.1	5,504.8	125.3	5,630.1
1990	35.5	1.7	37.2	6,513.1	140.7	6,653.8
1991E	36.7	1.7	38.4	6,997.3	141.3	7,138.6
Forecast						
1992	39.0	1.9	40.9	7,566.0	157.7	7,723.7
1993	42.1	2.1	44.2	8,335.8	174.3	8,510.1
1994	45.0	2.4	47.4	9,090.0	199.2	9,289.2
1995	48.0	2.7	50.7	9,840.0	224.1	10,064.1
1996	51 1	3.0	54.1	10,628.8	249.0	10,877.8
1997	54.3	3.3	57.6	11,403.0	273.9	11,676.9
1998	57.7	3.6	61.3	12,232.4	298.8	12,531.2
1999	61.3	3.9	65.2	13,118.2	323.7	13,441.9
2000	64.9	4.1	69.0	14,018.4	340.3	14,358.7
2001	68.7	4.3	73.0	14,976.6	356.9	15,333.5
2002	72.8	4.5	77.3	16,016.0	373.5	16,389.5
2003	76.9	4.6	81.5	17,071.8	381.8	17,453.6

* Source: RSPA, Form's 298-C and 41

TABLE 20

UNITED STATES REGIONALS/COMMUTERS

PASSENGER AIRCRAFT

AS OF JANUARY 1	LESS THAN 15 SEATS	15 TO 19 SEATS	20 TO 40 SEATS	MORE THAN 40 SEATS	TOTAL
Historical*					
1986	564	615	200	159	1,538
1987	581	652	213	158	1,604
1988	573	740	251	120	1,684
1989	538	802	303	139	1,782
1990	541	762	366	150	1,819
1991E	535	762	445	154	1,896
Forecast					
1992	506	757	510	171	1,944
1993	467	749	576	210	2,002
1994	421	741	635	253	2,050
1995	378	731	690	300	2,099
1996	329	720	739	347	2,135
1997	288	706	767	391	2,152
1998	255	689	795	434	2,173
1999	228	676	821	477	2,202
2000	206	657	847	519	2,229
2001	188	636	874	560	2,258
2002	174	615	902	600	2,291
2003	162	593	928	641	2,324

* Source: FAA Aircraft Utilization and Propulsion Reliability Report

TABLE 21

ESTIMATED ACTIVE GENERAL AVIATION AIRCRAFT

(In Thousands)

AS OF JANUARY 1	FIXED WING				ROTORCRAFT			
	PISTON							
	SINGLE ENGINE	MULTI-ENGINE	TURBOPROP	TURBOJET	PISTON	TURBINE	OTHER	TOTAL
Historical*								
1986	164.4	23.8	5.4	4.4	2.9	3.5	6.3	210.7
1987	171.8	23.9	6.0	4.5	2.9	4.0	7.0	220.0
1988	171.0	23.4	5.3	4.4	2.8	3.5	6.8	217.2
1989	164.8	22.8	5.3	4.2	2.6	3.8	6.9	210.3
1990	170.4	23.4	6.3	4.4	3.2	4.2	7.7	219.7
1991	165.1	22.7	5.6	4.4	3.5	3.9	7.0	212.2
Forecast								
1992	163.1	22.4	5.7	4.5	3.6	4.2	7.0	210.5
1993	163.1	22.4	5.8	4.6	3.5	4.5	7.2	211.1
1994	163.8	22.4	6.0	4.7	3.4	4.8	7.5	212.6
1995	164.5	22.5	6.2	4.8	3.3	5.1	7.8	214.2
1996	165.2	22.5	6.4	4.9	3.2	5.5	8.1	215.8
1997	165.9	22.6	6.6	5.0	3.2	5.7	8.4	217.4
1998	166.4	22.7	6.8	5.1	3.2	6.0	8.7	218.9
1999	166.9	22.8	7.0	5.2	3.1	6.4	8.8	220.2
2000	167.4	22.9	7.2	5.3	3.0	6.8	9.0	221.6
2001	167.7	23.0	7.5	5.4	3.0	7.2	9.1	222.9
2002	168.0	23.1	7.8	5.5	2.9	7.6	9.3	224.2
2003	168.3	23.2	8.1	5.6	2.8	8.0	9.5	225.5

* Source: FAA Statistical Handbook of Aviation (Historical data are estimated using a sample from the FAA aircraft registry and are subject to variation due to errors in the registry and statistical sampling procedures. Consequently, variations of plus or minus 5 percent in any category are not necessarily significant.)

Notes: Detail may not add to total because of independent rounding. An active aircraft must have a current registration and it must have been flown at least one hour during the previous calendar year.

TABLE 22

ACTIVE GENERAL AVIATION AIRCRAFT

BY FAA REGION

(In Thousands)

AS OF JANUARY 1	FAA REGION									TOTAL
	ANE	AEA	ASO	AGL	ACE	ASW	AWP	ANM	AAL	
Historical*										
1986	8.0	22.7	32.8	37.5	12.4	32.7	36.9	21.2	6.5	210.7
1987	9.0	25.5	33.5	37.8	13.1	32.7	38.8	22.0	7.6	220.0
1988	9.1	24.1	34.8	38.6	13.2	30.5	38.0	21.2	7.6	217.2
1989	9.6	23.9	34.6	37.4	12.2	29.5	36.8	19.9	6.3	210.3
1990	9.4	25.2	36.9	39.4	11.9	31.0	37.7	21.6	6.5	219.7
1991	8.7	24.7	35.2	37.3	11.8	28.3	38.3	21.8	7.0	212.2
Forecast										
1992	8.5	24.3	34.7	36.6	11.7	27.8	38.6	22.0	7.2	210.5
1993	8.5	24.3	34.9	36.3	11.6	28.0	38.8	22.2	7.3	211.1
1994	8.6	24.6	35.3	36.1	11.5	28.3	38.9	22.5	7.4	212.6
1995	8.6	24.9	35.6	36.2	11.5	28.6	39.1	22.8	7.5	214.2
1996	8.6	24.9	36.0	36.3	11.6	29.0	39.2	23.1	7.6	215.8
1997	8.7	25.2	36.4	36.4	11.7	29.3	39.3	23.3	7.6	217.4
1998	8.7	25.2	36.8	36.6	11.7	29.7	39.4	23.5	7.7	218.9
1999	8.8	25.4	37.1	36.7	11.8	29.8	39.5	23.7	7.7	220.2
2000	8.9	25.6	37.5	36.8	11.9	29.9	39.6	23.6	7.8	221.6
2001	9.0	25.8	37.8	37.0	12.0	30.0	39.7	23.9	7.9	222.9
2002	9.1	26.0	38.1	37.2	12.1	30.2	39.8	24.1	7.9	224.2
2003	9.2	26.1	38.4	37.5	12.2	30.4	39.6	24.2	7.9	225.5

* Source: FAA Statistical Handbook of Aviation

Notes: Detail may not add to total because of independent rounding.

TABLE 23

GENERAL AVIATION HOURS FLOWN
(In Millions)

FISCAL YEAR	FIXED WING				ROTORCRAFT			
	PISTON							
	SINGLE ENGINE	MULTI-ENGINE	TURBOPROP	TURBOJET	PISTON	TURBINE	OTHER	TOTAL
Historical*								
1986	22.2	4.9	2.7	1.7	0.8	1.8	0.4	34.5
1987	22.3	4.9	2.2	1.6	0.6	1.6	0.4	33.6
1988	22.0	4.4	2.3	1.6	0.6	2.0	0.6	33.6
1989	22.2	4.6	2.9	1.7	0.7	2.1	0.5	34.7
1990	23.3	4.4	2.7	1.5	0.8	1.7	0.4	34.8
1991E	23.8	4.3	2.6	1.6	0.8	1.7	0.4	35.2
Forecast								
1992	24.1	4.3	2.6	1.6	0.8	1.8	0.4	35.6
1993	24.2	4.4	2.7	1.6	0.8	2.0	0.4	36.2
1994	24.3	4.4	2.8	1.7	0.8	2.3	0.5	36.7
1995	24.3	4.5	2.9	1.7	0.8	2.4	0.5	37.0
1996	24.4	4.5	3.0	1.7	0.8	2.7	0.5	37.6
1997	24.4	4.5	3.1	1.7	0.8	2.9	0.6	38.1
1998	24.5	4.5	3.1	1.8	0.8	3.0	0.6	38.4
1999	24.6	4.6	3.3	1.8	0.8	3.2	0.7	39.1
2000	24.7	4.6	3.4	1.8	0.7	3.3	0.7	39.3
2001	24.8	4.6	3.5	1.8	0.7	3.4	0.7	39.6
2002	24.9	4.6	3.6	1.9	0.7	3.6	0.7	40.0
2003	25.0	4.6	3.7	1.9	0.7	3.7	0.8	40.5

* Source: FAA Statistical Handbook of Aviation

Notes: Detail may not add to total because of independent rounding.

TABLE 24

ACTIVE PILOTS BY TYPE OF CERTIFICATE
(In Thousands)

AS OF JANUARY 1	STUDENTS	RECREATIONAL[2]	PRIVATE	COMMERCIAL	AIRLINE TRANSPORT	HELICOPTER	GLIDER	LIGHTER-THAN-AIR[3]	TOTAL	INSTRUMENT RATED[1]
Historical*										
1986	146.7		311.1	151.6	82.7	8.1	8.2	1.1	709.5	258.6
1987	150.3		305.7	147.8	87.2	8.6	8.4	1.1	709.1	262.4
1988	146.0		300.9	143.6	91.3	8.7	7.9	1.2	699.7	266.1
1989	136.9		299.8	143.0	97.0	8.6	7.6	1.1	694.0	273.8
1990	142.5		293.2	144.5	102.1	8.9	7.7	1.1	700.0	282.8
1991	128.7	0.1	299.1	149.7	107.7	9.6	7.8		702.7	297.1
Forecast										
1992	130.1	0.1	301.8	153.4	111.5	9.8	8.1		714.8	300.6
1993	131.5	0.2	303.9	155.7	115.1	10.0	8.2		724.6	304.2
1994	138.0	0.3	304.8	157.3	118.6	10.1	8.3		737.5	308.8
1995	146.2	0.4	305.4	158.8	122.6	10.2	8.4		752.0	313.4
1996	147.4	0.5	306.0	160.5	127.1	10.4	8.4		760.3	317.5
1997	148.3	0.6	306.9	162.1	131.7	10.5	8.5		768.6	321.3
1998	149.0	0.6	307.8	163.7	136.6	10.6	8.5		776.9	326.1
1999	149.6	0.7	307.8	165.3	140.3	10.7	8.6		783.9	330.4
2000	150.1	0.8	309.7	167.0	144.0	10.8	8.6		791.0	334.7
2001	150.1	0.8	310.7	168.6	147.9	10.9	8.6		797.7	337.7
2002	151.1	0.8	311.6	170.3	150.9	11.0	8.7		804.5	340.4
2003	151.5	0.9	312.5	172.0	153.9	11.2	8.8		810.8	342.4

* Source: FAA Statistical Handbook of Aviation.

1/ Instrument rated pilots should not be added to other categories in deriving total.
2/ Recreational rating not available until 1991.
3/ Lighter-than-air type rating is no longer issued after 1990.
Notes: Detail may not add to total because of independent rounding.

TABLE 25

GENERAL AVIATION AIRCRAFT FUEL CONSUMPTION

(In Millions of Gallons)

	FIXED WING							
	PISTON				ROTORCRAFT			
FISCAL YEAR	SINGLE ENGINE	MULTI-ENGINE	TURBOPROP	TURBOJET	PISTON	TURBINE	OTHER	TOTAL
Historical*								
1986	242.0	157.8	230.0	451.4	11.0	56.7	0.1	1,149.0
1987	236.5	148.5	197.3	409.4	10.1	55.4	0.1	1,057.3
1988	235.4	148.5	189.1	409.4	10.1	55.4	0.1	1,048.0
1989	180.0	143.9	250.9	443.6	8.7	71.5	0.1	1,098.6
1990	189.1	137.8	227.4	413.4	9.5	59.2	0.1	1,036.5
1991E	192.9	135.0	220.6	419.6	9.6	59.2	0.1	1,037.0
Forecast								
1992	195.2	135.0	225.7	428.4	9.6	62.6	0.1	1,056.6
1993	196.4	137.7	233.6	435.7	9.6	68.9	0.1	1,082.0
1994	197.2	137.7	238.3	442.7	9.6	79.2	0.1	1,104.8
1995	197.2	140.5	244.7	449.8	9.6	80.9	0.1	1,122.7
1996	198.0	140.5	252.0	457.0	9.6	91.2	0.1	1,148.3
1997	198.0	143.3	260.3	463.8	9.6	98.1	0.1	1,173.2
1998	198.8	143.3	268.4	470.8	9.6	103.4	0.1	1,194.4
1999	199.6	146.1	277.3	478.3	9.6	110.4	0.2	1,221.4
2000	200.4	146.1	287.3	485.5	9.0	113.6	0.2	1,242.0
2001	201.0	146.1	297.3	492.8	9.0	117.0	0.2	1,263.3
2002	201.6	146.1	307.7	500.1	9.0	123.5	0.2	1,288.3
2003	202.2	146.1	318.5	507.7	9.0	126.7	0.2	1,310.4

* Source: FAA APO Estimates

TABLE 26

ACTIVE ROTORCRAFT FLEET AND HOURS FLOWN

AS OF JANUARY 1	ACTIVE FLEET (Thousands) PISTON	TURBINE	TOTAL	HOURS FLOWN (1) (Millions) PISTON	TURBINE	TOTAL
Historical*						
1986	2.9	3.5	6.4	0.8	1.8	2.6
1987	2.9	4.0	6.9	0.6	1.6	2.2
1988	2.8	3.5	6.3	0.6	2.0	2.6
1989	2.6	3.8	6.4	0.7	2.1	2.8
1990	3.2	4.2	7.4	0.8	1.7	2.5
1991E	3.5	3.9	7.4	0.8	1.7	2.5
Forecast						
1992	3.6	4.2	7.8	0.8	1.8	2.6
1993	3.5	4.5	8.0	0.8	2.0	2.8
1994	3.4	4.8	8.2	0.8	2.3	3.1
1995	3.3	5.1	8.4	0.8	2.4	3.2
1996	3.2	5.5	8.7	0.8	2.7	3.5
1997	3.2	5.7	8.9	0.8	2.9	3.7
1998	3.2	6.0	9.2	0.8	3.0	3.8
1999	3.1	6.4	9.5	0.8	3.2	4.0
2000	3.0	6.8	9.8	0.7	3.3	4.0
2001	3.0	7.2	10.2	0.7	3.4	4.1
2002	2.9	7.6	10.5	0.7	3.6	4.3
2003	2.8	8.0	10.8	0.7	3.7	4.4

* Source: FAA Statistical Handbook of Aviation

(1) Helicopter hours flown are on a fiscal year basis.

TABLE 27

TOTAL AIRCRAFT OPERATIONS

AT AIRPORTS WITH FAA TRAFFIC CONTROL SERVICE

(In Millions)

FISCAL YEAR	AIR CARRIER	AIR TAXI/ COMMUTER	GENERAL AVIATION	MILITARY	TOTAL	NUMBER OF FAA TOWERS
Historical*						
1986	12.3	6.9	37.1	2.6	59.0	399
1987	13.1	7.3	37.8	2.7	61.0	399
1988	12.8	8.3	37.5	2.8	61.3	399
1989	12.5	8.3	37.8	2.8	61.4	399
1990	12.9	8.8	39.0	2.8	63.5	403
1991E	12.5	8.9	37.6	2.5	61.5	400
Forecast						
1992	12.6	9.2	37.8	2.8	62.4	400
1993	13.0	9.6	38.6	2.8	64.0	400
1994	13.4	10.0	39.6	2.8	65.8	400
1995	13.8	10.4	40.3	2.8	67.3	400
1996	14.2	10.7	40.9	2.8	68.6	400
1997	14.6	11.0	41.6	2.8	70.0	400
1998	14.9	11.3	42.3	2.8	71.3	400
1999	15.2	11.5	42.9	2.8	72.4	400
2000	15.5	11.8	43.6	2.8	73.7	400
2001	15.8	12.1	44.3	2.8	75.0	400
2002	16.1	12.3	44.8	2.8	76.0	400
2003	16.4	12.6	45.5	2.8	77.3	400

* Source: FAA Air Traffic Activity.

Notes: Detail may not add to total because of rounding.

TABLE 28

ITINERANT AIRCRAFT OPERATIONS

AT AIRPORTS WITH FAA TRAFFIC CONTROL SERVICE

(In Millions)

FISCAL YEAR	AIR CARRIER	AIR TAXI/ COMMUTER	GENERAL AVIATION	MILITARY	TOTAL
Historical*					
1986	12.3	6.9	21.9	1.4	42.5
1987	13.1	7.3	22.1	1.4	43.9
1988	12.8	8.3	22.1	1.4	44.5
1989	12.5	8.3	22.1	1.4	44.3
1990	12.9	8.8	22.4	1.4	45.5
1991E	12.5	8.9	21.5	1.3	44.2
Forecast					
1992	12.6	9.2	21.7	1.4	44.9
1993	13.0	9.6	22.2	1.4	46.2
1994	13.4	10.0	22.7	1.4	47.5
1995	13.8	10.4	23.1	1.4	48.7
1996	14.2	10.7	23.5	1.4	49.8
1997	14.6	11.0	23.9	1.4	50.9
1998	14.9	11.3	24.3	1.4	51.9
1999	15.2	11.5	24.7	1.4	52.8
2000	15.5	11.8	25.1	1.4	53.8
2001	15.8	12.1	25.5	1.4	54.8
2002	16.1	12.3	25.8	1.4	55.6
2003	16.4	12.6	26.2	1.4	56.6

* Source: FAA Air Traffic Activity.

Notes: Detail may not add to total because of rounding.

TABLE 29

LOCAL AIRCRAFT OPERATIONS

AT AIRPORTS WITH FAA TRAFFIC CONTROL SERVICE

(In Millions)

FISCAL YEAR	GENERAL AVIATION	MILITARY	TOTAL
Historical*			
1986	15.2	1.3	16.4
1987	15.8	1.3	17.1
1988	15.4	1.4	16.8
1989	15.7	1.4	17.1
1990	16.6	1.4	18.0
1991E	16.0	1.2	17.2
Forecast			
1992	16.1	1.4	17.5
1993	16.4	1.4	17.8
1994	16.9	1.4	18.3
1995	17.2	1.4	18.6
1996	17.4	1.4	18.8
1997	17.7	1.4	19.1
1998	18.0	1.4	19.4
1999	18.2	1.4	19.6
2000	18.5	1.4	19.9
2001	18.8	1.4	20.2
2002	19.0	1.4	20.4
2003	19.3	1.4	20.7

* Source: FAA Air Traffic Activity.

Notes: Detail may not add to total because of rounding.

TABLE 30

INSTRUMENT OPERATIONS

AT AIRPORTS WITH FAA TRAFFIC CONTROL SERVICE

(In Millions)

FISCAL YEAR	AIR CARRIER	AIR TAXI/ COMMUTER	GENERAL AVIATION	MILITARY	TOTAL	
Historical*						
1986	12.8	6.6	16.8	4.3	40.5	(8.4)
1987	13.7	7.3	17.9	4.4	43.4	(9.2)
1988	13.4	8.4	18.3	4.4	44.5	(9.5)
1989	13.6	8.4	18.6	4.5	45.0	(9.4)
1990	14.0	9.4	19.1	4.4	46.8	(10.0)
1991E	13.5	9.5	18.1	4.0	45.1	(9.4)
Forecast						
1992	13.6	9.8	18.3	4.4	46.1	(9.6)
1993	14.0	10.2	18.8	4.4	47.4	(10.0)
1994	14.5	10.6	19.3	4.4	48.8	(10.3)
1995	14.9	11.0	19.8	4.4	50.1	(10.3)
1996	15.3	11.4	20.1	4.4	51.2	(10.3)
1997	15.8	11.7	20.6	4.4	52.5	(10.3)
1998	16.1	12.9	21.0	4.4	53.6	(10.3)
1999	16.4	13.1	21.4	4.4	54.5	(10.3)
2000	16.7	13.4	21.8	4.4	55.5	(10.3)
2001	17.1	12.7	22.2	4.4	56.6	(10.3)
2002	17.4	13.0	22.6	4.4	57.5	(10.3)
2003	17.7	13.2	23.0	4.4	58.5	(10.3)

* Source: FAA Air Traffic Activity.

Notes: Non-IFR instrument counts at Terminal Control Area (TCA) facilities and expanded area radar service are included in the totals and are shown in parenthesis (See Table 31). The data include instrument operations at FAA operated military radar approach control facilities.

Detail may not add because of rounding.

TABLE 31

NON-IFR INSTRUMENT OPERATIONS
(In Millions)

FISCAL YEAR	TERMINAL CONTROL AREAS	AIRPORT RADAR SERVICE AREAS	TOTAL
Historical*			
1986	1.7	6.7	8.4
1987	1.7	7.5	9.2
1988	1.7	7.8	9.5
1989	1.6	7.8	9.4
1990	1.9	8.1	10.0
1991E	1.8	7.6	9.4
Forecast			
1992	1.9	7.7	9.6
1993	2.0	8.0	10.0
1994	2.1	8.2	10.3
1995	2.1	8.4	10.3
1996	2.1	8.4	10.3
1997	2.1	8.4	10.3
1998	2.1	8.2	10.3
1999	2.1	8.2	10.3
2000	2.1	8.2	10.3
2001	2.1	8.2	10.3
2002	2.1	8.2	10.3
2003	2.1	8.2	10.3

* Source: FAA

TABLE 32

IFR AIRCRAFT HANDLED

AT FAA AIR ROUTE TRAFFIC CONTROL CENTERS

(In Millions)

FISCAL YEAR	IFR AIRCRAFT HANDLED				
	AIR CARRIER	AIR TAXI/ COMMUTER	GENERAL AVIATION	MILITARY	TOTAL
Historical*					
1986	16.0	5.0	8.1	5.1	34.2
1987	17.1	5.3	8.1	5.3	35.8
1988	17.9	5.8	8.1	4.6	36.4
1989	17.5	5.2	8.2	5.7	36.6
1990	18.5	5.6	7.9	5.5	37.4
1991E	18.3	5.6	7.4	5.1	36.4
Forecast					
1992	18.5	5.8	7.5	5.5	37.3
1993	19.1	6.0	7.7	5.5	38.3
1994	19.8	6.2	7.9	5.5	39.4
1995	20.3	6.5	8.0	5.5	40.3
1996	20.8	6.7	8.1	5.5	41.1
1997	21.3	6.9	8.2	5.5	41.9
1998	21.8	7.1	8.3	5.5	42.7
1999	22.2	7.3	8.5	5.5	43.5
2000	22.7	7.6	8.7	5.5	44.5
2001	23.2	7.8	8.8	5.5	45.3
2002	23.6	8.0	9.0	5.5	46.1
2003	23.9	8.2	9.1	5.5	46.7

* Source: FAA Air Traffic Activity.

Notes: Detail may not add to total because of rounding.

TABLE 33

IFR DEPARTURES AND OVERS

AT FAA AIR ROUTE TRAFFIC CONTROL CENTERS

(In Millions)

FISCAL YEAR	AIR CARRIER IFR DEPARTURES	AIR CARRIER OVERS	AIR TAXI/COMMUTER IFR DEPARTURES	AIR TAXI/COMMUTER OVERS	GENERAL AVIATION IFR DEPARTURES	GENERAL AVIATION OVERS	MILITARY IFR DEPARTURES	MILITARY OVERS	TOTAL DEPARTURES	TOTAL OVERS
Historical*										
1986	5.7	4.6	2.3	0.4	3.4	1.8	1.8	1.5	13.2	7.7
1987	6.0	5.0	2.5	0.4	3.4	1.9	1.9	1.5	13.8	8.3
1988	6.1	5.6	2.7	0.4	3.4	1.6	1.6	1.5	13.8	8.7
1989	6.0	5.4	2.5	0.3	3.4	1.9	1.9	1.9	13.8	9.0
1990	6.3	5.8	2.6	0.4	3.3	1.8	1.8	1.8	14.0	9.4
1991E	6.2	6.0	2.6	0.3	3.1	1.7	1.8	1.7	13.6	9.0
Forecast										
1992	6.3	6.2	2.7	0.4	3.1	1.8	1.8	1.8	13.9	9.4
1993	6.5	6.4	2.8	0.4	3.2	1.8	1.8	1.8	14.3	9.8
1994	6.8	6.5	2.9	0.4	3.3	1.8	1.8	1.8	14.8	9.9
1995	7.0	6.6	3.0	0.5	3.3	1.8	1.8	1.8	15.1	10.0
1996	7.2	6.8	3.1	0.5	3.3	1.8	1.8	1.8	15.4	10.1
1997	7.4	6.9	3.2	0.5	3.4	1.8	1.8	1.8	15.8	10.2
1998	7.6	7.0	3.3	0.5	3.4	1.8	1.8	1.8	16.1	10.4
1999	7.8	7.0	3.4	0.5	3.5	1.8	1.8	1.8	16.5	10.4
2000	8.0	7.1	3.5	0.5	3.6	1.8	1.8	1.8	16.9	10.6
2001	8.2	7.2	3.6	0.6	3.6	1.8	1.8	1.8	17.2	10.7
2002	8.4	7.3	3.7	0.6	3.7	1.8	1.8	1.8	17.6	10.8
2003	8.5	6.9	3.8	0.6	3.7	1.8	1.8	1.8	17.8	10.9

* Source: FAA Air Traffic Activity.

Note: Totals may not add because of rounding.

TABLE 34

TOTAL FLIGHT SERVICES

AT FAA FLIGHT SERVICE STATIONS AND COMBINED STATIONS/TOWERS

(In Millions)

FISCAL YEAR	FLIGHT PLANS ORIGINATED	PILOT BRIEFS	AIRCRAFT CONTACTED	TOTAL FLIGHT SERVICES
Historical*				
1986	7.5	13.4	7.2	49.0
1987	7.6	12.8	7.0	47.7
1988	7.6	11.7	6.4	45.0
1989	7.4	12.0	6.2	45.0
1990	6.9	11.5	6.1	42.9
1991E	6.2	10.7	5.5	39.4
Forecast				
1992	6.0	10.4	5.4	38.2
1993	6.2	10.5	5.4	38.8
1994	6.3	10.6	5.4	39.2
1995	6.4	10.6	5.4	39.4
1996	6.4	10.7	5.4	39.6
1997	6.6	10.7	5.4	40.0
1998	6.6	10.8	5.5	40.3
1999	6.7	10.8	5.5	40.5
2000	6.7	10.9	5.5	40.7
2001	6.8	10.9	5.5	40.9
2002	6.9	10.9	5.5	41.1
2003	6.9	11.0	5.5	41.3

* Source: FAA Air Traffic Activity.

Notes: Total flight services is equal to the sum of flight plans originated and pilot briefs, multiplied by two, plus the number of aircraft contacted.

TABLE 35

FLIGHT PLANS ORIGINATED

AT FAA FLIGHT SERVICE STATIONS AND COMBINED STATIONS/TOWERS

(In Millions)

	FLIGHT PLANS ORIGINATED		
FISCAL YEAR	IFR-DVFR	VFR	TOTAL
Historical*			
1986	5.9	1.6	7.5
1987	5.9	1.7	7.6
1988	5.7	1.7	7.4
1989	5.7	1.7	7.4
1990	5.3	1.6	6.9
1991E	4.7	1.5	6.2
Forecast			
1992	4.6	1.4	6.0
1993	4.7	1.5	6.2
1994	4.8	1.5	6.3
1995	4.8	1.6	6.4
1996	4.8	1.6	6.4
1997	5.0	1.6	6.6
1998	5.0	1.6	6.6
1999	5.0	1.7	6.7
2000	5.0	1.7	6.7
2001	5.1	1.7	6.8
2002	5.2	1.7	6.9
2003	5.2	1.7	6.9

* Source: FAA Air Traffic Activity.

Notes: Detail may not add to total because of rounding.

TABLE 36

AIRCRAFT CONTACTED

AT FAA FLIGHT SERVICE STATIONS AND COMBINED STATIONS/TOWERS

(In Millions)

	USER CATEGORY				FLIGHT RULES		
FISCAL YEAR	AIR CARRIER	AIR TAXI/ COMMUTER	GENERAL AVIATION	MILITARY	IFR-DVFR	VFR	TOTAL
Historical*							
1986	0.4	1.0	5.4	0.4	2.1	5.1	7.2
1987	0.4	1.0	5.2	0.4	2.1	4.9	7.0
1988	0.3	0.9	4.8	0.4	1.9	4.6	6.4
1989	0.3	0.8	4.7	0.4	1.9	4.3	6.2
1990	0.3	0.8	4.5	0.4	1.8	4.2	6.0
1991E	0.2	0.8	4.1	0.4	1.7	3.8	5.5
Forecast							
1992	0.2	0.7	4.1	0.4	1.6	3.8	5.4
1993	0.2	0.7	4.1	0.4	1.6	3.8	5.4
1994	0.2	0.7	4.1	0.4	1.6	3.8	5.4
1995	0.2	0.7	4.1	0.4	1.6	3.8	5.4
1996	0.2	0.7	4.1	0.4	1.6	3.8	5.4
1997	0.2	0.7	4.1	0.4	1.6	3.8	5.4
1998	0.2	0.7	4.2	0.4	1.6	3.9	5.5
1999	0.2	0.7	4.2	0.4	1.6	3.9	5.5
2000	0.2	0.7	4.2	0.4	1.6	3.9	5.5
2001	0.2	0.7	4.2	0.4	1.6	3.9	5.5
2002	0.2	0.7	4.2	0.4	1.6	3.9	5.5
2003	0.2	0.7	4.2	0.4	1.6	3.9	5.5

* Source: FAA Air Traffic Activity.

Notes: Detail may not add to total because of rounding.

TABLE 37

ACTIVE U.S. MILITARY AIRCRAFT

IN THE CONTINENTAL UNITED STATES [1/]

	FIXED WING AIRCRAFT				
FISCAL YEAR	JET	TURBOPROP	PISTON	HELICOPTER	TOTAL
Historical*					
1986	9,730	1,803	386	8,238	20,157
1987	9,819	1,865	370	8,460	20,514
1988	9,954	2,222	305	8,529	21,010
1989	9,501	2,131	261	7,330	19,223
1990	10,360	2,199	258	7,200	20,037
1991E	10,221	2,119	247	7,379	19,966
Forecast					
1992	9,678	2,033	234	7,277	19,222
1993	9,325	2,006	172	7,807	19,310
1994	9,052	2,025	172	7,798	19,047
1995	8,865	2,009	169	6,859	17,902
1996	8,743	1,997	169	6,670	17,579
1997	8,689	1,977	168	6,646	17,480
1998	8,736	1,977	168	6,648	17,529
1999	8,801	1,989	168	6,648	17,606
2000	8,862	1,988	167	6,636	17,653
2001	8,912	1,987	167	6,635	17,701
2002	8,911	1,984	167	6,634	17,696
2003	8,910	1,984	167	6,633	17,694

* Source: Office of the Secretary of Defense, Department of Defense.

[1/] Includes Army, Air Force, Navy and Marine regular service aircraft, as well as Reserve and National Guard aircraft. Data for Army and Air Force compiled in 1991, Navy and Marine portion is 1990 data.

TABLE 38

ACTIVE U.S. MILITARY AIRCRAFT

HOURS FLOWN IN THE CONTINENTAL UNITED STATES [1/]

(In Thousands)

	FIXED WING AIRCRAFT				
FISCAL YEAR	JET	TURBOPROP	PISTON	HELICOPTER	TOTAL
Historical*					
1986	3,510	820	155	1,798	6,283
1987	3,268	753	140	1,879	6,040
1988	3,339	808	92	1,763	6,002
1989	3,905	913	93	1,706	6,617
1990	3,849	908	202	1,772	6,731
1991E	3,689	863	208	1,471	6,231
Forecast					
1992	3,421	846	204	1,721	6,192
1993	3,279	899	67	1,717	5,962
1994	3,205	880	67	1,681	5,833
1995	3,167	882	67	1,472	5,588
1996	3,172	880	67	1,495	5,614
1997	3,188	880	67	1,489	5,624
1998	3,244	880	67	1,489	5,680
1999	3,294	880	67	1,489	5,730
2000	3,348	880	67	1,489	5,784
2001	3,395	880	67	1,489	5,831
2002	3,396	880	67	1,489	5,832
2003	3,397	880	67	1,489	5,833

* Source: Office of the Secretary of Defense, Department of Defense.

1/ Includes Army, Air Force, Navy and Marine regular service aircraft, as well as Reserve and National Guard aircraft. Data for Army and Air Force compiled in 1991, Navy and Marine portion is 1990 data.

GLOSSARY OF TERMS

Air Carrier Operations -- Arrivals and departures of air carriers certificated in accordance with FAR Parts 121 and 127.

Air Route Traffic Control Center (ARTCC) -- A facility established to provide air traffic control service to aircraft operating on an IFR flight plan within controlled airspace and principally during the en route phase of flight. When equipment capabilities and controller workload permit, certain advisory/assistance services may be provided to VFR aircraft.

Air Taxi -- An air carrier certificated in accordance with FAR Part 135 and authorized to provide, on demand, public transportation of persons and property by aircraft. Generally operates small aircraft "for hire" for specific trips.

Air Traffic -- Aircraft operating in the air or on an airport surface, exclusive of loading ramps and parking areas.

Air Traffic Hub -- Cities and Metropolitan Statistical Areas requiring aviation services. May include more than one airport. Communities fall into four classes as determined by the community's percentage of the total enplaned passengers by scheduled air carriers in the 50 United States, the District of Columbia, and other U.S. areas designated by the Federal Aviation Administration:

1. Large: 1.00 percent (4,385,440 passengers and over in CY 1990).
2. Medium: 0.25 percent to 0.999 percent (between 1,096,360 and 4,385,440 passengers in CY 1990).
3. Small: 0.05 percent to 0.249 percent (between 219,272 and 1,096,360 passengers in CY 1990).
4. Nonhub: Less than 0.05 percent (fewer than 219,272 passengers in CY 1990).

Air Travel Club -- An operator certificated in accordance with FAR Part 123 to engage in the carriage of members who qualify for that carriage by payment of an assessment, dues, membership fees, or other similar remittance.

Aircraft Contacted -- Aircraft with which the flight service stations have established radio communications contact. One count is made for each en route landing or departing aircraft contacted by a flight service station, regardless of the number of contacts made with an individual aircraft during the same flight. A flight contacting five FSS's would be counted as five aircraft contacted.

Aircraft Handled -- See IFR AIRCRAFT HANDLED.

Aircraft Operations -- The airborne movement of aircraft in controlled or noncontrolled airport terminal areas,

and counts at en route fixes or other points where counts can be made. There are two types of operations: local and itinerant.

1. LOCAL OPERATIONS are performed by aircraft that:

   (a) operate in the local traffic pattern or within sight of the airport;

   (b) are known to be departing for or arriving from flights in local practice areas located within a 20-mile radius of the airport;

   (c) execute simulated instrument approaches or low passes at the airport.

2. ITINERANT OPERATIONS are all aircraft operations other than local operations.

Airport Advisory Service -- A service provided by flight service stations at airports not served by a control tower. This service provides information to arriving and departing aircraft concerning wind direction/speed, favored runway, altimeter setting, pertinent-known traffic/field conditions, airport taxi routes/traffic patterns, and authorized instrument approach procedures. This information is advisory and does not constitute an ATC clearance.

Airport Traffic Control Tower -- A terminal facility that through the use of air/ground communications, visual signaling, and other devices, provides ATC services to airborne aircraft operating in the vicinity of an airport and to aircraft operating on the movement area.

All-Cargo Carrier -- An air carrier certificated in accordance with FAR Part 121 to provide scheduled air freight, express, and mail transportation over specified routes, as well as to conduct nonscheduled operations that may include passengers.

Approach Control Facility -- A terminal air traffic control facility providing approach control service.

Approach Control Service -- Air traffic control service provided by an approach control facility for arriving and departing VFR/IFR aircraft and, on occasion, for enroute aircraft. At some airports not served by an approach control facility, the ARTCC provides limited approach control service.

ARTCC -- See AIR ROUTE TRAFFIC CONTROL CENTER.

ASM's -- See AVAILABLE SEAT MILES.

Available Seat Miles (ASM's) -- The aircraft miles flown in a flight stage, multiplied by the number of seats available on that stage for revenue passenger use.

Business Transportation -- Any use of an aircraft, not for compensation or hire, by an individual for transportation required by the business in which the individual is engaged.

Center -- See AIR ROUTE TRAFFIC CONTROL CENTER.

Center Area -- The specified airspace within which an Air Route Traffic Control Center (ARTCC) provides air traffic control and advisory service.

Center Radar Approach Control (CERAP) -- A combined Air Route Traffic Control Center (ARTCC) and a Terminal Radar Approach Control facility (TRACON).

CERAP -- See CENTER RADAR APPROACH CONTROL.

Commercial Air Carriers -- An air carrier certificated in accordance with FAR Part 121 or 127 to conduct scheduled services on specified routes. These air carriers may also provide nonscheduled or charter services as a secondary operation. Four carrier groupings have been designated for statistical and financial data aggregation and analysis.

1. MAJORS: Air carriers with annual operating revenues greater than $1 billion.
2. NATIONALS: Air carriers with annual operating revenues between $100 million and $1 billion.
3. LARGE REGIONALS: Air carriers with annual operating revenues between $10 million and $99,999,999.
4. MEDIUM REGIONALS: Air carriers with annual operating revenues less than $10 million.

Common IFR Room -- A highly automated terminal radar control facility. It provides terminal radar service in an area encompassing more than one major airport that accommodates instrument flight operations.

Commuter Air Carrier -- An air carrier certificated in accordance with FAR Part 135 or 121 that operates aircraft with a maximum of 60 seats, and that provides at least five scheduled round trips per week between two or more points, or that carries mail.

Commuter/Air Taxi Operations -- Arrivals and departures of air carriers certificated in accordance with FAR Part 135.

Direct User Access Terminal System -- An automated pilot self-friefing and flight plan filing system. For pilots with access to a computer, modem, and touch telephone, the system provides direct access to a national weather data base and the ability to file flight plans without contact with a flight service station.

Domestic Operations -- All air carrier operations having destinations within the 50 United States, the District of Columbia, Puerto Rico, and the U.S. Virgin Islands.

DUATS -- See DIRECT USER ACCESS TERMINAL SYSTEM

Executive Transportation -- Any use of an aircraft, not for compensation or hire, by a corporation, company or other organization for the purpose of transporting its employees and/or property, and employing professional pilots for the operation of the aircraft.

FAA -- Federal Aviation Administration.

Facility -- See AIR TRAFFIC CONTROL TOWER.

Flight Plan -- Prescribed information relating to the intended flight of an aircraft that is filed orally or in writing with a flight service station or an air traffic control facility.

Flight Service Station (FSS) -- Air Traffic Service facilities within the National Airspace System that provide preflight pilot briefings and en route communications with IFR flights; assist lost IFR/VFR aircraft; assist aircraft having emergencies; relay ATC clearances, originate, classify, and disseminate Notices to Airmen (NOTAM's);

broadcast aviation weather and NAS information; receive and close flight plans; monitor radio NAVAIDS; notify search and rescue units of missing VFR aircraft; and operate the national weather teletypewriter systems. In addition, at selected locations, FSS's take weather observations, issue airport advisories, administer airmen written examinations, and advise Customs and Immigration of transborder flights.

Flight Services -- See TOTAL FLIGHT SERVICES.

Foreign Flag Air Carrier -- An air carrier other than a U.S. flag air carrier in international air transportation. "Foreign air carrier" is a more inclusive term than "foreign flag air carrier," including those non-U.S. air carriers operating solely within their own domestic boundaries. In practice, the two terms are used interchangeably.

FSS -- See FLIGHT SERVICE STATION.

General Aviation -- All civil aviation activity except that of air carriers certificated in accordance with FAR Parts 121, 123, 127, and 135. The types of aircraft used in general aviation (GA) activities cover a wide spectrum from corporate multi-engine jet aircraft piloted by professional crews to amateur-built single engine piston acrobatic planes, balloons, and dirigibles.

General Aviation Operations -- Arrivals and departures of all civil aircraft, except those classified as air carrier and commuter/air taxi.

Hub -- See AIR TRAFFIC HUB.

IFR -- See INSTRUMENT FLIGHT RULES.

IFR Aircraft Handled -- The number of IFR departures multiplied by two, plus the number of IFR overs. This definition assumes that the number of departures (acceptances, extensions, and originations of IFR flight plans) is equal to the number of landings (IFR flight plans closed).

IFR Departures -- An IFR departure includes IFR flights that:

1. originate in a Center's area;
2. are extended by the Center; or
3. are accepted by the Center under sole enroute clearance procedures.

IFR Overs -- An IFR flight that originates outside the ARTCC area and passes through the area without landing.

IFSS -- See INTERNATIONAL FLIGHT SERVICE STATION.

International and Territorial Operations -- The operation of aircraft flying between the 50 United States and foreign points, between the 50 United States and U.S. possessions and territories, and between two foreign points. Includes both the combination passenger/cargo and the all-cargo carriers engaged in international and territorial operations.

Instructional Flying -- Any use of aircraft for the purpose of formal instruction with the flight instructor aboard, or with the maneuvers on the particular flight(s) specified by the flight instructor.

Instrument Approach -- A series of predetermined maneuvers for the orderly

transfer of an aircraft under instrument flight conditions from the beginning of the initial approach to a landing, or to a point from which a landing may be made visually. An instrument approach is prescribed and approved for a specific airport by competent authority (FAR Part 91).

Instrument Flight Rules (IFR) -- Rules governing the procedures for conducting instrument flight.

Instrument Operation -- An aircraft operation in accordance with an IFR flight plan or an operation where IFR separation between aircraft is provided by a terminal control facility or air route traffic control center.

International Flight Service Station (IFSS) -- A central operations facility in the flight advisory system, manned and equipped to control aeronautical point-to-point telecommunications and air/ground telecommunications with pilots operating over international territory or waters, providing flight plan filing, weather information, search and rescue action, and other flight assistance operations.

Itinerant Operations -- See AIRCRAFT OPERATIONS.

Large Regionals -- See COMMERCIAL AIR CARRIERS.

Local Operations -- See AIRCRAFT OPERATIONS.

Majors -- See COMMERCIAL AIR CARRIERS.

Medium Regionals -- See COMMERCIAL AIR CARRIERS.

Military Operations -- Arrivals and departures of aircraft not classified as civil.

Nationals -- See COMMERCIAL AIR CARRIERS.

Personal/Pleasure Flying -- Any use of an aircraft for personal purposes not associated with a business or profession, and not for hire. This includes maintenance of pilot proficiency.

Pilot Briefing -- A service provided by the flight service station to assist pilots in flight planning. Briefing items may include weather information, NOTAM's, military activities, flow control information, and other items as requested.

Radar Air Traffic Control Facility (RATCF) -- An air traffic control facility, located at a U.S. Navy (USN) or Marine Corps (USMC) Air Station, utilizing surveillance and, normally, precision approach radar and air/ground communication equipment to provide approach control services to aircraft arriving, departing, and transiting the airspace controlled by the facility. The facility may be operated by the FAA, the USN and the FAA, the USN, or the USMC. Service may be provided to both civil and military airports.

Radar Approach Control (RAPCON) -- An air traffic control facility, located at a U.S. Air Force (USAF) Base, utilizing surveillance and, normally, precision approach radar and air/ground communication equipment to provide approach control services to aircraft arriving, departing, and transiting the airspace controlled by the facility. The facility may be operated by the FAA, or the USAF. Service may be provided to both civil and military airports.

Radio Contacts -- The initial radio call-up to a flight service station by enroute aircraft; a complete interchange of information and a termination of the contact.

RAPCON -- See RADAR APPROACH CONTROL.

RATCF -- See RADAR AIR TRAFFIC CONTROL FACILITY.

Registered Active General Aviation Aircraft -- A civil aircraft registered with the FAA that has been flown one or more hours during the previous calendar year. Excludes are aircraft owned and operated in regularly scheduled, nonscheduled, or charter service by commercial air carriers and aircraft in excess of 12,500 pounds maximum gross takeoff weight, and owned and operated by a commercial operator certificated by the FAA to engage in intrastate common carriage.

Research and Special Programs Administration (RSPA) -- The Research and Special Programs Administration of the U.S. Department of Transportation. Responsible for the collection of air carrier traffic and financial data on Form 41 that was collected formerly by the Civil Aeronautics Board.

Revenue Passenger Enplanements -- The total number of passengers boarding aircraft. Includes both originating and connecting passengers.

Revenue Passenger Load Factor -- Revenue passenger-miles as a percent of available seat-miles in revenue passenger services, i.e., the proportion of aircraft seating capacity that is actually sold and utilized.

Revenue Passenger Mile (RPM) -- One revenue passenger transported one mile in revenue service. Revenue passenger miles are computed by summation of the products of the revenue aircraft miles flown a flight stage, multiplied by the number of revenue passengers carried on that flight stage.

Revenue Ton Mile (RTM) -- One ton of revenue traffic transported one mile.

RPM -- See REVENUE PASSENGER MILE.

RSPA -- See Research and Special Program Administration

RTM -- See REVENUE TON MILE.

Secondary Airport -- An airport receiving approach control service as a satellite to a primary approach control facility, or one at which control is exercised by the approach control facility under tower en route control procedure.

Supplemental Air Carrier -- An air carrier certificated in accordance with FAR Part 121, and providing nonscheduled or supplemental carriage of passengers or cargo, or both, in air transportation. Also referred to as nonscheduled or charter air carriers.

Terminal Radar Approach Control (TRACON) -- An FAA traffic control facility using radar and air/ground communications to provide approach control services to aircraft arriving, departing, or transiting the airspace controlled by the facility. Service may be provided to both civil and military airports. A TRACON is similar to a RAPCON (USAF), RATCF (USN), and ARAC (Army).

Total Flight Services -- The sum of flight plans originated and pilot

briefs, multiplied by two, plus the number of aircraft contacted. No credit is allowed for airport advisories.

Total Operations -- All arrivals and departures performed by military, general aviation, commuter/air taxi, and air carrier aircraft.

Tower -- See AIRPORT TRAFFIC CONTROL TOWER.

TRACON -- See TERMINAL RADAR APPROACH CONTROL.

U.S. Flag Carrier -- Air carrier holding a certificate issued by the Department of Transportation, and approved by the President, authorizing the carrier to provide scheduled operations over a specified route between the United States (and/or its territories) and one or more foreign countries.

VFR -- See VISUAL FLIGHT RULES.

VFR Tower -- An airport traffic control tower that does not provide approach control service.

Visual Flight Rules (VFR) -- Rules that govern the procedures for conducting flight under visual conditions. Also used in the United States to indicate weather conditions that are equal to or greater than minimum VFR requirements. Used by pilots and controllers to indicate type of flight plan.

APPENDIX A

ACTIVE U.S. COMMERCIAL DOMESTIC AIR CARRIERS

Air Carrier	Carrier Type (1)	Carrier Grouping (2)	Reported Traffic Scheduled	Reported Traffic Charter
1. Aerial (AG)	F	MR		X
2. Air Wisconsin (ZW)	S	N	X	
3. Air Transport Int'l.	F	MR		X
4. Alaska (AS)	S	N	X	X
5. Aloha (AQ)	S	N	X	X
6. America West (HP)	S	M	X	X
7. American (AA)	S	M	X	X
8. American International	F	LR		X
9. Amerijet	F	LR	X	X
10. American Trans Air (TZ)	S	N	X	X
11. Arrow (JW)	F	LR	X	X
12. Buffalo	C	MR		X
13. Carnival (KW)	S	LR	X	X
14. Casino Express	C	MR		X
15. Continental (CO)	S	M	X	X
16. Delta (DL)	S	M	X	X
17. Evergreen (JO)	F	N		X
18. Executive (EX)	S	LR	X	
19. Express One	C	LR		X
20. Federal Express (FM)	F	M	X	X
21. Flagship	F	LR	X	X
22. Florida West	F	LR		X
23. Great American (FD)	C	MR		X
24. Hawaiian (HA)	S	N	X	X
25. Horizon Air (QX)	S	N	X	X
26. Independent Air	C	MR		X
27. Jet Fleet (JL)	C	MR		X
28. Key	C	LR		X
29. Markair (BF)	S	N	X	
30. Midwest Express (YX)	S	N	X	X

ACTIVE U.S. COMMERCIAL

DOMESTIC AIR CARRIERS (Continued)

Air Carrier	Carrier Type (1)	Carrier Grouping (2)	Reported Traffic Scheduled	Reported Traffic Charter
31. Million	F	MR		X
32. MGM Grand (MG)	S	LR	X	X
33. North American	C	MR		X
34. Northern Air Cargo (HU)	F	LR	X	X
35. Northwest (NW)	S	M	X	X
36. Private Jet	C	MR		X
37. Reeve (RV)	S	LR	X	X
38. Rich (XR)	C	LR		X
39. Southern Air	F	N		X
40. Southwest (WN)	S	M	X	X
41. Sun Country (SC)	C	LR		X
42. Trans Air Link	F	MR		X
43. Trans Continental	C	LR		X
44. Trans States (TX)	S	LR	X	
45. Trans World (TW)	S	M	X	X
46. Trump Shuttle (TB)	S	N	X	X
47. United (UA)	S	M	X	X
48. United Parcel Service (UP)	F	N		X
49. Universal	F	MR		X
50. USAir (AL)	S	M	X	X
51. Westair (OE)	S	N	X	
52. World (WO)	C	N		X
53. Zantop	F	LR	X	X

(1) S = Scheduled; C = Charter; F = All-Cargo.

(2) M = Majors; N = Nationals; LR = Large Regionals; MR = Medium Regionals.

APPENDIX B

ACTIVE U.S. COMMERCIAL INTERNATIONAL AIR CARRIERS

Air Carrier	Carrier Type (1)	Carrier Grouping (2)	Reported Traffic (3) ATL.	LAT.	PAC.	INTL.
1. Aerial (AG)	F	MR		X		
2. Air Transport Int'l.	F	MR	X			
3. Alaska (AS)	S	N		X		
4. America West (HP)	S	M			X	
5. American (AA)	S	M	X	X	X	
6. American International	F	LR				X
7. Amerijet	F	LR				X
8. American Trans Air (TZ)	S	N				X
9. Arrow (JW)	F	LR				X
10. Buffalo	F	MR				X
11. Carnival (KW)	S	LR		X		
12. Challenge Air Cargo	F	LR		X		
13. Connor	F	MR		X		
14. Continental (CO)	S	M	X	X	X	
15. Delta (DL)	S	M	X	X	X	
16. Emery	F	MR			X	
17. Evergreen (JO)	C	N				X
18. Executive (EX)	S	LR		X		
19. Express One	C	LR				X
20. Federal Express (FM)	F	M	X	X	X	
21. Flagship	F	LR	X		X	
22. Florida West	F	LR				X
23. Hawaiian (HA)	S	N			X	
24. Independent Air	C	MR				X
25. Jet Fleet (JL)	C	MR				X
26. Key	C	LR				X
27. Million	F	MR				X
28. Northwest (NW)	S	M	X		X	
29. Private Jet	C	MR				X
30. Rich (XR)	C	LR				X

ACTIVE U.S. COMMERCIAL

INTERNATIONAL AIR CARRIERS (Continued)

Air Carrier	Carrier Type (1)	Carrier Grouping (2)	Reported Traffic ATL.	LAT.	PAC.	INTL.
31. Southern Air	F	N				X
32. Sun Country (SC)	C	LR				X
33. Tower (FF)	S	N	X			
34. Trans Air Link	F	MR				X
35. Trans Continental	C	LR				X
36. Trans World (TW)	S	M	X			
37. United (UA)	S	M	X		X	
38. United Parcel Service (UP)	F	N	X	X	X	
39. Universal	F	MR				X
40. USAir (AL)	S	M	X	X		
41. World (WO)	C	N				X
			12	12	11	20

(1) S = Scheduled; C = Charter; F = All-Cargo.

(2) M = Majors; N = Nationals; LR = Large Regionals; MR = Medium Regionals.

(3) ATL = Atlantic; LAT = Latin America; PAC = Pacific; INT'L. = International

APPENDIX C

CARRIERS NO LONGER INCLUDED IN AIR CARRIER DATA BASE

Air Carrier	Carrier Type (1)	Carrier Grouping (2)	Date of First Reported Traffic (3) Domestic	Int'l.	Date of Last Reported Traffic (4)
1. Aeromech (KC)	S	MR	7-79		5-81**
2. Aeron	F	MR		4-83	5-89*
3. Air America	S	LR			12-89*
4. Air Atlanta (CC)	S	LR	2-84		7-86*
5. AirCal (OC)	S	N	1-79		3-87m
6. Air Florida (QH)	S	N	1-79	7-80	5-84*
7. Air Illinois (UX)	S	LR	1-83		2-84*
8. Airlift (RD)	C	MR	7-84	7-84	12-85*
9. Airmark	C	MR	8-84	9-84	12-84*
10. Air Midwest (ZV)	S	LR	X		12-84**
11. Air National (AH)	C	LR		4-84	6-84*
12. Air Nevada (LW)	S	MR	4-81		7-82**
13. Air New England (NE)	S	MR	X		10-81*
14. Air North (NO)	S	MR	6-80		8-82**
15. Air North/Nenana (XG)	S	MR	3-81		8-82**
16. Air One (CB)	S	LR	4-83		7-84*
17. AirPac (RI)	S	LR	4-84		12-85*
18. All Star (LS)	S	MR	4-83	4-83	10-85*
19. Altair (AK)	S	MR	1-79		9-82*
20. American Int'l. (AV)	S	LR	11-82		9-84*
21. Apollo (ID)	S	MR	5-79		7-81**
22. Arista (RI)	C	MR	12-82	8-82	3-84*
23. Aspen (AP)	S	LR	1-85		4-91m
24. Atlantic Gulf (ZY)	C	MR	9-85		7-86*
25. Best (IW)	S	MR	7-82		10-85**
26. Big Sky (GQ)	S	MR	6-79		9-82**
27. Blue Bell (BB)	C	MR	6-83		2-84*
28. Braniff (BN) (8)	S	N	3-84	6-89*	
29. Britt (RU)	S	LR	10-84		6-87**
30. Cascade (CZ)	S	LR	1-85		11-85*

CARRIERS NO LONGER INCLUDED

IN AIR CARRIER DATA BASE (Continued)

Air Carrier	Carrier Type (1)	Carrier Grouping (2)	Date of First Reported Traffic (3) Domestic	Date of First Reported Traffic (3) Int'l.	Date of Last Reported Traffic (4)
31. Capitol (CL)	S	N	7-80	7-81	9-84*
32. Challenge (CN)	F	MR		8-82	6-86*
33. Challenge Air Int'l.	S	MR		7-86	8-87*
34. Cochise (DP)	S	MR	1-79		12-81*
35. Coleman (CH)	S	MR	9-79		3-80*
36. Colgan (CJ)	S	MR	4-81		3-83**
37. Discovery	S	LR	3-90		7-90*
38. Eastern (EA)	S	M	X	X	1-91*
39. Emerald (OD)	S	LR	7-82		6-91*40
40. Empire (UR)	S	LR	10-79		4-86m
41. Five Star (12)	C	LR	12-85		5-89*
42. Flight International	C	MR	4-84	6-84	9-85*
43. Florida Express (ZO)	S	LR	1-84	1-87	2-89m
44. Flying Tiger (FT)	F	M	X	X	8-89m
45. Frontier (FL)	S	N	X	X	8-86m
46. Frontier Horizon (FH)	S	LR	1-84		1-85*
47. Galaxy (GY)	C	MR	10-83	12-83	5-87*
48. Global (GL)	C	LR	X	X	12-84*
49. Golden Gate (GG)	S	MR	5-80		7-81*
50. Golden West (GW)	S	MR	2-79		7-82**
51. Gulf Air Transport (GA)	C	MR		1-85	12-89*
52. Guy America (HX)	S	MR		8-81	2-83*
53. Hawaii Express (LP)	S	LR	10-82		10-83*
54. Imperial (II)	S	MR	1-80		6-82**
55. International Air Service	C	LR	7-88		3-89*
56. Int'l. Air Service (IE)	C	LR	11-83		5-85*
57. Interstate	F	LR	5-85	5-85	10-87*
58. Jet America (SI)	S	N	1-82		8-87m
59. Jet Charter	C	MR	7-82	7-82	5-85*
60. Kodiak (KO)	S	MR	X		11-82**

CARRIERS NO LONGER INCLUDED

IN AIR CARRIER DATA BASE (Continued)

Air Carrier	Carrier Type (1)	Carrier Grouping (2)	Date of First Reported Traffic (3) Domestic	Int'l.	Date of Last Reported Traffic (4)
61. L.A.B. (JF)	S	MR	1-82		8-82**
62. McClain (MU)	S	LR	11-86		2-87**
63. Mid-South (VL)	S	MR	6-80		2-84*
64. Midstate (IU)	S	MR	7-81		7-82**
65. Mid Pacific (HO)	S	LR	10-85		9-87*
66. Midway (ML)	S	N	11-79		11-91*
67. Midway Express	S	LR	10-84		7-85*
68. Mississippi Valley (XV)	S	MR	4-79		8-82**
69. Munz (XY)	S	MR	X		8-83*
70. New Air (NC)	S	MR	5-79		9-82**
71. New York Air (NY)	S	N	12-80		12-86m
72. New Wien (WC)	S	MR	9-85		10-85*
73. Northeastern (QS)	S	LR	7-84		2-85*
74. Orion	F	MR	1-87	1-87	12-89
75. Overseas (OV)	C	LR	10-82		10-85*
76. Ozark (OZ)	S	N	X		9-86m
77. Pacific East (PR)	S	LR	9-82		3-84*
78. Pacific Express (VB)	S	LR	2-82		10-83*
79. Pacific Southwest (PS)	S	N	1-79		4-88m
80. Pan American (PA)	S	M	X	X	12-91*
81. Peninsula (KS)	S	MR	1-82		1-83**
82. People Express (PE)	S	N	5-81	5-83	12-86m
83. Piedmont (PI)	S	M	X	7-87	8-89m
84. Pilgrim (PM)	S	LR	9-85		12-86*
85. Ports of Call Travel Club	C	LR	9-85		1-86*
86. Presidential (XV)	S	LR	10-85	11-89*	
87. Pride Air (NI)	S	LR	10-85		11-85*
88. Republic (RC)	S	M	X		9-86m
89. Rocky Mountain (JC)	S	MR	7-81		9-82**
90. Royale (OQ)	S	LR	3-84		6-84**

CARRIERS NO LONGER INCLUDED

IN AIR CARRIER DATA BASE (Continued)

Air Carrier	Carrier Type (1)	Carrier Grouping (2)	Date of First Reported Traffic (3) Domestic	Int'l.	of Last Reported Traffic (4)
91. Royal West	S	LR	7-86		
92. Ryan	C	LR	4-84	4-84	5-86*
93. Sea Airmotive (KJ)	S	MR	1-80		6-82**
94. Sky Bus (FW)	S	MR	7-85		11-86*
95. Skystar	C	MR	1-85	3-85	1-87*
96. Sky West (QG)	S	MR	7-79		12-84**
97. Sky World	C	LR	10-85	10-85	7-89*
98. Samoa (MB)	S	MR		2-85	6-85*
99. Southeast (NS)	S	MR	7-79		1-80*
100. South Pacific Island (HK)	S	LR		7-81	11-86*
101. Sun Coast (WS)	C	MR		5-87	9-87*
102. Sunworld (JK)	S	LR	5-83		9-88
103. Swift Aire (WI)	S	MR	1-79		7-81*
104. T-Bird (DQ)	C	MR		4-82	8-84*
105. Total Air (TA)	C	MR	10-84	5-85	1-87*
106. TPI International	F	MR		3-90	8-90*
107. Transamerica (TV)	S	N		5-79	9-86*
108. Trans International	F	MR	5-85	1-85	12-88*
109. Transtar (MA)	S	LR	8-81		8-87m
110. Wien (WC)	S	N	X		11-84*
111. Western (WA)	S	M	X	X	3-87m
112. Western Yukon (WX)	S	MR	7-81		6-82*
113. Worldwide	C	MR	10-84	10-84	3-86*
114. Wright (FW)	S	MR	X		11-82**

(1) S - Scheduled; C - Charter; F - All-Cargo.
(2) M - Majors; N - Nationals; LR - Large Regionals; MR - Medium Regionals.
(3) Date of first reported traffic is indicated for those carriers starting service since the passage of the Airline Deregulation Act of 1978. Traffic reported by those carriers certificated prior to deregulation indicated by an X.
(4) Date of last reported traffic is indicated. Carriers that have discontinued scheduled passenger service indicated by an *. Carriers now filing RSPA Form 298-C in lieu of RSPA Form 41 indicated by **. Carriers that have merged operations indicated by an m.

APPENDIX D

U.S. AIR CARRIERS

NONSCHEDULED TRAFFIC AND CAPACITY

DOMESTIC

FISCAL YEAR	ASM'S (MIL)	RPM'S (MIL)	L.F. (%)	ENPLANEMENTS (000)
Historical*				
1982	3,007	2,160	71.8	1,641
1983	6,854	5,109	74.5	2,882
1984	8,142	6,078	74.6	3,840
1985	9,841	7,491	76.1	5,318
1986	8,404	6,345	75.5	4,856
1987	6,170	4,422	71.7	3,933
1988	6,651	4,954	74.5	4,490
1989	6,862	5,128	74.7	4,887
1990	7,393	5,551	75.1	5,208
1991E	7,580	5,290	69.8	4,881

INTERNATIONAL

FISCAL YEAR	ASM'S (MIL)	RPM'S (MIL)	L.F. (%)	ENPLANEMENTS (000)
Historical*				
1982	4,260	3,643	85.5	1,149
1983	9,443	8,045	85.2	3,034
1984	8,513	7,385	86.8	2,824
1985	8,637	7,438	86.1	2,857
1986	7,517	6,327	84.2	2,662
1987	10,510	8,626	82.1	3,708
1988	11,118	9,148	82.3	3,932
1989	12,165	9,444	77.6	4,660
1990	11,220	8,152	72.7	3,906
1991E	15,489	9,963	64.3	4,043

U.S. AIR CARRIERS

NONSCHEDULED TRAFFIC AND CAPACITY (Continued)

	TOTAL			
FISCAL YEAR	ASM'S (MIL)	RPM'S (MIL)	L.F. (%)	ENPLANEMENTS (000)
Historical*				
1982	7,267	5,803	79.9	2,790
1983	16,297	13,154	80.7	5,916
1984	16,655	13,463	80.8	6,664
1985	18,478	14,929	80.8	8,175
1986	15,921	12,672	79.6	7,518
1987	16,680	13,048	78.2	7,641
1988	17,769	14,102	79.4	8,422
1989	19,027	14,570	76.6	9,547
1990	18,613	13,703	73.6	9,114
1991E	23,069	15,253	66.1	8,924

Source: RSPA Form 41

APPENDIX E

U.S. AIR CARRIERS

CARGO REVENUE TON MILES

(In Millions)

FREIGHT/EXPRESS RTM'S

FISCAL YEAR	DOMESTIC	INTERNATIONAL	TOTAL
Historical*			
1982	3,144	2,792	5,936
1983	3,809	2,910	6,719
1984	4,391	3,328	7,719
1985	3,943	3,340	7,284
1986	4,869	3,988	8,857
1987	5,782	4,781	10,563
1988	6,699	5,702	12,401
1989	7,413	6,749	14,162
1990	7,542	6,771	14,313
1991E	7,632	6,951	14,583

MAIL RTM'S

FISCAL YEAR	DOMESTIC	INTERNATIONAL	TOTAL
Historical*			
1982	999	392	1,391
1983	1,040	400	1,440
1984	1,145	441	1,586
1985	1,203	450	1,653
1986	1,233	438	1,671
1987	1,314	435	1,749
1988	1,423	463	1,886
1989	1,463	488	1,951
1990	1,478	516	1,994
1991E	1,459	507	1,966

U.S. AIR CARRIERS
CARGO REVENUE TON MILES (Continued)
(In Millions)

TOTAL RTM'S

FISCAL YEAR	DOMESTIC	INTERNATIONAL	TOTAL
Historical*			
1982	4,143	3,184	7,327
1983	4,849	3,310	8,159
1984	5,536	3,769	9,305
1985	5,146	3,790	8,936
1986	6,102	4,426	10,528
1987	7,096	5,216	12,312
1988	8,122	6,165	14,287
1989	8,876	7,237	16,113
1990	9,020	7,287	16,307
1991E	9,091	7,458	16,549

Source: RSPA Form 41

APPENDIX F

ACTIVE U.S. REGIONALS/COMMUTERS

1. Action Air
2. Aero Coach
3. Air Cape
4. Air LA
5. Air Midwest
6. Air Molokai
7. Air Nevada
8. Air Resorts
9. Air Sedona
10. Air Sunshine
11. Air Vantage
12. Air Vegas
13. Airways International
14. Alaska Island Air*
15. Aleutian Air Ltd.*
16. Allegheny Commuter
17. Aloha IslandAir
18. Alpha Air
19. Alpine Air
20. Arctic Circle Airlines*
21. Aspen Airlines
22. Atlantic Southeast
23. Baker Aviation*
24. Bar Harbor Airlines
25. Barrow Air*
26. Bellair*
27. Bemidgi
28. Bering Air*
29. Big Sky
30. Britt Airways
31. Business Express Airlines
32. California Air Shuttle
33. Cape Air
34. Cape Smythe*
35. CCAir
36. Central States Airlines
37. Chalks
38. Chartair
39. Charter One
40. Chautauqua Airlines
41. Christman Air System
42. Comair
43. Command Airways
44. Commutair
45. Conquest Airlines
46. Crown Airways
47. Dawn Air
48. Direct Air
49. Eastern Metro Express
50. Empire Airways
51. ERA Aviation*
52. Executive Airlines
53. Executive Express II
54. Express Airline I
55. Flamenco
56. Freedom Air*
57. Frontier Flying Service*
58. GP Express
59. Grand Airways
60. Grand Canyon Helicopters

ACTIVE U.S. REGIONALS/COMMUTERS (Continued)

61. Great Lakes Aviation
62. Gulf Air Taxi*
63. Gulf Flight Center
64. Gulfstream International
65. Gulkana Air Service*

66. Haines Airways*
67. Harbor Air Service*
68. Harbor Airlines
69. Helitrans
70. Henson Aviation

71. Hermens Air*
72. Horizon
73. Hub Express
74. Iliamna Air Taxi*
75. Jet Express

76. Jetstream International
77. Kenmore Air Harbor
78. Ketchikan Air Service*
79. LAB Flying Service*
80. Lake Union Air Service*

81. Lapsa Airlines
82. Larry's Flying Service*
83. Las Vegas Airlines
84. Loken Aviation*
85. Long Island Airlines

86. L'Express Airlines
87. Mall Airways
88. Mesa Airlines
89. Mesaba Aviation
90. Metro Northeast(ANO)

91. Metro Northeast(CAP)
92. Metro-flight Airlines
93. Michigan Airways
94. Midway Commuter
95. Midwest Aviation

96. Mohawk Airlines
97. Nashville Eagle(Flagship)
98. New England Airlines
99. New York Helicopters
100. Northeast Regional Express

101. North Pacific/NPA
102. Olson Air Service*
103. Pacific Coast Airlines
104. Pan Am Express
105. Panama Aviation

106. Panorama Air Tours
107. Paradise Island
108. Peninsula Airways*
109. Pennsylvania Airlines
110. Precision Airlines

111. Redwing Airlines
112. Rocky Mountain Airways
113. Ross Aviation
114. Ryan Air Service*
115. Samoa Air*

116. Scenic Airlines
117. Sea Air Shuttle
118. Simmons Airlines
119. Skagway Air Service*
120. Sky Master Airlines

121. Sky West Aviation
122. Southcentral Air*
123. Springdale Air
124. StatesWest Airlines
125. Sunaire(Aviation Associates)

126. Tanana Air Service*
127. Taquan Air Service*
128. Tatondok Air Service*
129. Temsco Airlines*
130. Trans States Airlines

131. Trump Air
132. Valley Air Service*
133. Viequies Air Link
134. Village Aviation(Camai Air)*
135. Virgin Air

136. Walker's International
137. Warblow's Air Venture*
138. West Isle Air
139. WestAir
140. Westates Airlines

ACTIVE U.S. REGIONALS/COMMUTERS (Continued)

141. Wilbur's Inc.*
142. Wings Airways(PA)
143. Wings of Alaska*
144. Wings West
145. WRA Inc.
146. Wright Air Service*
147. Yutana Airlines*
148. Yute Air Alaska*
149. 40-Mile Air*

* Carriers, primarily in Alaska, whose traffic is not included in the regional/commuter data base and forecast.

APPENDIX G

GENERAL AVIATION AIRCRAFT COST INDICES

SINGLE ENGINE PISTON AIRCRAFT

PRICE AND COST INDICES

(1972 = 100)

Calendar Year	Purchase Price	Maintenance Cost	Operating Cost	Total Cost
1970	93.7	86.4	98.2	95.0
1971	95.7	93.2	98.8	97.4
1972	100.0	100.0	100.0	100.0
1973	100.0	109.2	109.9	109.8
1974	100.0	129.6	148.8	143.6
1975	114.1	138.9	158.9	153.6
1976	132.4	169.1	173.1	172.1
1977	142.2	184.5	202.2	197.5
1978	149.9	192.0	230.9	220.5
1979	165.6	201.1	287.6	264.5
1980	173.8	214.8	364.6	324.5
1981	216.6	227.8	425.7	372.7
1982	245.3	256.2	443.7	393.6
1983	280.7	269.1	450.6	401.9
1984	304.3	279.6	446.1	401.5
1985	316.4	289.1	436.8	397.1
1986	338.4	294.6	411.9	380.4
1987	*	300.0	405.3	376.9
1988	*	308.5	405.3	379.2
1989	*	317.3	405.3	381.5
1990	*	327.9	430.3	402.7
1991	*	338.8	466.5	432.1

* Not calculated because all models in index have stopped production.

Source: FAA-APO Estimates

GENERAL AVIATION AIRCRAFT COST INDICES (CONTINUED)

MULTI-ENGINE PISTON AIRCRAFT

PRICE AND COST INDICES

(1972 = 100)

Calendar Year	Purchase Price	Maintenance Cost	Operating Cost	Total Cost
1970	82.6	96.7	98.1	97.5
1971	90.5	99.9	98.8	99.2
1972	100.0	100.0	100.0	100.0
1973	100.0	109.0	109.9	109.5
1974	102.9	130.0	148.6	140.5
1975	117.5	150.0	158.8	154.9
1976	128.6	172.8	173.0	173.0
1977	137.6	187.8	202.0	196.8
1978	151.8	196.5	230.8	215.8
1979	168.9	207.1	287.3	252.1
1980	185.3	216.6	364.2	299.5
1981	211.3	226.5	425.3	338.1
1982	232.9	240.6	443.4	359.2
1983	248.0	250.4	450.2	362.6
1984	289.4	260.0	445.7	364.3
1985	327.5	268.8	436.7	363.1
1986	343.2	274.2	411.7	351.2
1987	341.0	279.3	405.0	349.6
1988	367.6	287.2	405.0	353.1
1989	400.7	295.3	405.0	356.7
1990	439.9	305.2	429.9	375.0
1991	450.6	315.3	466.1	399.7

Source: FAA-APO Estimates

GENERAL AVIATION AIRCRAFT COST INDICES (CONTINUED)

TURBOPROP AIRCRAFT

PRICE AND COST INDICES

(1972 = 100)

Calendar Year	Purchase Price	Maintenance Cost	Operating Cost	Total Cost
1970	87.7	99.3	92.7	95.3
1971	93.9	103.1	97.9	99.9
1972	100.0	100.0	100.0	100.0
1973	100.0	108.9	118.8	114.8
1974	103.0	130.0	146.6	139.9
1975	113.8	144.4	156.8	151.7
1976	125.6	150.2	164.6	158.7
1977	125.6	144.1	181.9	166.6
1978	131.9	156.8	221.4	195.2
1979	145.0	160.7	296.9	241.8
1980	157.8	163.4	354.0	276.9
1981	182.7	169.6	403.8	309.0
1982	189.9	180.2	420.8	323.2
1983	204.3	187.5	434.7	334.6
1984	213.0	194.7	434.7	337.5
1985	236.2	201.3	429.9	335.4
1986	247.5	205.3	384.8	310.2
1987	251.8	209.1	384.8	311.7
1988	295.6	215.0	384.8	314.1
1989	318.4	221.1	384.8	316.6
1990	343.1	228.5	422.4	342.0
1991	357.2	236.1	465.1	370.4

Source: FAA-APO Estimates

GENERAL AVIATION AIRCRAFT COST INDICES (CONTINUED)

TURBOJET AIRCRAFT

PRICE AND COST INDICES

(1972 = 100)

Calendar Year	Purchase Price	Maintenance Cost	Operating Cost	Total Cost
1970	87.0	94.6	92.6	93.3
1971	87.0	96.2	97.8	97.2
1972	100.0	100.0	100.0	100.0
1973	100.2	109.0	118.7	115.6
1974	104.7	130.0	127.4	128.2
1975	115.1	140.2	156.8	151.4
1976	123.4	153.5	164.6	160.9
1977	135.9	167.6	181.9	177.3
1978	151.5	174.3	221.4	206.2
1979	167.2	179.4	296.9	259.0
1980	205.7	182.7	353.9	298.7
1981	216.7	187.1	403.8	333.9
1982	240.4	198.7	420.8	348.9
1983	251.8	206.7	434.7	361.2
1984	266.2	214.7	434.7	363.7
1985	278.4	221.3	429.9	362.8
1986	299.0	225.7	384.8	333.8
1987	309.3	229.9	384.8	335.2
1988	328.2	236.4	384.8	337.3
1989	326.9	243.1	384.8	339.4
1990	363.1	251.2	422.8	367.8
1991	370.0	259.6	465.6	399.5

Source: FAA-APO Estimates

APPENDIX H

FAA TOWERED AIRPORTS

Birmingham, AL (BHM)
Dothan, AL (DHN)
Huntsville Madison County, AL (HSV)
Mobile Bates Field, AL (MOB)
Montgomery Dannelly Field, AL (MGM)

Tuscaloosa Van De Graaf, AL (TCL)
Anchorage International, AK (ANC)
Anchorage Lake Hood SPB, AK (LHD)
Anchorage Merrill, AK (MRI)
Bethel, AK (BET)

Fairbanks International, AK (FAI)
Juneau, AK (JNU)
Kenai Municipal, AK (ENA)
King Salmon, AK (AKN)
Kodiak, AK (ADQ)

Deer Valley, AZ (DVT)
Falcon/Mesa, AZ (FFZ)
Goodyear, AZ (GYR)
Grand Canyon Municipal, AZ (GCN)
Phoenix Sky Harbor Int'l., AZ (PHX)

Prescott, AZ (PRC)
Scottsdale, AZ (SDL)
Tucson, AZ (TUS)
Fayetteville Drake Field, AR (FYV)
Fort Smith Municipal, AR (FSM)

Little Rock Adams Field, AR (LIT)
Texarkana, AR (TXK)
Bakersfield Meadows Field, CA (BFL)
Burbank, CA (BUR)
Camarillo, CA (CMA)

Carlsbad Palomar, CA (CRQ)
Chico, CA (CIC)
Chino, CA (CNO)
Concord, CA (CCR)
El Monte, CA (EMT)

Fresno Air Terminal, CA (FAT)
Fullerton Municipal, CA (FUL)
Hawthorne, CA (HHR)
Hayward, CA (HWD)
La Verne Brackett, CA (POC)

Lancaster Fox Airport, CA (WJF)
Livermore Municipal, CA (LVK)
Long Beach, CA (LGB)
Los Angeles International, CA (LAX)
Modesto City County, CA (MOD)

Monterey, CA (MRY)
Napa County, CA (APC)
Oakland International, CA (OAK)
Ontario, CA (ONT)
Oxnard Ventura County, CA (OXR)

Palm Springs Municipal, CA (PSP)
Palmdale, CA (PMD)
Palo Alto, CA (PAO)
Redding, CA (RDD)
Riverside Municipal, CA (RAL)

Sacramento Executive, CA (SAC)
Sacramento Metro, CA (SMF)
Salinas Municipal, CA (SNS)
San Carlos, CA (SQL)
San Diego Brown Field, CA (SDM)

San Diego Gillespi, CA (SEE)
San Diego Lindberg, CA (SAN)
San Diego Montgomery, CA (MYF)
San Franciso, CA (SFO)
San Jose International, CA (SJC)

San Jose Reid Hillview, CA (RHV)
San Luis Obispo, CA (SBP)
Santa Ana/Orange County, CA (SNA)
Santa Barbara, CA (SBA)
Santa Maria Public, CA (SMX)

FAA TOWERED AIRPORTS

Santa Monica, CA (SMO)
Santa Rosa Sonoma County, CA (STS)
South Lake Tahoe, CA (TVL)
Stockton, CA (SCK)
Torrance Municipal, CA (TOA)

Van Nuys, CA (VNY)
Aspen Pitkin County, CO (ASE)
Broomfield Jefferson County, CO (BJC)
Colorado Springs, CO (COS)
Denver Stapleton Int'l., CO (DEN)

Denver/Centennial, CO (APA)
Grand Junction, CO (GJT)
Pueblo, CO (PUB)
Bridgeport, CT (BDR)
Danbury Municipal, CT (DXR)

Groton/New London, CT (GON)
Hartford Brainard, CT (HFD)
New Haven, CT (HVN)
Windsor Locks, CT (BDL)
Wilmington Greater Wilmington, DE (ILG)

Washington National, DC (DCA)
Craig Field Jacksonville, FL (CRG)
Daytona Beach, FL (DAB)
Fort Lauderdale, FL (FLL)
Fort Lauderdale Executive, FL (FXE)

Fort Myers Page Field, FL (FMY)
Fort Myers Regional, FL (RSW)
Fort Pierce, FL (FPR)
Gainesville, FL (GNV)
Hollywood, FL (HWO)

Jacksonville International, FL (JAX)
Key West, FL (EYW)
Melbourne, FL (MLB)
Miami International, FL (MIA)
Opa Locka, FL (OPF)

Orlando Executive, FL (ORL)
Orlando International Airport, FL (MCO)
Panama City Bay County, FL (PFN)
Pensacola, FL (PNS)
Pompano Beach Airpak, FL (PMP)

Sarasota Bradenton, FL (SRQ)
St. Petersburg Clearwater, FL (PIE)
St. Petersburg Whitt, FL (SPG)
Tallahassee, FL (TLH)
Tamiami, FL (TMB)

Tampa International, FL (TPA)
Vero Beach, FL (VRB)
West Palm Beach, FL (PBI)
Albany, GA (ABY)
Atlanta DeKalb Peachtree, GA (PDK)

Atlanta Fulton County, GA (FTY)
Atlanta International, GA (ATL)
Augusta, GA (AGS)
Columbus, GA (CSG)
Macon Lewis B. Wilson, GA (MCN)

Savannah Municipal, GA (SAV)
Hilo General Lyman Field, HI (ITO)
Honolulu, HI (HNL)
Kahului, HI (OGG)
Kona Ke Ahole, HI (KOA)

Lihue, HI (LIH)
Molokai, HI (MKK)
Boise, ID (BOI)
Idaho Falls Fanning Field, ID (IDA)
Lewiston, ID (LWS)

Pocatello, ID (PIH)
Twin Falls, ID (TWF)
Alton St. Louis Regional, IL (ALN)
Aurora Municipal, IL (ARR)
Bloomington/Normal, IL (BMI)

Carbondale, IL (MDH)
Champaign Univeristy of Illinois, IL (CMI)
Chicago Du Page, IL (DPA)
Chicago Meigs, IL (CGX)
Chicago Midway, IL (MDW)

Chicago O'Hare International, IL (ORD)
Chicago Palwaukee, IL (PWK)
Decatur, IL (DEC)
East St. Louis State Park, IL (CPS)
Moline, IL (MLI)

FAA TOWERED AIRPORTS

Peoria, IL (PIA)
Rockford, IL (RFD)
Springfield Capital, IL (SPI)
Bloomington Monroe County, IN (BMG)
Evansville, IN (EVV)

Fort Wayne, IN (FWA)
Indianapolis International, IN (IND)
Lafayett Purdue University, IN (LAF)
Muncie Delaware County, IN (MIE)
South Bend, IN (SBN)

Terre Haute, IN (HUF)
Cedar Rapids, IA (CID)
Des Moines Municipal, IA (DSM)
Dubuque, IA (DBQ)
Sioux City Municipal, IA (SUX)

Waterloo, IA (ALO)
Hutchinson, KS (HUT)
Olathe, KS (OJC)
Salina, KS (SLN)
Topeka Forbes Field, KS (FOE)

Wichita Mid Continent, KS (ICT)
Cincinnati Greater, KY (CVG)
Lexington, KY (LEX)
Louisville Bowman, KY (LOU)
Louisville Standiford, KY (SDF)

Alexandria, LA (ESF)
Baton Rouge Ryan Field, LA (BTR)
Houma, LA (HUM)
Lafayette, LA (LFT)
Lake Charles, LA (LCH)

Monroe, LA (MLU)
New Orleans Lakefront, LA (NEW)
New Orleans Moesant, LA (MSY)
Shreveport, LA (SHV)
Shreveport Downtown, LA (DTN)

Bangor International, ME (BGR)
Portland, ME (PWM)
Baltimore Washington Int'l, MD (BWI)
Camp Springs Andrews AFB, MD (ADW)
Hagerstown, MD (HGR)

Bedford, MA (BED)
Beverly Muncipal, MA (BVY)
Boston Logan, MA (BOS)
Hyannis, MA (HYA)
Lawrence, MA (LWN)

Natucket Memorial, MA (ACK)
New Bedford, MA (EWB)
Norwood, MA (OWD)
Westfield, MA (BAF)
Worcester, MA (ORH)

Ann Arbor Municipal, MI (ARB)
Battle Creek, MI (BTL)
Detroit City, MI (DET)
Detroit Metro Wayne County, MI (DTW)
Detroit Willow Run, MI (YIP)

Flint Bishop, MI (FNT)
Grand Rapids, MI (GRR)
Jackson Reynolds Municipal, MI (JXN)
Kalamazoo, MI (AZO)
Lansing, MI (LAN)

Muskegon, MI (MKG)
Pontiac, MI (PTK)
Saginaw Tri City, MI (MBS)
Traverse City, MI (TVC)
Duluth, MN (DLH)

Minneapolis Crystal, MN (MIC)
Minneapolis Flying Cloud, MN (FCM)
Minneapolis St. Paul Int'l., MN (MSP)
Rochester, MN (RST)
St. Paul, MN (STP)

Greenville Municipal, MS (GLH)
Gulfport, MS (GPT)
Jackson Hawkins, MS (HKS)
Jackson Municipal Airport, MS (JAN)
Meridian Key, MS (MEI)

Columbia Regional, MO (COU)
Joplin, MO (JLN)
Kansas City International, MO (MCI)
Kansas City Municipal, MO (MKC)
Springfield, MO (SGF)

FAA TOWERED AIRPORTS

St. Joseph, MO (STJ)
St. Louis International, MO (STL)
St. Louis Spirit of St. Louis, MO (SUS)
Billings, MT (BIL)
Great Falls, MT (GTF)

Helena, MT (HLN)
Missoula, MT (MSO)
Grand Island, NE (GRI)
Lincoln Municipal, NE (LNK)
Omaha, NE (OMA)

Las Vegas McCarran Int'l, NV (LAS)
North Las Vegas, NV (VGT)
Reno International, NV (RNO)
Lebanon, NH (LEB)
Manchester, NH (MHT)

Atlantic City, NJ (ACY)
Caldwell, NJ (CDW)
Morristown, NJ (MMU)
Newark, NJ (EWR)
Teterboro, NJ (TEB)

Trenton, NJ (TTN)
Albuquerque Int'l, NM (ABQ)
Roswell, NM (ROW)
Santa Fe, NM (SAF)
Albany County, NY (ALB)

Binghamton Broome Cnty., NY (BGM)
Buffalo International, NY (BUF)
Elmira, NY (ELM)
Farmingdale, NY (FRG)
Islip McArthur, NY (ISP)

Ithaca Tompkins County, NY (ITH)
John F. Kennedy International, NY (JFK)
La Guardia, NY (LGA)
Niagara Falls, NY (IAG)
Poughkeepsie Dutchess County, NY (POU)

Rochester Monroe County, NY (ROC)
Syracuse Hancock International, NY (SYR)
Utica, NY (UCA)
White Plains Westchester, NY (HPN)
Asheville, NC (AVL)

Charlotte Douglas, NC (CLT)
Fayetteville Grannis, NC (FAY)
Greensboro Regional, (GSO)
Kinston, NC (ISO)
Raleigh Durham, NC (RDU)

Wilmington New Hanover County, NC (ILM)
Winston Salem, NC (INT)
Bismark, ND (BIS)
Fargo Hector Field, ND (FAR)
Grand Forks International, ND (GFK)

Minot International, ND (MOT)
Akron Canton Regional, OH (CAK)
Cincinnati Lunken, OH (LUK)
Cleveland Burke Lakefront, OH (BKL)
Cleveland Hopkins Int'l, OH (CLE)

Port Columbus International, OH (CMH)
Columbus Ohio State, OH (OSU)
Dayton, OH (DAY)
Mansfield Lahm Municipal, OH (MFD)
Toledo Express, OH (TOL)

Youngstown, OH (YNG)
Clinton Sherman, OK (CSM)
Lawton Municipal, OK (LAW)
Oklahoma City Wiley Post, OK (PWA)
Oklahoma City Will Rogers, OK (OKC)

Tulsa International, OK (TUL)
Tulsa Riverside, OK (RVS)
Eugene, OR (EUG)
Hillsboro, OR (HIO)
Klamath Falls, OR (LMT)

Medford Jackson County, OR (MFR)
Portland International, OR (PDX)
Salem McNary Field, OR (SLE)
Troutdale, OR (TTD)
Allentown, PA (ABE)

Capital, City/Harrisburg, PA (CXY)
Erie, PA (ERI)
Harrisburg International, PA (MDT)
Lancaster, PA (LNS)
North Philadelphia, PA (PNE)

FAA TOWERED AIRPORTS

Philadelphia International, PA (PHL)
Pittsburgh Allegheny, PA (AGC)
Pittsburgh Greater International, PA (PIT)
Reading, PA (RDG)
Wilkes Barre, PA (AVP)

Williamsport, PA (IPT)
Providence, RI (PVD)
Charleston AFB Municipal, SC (CHS)
Columbia Metropolitan, SC (CAE)
Florence City, SC (FLO)

Greenville Municipal, SC (GMU)
Greer, SC (GSP)
Rapid City, SD (RAP)
Sioux Falls Foss Field, SD (FSD)
Bristol Tri City, TN (TRI)

Chattanooga, TN (CHA)
Knoxville McGhee Tyson, TN (TYS)
Memphis International, TN (MEM)
Nashville Metropolitan, TN (BNA)
Abilene, TX (ABI)

Amarillo, TX (AMA)
Austin, TX (AUS)
Beaumont Port Arthur, TX (BPT)
Brownsville International, TX (BRO)
College Station, TX (CLL)

Corpus Christi, TX (CRP)
Dallas Addison, TX (ADS)
Dallas Love Field, TX (DAL)
Dallas Redbird, TX (RBD)
Dallas/Ft. Worth Int'l, TX (DFW)

El Paso International, TX (ELP)
Fort Worth Meacham, TX (FTW)
Fort Worth/Alliance, TX (AFW)
Harlingen Industrial AP, TX (HRL)
Houston Hobby, TX (HOU)

Houston Intercontinental, TX (IAH)
Longview, TX (GGG)
Lubbock, TX (LBB)
McAllen, TX (MFE)
Midland, TX (MAF)

San Angelo, TX (SJT)
San Antonio International, TX (SAT)
San Antonio Stinson, TX (SSF)
Tomball D. W. Hooks, TX (DWH)
Tyler, TX (TYR)

Waco Municipal, TX (ACT)
Ogden Municipal, UT (OGD)
Salt Lake City Int'l, UT (SLC)
Burlington International, VT (BTV)
Charlottesville Albemarle, VA (CHO)

Lynchburg, VA (LYH)
Newport News, VA (PHF)
Norfolk International, VA (ORF)
Richmond Byrd Int'l, VA (RIC)
Roanoke, VA (ROA)

Washington Dulles Int'l, VA (IAD)
St. Croix Alex Hamilton, VI (STX)
St. Thomas H.S. Thomas, VI (STT)
Everett Paine Field, WA (PAE)
Moses Lake Grant, WA (MWH)

Olympia, WA (OLM)
Pasco Tri Cities, WA (PSC)
Renton, WA (RNT)
Seattle Boeing, WA (BFI)
Seattle Tacoma Int'l, WA (SEA)

Spokane Felts Field, WA (SFF)
Spokane International, WA (GEG)
Tacoma Narrows, WA (TIW)
Walla Walla, WA (ALW)
Yakima Air Terminal, WA (YKM)

Charleston, WV (CRW)
Clarksburg Benendum, WV (CKB)
Huntington, WV (HTS)
Morgantown, WV (MGW)
Parkersburg Wood County, WV (PKB)

Wheeling, WV (HLG)
Appleton, WI (ATW)
Green Bay Austin Straubel, WI (GRB)
Janesville, WI (JVL)
Lacrosse, WI (LSE)

FAA TOWERED AIRPORTS

Madison, WI (MSN)
Milwaukee Mitchell, WI (MKE)
Milwaukee Timmerman, WI (MWC)
Oshkosh Wittman Field, WI (OSH)
Casper, WY (CPR)
Cheyene, WY (CYS)
San Juan International, PR (SJU)
San Juan Isla Grande, PR (SIG)
Kwajalein AAF, WK (KWA)
Pago Pago International, AS (TUT)

APPENDIX I

CONTRACT TOWERS

1. Flagstaff, Arizona (FLG)
2. Pacoima/Whitman, California (WHP)
3. Lakeland, Florida (LAL)
4. Valdosta Municipal, Georgia (VLD)
5. Hailey, Idaho (SUN)
6. Marion Williamson County, Illinois (MWA)
7. Waukegan, Illinois (UGN)
8. Topeka-Phillip Ballard, Kansas (TOP)
9. Owensboro-Daviees County, Kentucky (OWB)
10. Paducah Barkley Field, Kentucky (PAH)
11. New Iberia, Louisiana (ARA)
12. Martha's Vineyard, Massachusetts (MVY)
13. Cape Girardeau, Missouri (CGI)
14. Nashua, New Hampshire (ASH)
15. Farmington Municipal, New Mexico (FMN)
16. Hobbs Lea, New Mexico (HOB)

CONTRACT TOWERS (Continued)

17. Cleveland-Cuyahoga County, Ohio (CGF)
18. Ardmore Municipal, Oklahoma (ADM)
19. Clinton Sherman, Oklahoma (CSM)
20. Enid Woodring Memorial, Oklahoma (WDG)
21. Pendleton, Oregon (PDT)
22. Myrtle Beach, South Carolina (CRE)
23. Laredo, Texas (LRD)
24. Bellingham, Washington (BLI)
25. Lewisburg-Greenbrier, West Virginia (LWB)

APPENDIX J

TERMINAL CONTROL AREAS AND AIRPORT RADAR SERVICE AREAS

Birmingham, AL (BHM)
Huntsville Madison County, AL (HSV)
Mobile Bates Field, AL (MOB)
Montgomery Dannelly Field, AL (MGM)
Anchorage International, AK (ANC)

Phoenix Sky Harbor Int'l., AZ (PHX/P50*)
Tucson, AZ (TUS/U90)
Fort Smith Municipal, AR (FSM)
Little Rock Adams Field, AR (LIT)
Burbank, CA (BUR/B90*)

El Toro, CA (NZJ)*
Fresno Air Terminal, CA (FAT)
Los Angeles Int'l, CA (LAX/L56*)
Monterey, CA (MRY)
Oakland International, CA (OAK/O90*)

Ontario, CA (ONT/O40*)
Palm Springs Municipal, CA (PSP)
Sacramento Metro, CA (SME/MCC*)
San Diego Lindberg, CA (SAN/NKX*)
San Francisco, CA (SFO)

San Jose International, CA (SJC)
Santa Ana/Orange County, CA (SNA)
Santa Barbara, CA (SBA)
Colorado Springs, CO (COS)
Denver Stapleton Int'l, CO (DEN/D84*)

Hartford Bradley Int'l, CT (BDL/Y90*)
Washington National, DC (DCA)
Daytona Beach, FL (DAB)
Fort Lauderdale, FL (FLL)
Fort Myers Regional, FL (RSW)

Jacksonville International, FL (JAX)
Miami International, FL (MIA)
Orlando Int'l Airport, FL (MCO)
Pensacola, FL (PNS/P31*)
Sarasota Bradenton, FL (SRQ)

Tallahassee, FL (TLH)
Tampa International, FL (TPA)
West Palm Beach, FL (PBI)
Atlanta International, GA (ATL)
Augusta, GA (AGS)

Columbus, GA (CSG)
Macon Lewis B. Wilson, GA (MCN)
Savannah Municipal, GA (SAV)
Honolulu, HI (HNL)
Honolulu, HI (ZHN)

Kahului, HI (OGG)
Boise, ID (BOI)
Champaign Univ. of Illinois, IL (CMI)
Chicago Midway, IL (MDW)
Chicago O'Hare Int'l, IL (ORD/C90*)

Moline, IL (MLI)
Peoria, IL (PIA)
Rockford, IL (RFD)
Springfield Capital, IL (SPI)
Evansville, IN (EVV)

Fort Wayne, IN (FWA)
Indianapolis International, IN (IND)
South Bend, IN (SBN)
Cedar Rapids, IA (CID)
Des Moines Municipal, IA (DSM)

Wichita Mid Continent, KS (ICT)
Cincinnati Greater, KY (CVG)
Lexington, KY (LEX)
Louisville Standiford, KY (SDF)
Baton Rouge Ryan Field, LA (BTR)

Lafayette, LA (LFT)
Lake Charles, LA (LCH)
Monroe, LA (MLU)
New Orleans Moisant, LA (MSY)
Shreveport, LA (SHV)

TERMINAL CONTROL AREAS AND AIRPORT RADAR SERVICE AREAS

Bangor International, ME (BGR)
Portland, ME (PWM)
Baltimore Washington Int'l, MD (BWI/B95*)
Camp Springs Andrews AFB, MD (ADW)
Boston Logan, MA (BOS/A90*)

Detroit Metro Wayne County, MI (DTW/D21*)
Flint Bishop, MI (FNT)
Grand Rapids, MI (GRR)
Kalamazoo, MI (AZO)
Lansing, MI (LAN)

Muskegon, MI (MKG)
Saginaw Tri City, MI (MBS)
Minneapolis St. Paul, MN (MSP/M98*)
Gulfport, MS (GPT)
Jackson Municipal Airport, MS (JAN)

Kansas City International, MO (MCI)
St. Louis International, MO (STL/T75*)
Billings, MT (BIL)
Great Falls, MT (GTF)
Lincoln Municipal, NE (LNK)

Omaha, NE (OMA/R90*)
Las Vegas McCarrna Int'l., NV (LAS)
Reno International, NV (RNO)
Atlantic City, NJ (ACY)
Newark, NJ (EWR)

Albuquerque International, NM (ABQ)
Albany County, NY (ALB)
Binghamton Broome County, NY (BGM)
Buffalo International, NY (BUF)
Elmira, NY (ELM)

Griffiss AFB, NY (RME)
John F. Kennedy Int'l, NY (JFK/N90*)
La Guardia, NY (LGA)
Rochester Monroe County, NY (ROC)
Syracuse Hancock Int'l, NY (SYR)

Asheville, NC (AVL)
Charlotte Douglas, NC (CLT)
Fayetteville Grannis, NC (FAY)
Greensboro Regional, NC (GSO)
Raliegh Durham, NC (RDU)

Wilmington New Hanover County, NC (ILM)
Fargo Hector Field, ND (FAR)
Akron Canton Regional, OH (CAK)
Cleveland Hopkins Int'l., OH (CLE)
Columbus International, OH (CMH)

Dayton, OH (DAY)
Toledo Express, OH (TOL)
Youngstown, OH (YNG)
Oklahoma City Will Rogers, OK (OKC)
Tulsa International, OK (TUL)

Portland International, OR (PDX/P80*)
Allentown, PA (ABE)
Capital City/Harrisburg, PA (CXY)
Erie, PA (ERI)
Philadelphia International, PA (PHL)

Pittsburgh Greater Int'l, PA (PIT)
Wilkes Barre, PA (AVP)
Providence, RI (PVD/G90*)
Charleston AFB Municipal, SC (CHS)
Columbia Metropolitan, SC (CAE)

Greer, SC (GSP)
Bristol Tri City, TN (TRI)
Chattanooga, TN (CHA)
Knoxville McGhee Tyson, TN (TYS)
Memphis International, TN (MEM)

Nashville Metropolitan, TN (BNA)
Abilene, TX (ABI)
Amarillo, TX (AMA)
Austin, TX (AUS)
Beaumont Port Arthur, TX (BPT)

Corpus Christi, TX (CRP)
Dallas Love Field, TX (DAL)
Dallas/Ft. Worth Regional, TX (DFW/D10*)
El Paso International, TX (ELP)
Houston Hobby, TX (HOU)

Houston Intercontinental, TX (IAH/I90*)
Longview, TX (GCG)
Lubbock, TX (LBB)
Midland, TX (MAF)
San Antonio International, TX (SAT)

TERMINAL CONTROL AREAS AND AIRPORT RADAR SERVICE AREAS

Salt Lake City Int'l., UT (SLC/S56*)
Burlington International, VT (BTV)
Norfolk Regional, VA (ORF)
Richmond Byrd International, VA (RIC)
Roanoke, VA (ROA)

Washington Dulles Int'l, VA (IAD)
Seattle Tacoma Int'l, WA (SEA/S46*)
Spokane International, WA (GEG)
Charleston, WV (CRW)
Huntington, WV (HTS)

Green Bay Austin Straubel, WI (GRB)
Madison, WI (MSN)
Milwaukee Mitchell, WI (MKE)
Agana NAS, SP (GUM/ZUA*)
San International, PR (SJU/ZSU)

* Indicates that airport has terminal radar approach control (TRACON)

APPENDIX K

MEDIUM HUB AIRPORTS
FY 1990

City	State	Region	Location Identifier
Albuquerque	NM	ASW	ABQ
Anchorage	AK	AAL	ANC
Austin	TX	ASW	AUS
Buffalo	NY	AEA	BUF
Burbank	CA	AWP	BUR
Chicago Midway	IL	AGL	MDW
Cleveland	OH	AGL	CLE
Columbus	OH	AGL	CMH
Covington/Cincinnati	KY	ASO	CVG
Dallas Love Field	TX	ASW	DAL
Dayton	OH	AGL	DAY
El Paso	TX	ASW	ELP
Fort Myers	FL	ASO	RSW
Fort Lauderdale	FL	ASO	FLL
Hartford	CT	ANE	BDL
Houston Hobby	TX	ASW	HOU
Indianapolis	IN	AGL	IND
Jacksonville	FL	ASO	JAX
Kansas city	MO	ACE	MCI
Kahului	HI	AWP	OGG
Lihue	HI	AWP	LIH
Memphis	TN	ASO	MEM
Milwaukee	WI	AGL	MKE
Nashville	TN	ASO	BNA
New Orleans	LA	ASW	MSY
Norfolk	VA	AEA	ORF
Oakland	CA	AWP	OAK
Oklahoma City	OK	ASW	OKC
Ontario	CA	AWP	ONT
Portland	OR	ANM	PDX

(continued on next page)

MEDIUM HUB AIRPORTS
FY 1990

City	State	Region	Location Identifier
Raleigh/Durham	NC	ASO	RDU
Reno	NV	AWP	RNO
Rochester	NY	AEA	ROC
Sacremento	CA	AWP	SMF
San Antonio	TX	ASW	SAT
San Jose	CA	AWP	SJC
San Juan	PR	ASO	SJU
Santa Ana	CA	AWP	SNA
Syracuse	NY	AEA	SYR
Tucson	AZ	AWP	TUS
Tulsa	OK	ASW	TUL
West Palm Beach	FL	ASO	PBI

Source: FAA TERMINAL AREA FORECASTS FY 1992-2005.

APPENDIX L

SMALL HUB AIRPORTS
FY 1990

City	State	Region	Location Identifier
Akron	OH	AGL	CAK
Agana	SP	AWP	NGM
Albany	NY	AEA	ALB
Allentown	PA	AEA	ABE
Amarillo	TX	ASW	AMA
Baton Rouge	LA	ASW	BTR
Billings	MT	ANM	BIL
Birmingham	AL	ASO	BHM
Boise	ID	ANM	BOI
Burlington	VT	ANE	BTV
Cedar Rapids	IA	ACE	CID
Charleston	SC	ASO	CHS
Charlotte Amalie	VI	ASO	STT
Chattanooga	TN	ASO	CHA
Colorado Springs	CO	ANM	COS
Columbia	SC	ASO	CAE
Corpus Christi	TX	AWP	CRP
Daytona Beach	FL	ASO	DAB
Des Moines	IA	ACE	DSM
Detroit	MI	AGL	DET
Eugene	OR	ANM	EUG
Fairbanks	AK	AAL	FAI
Fort Wayne	IN	AGL	FWA
Fresno	CA	AWP	FAT
Grand Rapids	MI	AGL	GRR
Greensboro	NC	ASO	GSO
Greer	SC	ASO	GSP
Harlingen	TX	ASW	HRL
Hilo	HI	AWP	ITO
Huntsville	AL	ASO	HSV

(continued on next page)

SMALL HUB AIRPORTS
FY 1990

City	State	Region	Location Identifier
Islip	NY	AEA	ISP
Jackson	MS	ASO	JAN
Kialua-Kona	HI	AWP	KOA
Knoxville	TN	ASO	TYS
Lexington	KY	ASO	LEX
Little Rock	AR	ASW	LIT
Long Beach	CA	AWP	LGB
Louisville	KY	ASO	SDF
Lubbock	TX	AWP	LBB
Madison	WI	AGL	MSN
Manchester	NH	ANE	MHT
Melbourne	FL	ASO	MLB
Middletown	PA	AEA	MDT
Midland	TX	ASW	MAF
Mobile	AL	ASO	MOB
Moline	IL	AGL	MLI
Omaha	NE	ACE	OMA
Palm Springs	CA	AWP	PSP
Pensacola	FL	ASO	PNS
Portland	ME	ANE	PWM
Providence	RI	ANE	PVD
Richmond	VA	AEA	RIC
Roanoke	VA	AEA	ROA
Saginaw	MI	AGL	MBS
Saipan (Mariana Islands)	SP	AWP	GSN
Santa Barbara	CA	AWP	SBA
Sarasota/Bradenton	FL	ASO	SRQ
Savannah	GA	ASO	SAV
Shreveport	LA	ASW	SHV
Sioux Falls	SD	AGL	FSD
South Bend	IN	AGL	SBN
Spokane	WA	ANM	GEG
Tallahassee	FL	ASO	TLH
Wichita	KS	ACE	ICT

Source: FAA TERMINAL AREA FORECASTS FY 1992-2005.

CHAPTER 1

EXECUTIVE SUMMARY

CHAPTER X

YEAR-BY-YEAR DATA FOR FAA AVIATION FORECASTS FISCAL YEARS 1992–2003