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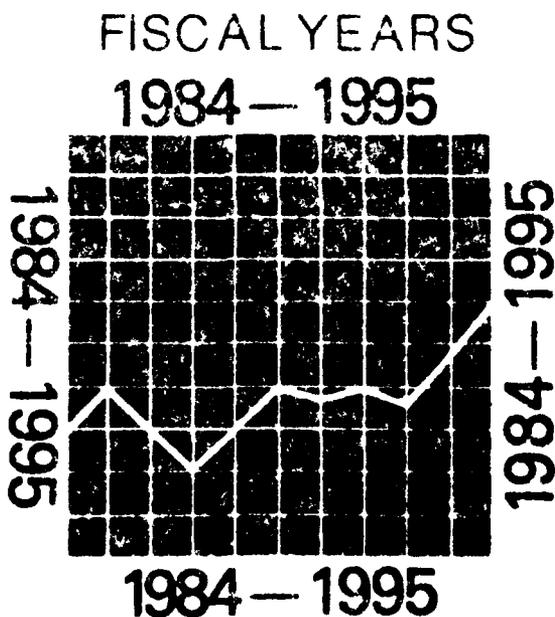


U.S. Department of Transportation  
Federal Aviation Administration

# FAA Aviation Forecasts

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16. Abstract This report contains the Fiscal Years 1984-1995 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 forecasts were made for the four major users of the national aviation system: air carriers, air taxi/commuters, general aviation and the military. 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, by the aviation industry and the general public.  The overall outlook for the forecast period is for strong economic growth relatively stable real fuel prices, and moderate inflation. Based upon these assumptions, aviation activity is forecast to increase by Fiscal Year 1995 by 79 percent at towered airports (commuters, 73 percent; air carrier, 23 percent; general aviation, 101 percent; military, 0 percent), 45 percent at air route traffic control centers (commuters, 110 percent; air carriers, 25 percent; general aviation, 74 percent; military, 0 percent), and 60 percent in flight services performed. Hours flown by general aviation is forecast to increase 60 percent and helicopter hours flown 67 percent. Scheduled domestic revenue passenger miles (RPM's) are forecast to increase 81 percent, with scheduled international RPM's forecast to increase by 79 percent and commuter RPM's forecast to increase by 195 percent.					
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# Table of Contents

	<u>Page</u>
Preface . . . . .	i
Acknowledgements . . . . .	ii
Table of Contents . . . . .	iii
List of Figures . . . . .	iv
List of Tables . . . . .	v
Chapter I: Forecast Environment . . . . .	1
Forecast Summary . . . . .	3
Aviation Activity . . . . .	4
FAA Workload . . . . .	5
Chapter II: Baseline Forecasts . . . . .	7
Economic Overview . . . . .	9
Forecast Assumptions . . . . .	9
General Aviation Forecasts . . . . .	12
Fleet Composition and Aircraft Shipments . . . . .	13
Hours Flown . . . . .	15
Pilot Population . . . . .	15
Forecasts . . . . .	16
Air Carrier Forecasts . . . . .	18
Fuel Prices . . . . .	19
Air Carrier Profitability . . . . .	20
Industry Composition . . . . .	22
Forecast Assumptions . . . . .	26
Forecasts . . . . .	31
Commuter Airline Forecasts . . . . .	34
Recognition and Growth . . . . .	34
Forecast Assumptions . . . . .	35
Forecasts . . . . .	35
FAA Workload Forecasts . . . . .	38
Tower Activity . . . . .	38
Center Traffic . . . . .	38
Flight Service Station Activity . . . . .	39
Forecast Assumptions . . . . .	39
Forecasts . . . . .	39
Chapter III: Year-By-Year Data For FAA Aviation Forecasts: Fiscal Years 1984-1995 . . . . .	43
Glossary of Terms . . . . .	70

# List of Figures

<u>Figure</u>	<u>Page</u>
Gross National Product . . . . .	10
Consumer Price Index and Oil and Gas Deflator. . . . .	11
U.S. General Aviation Aircraft Shipments . . . . .	13
Total Active General Aviation Piston Aircraft . . . . .	16
Total Active General Aviation Turbine Powered Aircraft . . . . .	17
Total Active General Aviation Rotorcraft . . . . .	17
U.S. Domestic Civil Aviation Fuel Prices . . . . .	19
U.S. Certificated Carriers Operating Profit (Loss) . . . . .	21
Scheduled Domestic RPM's by Carrier Groupings. . . . .	23
Scheduled Domestic Enplanements by Carrier Groupings . . . . .	24
Scheduled Domestic Departures by Carrier Groupings . . . . .	25
Average Passenger Trip Length: Domestic Operations . . . . .	27
Average Seats Per Aircraft: Domestic Operations . . . . .	28
U.S. Certificated Air Carriers Passenger Load Factor . . . . .	29
Revenue Per Passenger Mile: Domestic Operations . . . . .	30
U.S. Certificated Route Air Carrier Scheduled Passenger Traffic . . . . .	31
Commercial Jet Aircraft Orders and Deliveries U.S. Customers . . . . .	32
Total Large Jet Aircraft in U.S. Commercial Airline Service by Aircraft Type . . . . .	33
U.S. Commuter Airlines Scheduled Passenger Traffic . . . . .	36
Total Commuter Aircraft in U.S. Commuter Airline Service by Aircraft Size . . . . .	37
Aircraft Operations at Airports with FAA Traffic Control Service . . . . .	40
Instrument Operations at Airports with FAA Traffic Control Service . . . . .	41
IFR Aircraft Handled at FAA Air Route Traffic Control Centers . . . . .	42

# List of Tables

<u>Table</u>	<u>Page</u>
FAA Forecast Economic Assumptions . . . . .	3
Aviation Activity Forecasts . . . . .	4
FAA Workload Measures . . . . .	5
Growth in Avionics Equipment by Aircraft Type 1977-1981 . . . . .	14
U.S. Certificated Scheduled Air Carriers . . . . .	45
1. United States Certificated Route Air Carrier Scheduled Passenger Traffic . . . . .	46
2. Total Large Jet Aircraft in U.S. Commercial Airline Service by Aircraft Type . . . . .	47
3. Total Airborne Hours, U.S. Commercial Airline Large Jet Aircraft by Aircraft Type . . . . .	48
4. Commuter Airlines Passenger Traffic . . . . .	49
5. Total Commuter Passenger Aircraft in U.S. Commuter Airline Service by Aircraft Type . . . . .	50
6. Estimated Active General Aviation Aircraft by Type of Aircraft . . . . .	51
7. Estimated Active General Aviation Aircraft by FAA Region . . . . .	52
8. Estimated Hours Flown in General Aviation by Type of Aircraft . . . . .	53
9. Estimated Fuel Consumed by General Aviation by Type of Aircraft . . . . .	54
10. Estimated Fuel Consumed by United States Domestic Civil Aviation . . . . .	55
11. Total Itinerant and Local Aircraft Operations at Airports with FAA Traffic Control Service . . . . .	56
12. Itinerant Aircraft Operations at Airports with FAA Traffic Control Service . . . . .	57
13. Local Aircraft Operations at Airports with FAA Traffic Control Service . . . . .	58
14. Instrument Operations at Airports with FAA Traffic Control Service . . . . .	59
15. Non-IFR Instrument Operations . . . . .	60
16. IFR Aircraft Handled FAA Air Route Traffic Control Centers . . . . .	61
17. IFR Departures and Overs FAA Air Route Traffic Control Centers . . . . .	62
18. Total Flight Services, Pilot Briefs and Flight Plans Originated at FAA Flight Service Stations and Combined Station/Towers . . . . .	63
19. Aircraft Contacted FAA Flight Service Stations and Combined Station/Towers . . . . .	64

Tables (Continued)

Page

20. Active Pilots by Type of Certificate . . . . .	65
21. Active U.S. Military Aircraft in Continental United States . . . . .	66
22. Active U.S. Military Aircraft Flying Hours in Continental United States . . . . .	67
23. Economic Assumptions Used in FAA Forecasts . . . . .	68
24. Baseline Air Carrier Assumptions - Domestic Operations . . . . .	69

# **Chapter I**

## **Forecast Environment**

## CHAPTER I

### FORECAST ENVIRONMENT

By any measure, the United States National Airspace System is the busiest in the world. There are now over 300 commercial operators, serving over 550 airports, enplaning over 300 million passengers. In addition, there are over 200,000 aircraft traversing the Nation's airways. The performance characteristics of these aircraft vary widely and the trend is toward the production of more sophisticated aircraft which will intensify the use of controlled airspace and the services which FAA provides. The continuing growth projected in these forecasts poses unique challenges for the FAA in accomplishing its statutory mission, that being "service to the Nation by providing a safe and efficient aviation system which contributes to national security and the promotion of U.S. aviation."

Fiscal year 1983 may well have marked the beginning of the long awaited upturn in aviation activity. However, like the prior four years under deregulation, 1983 has also witnessed a number of changes in the overall structure of the commercial aviation community. These changes have placed new demands on the National Airspace System. They have caused both the old established carriers as well as the new users of the Nation's Airspace to reevaluate their past methods of conducting day-to-day operations. Relationships that had existed between competitive airlines, between airline management and labor, between airlines and aircraft manufacturers, and between airlines and Government are all being reassessed in light of the new demands of the marketplace.

During fiscal 1983, seven new carriers were added to the list of scheduled certificated carriers, bringing the total number of carriers certificated since deregulation to 53. Also, in 1983, the eighth largest U.S. air carrier, after failing to win major wage and productivity concessions from labor, filed Chapter 11 bankruptcy. The reorganized company abrogated its labor contracts. Another large U.S. air carrier is establishing a separate nonunion subsidiary to compete with the new low-cost carriers. These actions indicate a definite shift in management's approach to reducing labor costs. In the period immediately following the bankruptcy, another shift in relationships became evident. For the first time, carriers refused to accept tickets issued by a bankrupt carrier and several large carriers proposed withdrawing from the systemwide, multilateral interline agreement in favor of bilateral agreements with 30-day cancellation provisions so as to reduce their exposure to loss in the event of another bankruptcy. The industry's poor financial position, combined with declining fuel prices and the existence of large numbers of used aircraft, has significantly reduced the current market for new aircraft and changed the business relationship between airlines and manufacturers. To sell aircraft in a depressed market, the aircraft manufacturers have begun to enter into creative lease arrangements and accept used aircraft in trade arrangements. In its attempts to strengthen default protection and determine whether anticompetitive practices are present in large carriers' reservation systems, the Government has instituted some new economic regulations to assure consumer protection. Despite some demands for reregulation, it appears that the support for deregulation is still strong. As such, we can expect the overall structure of the commercial aviation industry to continue to change for some years to come.

The commuter airline industry has grown very rapidly since its formal recognition in 1969. With their greatly expanded route structure and the trend toward the use of larger turboprop aircraft, many commuters now resemble the local service carriers of an earlier day. It is expected that the commuters will continue to benefit from the larger air carriers' route rationalization policies, and will continue to expand the number of city pairs they serve.

The character of general aviation will continue to change. Expected growth in the demand for business flying will greatly expand the active fleet of multi-engine piston, turboprop, and turbojet aircraft. Although the total active general aviation fleet declined during the past two years, the turbine powered fleet experienced significant growth. These aircraft are usually equipped with sophisticated electronics and make extensive use of the air traffic control system. Also, business aircraft tend to use those airports where aviation facilities and groundside services are most extensive.

#### Forecast Summary

The forecasts presented herein are based on improved models of general aviation and air carrier activities and on forecasts of economic variables as contained in the table below.

FAA FORECAST ECONOMIC ASSUMPTIONS  
(Fiscal Years)

Economic Variables	Historical			Forecast			Percent Average Annual Growth				
	1979	1982	1983	1984	1985	1995	79/82	82/83	83/84	84/85	83/95
Gross National Produce (Billions 1972\$)	1,476.7	1,491.9	1,512.3	1,598.3	1,665.7	2,298.6	0.4	1.4	5.7	4.2	3.5
Consumer Price Index (1967=100)	211.1	285.5	295.3	307.1	320.9	526.3	10.6	3.4	4.0	4.5	4.9
Oil & Gas Deflator (1972=100)	220.4	362.2	347.7	355.6	357.5	630.3	18.0	(4.0)	2.3	0.5	5.1

Source: 1984-89 Executive Office of the President, Office of Management and Budget

1990-95 Consensus growth rates of Chase Econometrics, Data Resources, Inc., Evans Economics, Inc., and Wharton Econometric Forecasting Associates.

Reflecting the strong recovery of the U.S. economy, aviation activity in 1984 is expected to continue the upturn begun during fiscal 1983. Overall, the long-term outlook for aviation is for relatively strong growth throughout the forecast period. This growth is consistent with forecasted long-term economic growth. In any given year there may be some perturbation from the long-term growth trend because none of the economic models are sufficiently precise to predict such turning points.

## Aviation Activity

Domestic air carrier revenue passenger miles are forecast to increase at an annual growth rate of 5 percent during the 1984-1995 time period. Domestic enplanements are forecast to increase by 4.6 percent annually during the same time period, a rate somewhat slower than passenger mile growth due to longer passenger trip lengths. Air carrier aircraft operations are forecast to increase at a more modest 1.7 percent over the forecast period. The high growth in revenue passenger miles and enplanements relative to operations reflects the baseline air carrier assumptions of higher load factors, larger seating capacity for air carrier aircraft, and longer passenger trip lengths.

In 1984, the commuter carriers are expected to enplane 21.5 million passengers, 6.4 percent of all fare paying passengers in scheduled domestic air service. By 1995, these carriers are expected to carry 46.1 million passengers and account for 8.5 percent of all domestic passenger enplanements. Commuter carriers are expected to continue the shift to small jet aircraft and larger propeller driven aircraft.

AVIATION ACTIVITY FORECASTS  
(Fiscal Years)

Aviation Activity	Historical			Forecast			Percent Average Annual Growth					
	1979	1982	1983	1984	1985	1995	79/82	82/83	83/84	84/85	83/95	
<b>Air Carrier, Domestic</b>												
Rev. Pass. Enps. (millions)	283.4	272.8	290.3	312.7	330.0	497.8	(1.2)	6.4	7.7	5.5	4.6	
Rev. Pass. Miles (billions)	203.7	207.8	223.5	240.8	255.1	399.7	0.7	7.6	7.7	5.9	5.0	
<b>Commuter Carriers</b>												
Rev. Pass. Enps. (millions)	12.5	17.1	19.5	21.5	23.4	46.1	11.0	14.0	8.8	9.0	7.4	
Rev. Pass. Miles (billions)	1.5	2.3	2.7	3.1	3.4	7.9	15.8	16.2	12.8	10.6	9.3	
<b>Fleet</b>												
Air Carrier	2,237	2,483	2,556	2,657	2,633	3,329	3.6	2.9	4.0	(0.9)	2.2	
Commuter	1,413	1,494	1,500	1,606	1,682	2,537	1.9	0.4	7.1	4.7	4.5	
General Aviation (thousands)	198.8	213.2	209.8	207.0	211.0	287.0	2.4	(1.6)	(1.3)	1.9	2.6	
<b>Hours Flown (millions)</b>												
Air Carrier	6.4	6.3	6.6	6.8	6.8	8.5	(0.5)	5.1	2.4	0.7	2.1	
General Aviation	42.3	37.8	36.6	37.6	39.1	58.4	(3.4)	(3.2)	2.7	4.0	4.0	

Source: 1979-83 CAB, FAA DATA  
1984-95 FAA Forecasts

Nationally, commuter and air taxi aircraft operations are expected to almost double their 1983 volume of 5.9 million operations by 1995. The larger air carriers are expected to continue their route rationalization, although at a slower pace than during the past five years. Commuter airlines will continue to move into those markets abandoned by these carriers, performing more operations with smaller aircraft than those flown previously by the larger air carriers. In addition, the commuters are expected to continue their development of new markets in those smaller communities which show potential for supporting regularly scheduled service.

Increased business use of general aviation continues to be reflected in the changing character of the fleet. The more expensive and sophisticated turbine powered part of the fixed-wing fleet is expected to almost double between 1983 and 1995. The total fleet, 78.3 percent single engine piston aircraft in 1983, will grow by only 32 percent. Fixed-wing turbine powered aircraft accounted for 4.4 percent of the fleet in 1983. By 1995, the percentage will increase to 6.3 percent.

#### FAA Workload

Aviation activity at FAA facilities reversed three consecutive years of decline in 1983. The demand for FAA operational services is anticipated to increase over the forecast period as a result of continued strong growth in aviation activity. Total aircraft operations at FAA towered airports are forecast to increase to 95.6 million in 1995, a 5 percent annual growth rate over the 53.3 million operations achieved in 1983.

FAA WORKLOAD MEASURES  
(Millions)

FAA Workload Measures	Historical			Forecast			Percent Average Annual Growth					
	1979	1982	1983	1984	1985	1995	79/82	82/83	83/84	84/85	83/95	
<b>Aircraft Operations</b>												
Air Carrier	10.4	9.0	9.7	10.1	10.2	11.9	(4.3)	6.9	4.1	1.0	1.7	
Air Taxi and Commuter	4.4	5.1	5.9	6.1	6.5	10.2	5.0	14.9	3.4	6.6	4.7	
General Aviation	51.7	34.2	35.3	38.5	42.4	71.0	(10.2)	3.4	9.1	10.1	6.0	
Military	2.5	2.3	2.5	2.5	2.5	2.5	(2.6)	4.9	-	-	-	
Total	69.0	50.6	53.3	57.2	61.6	95.6	(8.2)	5.3	7.3	7.7	5.0	
<b>Instrument Operations</b>												
Air Carrier	10.7	9.5	10.1	10.6	10.7	12.5	(3.6)	6.4	5.0	0.9	1.8	
Air Taxi and Commuter	3.7	4.6	5.3	5.5	6.0	9.9	7.5	15.4	3.8	9.1	5.3	
General Aviation	17.9	13.9	14.8	16.7	18.9	26.1	(7.0)	6.1	12.8	13.2	4.8	
Military	3.9	3.6	3.8	3.8	3.8	3.8	(2.5)	5.8	-	-	-	
Total	36.2	31.6	34.0	36.6	39.4	52.3	(4.1)	7.5	7.6	7.7	3.7	
<b>IFR Aircraft Handled</b>												
Air Carrier	14.0	12.7	13.3	13.8	14.1	16.6	(3.0)	4.6	3.8	2.2	1.9	
Air Taxi and Commuter	2.3	3.3	3.7	4.2	4.4	7.8	12.8	11.3	13.5	4.8	6.4	
General Aviation	8.8	7.5	7.8	8.6	9.0	13.6	(4.7)	3.7	10.3	4.7	4.7	
Military	4.8	4.3	4.6	4.6	4.6	4.6	(3.4)	6.2	-	-	-	
Total	29.9	27.8	29.4	31.2	32.1	42.6	(2.3)	5.4	6.1	2.9	3.1	
<b>Flight Services</b>												
Pilot Briefs	18.7	17.8	16.0	17.1	18.2	27.0	(1.6)	(10.1)	6.9	6.4	4.5	
Flight Plans Originated	9.5	8.5	8.1	8.8	9.3	13.4	(3.4)	(4.7)	8.6	5.7	4.3	
Aircraft Contacted	10.2	9.7	8.6	8.9	9.2	10.0	(1.6)	(11.4)	3.5	3.4	1.3	
Total	66.6	62.4	56.9	60.7	64.2	90.8	(2.1)	(8.8)	6.7	5.8	4.0	

Source: FY 1979-83 FAA Data  
FY 1984-95 FAA Forecasts

The increased use of avionics by commuter airlines and general aviation will contribute most of the growth in instrument operations at FAA towered airports. Instrument operations are expected to increase from 34 million operations in 1983 to 52.3 million in 1995, a 3.7 percent annual growth rate.

The workload at the Air Route Traffic Control Centers is forecast to increase at a 3.1 percent average annual rate between 1983 and 1995. The increased demand will come primarily from commuter airlines and general aviation. Commuter aircraft handled at the Centers are projected to more than double over the next 12 years.

In summary, aviation activity is expected to continue the upturn begun in fiscal 1983 and is expected to grow at a faster rate than the general economy. Aviation will continue to dominate all other transportation modes in the commercial intercity passenger market. Commuter airline operations and business use of general aviation are expected to experience greater growth than the larger established airlines and personal use of general aviation.

# **Chapter II**

## **Baseline Forecasts**

CHAPTER II  
BASELINE FORECASTS

With the economic recovery in full upswing, the commercial aviation industry is registering significant gains in traffic and profits. Although general aviation remains sluggish, as measured by new aircraft deliveries, we expect to see significant increases in activity in this segment of the industry soon. Based on projections of continuing strength in the United States economy, the FAA forecasts a strong and robust expansion in aviation.

The official forecasts of aviation activity and FAA workload for the years 1984 to 1995 are discussed in subsequent pages. The baseline forecasts are presented in tabular form in Chapter IV.

## ECONOMIC OVERVIEW

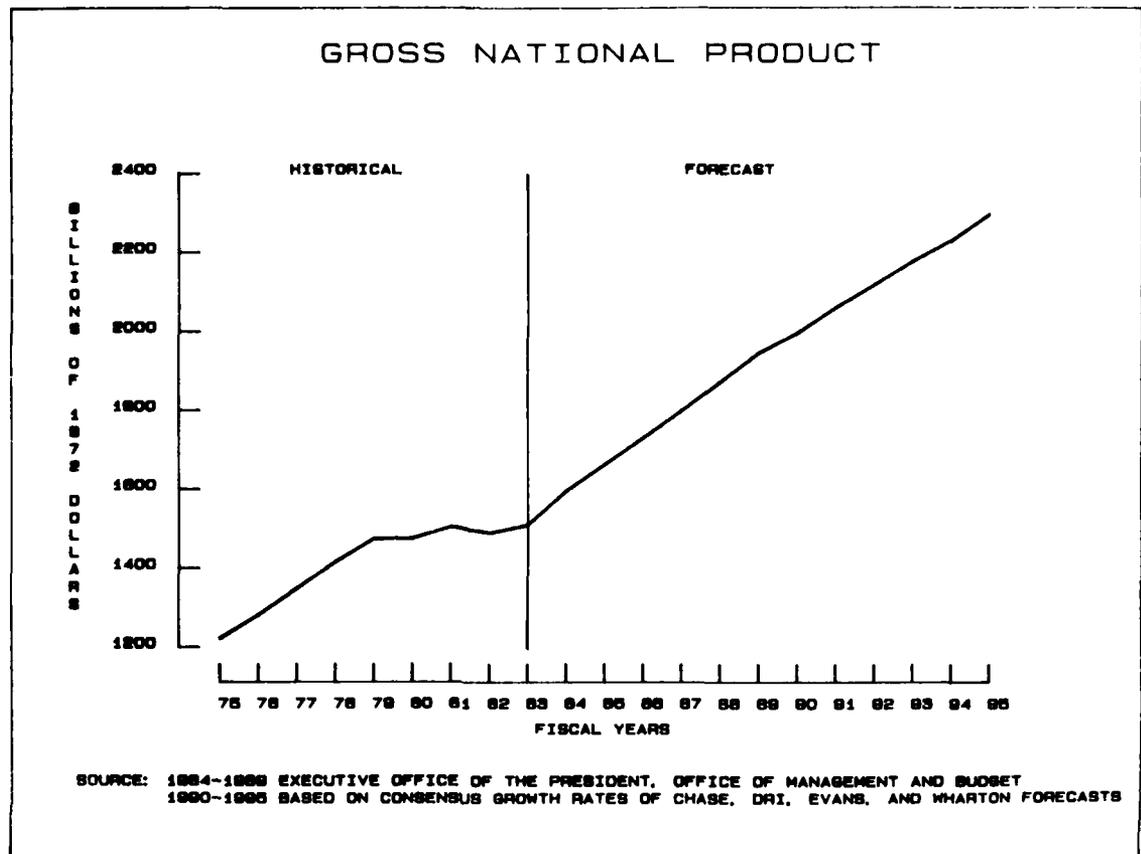
After three years of little or no growth in economic activity, it appears that the long awaited economic upturn finally materialized in fiscal 1983 with Gross National Product, adjusted for inflation, growing by 1.4 percent. After a slow start that showed the economy declining by 1.3 percent in the first quarter, the economy began to pick up steam, expanding by 2.6 percent, 9.7 percent and 7.7 percent over the remaining three quarters of fiscal 1983. Inflation, as measured by the Consumer Price Index, slowed measurably in fiscal 1983, increasing by only 3.4 percent. The rate of inflation was helped considerably by the fact that U.S. oil prices, as measured by the Oil and Gas Deflator, declined by 4 percent in fiscal 1983.

Economic recovery is forecast to be in full upswing in 1984. Inflation is expected to remain in the moderate range as fuel prices increase only slightly. Low fuel prices, moderate inflationary pressures, and a robust economy in 1984 are expected to result in a continuation of the upturn in aviation activity begun in 1983.

### Forecast Assumptions

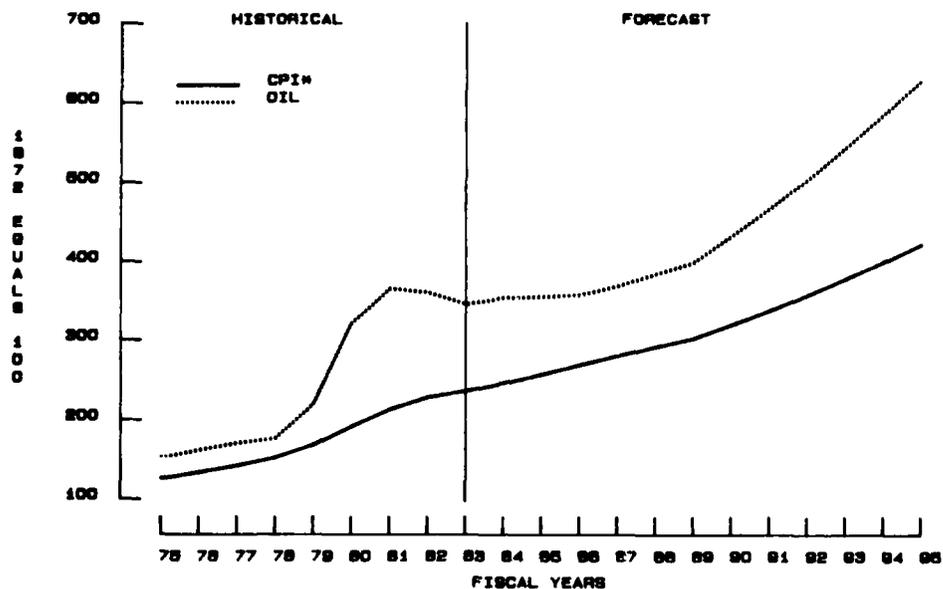
The economic scenario utilized in developing the FAA Baseline Aviation Forecasts for the period 1984-89, was provided by the Executive Office of the President, Office of Management and Budget. For the period 1990-95, the economic scenario utilized consensus growth rates of the economic variables prepared by Chase Econometrics, Data Resources, Inc., Evans Economics, Inc., and Wharton Econometric Forecasting Associates. The data are presented in tabular form in Chapter III. The principal series used in preparing the forecasts are presented here. Specific assumptions used in the individual models are discussed in the following pages.

Gross National Product is forecast to grow in real terms, i.e., adjusted for inflation, at an average annual rate of 3.5 percent throughout the forecast period, slightly above the average growth rate of 3.3 percent exhibited during the 1975-1981 period. It is expected that the economy will be in full upswing by 1984, growing by 5.7 and 4.2 percent during fiscal years 1984 and 1985, respectively.



Consumer prices are expected to remain in the moderate range, increasing by an average annual rate of 4.9 percent over the forecast period. Inflation is forecast to increase by only 4 percent in fiscal 1984 and 4.5 percent in fiscal 1985. Fuel prices are expected to resume their upward trend in fiscal 1984, although the increases will be moderate over the next several years. Fuel prices are forecast to increase 2.3 percent in fiscal 1984, 0.5 percent in fiscal 1985, and 0.6 percent in fiscal 1986. Over the entire forecast period, fuel prices are expected to increase at an annual rate of 5.1 percent, only slightly faster than inflation.

## CONSUMER PRICE INDEX AND OIL AND GAS DEFLATOR



SOURCE: 1984-1988 EXECUTIVE OFFICE OF THE PRESIDENT, OFFICE OF MANAGEMENT AND BUDGET  
 1980-1988 BASED ON CONSENSUS GROWTH RATES OF CHASE, DRI, EVANS, AND WHARTON FORECASTS  
 \* CPI INDEXED TO 1972 FOR PLOTTING PURPOSES

## GENERAL AVIATION FORECASTS

Trends in the overall economy are creating major changes within general aviation. Over the past several years, general aviation has become increasingly important as a means of transportation for business use. Events which have contributed to this are changes in tax legislation, business dispersion and centralized management, changing air carrier route structures, and lower costs relative to competing modes. The aircraft purchased by businesses tend to be the larger more sophisticated types which are intensive users of the air traffic control system. The ultralight industry also represents an area of aviation where a considerable amount of expansion and change has taken place.

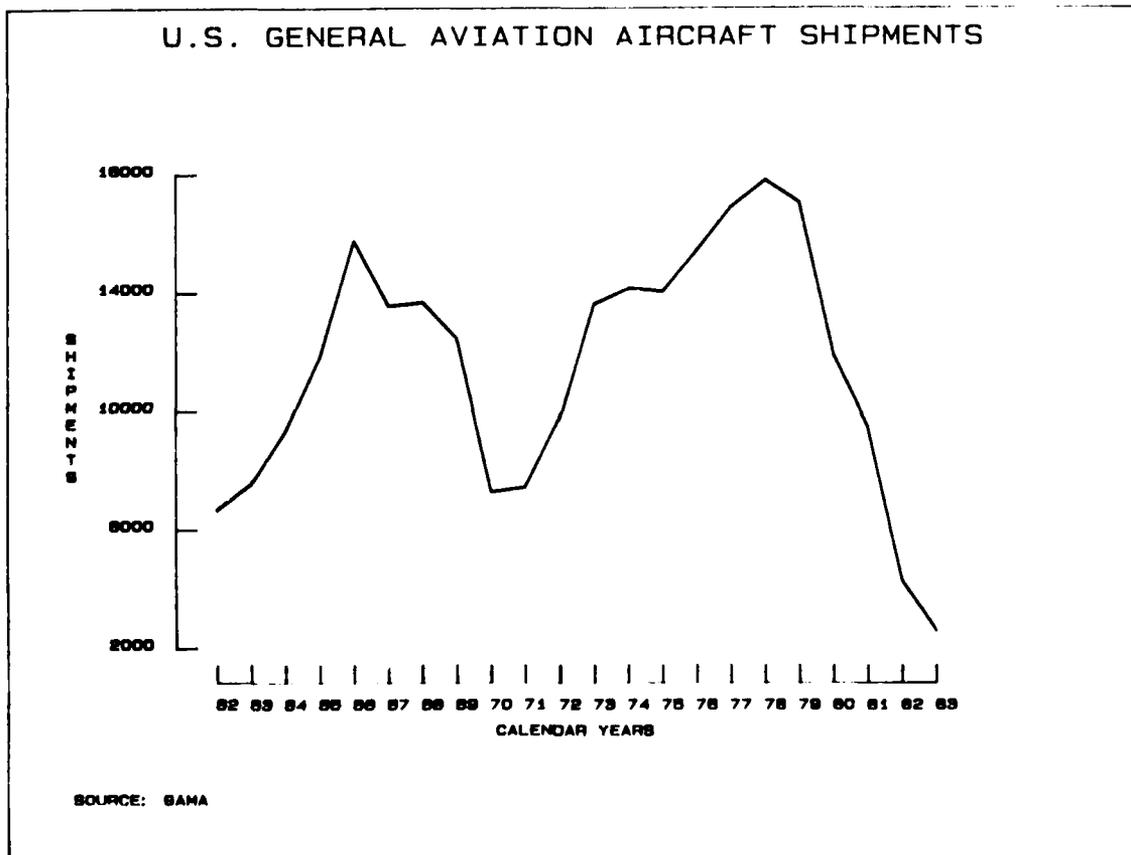
During the past 5 years the growth in the number of ultralight vehicles produced and the number of manufacturers has been dramatic. There are approximately 25,000 to 30,000 ultralights now in use in this country, and 60 manufacturers. Manufacturers' deliveries have averaged 8,500 units per year, and short- and long-term projections indicate that these production rates will be sustained through the decade. At these levels, the size of the ultralight fleet could expand to approximately 100,000 by the end of the 1980's.

The significant growth in the sale of ultralights and the subsequent decline in the demand for single-engine aircraft during the past few years may indicate that there has been a structural shift in the market for recreational flying. The average price of an ultralight is between \$4,500 and \$6,500, and its hourly operating cost is approximately \$4. Clearly, this compares very favorably with an average price of \$60,000 for a single-engine piston aircraft that has an operating cost between \$30 and \$60 an hour. A recent survey of ultralight owners implies that the two products are competing in similar socio-economic markets and may have high cross-elasticities of demand. Ultralight owners tend to be older than 35, married, professional or skilled tradesmen, and have average family incomes greater than \$35,000 a year. Another interesting statistic gleaned from the survey is that approximately 50 percent of all ultralight owners are licensed pilots. This fact reinforces the notion that ultralights could be negatively impacting the market for production aircraft. However, individuals interested in flying can now get involved at relatively low costs. Eventually, many ultralight pilots may wish to expand their capabilities and move up to larger more versatile aircraft.

## Fleet Composition and Aircraft Shipments

As of January 1, 1983, the general aviation fleet consisted of 209,779 aircraft, representing an annual growth rate of 1.4 percent during the 1979 to 1983 period. During this same period, single-engine piston aircraft increased at a yearly rate of 0.5 percent, turbine powered fixed wing aircraft grew at a 13.2 percent rate, and rotorcraft increased at a 3.6 percent rate. The total fleet declined 1.6 percent in 1983. However, the turbine powered fleet experienced significant growth, increasing 16.5 percent. While, in the short-term, the growth of the fleet will be less than what has been experienced during the 1970's, the long-term trend suggests a sustained growth close to historical levels.

Shipments of general aviation aircraft (excluding helicopters, balloons, dirigibles, and gliders) declined approximately 38 percent in 1983. Both single-engine and multi-engine piston aircraft deliveries fell 36 percent. Shipments of turboprop and turbojet aircraft declined 34 percent and 48 percent, respectively. Latest industry estimates indicate that 1984 production levels will show modest increases above 1983.



The deliveries of general aviation aircraft (excluding helicopters, balloons, dirigibles, and gliders) are characterized by cycles with relatively large variability. For the period 1962 through 1983 two distinct cycles, approximately 10 years in duration, are evident. In 1962, production was at 6,697 units, climbed to a peak of 13,577 in 1967, and then fell to a low of 7,292 in 1970. The cycle during the 1970's reached a peak of 17,811 units in 1978, and then declined to approximately 2,600 in 1983. A comparison of the yearly growth rate of deliveries with that of Gross National Product, adjusted for inflation, indicates that the two rates are highly correlated. Assuming this pattern will continue in the future, sustained growth in the economy should have a significant, positive impact on the demand for general aviation aircraft.

Industry sources indicate that approximately 90 percent of the sales of general aviation jet aircraft are intended for business use. Approximately 80 to 85 percent of the turboprop aircraft and about 60 to 70 percent of the multi-engine piston aircraft are purchased for business use. Less than 30 percent of the single-engine piston aircraft are sold for business purposes. However, the percentage of single-engine piston aircraft sales intended for business use has increased from about 10 percent in 1969 to approximately 25 percent in 1978, while the percentage of single-engine aircraft purchased for personal use has declined from 42 percent to 34 percent, and instructional use from 27 percent to 17 percent during this period.

GROWTH IN AVIONICS EQUIPMENT BY AIRCRAFT TYPE  
1977-1981

Aircraft Type	Fleet Population Growth Rate %	Avionics Equipment Growth Rates			
		Communications %	Transponders %	ILS %	Navigation %
Piston	19	19	46	31	21
Rotocraft	39	33	42	118	76
Turboprop*	64	59	58	61	46
Turbojet	48	43	44	45	45

Source: General Aviation Activity and Avionics Survey, FAA.

\*The differences in the growth rates between the turboprop fleet and turboprop aircraft equipped with avionics are due to sampling errors.

An indication of the growth in the demand for air traffic control and navigation services by general aviation is the significant growth in the number of aircraft equipped with sophisticated avionics. This trend is most pronounced for piston aircraft and rotorcraft. For example, for the period 1977 through 1981, the piston fleet population grew 19 percent, while the number of aircraft equipped with transponders grew 46 percent, and the number equipped with Instrument Landing Systems (ILS) grew 31 percent. Turbojet and turboprop aircraft typically are equipped to make full use of navigation and air traffic control services. The table above shows the growth rates for 4 types of avionics equipment and the fleet by aircraft type for the period 1977 through 1981.

#### Hours Flown

Total general aviation hours flown in fiscal 1982 was 37.8 million hours, down 7.8 percent from fiscal 1981. Single-engine piston aircraft accounted for 67 percent of all hours flown, multi-engine aircraft for 16 percent, turbine powered aircraft for 10 percent, and rotorcraft for 7 percent. The single-engine piston aircraft hours flown declined 9.7 percent in 1982, while turbine powered aircraft hours remained constant at 1981 levels, and rotorcraft hours decreased 7.4 percent. During the period 1979 through 1982, single-engine piston aircraft hours flown declined at a yearly rate of 5.3 percent, turbine powered aircraft hours grew at a 7 percent rate, rotorcraft hours flown remained relatively stable, and total hours flown declined at a yearly rate of 4 percent.

In calendar 1982, personal and instructional use accounted for 36 percent of all hours flown, and business and executive use for 32 percent. In 1970 personal and instructional use accounted for over 50 percent of all hours flown, and business and executive for only 28 percent. Between 1970 and 1982 the use of general aviation for business grew at a 6 percent rate and personal use grew at a yearly rate of 4 percent, while personal and instructional use declined at a rate of approximately 1 percent a year.

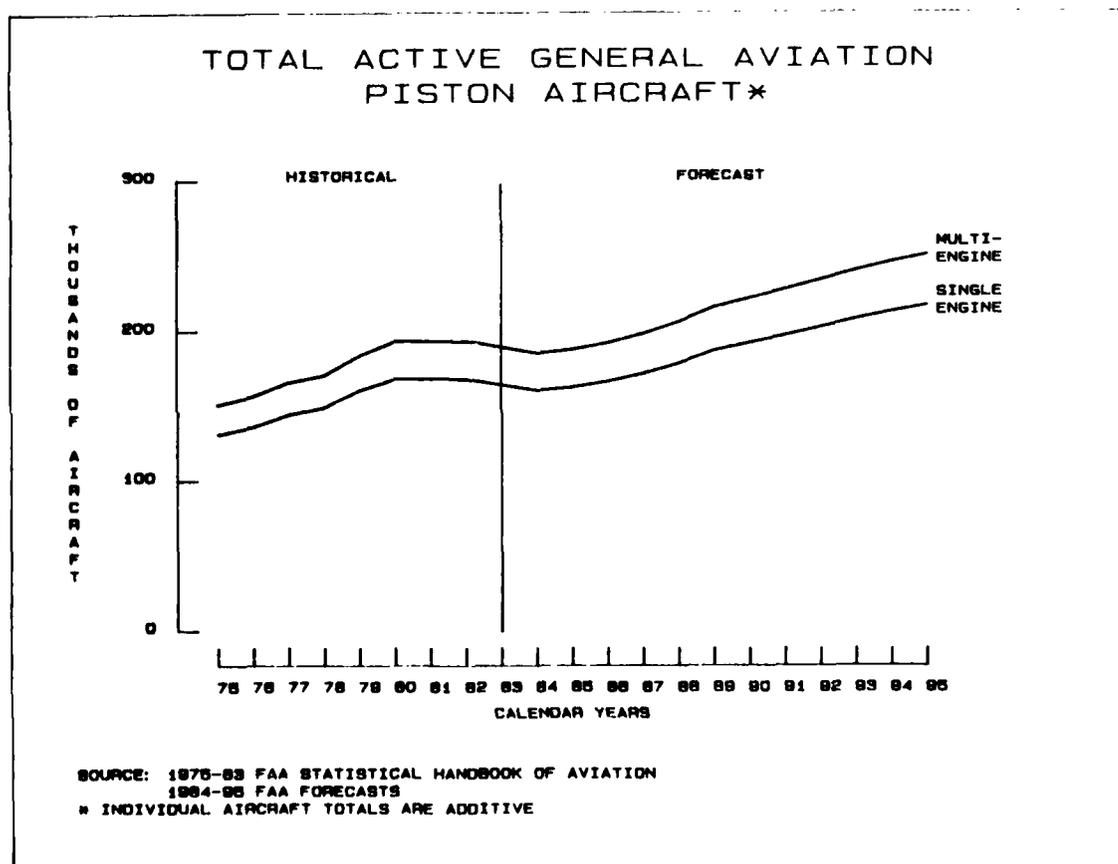
#### Pilot Population

Recent trends within the general aviation pilot population provide further evidence of this sector's changing characteristics. As of January 1, 1983, 44 percent of the licensed pilots possessed an instrument rating, compared to 32 percent in 1970. While the total pilot population declined 4 percent in 1983, the number of instrument rated pilots grew 1 percent. Also, during the period 1979 through 1983 the total pilot population declined at an annual rate of 2 percent, while the number of instrument rated pilots increased at the same rate.

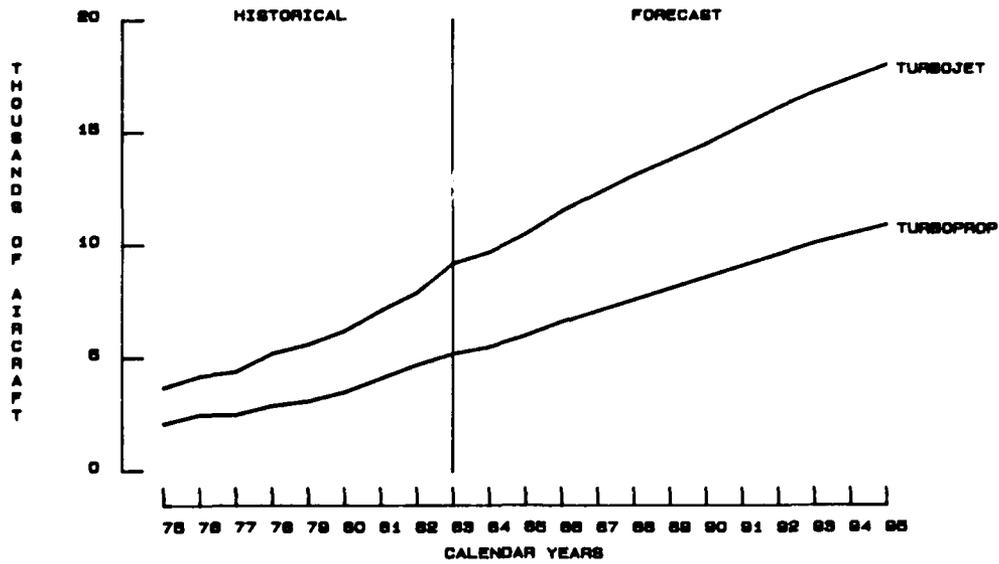
## Forecasts

Growth over the entire forecast period for general aviation hours flown is expected to average 4 percent per year, resulting in an estimated 58.4 million hours flown in 1995. For the same period, turbine powered aircraft hours flown is forecast to grow 5 percent per year, and turbine rotorcraft hours flown 6 percent.

The industry will experience a continuation of slow growth in the general aviation fleet in the 1984-1986 time period. There will be variations in the number of aircraft added to the fleet each year due in part to changes in economic conditions. However, the net addition to the fleet will average about 7,300 aircraft per year between 1984 and 1995. Active single-engine and multi-engine piston aircraft are forecast to grow approximately 2.4 percent per year. The number of turbine powered aircraft is projected to increase from 9,200 in 1983 to 18,000 in 1995, growing at the rate of 5.8 percent a year. The turbine rotorcraft fleet is also expected to show significant growth, increasing at the yearly rate of 7 percent. These new sophisticated aircraft are expected to make extensive use of FAA provided services.

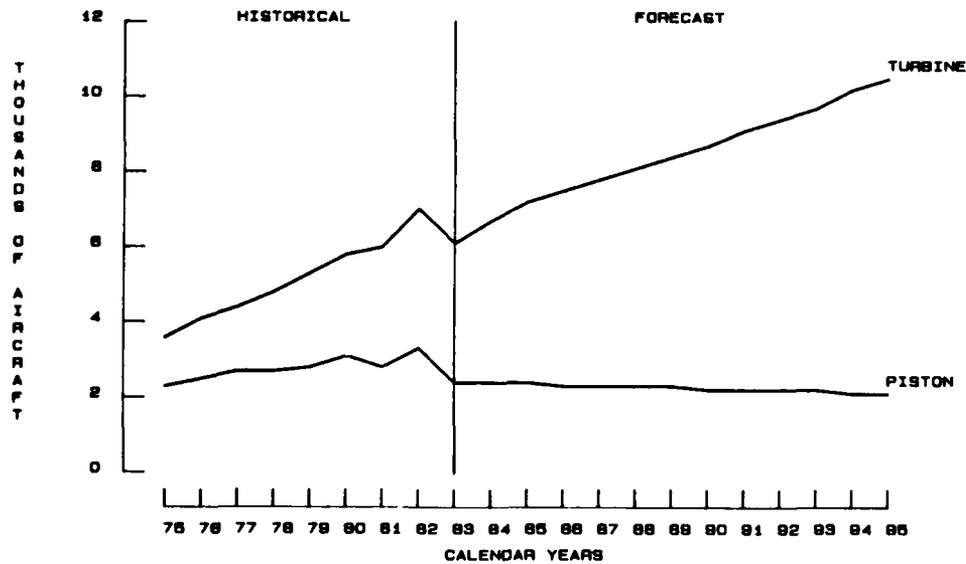


### TOTAL ACTIVE GENERAL AVIATION TURBINE POWERED AIRCRAFT\*



SOURCE: 1975-83 FAA STATISTICAL HANDBOOK OF AVIATION  
1984-85 FAA FORECASTS  
\* INDIVIDUAL AIRCRAFT TOTALS ARE ADDITIVE

### TOTAL ACTIVE GENERAL AVIATION ROTORCRAFT\*



SOURCE: 1975-83 FAA STATISTICAL HANDBOOK OF AVIATION  
1984-85 FAA FORECASTS  
\* INDIVIDUAL AIRCRAFT TOTALS ARE ADDITIVE

## AIR CARRIER FORECASTS

Fiscal year 1983 is a year that will be remembered with mixed emotions by most U.S. air carriers. First, on the positive side, the restrictions placed on air carrier flow into high density airports as a result of the air traffic controllers job action have been eliminated in all but four airports. The long awaited economic recovery finally materialized after three years of considerable softness. Jet fuel prices declined for a second consecutive year, allowing the air carriers to realize substantial savings on the expense side of the financial ledger. Lower fuel prices and the prospects for continued price stability have, at least for the short-term, postponed the need to replace current fleets with the newer, more fuel efficient and expensive aircraft. The U.S. traveling public, lured by lower fares domestically and a strong U.S. dollar internationally, has shown a willingness to spend its discretionary earnings on air travel. The result was significant gains in both domestic and international traffic. However, these traffic gains did not come cheaply.

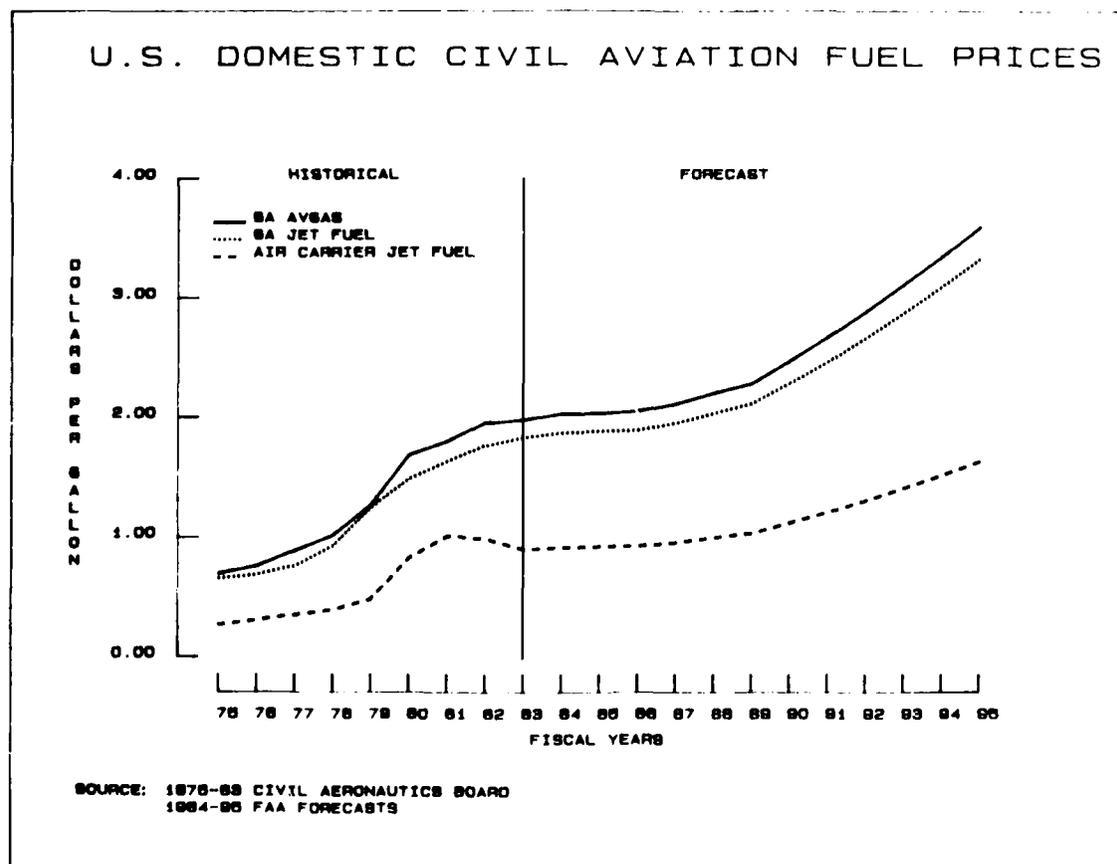
Competitive fare wars during the first half of fiscal 1983 significantly reduced passenger yields and revenues for a second consecutive year such that, despite a highly profitable summer quarter, U.S. air carriers incurred substantial operating losses for the second consecutive year and the third of the last four years. These recurrent losses, combined with intense competition from new low-cost, low-fare carriers, have placed a premium on cost cutting programs within the industry. The most obvious controllable expense is labor. How well an air carrier is able to control or reduce its labor costs, be it through negotiation or confrontation, could very well determine whether the carrier is able to stay in business.

Some of the actions taken, or considered, by financially troubled carriers during 1983 include the following. (1) Continental Airlines filed for bankruptcy on September 24, 1983, reorganizing three days later with 78 percent fewer departures, 65 percent fewer employees and wage scales 50 percent below those in effect prior to bankruptcy. (2) Several other carriers, most notably Eastern Airlines, threatened its employees with actions similar to Continental's unless they accepted various wage and productivity concessions. Eastern later withdrew its threat. (3) Frontier Holdings, Inc., parent company of Frontier Airlines, has established a second Denver-based airline, Frontier Horizon, to serve high-density markets with nonunion personnel beginning January 9, 1984. (4) New York Air and Midway Airlines, two of the original low-cost, low-fare airlines, have upgraded their service and revised their marketing philosophy to attract the frequent business flyer. Yields for these two carriers are now considerably higher than the industry average. (5) Hawaii Express, one of two low-cost carriers who began flying between Los Angeles and Hawaii in 1982, suspended operations and filed for protection under Chapter 11 of the federal bankruptcy laws on December 20, 1983.

Many of these actions have the potential of altering the current structure of the airline industry. To the extent that these actions prove successful, we can expect a certain amount of duplication by other carriers. Whatever the case, the only thing certain about the structure of the airline industry is that it is certain to change. For better or worse, the dynamic transition that has taken place within the industry since deregulation can be expected to continue for some time into the future.

### Fuel Prices

During the 1978-81 time period, the air carrier industry was subjected to a 153 percent increase in the price of jet fuel, rising to a peak price of \$1.052 domestic and \$1.168 international in May 1981. However, an oversupply of fuel, caused in part by depressed world economies and in part by successful conservation efforts by world air carriers, has substantially lessened the demand for jet fuel, the result being lower jet fuel prices. As of October 1983, domestic fuel prices had declined 18.2 percent from the May 1981 peak to 86.1 cents per gallon. International fuel prices declined 20 percent to 93.4 cents per gallon.



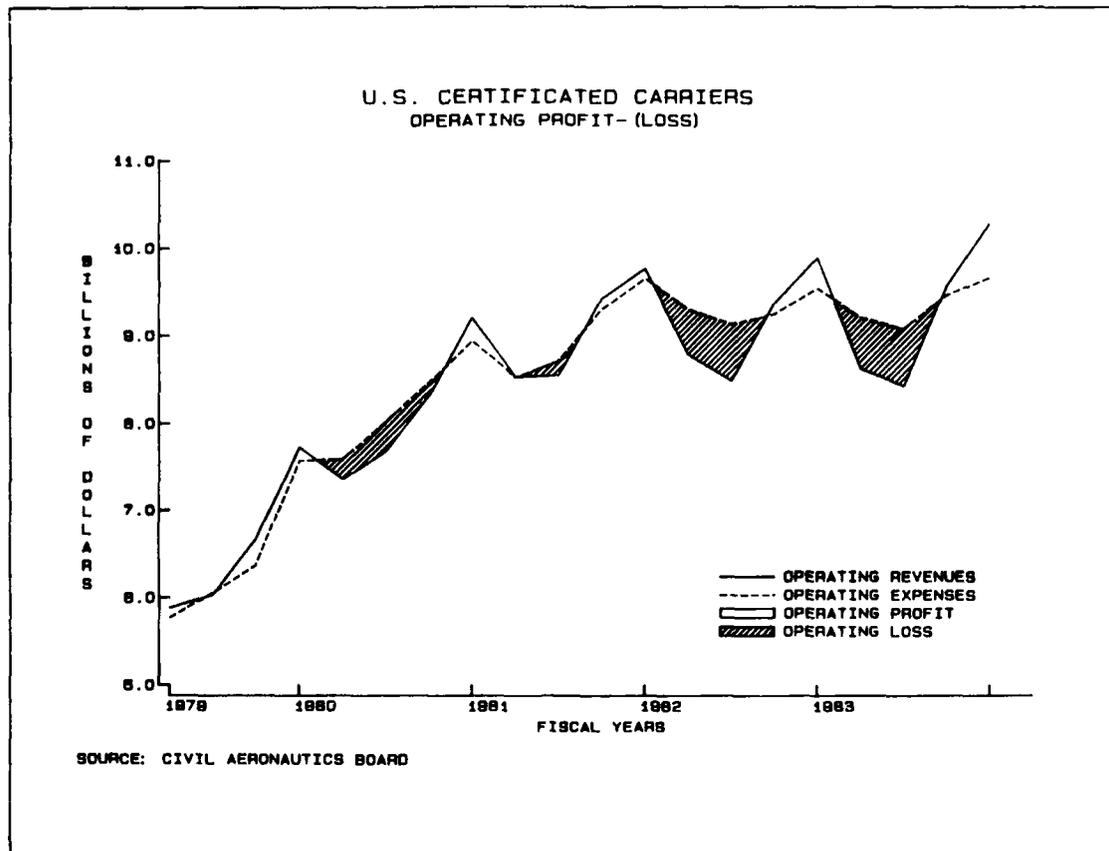
In 1978, fuel costs accounted for 19.8 percent of total domestic operating costs and 19.6 percent of total international operating costs. By 1981, fuel costs had increased to 29.7 percent of domestic operating costs and 32.3 percent of international operating costs. In 1983, after two consecutive years of declining jet fuel prices, domestic fuel costs had been reduced to just 25.2 percent of operating costs. International fuel costs declined to 28.7 percent of operating costs during the same time period.

Jet fuel prices are projected to resume their upward trend in 1984, although the increases are expected to be moderate over the next several years. Domestic jet fuel prices are not forecast to exceed \$1.00 a gallon until 1988. Over the entire forecast period, domestic jet fuel prices are expected to increase at an average rate of 5.1 percent annually, to \$1.64 per gallon in 1995.

#### Air Carrier Profitability

Since deregulation, the air carriers have introduced a wide variety of discount fares and frequent flyer promotions to promote new services and to respond to the new low-cost competition entering established markets. Unfortunately, fare competition developed into outright fare wars in many markets during the past two years, with disastrous financial results. Although operating revenues have increased substantially since 1978, operating costs have increased even more rapidly due to higher fuel and labor costs, the costs of introducing new services' and general inflation. Although the carriers have petitioned for and been awarded numerous increases in the basic fare level, discounts have wiped out much of the expected gain in revenues. Compounding these problems, the Nation's economy has shown very little 'real' growth since 1979.

In fiscal years 1978-79, the first two years under deregulation, U.S. certificated air carriers earned operating profits of just under \$2 billion. However, since 1979, commercial air carriers have incurred operating losses in three of the four years, with cumulative operating losses totaling over \$1.5 billion for the four year period. A 114 percent increase in jet fuel prices was the major contributing factor to the poor financial showing during the 1980-81 time period. A revenue gain of almost 38 percent during this two-year period was not enough to offset a 40 percent increase in operating expenses, the net result being a \$460 million loss in fiscal 1980 and an operating profit of only \$89 million in fiscal 1981.



To stimulate traffic demand in the face of the absolute decline in economic activity that occurred during fiscal 1982 and the first quarter of fiscal 1983, the carriers responded with deep fare cuts on many of their heavily traveled routes. Although the discount fares did generate traffic increases of almost 13 percent during the 1982-83 time period, they also led to a general deterioration in yield. During this two-year period, gains achieved from wage and productivity concessions and lower fuel prices helped limit operating expense increases to only 2.4 percent. Unfortunately, the uneconomic yields wiped out all these gains as revenues increased by only 1.8 percent, the net result being operating losses of \$678 million in fiscal 1982 and over \$500 million in fiscal 1983. While the overall financial results for fiscal 1983 were discouraging, the commercial air carriers did end the year on an encouraging note, posting profits of over \$600 million during the last two quarters of the year. Assuming that the air carriers can continue to tighten the restrictions on their discount fares and resist the temptation to sell a seat at any price during periods of weak traffic demand, the commercial aviation industry can be expected to once again return to profitability.

## Industry Composition

The composition of the domestic air carrier industry has changed markedly in the five years since deregulation. The former trunks, in an effort to develop more profitable and efficient route systems, have rationalized their route systems by eliminating or reducing service on many of their marginally profitable medium- and short-haul, low-density routes. At the same time, these carriers have attempted to develop and strengthen hubs and connection complexes at those airports exhibiting high growth potential for their particular route systems. The former local service carriers have followed a similar pattern but generally at smaller hubs and on lower density and shorter distance markets. Former intrastate carriers have expanded their route systems to include new inter-state and international markets, mostly in direct competition with the established trunk and local service carriers. Similarly, an increasing number of newly established low-cost carriers have begun point-to-point service in a number of high density markets, also in direct competition with established carriers. In addition, some 30 former commuter carriers were awarded certificated route air carrier status by the CAB. However, 18 of these carriers have been allowed to return to commuter air carrier status for the purpose of filing financial and traffic reports.

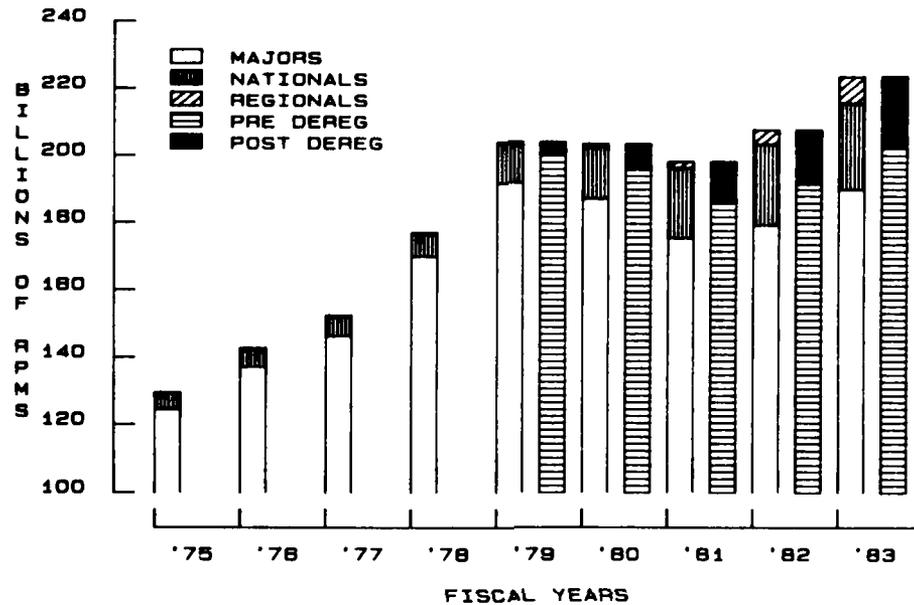
The net effect of these changes can readily be seen in the distribution of revenue passenger miles, revenue enplanements, departures, trip length and aircraft size for the three carrier groupings: Majors, Nationals and Regionals.\* The Majors (former Trunks plus Republic and U.S. Air) still dominate the U.S. scheduled domestic air carrier industry, but their proportion of passenger miles, passenger enplanements, and departures has declined significantly. In 1978, the Majors accounted for 96.0 percent of all scheduled domestic revenue passenger miles. Five years later, their share of passenger miles had declined to 84.9 percent. During this same time period, the Nationals increased their share of passenger miles from 3.9 percent to 11.6 percent while the Regionals increased their share from less than 0.1 percent to 3.5 percent. Viewing this distribution in a slightly different manner, we note that those carriers certificated since deregulation have made their presence felt in the domestic carrier industry, accounting for almost 10 percent of all scheduled domestic passenger miles in 1983.

In the five years since deregulation, the Majors' revenue passenger miles have increased by 11.6 percent, the Nationals' by 275 percent and the Regionals' by 7800 percent. Passenger mile growth in 1983 was 5.9 percent for the Majors, 7.0 percent for the Nationals and 92.7 percent for the Regionals. Passenger miles for those carriers certificated prior to deregulation has increased by 14.2 percent since 1978, 5.6 percent in 1983. The post-deregulation carriers' passenger miles has increased by 532.4 percent since 1979, 33.5 percent in 1983.

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\*A list of the carriers included in each grouping can be found on page 45.

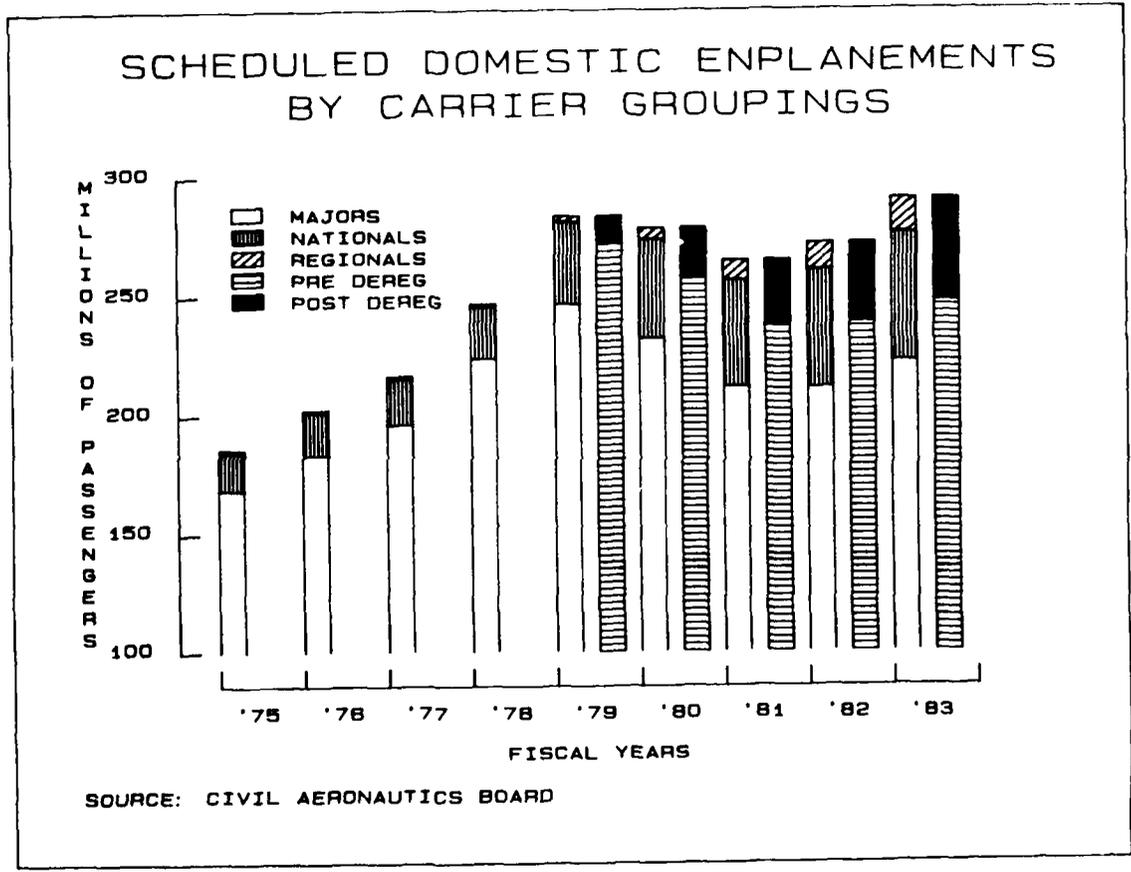
## SCHEDULED DOMESTIC RPM'S BY CARRIER GROUPINGS



SOURCE: CIVIL AERONAUTICS BOARD

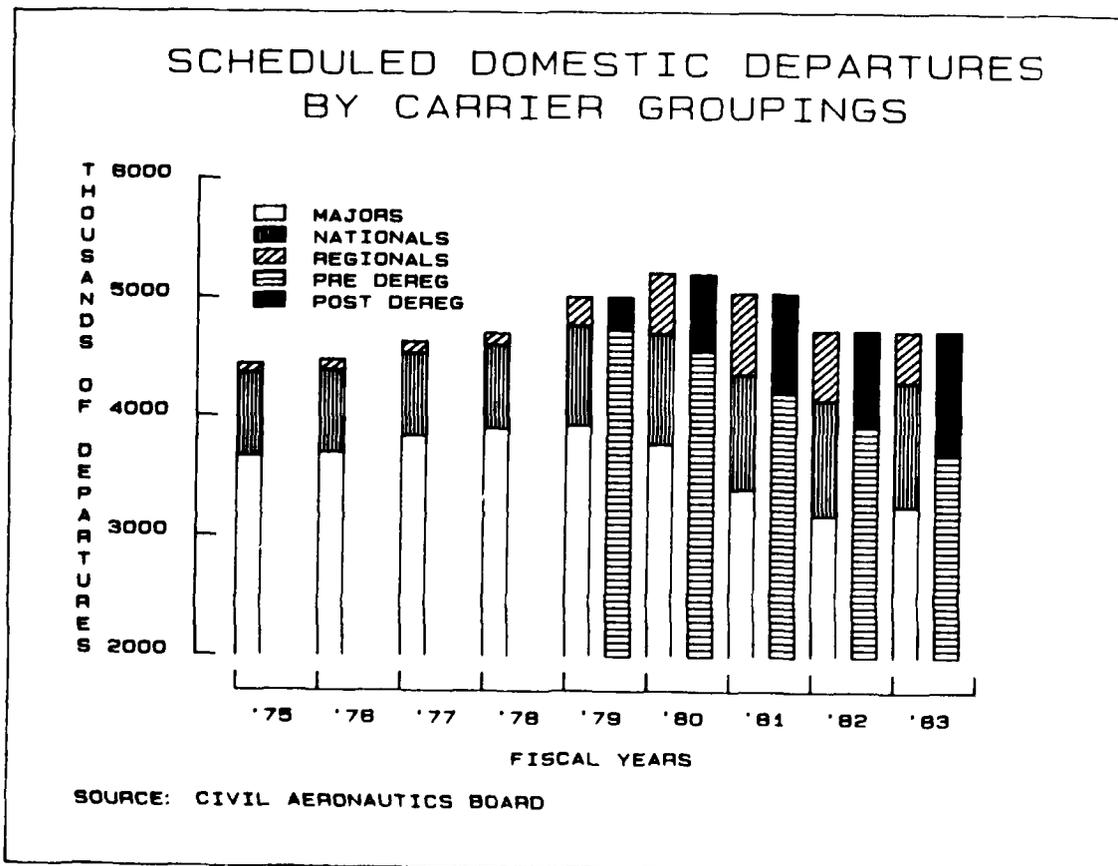
Between 1978 and 1983, the Majors' share of scheduled domestic enplanements has declined by more than 14 points, from 90.7 percent to 76.5 percent. During this same time period, the Nationals' share of enplanements increased from 8.9 percent to 18.9 percent, the Regionals from 0.4 percent to 4.9 percent. Those carriers certificated since deregulation accounted for 14.8 percent of all passenger enplanements in 1983.

Over the past five years, the Majors' domestic enplanements have actually declined by almost 1 percent, although enplanements did show a 5.1 percent increase in 1983. The Nationals' enplanements increased by 146 percent between 1978 and 1983 while the Regionals' showed a 1500 percent increase over the same period. For 1983, the Nationals' enplanements grew by 9.1 percent, the Regionals' by 28.8 percent. Since 1978, prederegulation carriers' enplanements grew by only 0.3 percent, 3.6 percent in 1983. Post deregulation carriers' enplanements have increased by 294 percent since 1979, 29.5 percent in 1983.



The Majors' share of scheduled domestic departures has declined by 16 percentage points since 1978, from 85 percent to 69 percent. At the same time, the Nationals increased their share of departures from 15 percent to 22 percent while the Regionals' share increased from 2.1 percent to 9 percent. The Regionals' 1983 share, however, represents a decline from its shares of 13.6 percent in 1981 and 12.3 percent in 1982. Much of this decline can be attributed to the fact that 18 former Regionals were allowed to return to commuter carrier status in August 1982. By 1983, those carriers certificated since 1978 had increased their share of domestic departures to 21.8 percent.

In terms of actual departures, the Majors performed almost 16.5 percent fewer departures in 1983 than they had in 1978. During the same time period, however, the number of departures performed by the Nationals increased by 47.9 percent. The number of departures performed by Regionals has increased by 327.3 percent since 1978, although the Regionals' departures have declined by 37.7 percent since 1981, 26.7 percent in 1983. Prederegulation carrier departures have declined by almost 21.5 percent since 1978 while the post-deregulation carriers have increased their departures by almost 270 percent since 1979.



These shifts in the distribution and absolute number of passenger miles, passenger enplanements, and departures shown above reflect, to some extent, the impacts that the entry of new carriers and deregulation has had on the larger established air carriers.

The five years since deregulation have also witnessed dramatic changes in the average trip length and aircraft size flown by each of the three carrier groupings. Between 1978 and 1983, the Majors increased their passenger trip length from 759 miles to 854 miles, an increase of 95 miles. The Nationals increased their trip length by 167 miles, from 313 miles in 1978 to 480 miles in 1983, although the 1983 trip length represents a decline of 9 miles from 1982 levels. The Regionals have, over the same time period, increased its trip length by 420 miles, from 132 miles to 552 miles. <sup>1/</sup> The Regionals' 1983 trip length, 72 miles longer than the Nationals' trip length, reflects the fact that the Regionals' grouping now includes two carriers flying between the West Coast and Hawaii, a distance of 1500 miles.

Between 1978 and 1983, the Majors' average aircraft size increased from 141 seats to 162 seats. During this same time period, the Nationals' average aircraft size increased by 49 seats, from 73 seats to 122 seats. The Regionals' aircraft size showed the most dramatic increase, from an average 30 seats in 1978 to 108 seats in 1983, an increase of 78 seats. <sup>2/</sup> For the most part, these shifts in trip length and aircraft size reflect the different approaches to which the respective carrier groups have responded to changes in the economy and the market entry and exit freedom. These shifts also reflect the carriers' attempts to best utilize their fleets in the most fuel efficient and profitable manner.

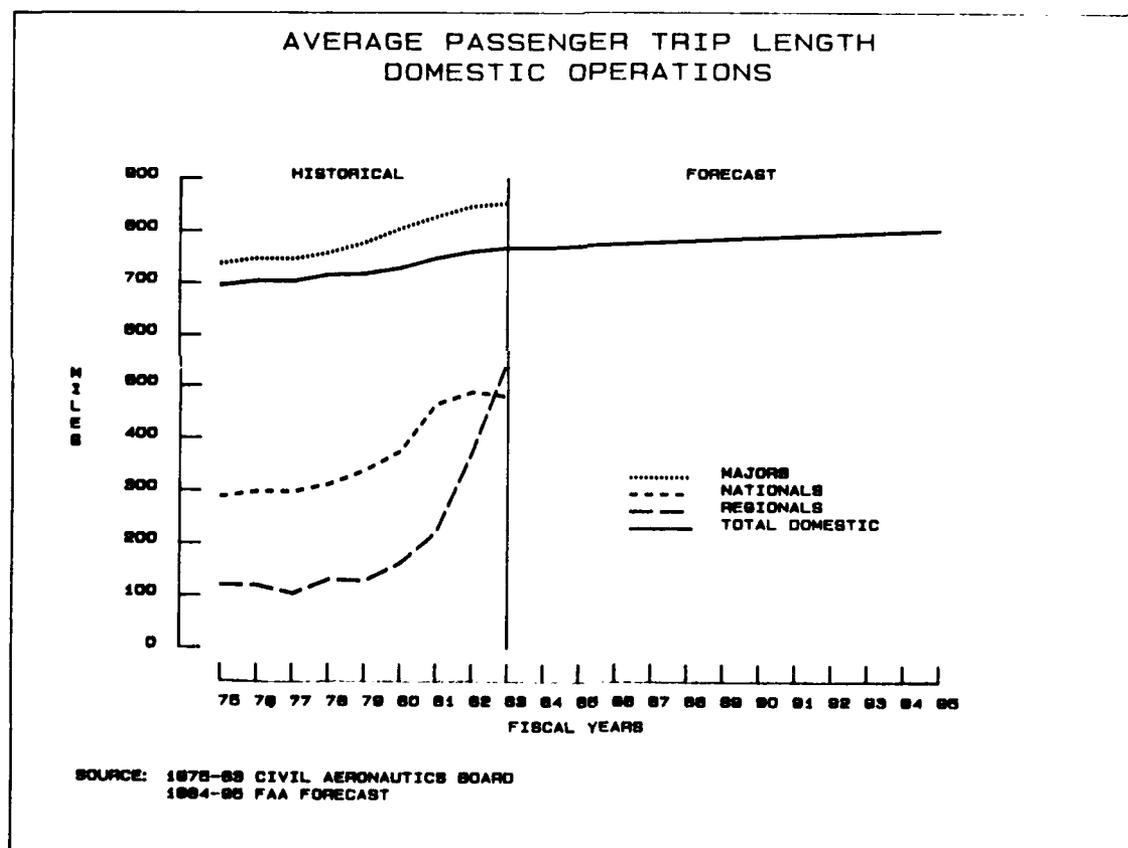
#### Forecast Assumptions

The baseline forecasts of air carrier traffic and activity over the next 12 years anticipate that the industry will continue to be affected by the deregulation process for at least several more years. While it is impossible to foresee all the changes that will occur in the commercial aviation industry in the years ahead, it is likely that there will be additional mergers, that we will see the emergence of a number of low-cost airlines, and that one or more carriers may cease operations. On the other hand, the resultant route systems and service patterns available to the traveling public will almost certainly reflect a better balance of service in terms of trip frequencies and fares than would be the case under a more closely regulated system. The carriers will also be able to continue their experimentation with innovative ways of developing travel markets. Likewise, the carriers will be able to come closer to utilizing their particular aircraft fleets in the most fuel efficient and profitable manner.

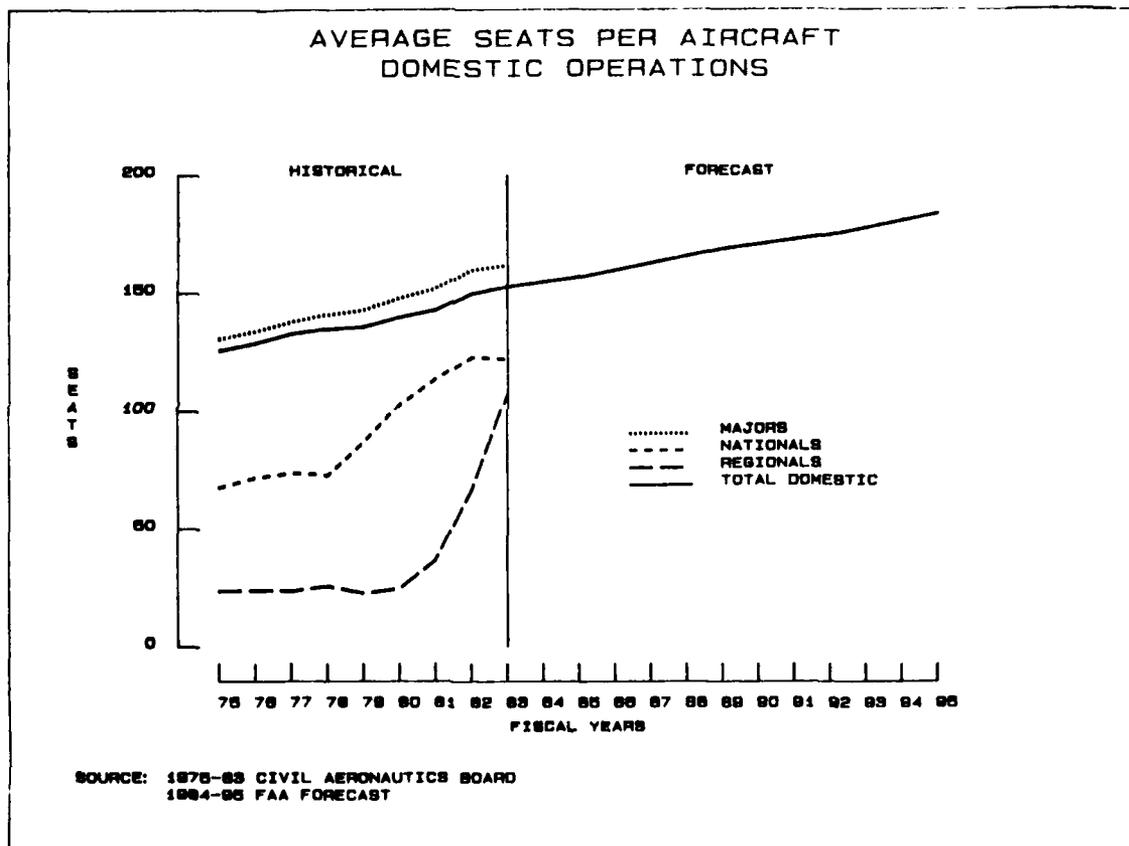
<sup>1/</sup> See Figure on Page 27

<sup>2/</sup> See Figure on Page 28

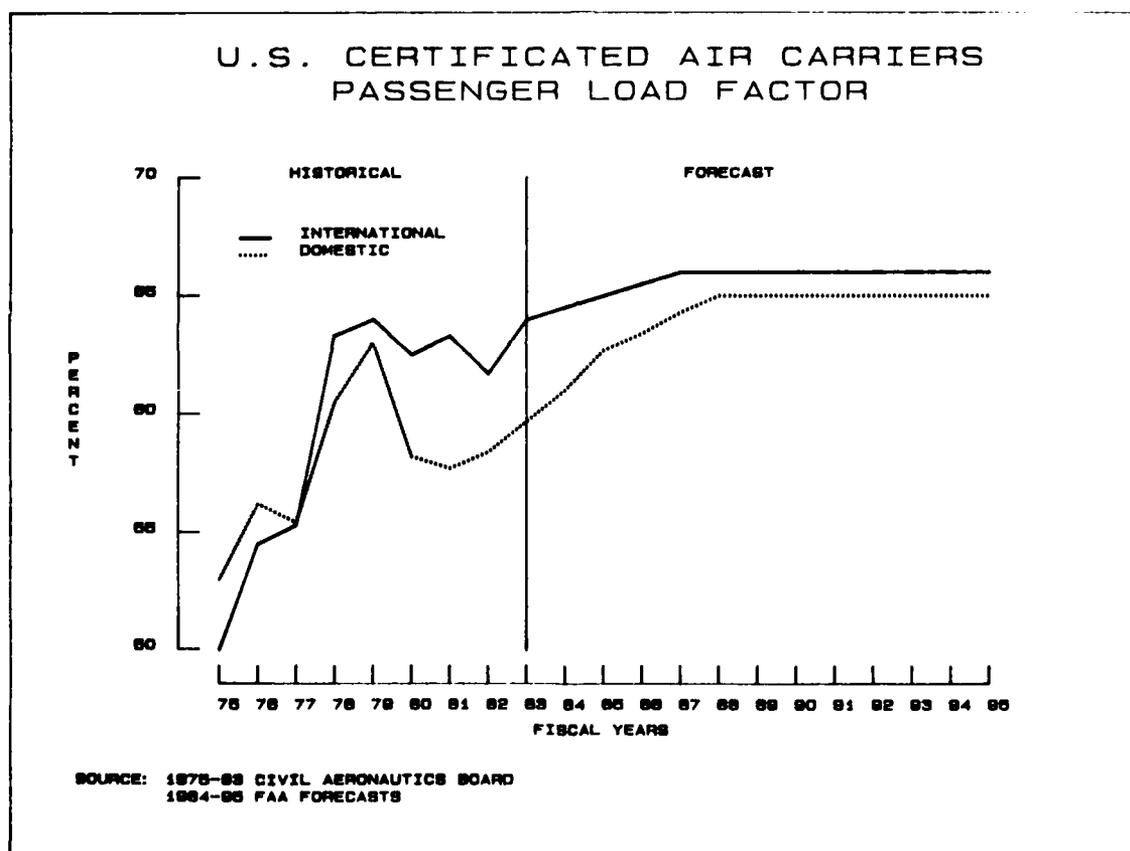
With respect to specific assumptions, it is anticipated that the type of structural changes evident during the 1978-1983 period will moderate somewhat during the forecast period. Since deregulation, the average domestic passenger trip length has increased by 53 miles, 21 miles during the past two years. We believe that the growth in trip length since 1981 reflects, to a certain degree, the fare wars that occurred in many of the longer haul markets. Because fare levels are expected to increase in 1984, our forecast assumes no growth in trip length in 1984; then a resumption of the long-term historical growth rate of three miles per year in 1985. The average passenger trip length is projected to increase from 770 miles in 1983 to 803 miles in 1995. Based upon the changing structure of the domestic air carrier industry, it is felt that an average domestic trip length of 803 miles is a reasonable expectation and well within any upper bound.



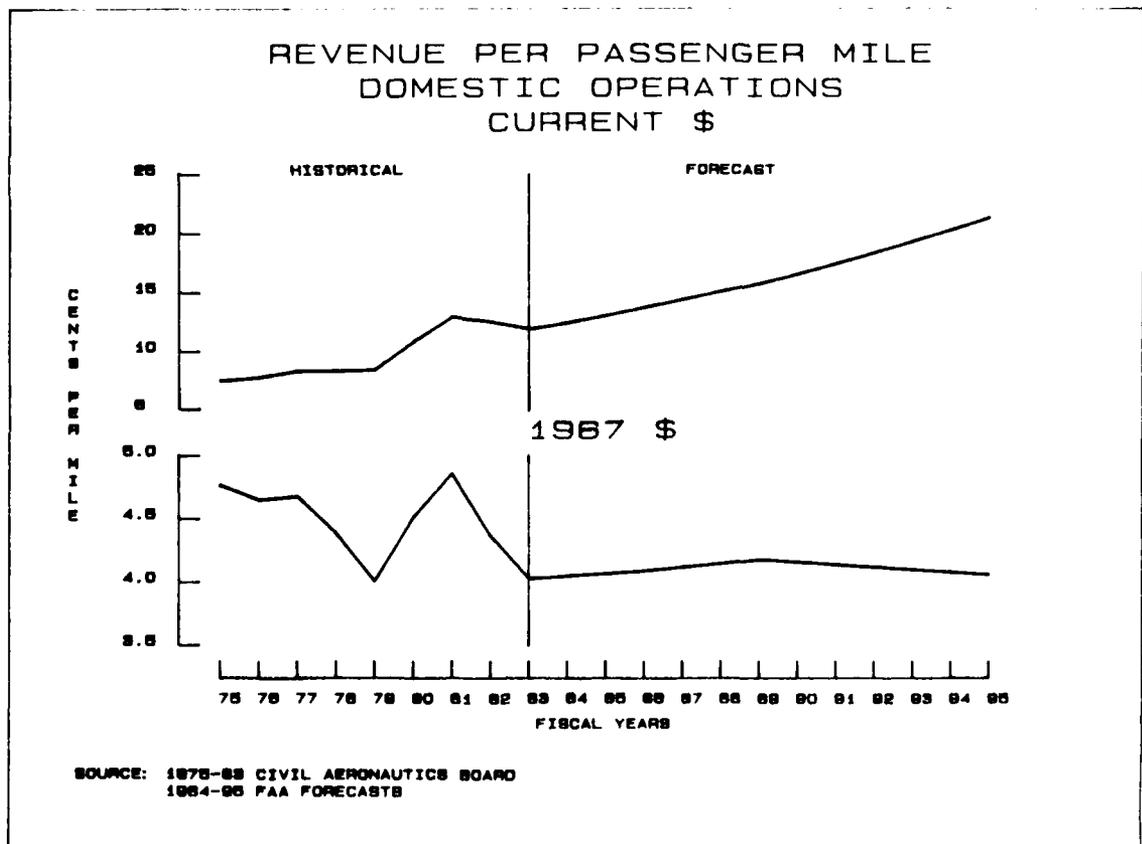
Declining fuel prices have, at least for the short-term, slowed the trend toward replacement of older aircraft with quieter, larger capacity, and more fuel efficient aircraft. The prospects for continued high levels of intense competition from new low-cost carriers has also increased the importance of higher frequencies and the demand for efficient aircraft with smaller capacities. The industry's average seating capacity, which increased by just under three seats in 1983, is expected to continue its growth, but at a rate somewhat less than the long-term historical growth of three to four seats per year. The average seat size of the domestic fleet is forecast to increase from 153 seats in 1983 to 184 seats in 1995.



Based upon projected levels of capacity and traffic, the domestic load factor is expected to increase from 59.7 percent in 1983 to 61.0 percent in 1984 and 62.7 percent in 1985. Domestic load factors are then forecast to gradually increase to 65 percent by 1988 and maintain that level throughout the remainder of the forecast period. This reflects a reassessment of the assumptions contained in previous forecasts that considered 63 percent to be the upper limit for an achievable average annual load factor. However, we now believe that competition from new and existing low-cost carriers will exert pressure on air carriers to keep fare increases to a minimum. This will, therefore, increase the breakeven load factor and force carriers to achieve higher load factors. International load factors are projected to increase from 63.9 percent in 1983 to 66.0 percent in 1991 and remain at that level throughout the remainder of the forecast period.



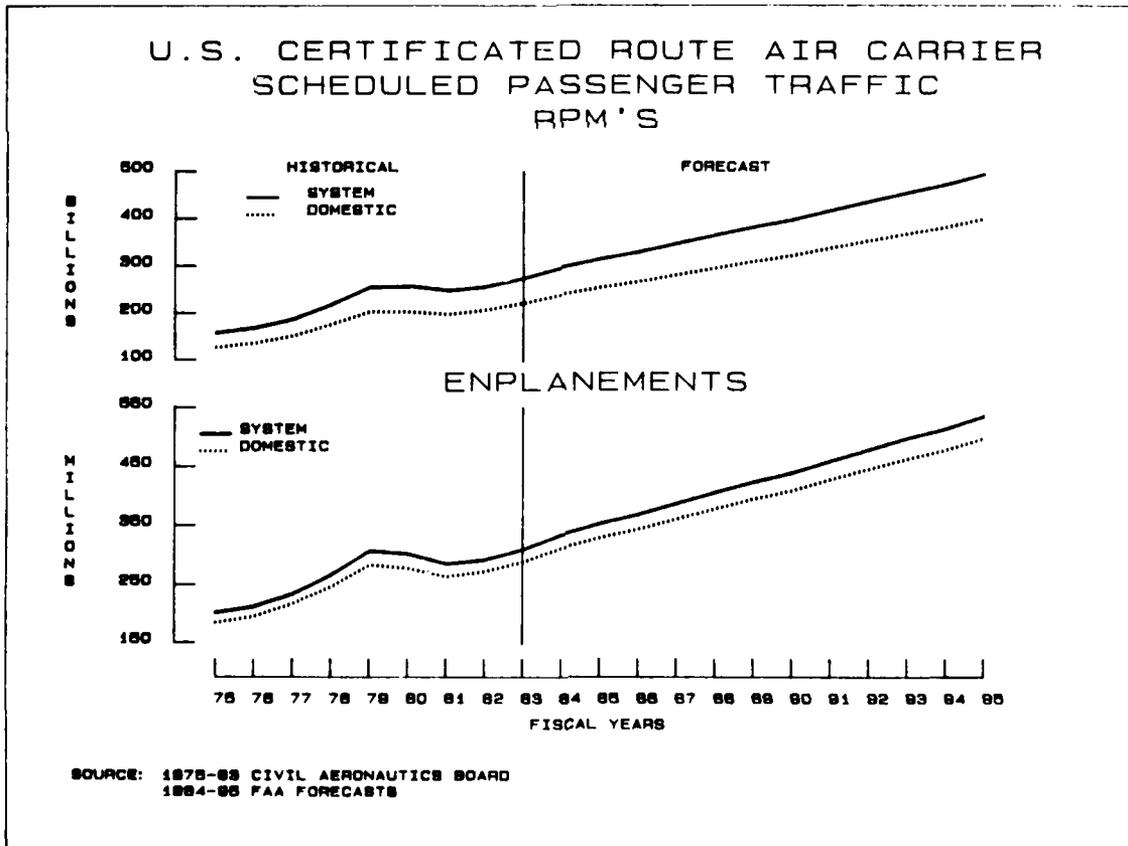
Domestic passenger yields, the average revenue received per passenger mile, have declined by over 8 percent over the past two years, over 17 percent in 'real' terms. These declines are due almost entirely to the competitive fare wars that occurred during much of 1982 and early 1983. The deteriorating financial position of many commercial air carriers did, however, result in efforts to increase the yield during the last half of fiscal 1983. We expect this trend in yield improvement to continue, and have projected yield increases of 4.5 percent in 1984 and 5 percent in 1985. For the entire forecast period, it is anticipated that the yield will increase at a 5 percent annual rate, from 11.9 cents in 1983 to 21.4 cents in 1995. In 'real' terms, yield is expected to increase at an annual rate of just over 0.5 percent over the next six years, then decline by an annual rate of just under 0.5 percent over the remaining six years of the forecast period. Over the entire forecast period, 'real' yield is expected to increase by only 0.7 percent, from 4.03 cents in 1983 to 4.06 cents in 1995. This "no growth" scenario for 'real' yield is based on the assumptions of further system optimization, greater market competition from new low-cost carriers, and the introduction of new, larger, more fuel efficient aircraft with lower unit operating costs than today's aircraft.



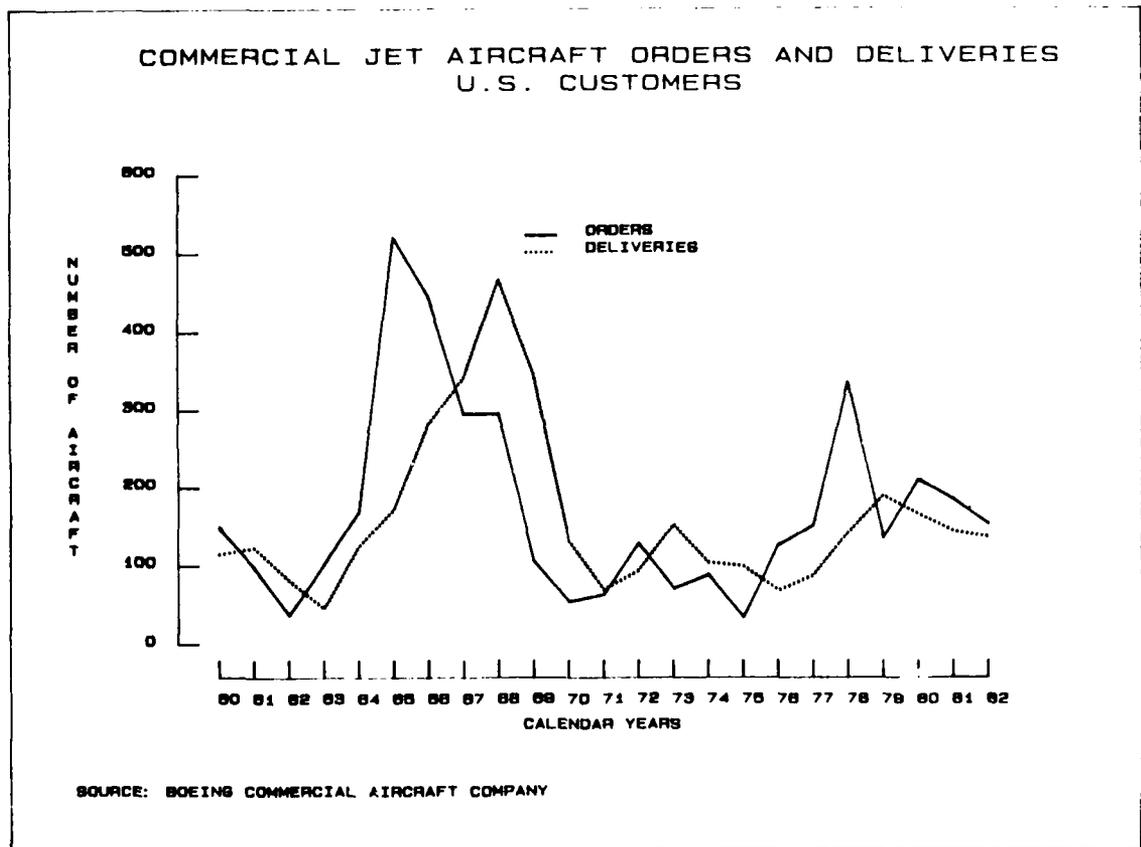
Forecasts

Air carrier domestic enplanements increased by 6.4 percent in 1983 to 290.3 million, surpassing the previous high for enplanements which was set in 1979. Enplanements are projected to increase 7.7 percent in 1984, 5.5 percent in 1985, and 4.3 percent in 1986. For the entire forecast period domestic enplanements are expected to increase at an average annual rate of 4.6 percent, to 497.8 million passengers in 1995. International enplanements, reversing a two year decline, increased by 7.1 percent in 1983. International enplanements are forecast to increase from 21.1 million in 1983 to 37.4 million in 1995, an average annual growth rate of 4.9 percent.

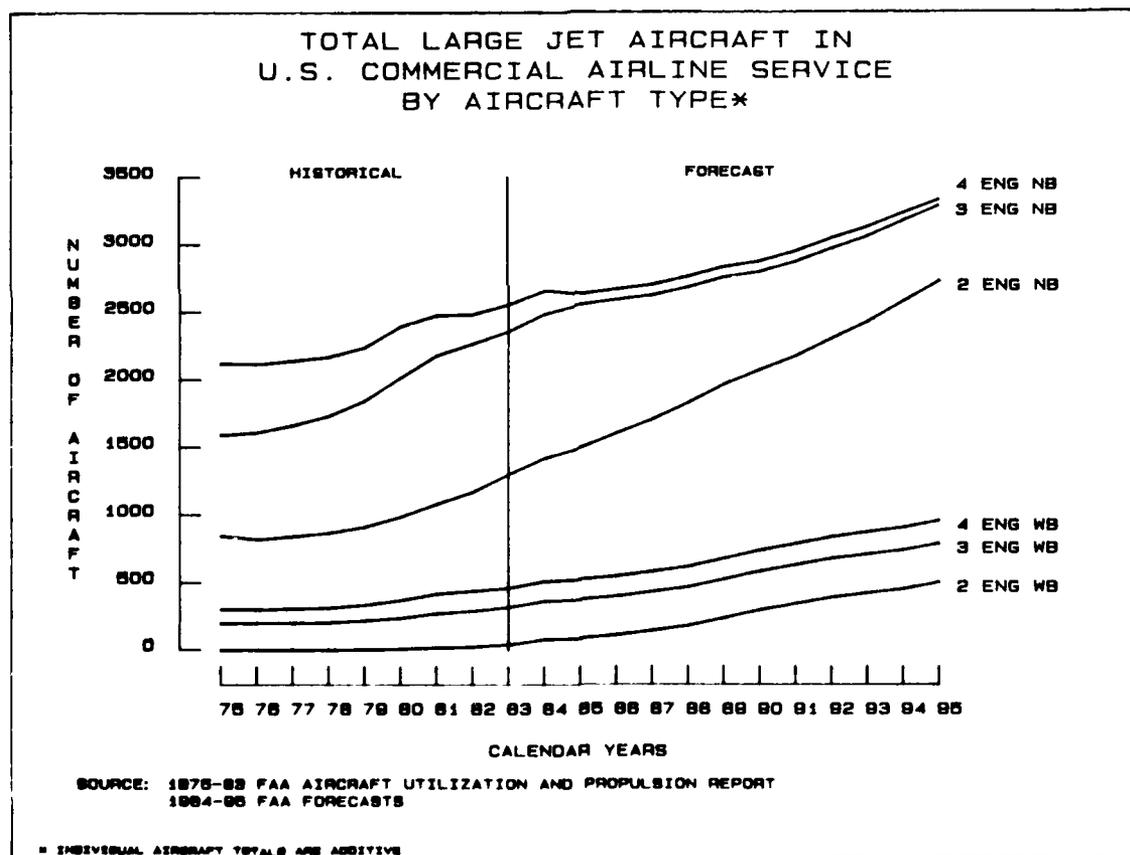
Domestic revenue passenger miles grew by 7.7 percent in 1983 to 223.5 billion. Domestic passenger miles are forecast to grow 7.8 percent in 1984, 5.9 percent in 1985, and 4.7 percent in 1986. Over the entire forecast period domestic passenger miles are projected to increase at an average rate of just under 5 percent annually, to 399.7 billion in 1995. International passenger miles grew by 7.1 percent in 1983, reversing a two year decline. International passenger miles are forecast to increase at an average annual growth rate of 5 percent, from 52.7 billion in 1983 to 94.7 billion in 1995.



Commercial jet aircraft orders and deliveries have been characterized by cycles with relatively large variability, both exhibiting two distinct cycles since 1960. Aircraft orders appear to be highly correlated with periods of strong economic growth and traffic demand, peaking in 1966 and 1978. On the other hand, deliveries have peaked in years of declining economic activity and traffic demand, creating problems of over capacity in periods when the carriers can least afford it. Assuming that these patterns will continue into the future, the current forecasts depicting sustained growth in both economic activity and traffic demand should result in increased demand for commercial jet aircraft.



Based upon the projections of air carrier traffic, seat capacity and load factor, the U.S. commercial air carrier fleet is forecast to increase from 2,556 large jet aircraft in 1983 to 3,329 aircraft in 1995, an average increase of 2.2 percent or 64 aircraft annually. By far the largest growth occurs in two-engine aircraft, with two-engine narrow-body aircraft (DC-9, B-737, B-757) growing by an average of 78 aircraft annually. This reflects the fact that the prospects for continued levels of intense competition increases the importance of higher frequencies; thus, the demand for aircraft with smaller capacities than needed before deregulation. Two-engine wide-body aircraft (A-300, B-767) are expected to increase by an average of 38 aircraft annually. The three-engine narrow-body (B-727) and four engine narrow-body (B-707, DC-8) aircraft will decline in absolute number over the forecast period. Wide-body aircraft, which accounted for only 18 percent of the fleet in 1983, is expected to account for almost 29 percent of the fleet in 1995.



## COMMUTER AIRLINE FORECASTS

During the ten-year period between 1972 and 1982, commuter airlines' passenger enplanements grew at an annual rate of 13.1 percent while revenue passenger miles increased at a 16.9 percent rate. In 1982 the rate of growth of the commuter airlines was slowed somewhat due to the air traffic controllers' job action, and in part by the removal of Altair from the 1982 statistics because of its conversion to a large jet fleet. However, even with the airport restrictions and removal of Altair, enplanements and revenue passenger miles posted increases of 8.2 percent and 10.7 percent respectively. In 1983, with most airspace restrictions lifted, commuter enplanements increased 14.0 percent and revenue passenger miles increased 16.2 percent, more in line with the long-term historical trend.

### Recognition and Growth

Formal recognition of a developing third level airline industry and coining of the term "commuter" date back to 1969 when commuter airlines were first required to register with, and report activity data to, the Civil Aeronautics Board.

Growth of the commuter industry can be attributed in large part to the role it plays as a feeder of traffic to the larger certificated airlines. The significance of this role is reflected in the growth of the number of communities served exclusively by commuters, and the increasing size and sophistication of aircraft operated by commuter airlines. The maximum number of seats allowed, without special exemption, has been increased from 19 in 1969, to 30 in 1972, to 56 by the Airline Deregulation act of 1978, and later to 60 seats by Civil Aeronautics Board regulatory action. This has contributed directly to the improvement in quality of service and increased public acceptance, especially in those communities formerly served by the larger certificated carriers.

Probably the two most significant factors underlying the growth of commuters were the conversion to large turbojet aircraft by the large certificated carriers and the Airline Deregulation Act of 1978. The cost of operating the large turbojet aircraft was such that traffic at small communities proved insufficient to justify regularly scheduled service. Airline deregulation has accelerated this process with the Majors and Nationals concentrating on high density medium- and long-haul markets to which their aircraft fleets were best suited.

As the large air carriers embarked on programs to rationalize their route structure so as to increase aircraft utilization and fuel efficiency, the commuters have been able to move into those markets no longer served by the large jet aircraft of the former trunk and local service carriers. In most cases where commuter replacement service has occurred, the affected communities have gained in that they are offered greater schedule frequency than the certificated air carriers could afford, given their large aircraft and the low passenger density of the markets. In many markets, demand has substantially increased as a result of the greater schedule frequency.

Given the early restrictions on the size of aircraft they were allowed to operate, commuters were restricted to the use of general aviation aircraft; most with 9 seats or less. These seat restrictions, coupled with the types of aircraft operated, hampered both the commuters' ability to attract surface passengers to air travel, and the quality of service provided. These seat restrictions also eliminated any incentive for manufacturers to design and build aircraft particularly suited to commuter service. As the seat restrictions have been relaxed, there has been a growing trend toward utilization of new, larger turbo-prop aircraft by commuter carriers.

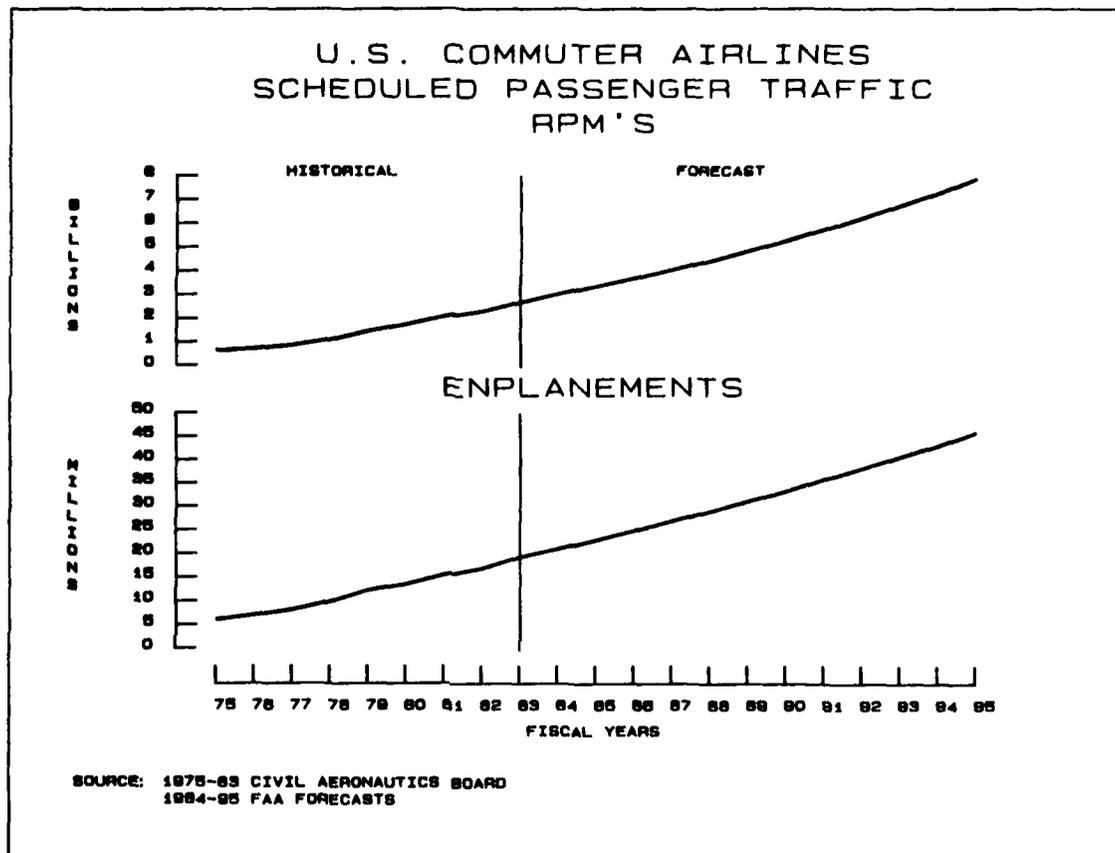
Today, manufacturers in the United States, and more significantly in other countries, are delivering aircraft designed to more efficiently serve commuter markets. These larger aircraft are proving attractive to travelers accustomed to the amenities of air carrier jets, and thus contributing to greater public acceptance vis-a-vis other modes of transportation. With the move to larger aircraft and greatly expanded route structures, many of the commuter carriers resemble the local service carriers of an earlier day. Improved passenger service, joint fares, reservation and schedule tie-ins with major carriers all contribute to the commuters ability to effectively serve the public.

#### Forecast Assumptions

It is expected that commuter carriers will continue to benefit from the larger air carriers' route rationalization policies over the next several years. It is also expected that the average number of seats per aircraft, the number of city-pairs served, and the average stage length will increase over the forecast period. However, it is assumed that the commuters will continue to serve primarily those markets under 200 miles where they are now concentrated. Growth achieved through replacement of air carrier service will cease to be a major factor by the mid to late 80's. After that time, growth for the industry is expected to come from increasing demand placed on a stable, mature commuter airline industry.

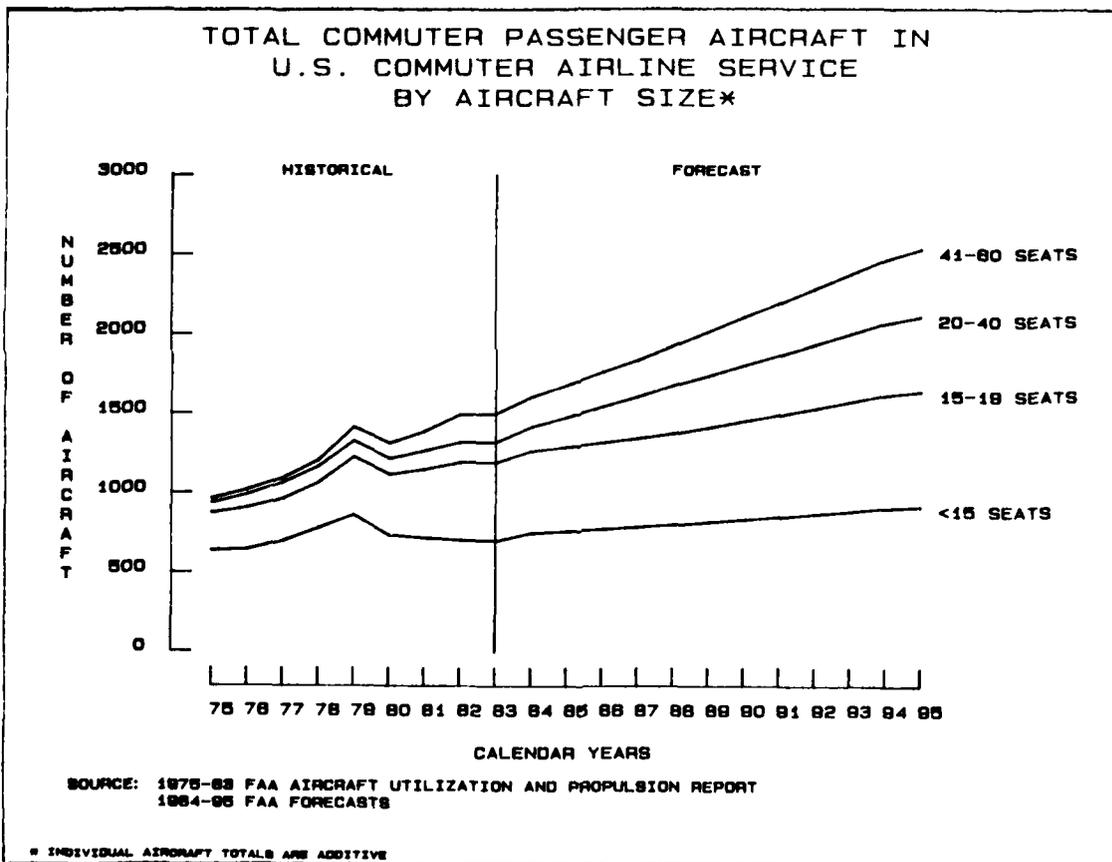
#### Forecasts

After a brief slowdown in the demand for commuter service in 1982, the strong growth in commuter activity relative to other segments of the aviation industry resumed in 1983. The forecast anticipates higher growth rates in the early years of the forecast period and a gradual decline in the magnitude of that growth as 1995 is approached. By 1984, the commuters are forecast to enplane 21.5 million passengers, a 10.3 percent increase over 1983 levels. Revenue passenger miles are forecast to be 14.5 percent above 1983 levels, or 3.1 billion passenger miles. Passenger enplanements are anticipated to grow 8.8 percent in 1985 and 8.1 percent in 1986, while revenue passenger miles are expected to grow 10.5 percent in 1985 and 9.8 percent in 1986. However, these rates of growth are not expected to be maintained over the entire forecast period as the commuter industry approaches maturity. Thus, the expected average growth rate between 1983 and 1995 is 7.4 percent for enplanements and 9.4 percent for passenger miles. This forecast implies that enplanements will more than double their 1982 level during the forecast period, reaching 46.1 million enplanements in 1995. Revenue passenger miles are expected to almost triple their 1983 level, totaling 7.9 billion in 1995.



The growth of the commuter airline industry is also reflected in the trend toward the use of larger aircraft. The total commuter passenger fleet is forecast to grow at an average annual rate of just over 4.5 percent per year, increasing from 1500 aircraft in 1983 to 2537 aircraft in 1995. Although aircraft with less than 15 seats will continue to make up the largest part of the fleet, its relative share of the total fleet will decline from 46.5 percent in 1983 to 36.1 percent in 1995. The portion of the fleet in the "15 to 19 seat" category will also decline, from 33 percent of the fleet in 1983 to 28.6 percent in 1995. While the "less than 15 seats" and "15 to 19 seat" categories' relative shares of the total fleet decline, the number of aircraft in these groups is expected to increase at average annual rates of 2.5 and 3.2 percent respectively over the forecast period.

The largest growth in the commuter fleet is expected to occur in the "20-40 seat" and "greater than 40 seats" categories. The 20-40 seat aircraft are expected to increase from 128 in 1983 to 472 in 1995, an average annual increase of 11.5 percent. By 1995 this category will account for over 18 percent of the commuter aircraft fleet, up from 8.5 percent in 1983. The "greater than 40 seats" category is forecast to increase from 179 aircraft in 1983 to 425 in 1995, a 7.5 percent average growth rate. Its share of the fleet is expected to increase from 11.9 percent of the fleet in 1983 to 16.8 percent in 1995. This trend to larger aircraft is expected to increase the average seat size per aircraft from 17.3 in 1983 to 21.4 by 1995.



## FAA WORKLOAD FORECASTS

The FAA provides the aviation community with three operational services: air traffic control at selected airports, traffic surveillance and aircraft separation by Air Route Traffic Control Centers, and flight planning and pilot briefings at the Flight Service Stations. All four categories of aviation - general aviation, air carrier, commuter, and military - employ these services to enhance aviation traffic safety.

Multiple indicators are used to describe the total FAA operational workload. The four categories of system users differ in the demands they impose on the air traffic system. Consequently, no single measure typifies past trends and future demand for these FAA services. There have been, and will continue to be, different socioeconomic forces driving the growth of each of the system users.

### Tower Activity

Aviation activity at FAA towered airports, which had declined by almost 27 percent between 1979 and 1982, showed an increase of 5.3 percent to 53.3 million operations in 1983. The 1983 increase is due in part to the upturn in the economy and in part to the return of the Air Traffic Control System to near normalcy. Commuter operations, the fastest growing category over the past several years, once again registered the greatest increase in 1983, up 14.9 percent over 1982 levels. Air carrier operations exhibited strong growth throughout the year, reversing a three-year decline by increasing 6.9 percent in 1983. General aviation operations also reversed a three-year decline, growing by 3.4 percent in 1983. General aviation itinerant and local operations grew by 2.9 and 3.7 percent, respectively. Military use of FAA facilities increased by 4.9 percent in 1983.

Instrument operations handled at FAA towers, which had declined by over 17 percent during the past two years, registered an increase of 7.5 percent in 1983, to 34 million operations. Commuters led the increase with a 15.4 percent increase in instrument operations, followed by air carrier and general aviation instrument operations, which grew by 6.4 and 6.1 percent, respectively. Military instrument operations increased by 5.8 percent.

### Center Traffic

In the four years between 1976 and 1980, the number of aircraft flying under instrument rules handled by Air Traffic Control Centers' personnel increased dramatically from 23.9 to 30.1 million, or 6.2 million additional aircraft handled in 1980. The growth for the period 1970 to 1976 was just 2.3 million. As was the case with instrument operations at FAA towers, this increase can be attributed to the growth of the commuter industry as well as the increasing sophistication of general aviation pilots and aircraft. However, despite continued growth by commuters, the total number of aircraft handled by the Centers declined 7.6 percent between 1980 and 1982 before reversing the decline with a 5.4 percent increase in 1983. The number of commuter aircraft handled in 1983 increased by 11.3 percent, the number of air carrier aircraft by 4.6 percent, and the number of general aviation aircraft by 3.7 percent. Military aircraft handled increased by 6.2 percent.

## Flight Service Station Activity

User demands on Flight Service Stations have declined almost 15 percent since 1979. In 1983 the total number of pilot briefings, flight plans originated, and aircraft contacted declined 8.8 percent from 1982 levels. The total number of flight services rendered at Flight Service Stations in 1983 was 56.9 million.

## Forecast Assumptions

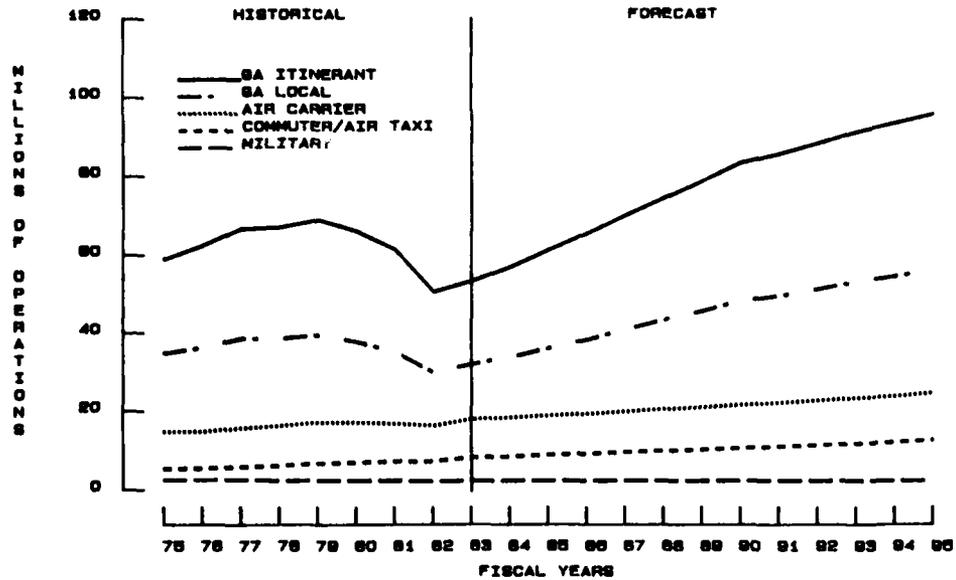
Growth in FAA workload measures is a function of demand imposed on the National Airspace System plus inclusion of aviation activity at locations previously not provided FAA services. Thus, the number of aircraft operations at FAA towered-airports in 1995 will consist of traffic at current towers plus those airports with newly commissioned towers during the forecast period. The short-term forecast reflects the reopening of several towers which were temporarily closed as a result of the Air Traffic Controllers' Strike.

No specific assumptions beyond the changing traffic mix discussed as part of the aviation activity forecasts have been made in developing the Air Route Traffic Control Center forecast.

## Forecasts

As the Air Traffic Control System completes its return to normalcy in 1984, aircraft operations are expected to resume the historical growth rates exhibited during the early to mid-1970's. Aircraft operations at FAA towers are forecast to increase at an average growth rate of 5 percent between 1983 and 1995, from 53.3 million to 95.6 million. The mix of traffic is likely to become increasingly more heterogeneous since the general aviation and commuter fleets of smaller aircraft are forecast to grow at a faster rate than the air carrier fleet of larger jets. The combined operations of general aviation and commuters will account for almost 85 percent of total tower operations in 1995, up from 77.3 percent in 1983. Forecasted average annual growth rates by user group over the entire forecast period is: general aviation, 6 percent; air carrier, 1.7 percent; and commuter, 4.7 percent. Military operations are expected to remain constant at the 1983 level of operations.

## AIRCRAFT OPERATIONS AT AIRPORTS WITH FAA TRAFFIC CONTROL SERVICE\*

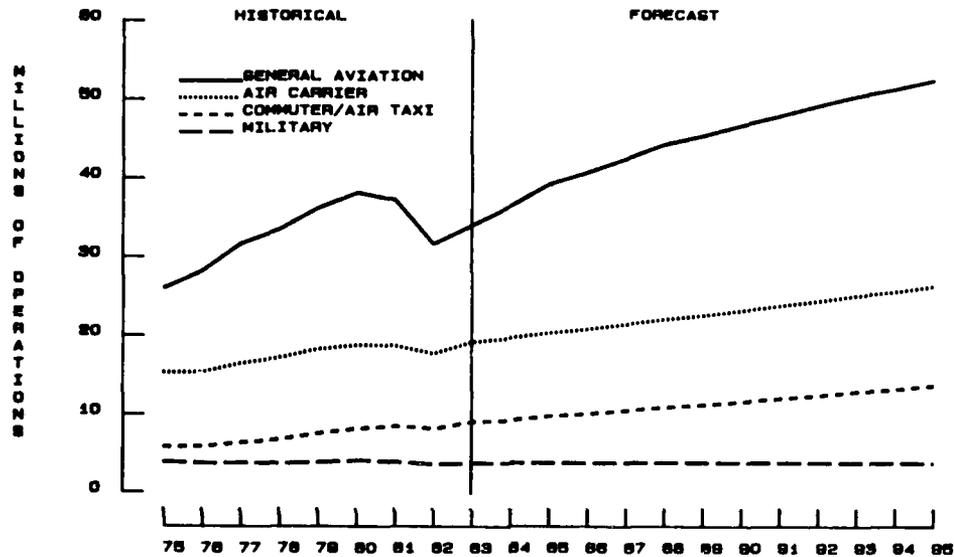


SOURCE: 1975-83 FAA AIR TRAFFIC ACTIVITY REPORT  
1984-95 FAA FORECASTS

\* INDIVIDUAL USER GROUP FORECASTS ARE ADDITIVE

Instrument operations at FAA towers are expected to grow at an average annual growth rate of 3.7 percent between 1983 and 1995, from 34 million to 52.3 million. The mix of instrument operations will also become more heterogeneous as general aviation and commuter operations are expected to increase at annual rates of 4.8 percent and 5.3 percent, respectively, during the forecast period. By 1995, 68.8 percent of instrument operations will be by general aviation and commuter aircraft - up from 59.1 percent in 1983. Air carrier instrument operations are expected to average 1.8 percent annual growth over the next 12 years. Military operations are expected to remain constant at the 1983 level of operations.

## INSTRUMENT OPERATIONS AT AIRPORTS WITH FAA TRAFFIC CONTROL SERVICE\*

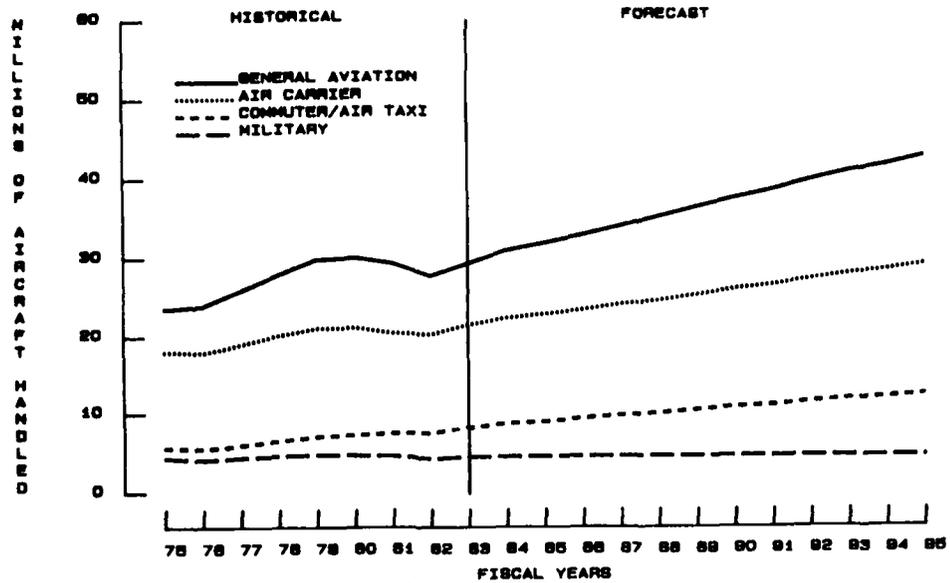


SOURCE: 1975-82 FAA AIR TRAFFIC ACTIVITY REPORT  
1984-85 FAA FORECASTS

\* INDIVIDUAL USER GROUP FORECASTS ARE ADDITIVE

The workload at Air Route Traffic Control Centers is estimated to grow at an annual rate of 3.1 percent between 1983 and 1995, to 42.6 million aircraft handled. In 1983, 45.2 percent of the traffic handled at the Centers were air carrier flights. By 1995 only 39 percent of the Centers' workload is expected to be generated by air carriers; both general aviation and commuters increasing their shares of the total workload. The number of general aviation and commuter aircraft handled are forecast to increase at average annual growth rates of 4.7 percent and 6.4 percent, respectively, between 1983 and 1995. Air carrier growth will average 1.9 percent over the same time period while military operations are expected to remain constant at 1983 levels.

## IFR AIRCRAFT HANDLED AT FAA AIR ROUTE TRAFFIC CONTROL CENTERS\*



SOURCE: 1976-83 FAA AIR TRAFFIC ACTIVITY REPORT  
1984-85 FAA FORECASTS

\* INDIVIDUAL USER GROUP FORECASTS ARE ADDITIVE

Total services rendered at Flight Service Stations are forecast to increase at an average annual rate of 4 percent between 1983 and 1995, from 56.9 to 90.8 million. Pilot briefings are expected to increase at an annual rate of 4.5 percent, flight plans by 4.3 percent, and aircraft contacted by 1.3 percent over the same time period.

**Chapter III**  
**Year-by-Year Data for**  
**FAA Aviation Forecasts:**  
**Fiscal Years 1984-1995**

### CHAPTER III

#### YEAR-BY-YEAR DATA FOR FAA AVIATION FORECASTS: FISCAL YEARS 1984-1995

Chapter III provides the detailed data for the National Aviation and FAA workload series forecasted by the FAA Office of Aviation Policy and Plans. The addition of newly certificated carriers reporting to the CAB since deregulation, the reporting of San Juan and Virgin Island traffic as domestic, beginning January 1, 1981, and the duplication of air carrier and commuter traffic in Tables 1 and 4 should be noted.

SCHEDULED PASSENGER AIR CARRIERS

	Carrier Group/	Reported Traffic <sup>2/</sup>		Traffic Included in Computer Totals <sup>3/</sup>	Date of Last Reported Traffic <sup>4/</sup>	Carrier Group/	Reported Traffic <sup>2/</sup>		Traffic Included in Computer Totals <sup>3/</sup>	Date of Last Reported Traffic <sup>4/</sup>
		Domestic	Int'l				Domestic	Int'l		
1. AeroMech (KC)	MR	7-79		X	5-81**	LR	10-82		X	12-83*
2. AirCal (OC)	N	1-79				MR	1-80			6-82**
3. Air Florida (QH)	N	1-79	7-80	X		LR	1-82		X	
4. Air Illinois (UX)	LR	1-83		X		MR	X		X	
5. Air Midwest (ZV)	LR	X		X	7-82**	MR	1-82		X	8-82**
6. Air Nevada (LW)	MR	4-81		X		MR	6-80		X	
7. Air New England (NE)	MR	X		X	10-81*	MR	7-81		X	7-82**
8. Air North (NO)	MR	6-80		X	8-82**	LR	11-79		X	
9. Air North/Nenana (XG)	MR	3-81		X	8-82**	MR	4-79		X	8-82**
10. Air One (CB)	LR	4-83		X		MR	X		X	
11. Air Wisconsin (ZW)	LR	7-79		X		LR	8-81		X	9-82**
12. Alaska (AS)	N	X				MR	5-79		X	
13. Aloha (AQ)	N	X				LR	12-80			
14. Altair (AK)	MR	1-79	X	X	9-82*	MR	3-82			
15. American (AA)	M	X				M	X			
16. American Int'l (NI)	MR	11-82				N	X			
17. American West (HP)	LR	8-83		X		LR	9-82			
18. Apollo (ID)	MR	5-79				LR	2-82			
19. Arrow (JW)	MR	11-82	6-83	X	7-81**	N	1-79		X	
20. Aspen (AP)	MR	X				MR	X			
21. Best (JW)	MR	7-82		X		MR	X			
22. Big Sky(GQ)	MR	6-79		X	8-82**	LR	5-81		X	5-83
23. Braniff (BN)	M	X				N	X			
24. Britt (RU)	MR	1-81		X	9-82**	MR	1-82		X	
25. Capitol (CL)	N	7-80	7-81	X	8-81**	LR	X			
26. Cascade (CZ)	MR	4-80		X		MR	X			
27. Challenge (CN)	MR	1-79	8-82	X	8-82**	LR	7-79		X	
28. Cochise (DP)	MR	9-79		X		MR	7-79			
29. Coleman (CH)	MR	4-81		X		MR	X			
30. Colgan (CJ)	MR	X				MR	X			
31. Continental (CO)	M	X				MR	2-79			
32. Delta (DL)	M	X				MR	5-83			
33. Eastern (EA)	M	X				MR	1-80		X	9-82**
34. Emerald (OD)	MR	7-82		X	12-81*	MR	7-79		X	6-82**
35. Empire (UR)	LR	10-79		X	3-80*	LR	7-79		X	1-80*
36. Flying Tiger/ Metro Int'l (FT)	N		3-82			MR	7-79			
37. Frontier (FL)	N	X				LR	2-79			
38. Golden Gate (GG)	MR	5-80		X	8-82**	MR	5-83		X	
39. Golden West (GW)	MR	2-79		X		MR	1-79		X	7-81*
40. Great American (FD)	MR	10-80		X	5-81	N	X			
41. Guy-America (HX)	MR	X				M	X			
42. Hawaiian (HA)	N		8-81			M	X			

1/ M=Major; N=Nationals; LR=Large Regionals; MR=Medium Regionals.  
 2/ Reported traffic designated by X in appropriate box. Date of first reported traffic is indicated for those carriers certificated for scheduled air service since passage of the Airline Deregulation Act of 1978.  
 3/ Former commuter carriers holding Section 401 certificate. Traffic data duplicated in Tables 1 and 4.  
 4/ Date of last reported traffic is indicated. Carriers that have discontinued scheduled passenger service indicated by \*. Carriers now filing CAB Form 298-C in lieu of CAB Form 41 indicated by \*\*.

TABLE 1

UNITED STATES CERTIFICATED ROUTE AIR CARRIER  
SCHEDULED PASSENGER TRAFFIC(1)

Fiscal Year	Revenue Passenger Enplanements (millions)		Revenue Passenger Miles (billions)	
	Total	Domestic	International	Total
<b>Historical*</b>				
1979	307.0	283.4	23.6	255.4
1980	302.3	278.2	24.1	257.4
1981	285.5	264.3	21.2	248.2
1982	292.5	272.8	19.7	257.0
1983E	311.4	290.3	21.1	276.2
<b>Forecast</b>				
1984	335.6	312.7	22.9	298.2
1985	354.1	330.0	24.1	315.5
1986	369.3	344.3	25.0	329.9
1987	387.8	361.5	26.3	347.7
1988	406.3	378.6	27.7	365.6
1989	423.8	394.9	28.9	382.7
1990	438.9	409.0	29.9	397.7
1991	459.2	427.8	31.4	417.6
1992	478.2	445.3	32.9	436.6
1993	496.7	462.4	34.3	455.2
1994	513.8	478.1	35.7	472.6
1995	535.2	497.8	37.4	494.4
				Domestic
				International
				Total
				Domestic
				International
				Total

\*Source: CAB Air Carrier Traffic Statistics.

(1) Includes passenger traffic reported by those air carriers listed on preceding page. Also includes the following traffic of commuter carriers holding Section 401 certificates and duplicated in Table 4:

	Enplanements (Millions)	RPM's (Billions)	Enplanements (Millions)	RPM's (Billions)
1979	2.364	.356	1982	4.553
1980	4.250	.627	1983E	2.314
1981	5.652	.995		.741
				.435

TABLE 2

TOTAL LARGE JET AIRCRAFT IN  
U.S. COMMERCIAL AIRLINE SERVICE  
BY AIRCRAFT TYPE

As of January 1	Total	Narrow Body				Wide Body			
		2 Engine	3 Engine	4 Engine	2 Engine	3 Engine	4 Engine		
Historical*									
1979	2,237	576	931	394	6	215	115		
1980	2,394	615	1,029	380	12	227	131		
1981	2,475	663	1,097	297	19	255	144		
1982	2,483	730	1,096	218	25	267	147		
1983 1/	2,556	839	1,057	199	43	277	141		
Forecast									
1984 1/	2,657	911	1,065	172	82	282	145		
1985	2,633	974	1,060	77	90	285	147		
1986	2,668	1,058	988	77	113	285	147		
1987	2,701	1,126	919	77	147	285	147		
1988	2,759	1,213	854	77	182	285	148		
1989	2,830	1,288	790	77	238	285	152		
1990	2,871	1,335	724	77	296	285	154		
1991	2,945	1,388	696	77	342	285	157		
1992	3,043	1,468	664	77	389	285	160		
1993	3,127	1,556	630	70	422	285	164		
1994	3,231	1,676	594	58	451	285	167		
1995	3,329	1,775	556	44	501	285	168		

\*Source: FAA Aircraft Utilization and Propulsion Reliability Report

1/ 1983 and 1984 totals do not include Braniff and Altair fleets

TABLE 3  
 TOTAL AIRBORNE HOURS  
 U.S. COMMERCIAL AIRLINE LARGE JET AIRCRAFT  
 BY AIRCRAFT TYPE  
 (millions)

Fiscal Year	Total	Narrow Body				Wide Body			
		2 Engine	3 Engine	4 Engine	2 Engine	3 Engine	4 Engine		
<b>Historical*</b>									
1979	6.39	1.56	2.71	.99	.02	.64	.47		
1980	6.72	1.59	3.02	.79	.04	.75	.53		
1981	6.25	1.68	2.80	.47	.06	.74	.50		
1982	6.30	1.87	2.68	.35	.07	.80	.53		
1983	6.62	2.21	2.65	.31	.16	.77	.52		
<b>Forecast</b>									
1984	6.78	2.36	2.60	.25	.24	.80	.53		
1985	6.83	2.53	2.55	.15	.26	.80	.54		
1986	6.96	2.74	2.40	.15	.33	.80	.54		
1987	7.03	2.91	2.20	.15	.43	.80	.54		
1988	7.15	3.13	2.00	.15	.53	.80	.54		
1989	7.35	3.28	1.91	.14	.67	.79	.56		
1990	7.48	3.41	1.72	.14	.85	.79	.57		
1991	7.69	3.54	1.64	.14	1.00	.79	.58		
1992	7.89	3.73	1.52	.14	1.13	.78	.59		
1993	8.11	3.93	1.44	.13	1.23	.78	.60		
1994	8.32	4.20	1.32	.11	1.30	.77	.62		
1995	8.52	4.44	1.20	.08	1.41	.77	.62		

\*Source: FAA Aircraft Utilization and Propulsion Reliability Report.

TABLE 4

COMMUTER AIRLINES PASSENGER TRAFFIC (1)  
(millions)

Fiscal Year	Revenue Passenger Enplanements			Revenue Passenger Miles		
	Total	48 States (2)	Hawaii/ Puerto Rico/ Virgin Island	Total	48 States (2)	Hawaii/ Puerto Rico/ Virgin Island
<b>Historical*</b>						
1979r	12.5	10.7	1.8	1,503.0	1,374.7	128.4
1980r	13.9	12.4	1.5	1,782.6	1,674.8	107.8
1981r	15.8	14.0	1.8	2,109.4	1,972.6	136.8
1982 (3)	17.1	14.9	2.2	2,334.8	2,147.4	187.4
1983E	19.5	16.9	2.6	2,712.8	2,478.8	234.0
<b>Forecast</b>						
1984	21.5	18.5	3.0	3,106.0	2,849.0	257.0
1985	23.4	20.0	3.4	3,431.7	3,140.0	291.7
1986	25.3	21.5	3.8	3,766.7	3,440.0	326.7
1987	27.3	23.0	4.3	4,111.7	3,749.0	362.7
1988	29.3	24.6	4.7	4,482.5	4,083.6	398.9
1989	31.4	26.4	5.0	4,888.4	4,461.6	426.8
1990	33.6	28.3	5.3	5,322.1	4,867.6	454.5
1991	36.0	30.3	5.7	5,784.3	5,302.5	481.8
1992	38.4	32.4	6.0	6,275.5	5,767.2	508.3
1993	40.9	34.6	6.3	6,796.3	6,262.6	533.7
1994	43.3	36.7	6.6	7,313.2	6,752.8	560.4
1995	46.1	39.2	6.9	7,916.0	7,330.4	585.6

E - Estimate \*Source: Civil Aeronautics Board

(1) Includes the traffic of commuter carriers holding Section 401 certificates and not reporting on CAB Form 298-C. The following traffic is duplicated in Table 1:

	Enplanements (Millions)	RPM's (Millions)	Enplanements (Millions)	RPM's (Millions)
1979	2.364	356.0	1982	741.0
1980	4.250	627.4	1983E	434.9
1981	5.652	994.7		

(2) Forecasts exclude Alaska Commuter Traffic.

(3) Fiscal year 1982 excludes Altair because of conversion to all jet fleet.

(r) Revised

TABLE 5  
 TOTAL COMMUTER PASSENGER AIRCRAFT IN  
 U.S. COMMUTER AIRLINE SERVICE  
 BY AIRCRAFT TYPE 1/

As of January 1	Total	Less Than 15 Seats	15-19 Seats	20-40 Seats	More than 40 Seats
<b>Historical*</b>					
1979	1413	861	365	101	86
1980	1313	734	383	99	97
1981	1388	716	433	117	122
1982	1494	701	493	125	175
1983E	1500	698	495	128	179
<b>Forecast</b>					
1984	1606	749	517	152	188
1985	1682	760	531	188	203
1986	1762	772	545	227	218
1987	1838	786	559	261	232
1988	1927	800	575	303	249
1989	2015	815	597	328	275
1990	2107	832	621	353	301
1991	2195	849	643	377	326
1992	2287	867	666	402	352
1993	2378	885	690	426	377
1994	2471	905	713	451	402
1995	2537	915	725	472	425

\*Source: FAA Aircraft Utilization and Propulsion Reliability Report

E = Estimate

1/ Includes only aircraft with 60 seats or less. Aircraft also included in general aviation fleet in Table 6.

TABLE 6

ESTIMATED ACTIVE GENERAL AVIATION  
AIRCRAFT BY TYPE OF AIRCRAFT <sup>1/</sup>  
(thousands)

As of January 1 Historical*	Fixed Wing										Rotorcraft		
	Total	Piston		Turboprop	Turbojet	Piston	Turbine	Turbine	Piston	Turbine	Turbine	Balloons/ Dirigibles/ Gliders	
		Single Engine	Multi- Engine										
1979	198.8	160.7	23.2	3.1	2.5	2.8	2.5	2.5	2.8	2.5	2.5	4.0	
1980	210.3	168.4	25.1	3.5	2.7	3.1	2.7	2.7	3.1	2.7	2.7	4.8	
1981	211.0	168.4	24.6	4.1	3.0	2.8	3.2	3.2	2.8	3.2	3.2	4.9	
1982	213.2	167.9	25.5	4.7	3.2	3.3	3.7	3.7	3.3	3.7	3.7	5.0	
1983	209.8	164.2	25.0	5.2	4.0	2.4	3.7	3.7	2.4	3.7	3.7	5.2	
Forecast													
1984	207.0	160.6	24.7	5.5	4.2	2.4	4.3	4.3	2.4	4.3	4.3	5.3	
1985	211.0	162.9	25.0	6.0	4.5	2.4	4.8	4.8	2.4	4.8	4.8	5.4	
1986	216.9	166.7	25.6	6.6	4.9	2.3	5.2	5.2	2.3	5.2	5.2	5.6	
1987	224.5	172.0	26.5	7.1	5.2	2.3	5.5	5.5	2.3	5.5	5.5	5.9	
1988	233.6	178.7	27.5	7.6	5.5	2.3	5.8	5.8	2.3	5.8	5.8	6.2	
1989	244.7	187.1	28.8	8.1	5.7	2.3	6.1	6.1	2.3	6.1	6.1	6.6	
1990	251.8	192.2	29.6	8.6	5.9	2.2	6.5	6.5	2.2	6.5	6.5	6.8	
1991	259.0	197.0	30.5	9.1	6.2	2.2	6.7	6.7	2.2	6.7	6.7	7.1	
1992	266.6	202.4	31.4	9.6	6.5	2.2	7.2	7.2	2.2	7.2	7.2	7.3	
1993	274.0	207.7	32.2	10.1	6.7	2.2	7.5	7.5	2.2	7.5	7.5	7.6	
1994	281.0	212.6	33.0	10.5	6.9	2.1	8.1	8.1	2.1	8.1	8.1	7.8	
1995	287.0	216.8	33.7	10.9	7.1	2.1	8.4	8.4	2.1	8.4	8.4	8.0	

\*Source: FAA Statistical Handbook of Aviation

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 1 hour during the previous calendar year.

<sup>1/</sup> Includes commuter aircraft shown in Table 5.

TABLE 7  
ESTIMATED ACTIVE GENERAL AVIATION  
AIRCRAFT BY FAA REGION 1/  
(thousands)

		FAA Region									
As of	Total	ANE	AEA	ASO	AGL	ACE	ASW	AWP	ANM	AAL	
<i>Historical*</i>											
1979	198.8	7.5	23.7	29.5	37.5	13.8	26.7	31.3	23.0	5.8	
1980	210.3	7.4	22.9	29.7	39.7	14.1	30.9	35.3	24.4	5.9	
1981	211.0	7.4	23.0	29.8	39.9	14.1	31.0	35.4	24.5	5.9	
1982**	213.2	7.0	21.2	32.1	40.0	14.0	32.2	36.7	23.8	6.2	
1983	209.8	7.7	22.8	32.2	37.0	12.8	34.0	34.4	22.1	6.8	
<i>Forecast</i>											
1984	207.0	6.8	20.7	31.1	38.8	13.5	31.3	35.7	23.1	6.0	
1985	211.0	6.8	21.1	31.8	39.5	13.8	31.9	36.3	23.6	6.2	
1986	216.9	7.1	21.6	32.7	40.7	14.2	32.8	37.3	24.2	6.3	
1987	224.5	7.3	22.4	33.9	42.1	14.7	33.9	38.6	25.1	6.5	
1988	233.6	7.6	23.3	35.2	43.8	15.3	35.3	40.2	26.1	6.8	
1989	244.7	8.0	24.4	36.8	45.9	16.0	37.0	42.2	27.3	7.1	
1990	251.8	8.3	25.1	37.9	47.3	16.5	38.0	43.3	28.1	7.3	
1991	259.0	8.5	25.7	39.0	48.6	17.0	39.2	44.5	28.9	7.6	
1992	266.6	8.7	26.5	40.2	50.0	17.5	40.3	45.8	29.8	7.8	
1993	274.0	8.9	27.3	41.3	51.5	18.0	41.4	47.1	30.6	7.9	
1994	281.0	9.2	27.9	42.3	52.7	18.4	42.5	48.4	31.4	8.2	
1995	287.0	9.4	28.5	43.3	53.7	18.8	43.4	49.4	32.1	8.4	

\*Source: FAA Statistical Handbook of Aviation

Detail may not add to total because of independent rounding.

\*\*Regional totals were revised based upon their standard errors so that they sum to the national total.

1/ Includes commuter aircraft shown in Table 5.

TABLE 8

ESTIMATED HOURS FLOWN IN  
GENERAL AVIATION BY TYPE OF AIRCRAFT  
(millions)

Fiscal Year	Total	Fixed Wing				Rotorcraft			Balloons Dirigibles Glider
		Piston		Turbojet	Turboprop	Turbojet	Piston	Turbine	
		Single Engine	Multi- Engine						
Historical*									
1979	42.3	29.7	6.8	1.8	1.2	.9	1.6	.3	
1980	41.6	28.8	6.6	2.1	1.3	.8	1.6	.4	
1981	41.0	27.9	6.4	2.2	1.5	.9	1.8	.4	
1982	37.8	25.2	6.0	2.1	1.6	.7	1.8	.4	
1983E	36.6	23.8	5.8	2.2	1.7	.6	2.1	.4	
Forecast									
1984	37.6	24.1	6.0	2.4	1.8	.6	2.3	.4	
1985	39.1	24.9	6.2	2.6	1.9	.6	2.5	.4	
1986	41.1	26.1	6.4	2.8	2.1	.5	2.7	.5	
1987	43.3	27.7	6.6	3.0	2.2	.5	2.8	.5	
1988	45.9	29.7	6.8	3.2	2.2	.5	3.0	.5	
1989	47.7	31.1	6.9	3.3	2.3	.4	3.2	.5	
1990	49.6	32.3	7.1	3.4	2.4	.4	3.4	.6	
1991	51.4	33.6	7.2	3.6	2.5	.3	3.6	.6	
1992	53.3	34.9	7.4	3.8	2.6	.3	3.7	.6	
1993	55.1	36.2	7.6	3.9	2.6	.3	3.9	.6	
1994	56.9	37.3	7.7	4.1	2.7	.3	4.1	.7	
1995	58.4	38.4	7.8	4.2	2.8	.3	4.2	.7	

E - Estimate

\*Source: FAA Statistical Handbook of Aviation

Detail may not add to total because of independent rounding.

TABLE 9  
ESTIMATED FUEL CONSUMED BY  
GENERAL AVIATION BY TYPE OF AIRCRAFT  
(millions of gallons)

Fiscal Year	Total	Fixed Wing					Rotorcraft		
		Piston		Turbojet	Turboprop	Turbojet	Piston	Turbine	Other
		Single Engine	Multi-Engine						
<b>Historical*</b>									
1979	1,299.8	296.1	241.9	192.6	489.6	18.4	60.2	1.0	
1980	1,291.0	287.6	231.1	223.9	474.6	13.3	59.7	.8	
1981	1,257.3	276.5	206.1	219.6	483.2	13.3	57.8	.8	
1982	1,314.2	251.2	197.4	230.8	562.1	9.7	62.5	.5	
1983E	1,348.5	237.0	190.8	241.8	597.2	8.3	72.9	.5	
<b>Forecast</b>									
1984	1,422.1	240.0	197.4	263.8	632.3	8.3	79.8	.5	
1985	1,500.7	248.0	203.9	285.7	667.5	8.3	86.8	.5	
1986	1,617.2	260.0	210.6	307.7	737.7	6.9	93.7	.6	
1987	1,700.3	275.9	217.1	329.7	772.9	6.9	97.2	.6	
1988	1,755.7	295.8	223.7	351.7	773.0	6.8	104.1	.6	
1989	1,824.5	309.8	227.0	362.7	807.9	5.5	111.0	.6	
1990	1,896.2	321.7	233.6	373.7	843.1	5.4	117.9	.8	
1991	1,975.4	334.7	236.9	395.6	878.3	4.2	124.9	.8	
1992	2,055.5	347.6	243.5	417.6	913.4	4.2	128.4	.8	
1993	2,093.5	360.6	250.0	428.6	914.0	4.1	135.3	.9	
1994	2,171.1	371.5	253.3	450.6	948.5	4.0	142.3	.9	
1995	2,234.9	382.5	256.6	461.6	983.6	4.0	145.7	.9	

E - Estimate

\*Source: FAA APO Estimates

TABLE 10

ESTIMATED FUEL CONSUMED BY  
UNITED STATES DOMESTIC CIVIL AVIATION  
(millions of gallons)

Fiscal Year	Total Jet Fuel and Aviation Gasoline		Jet Fuel		Aviation Gasoline		
	Gasoline	Total	Air Carrier	General Aviation	Total	Air Carrier	General Aviation
Historical*							
1979	10,589	10,017	9,275	742	572	15	557
1980	10,619	10,073	9,296	777	546	13	533
1981	9,804	9,296	8,585	761	508	11	497
1982	9,720	9,253	8,398	855	467	9	458
1983E	10,010	9,566	8,654	912	444	7	437
Forecast							
1984	10,226	9,774	8,798	976	452	6	446
1985	10,488	10,022	8,982	1,040	466	5	461
1986	10,733	10,250	9,111	1,139	483	5	478
1987	10,951	10,446	9,246	1,200	505	4	501
1988	11,207	10,677	9,448	1,229	530	3	527
1989	11,472	10,927	9,645	1,282	545	2	543
1990	11,697	11,133	9,798	1,335	564	2	562
1991	12,028	11,449	10,050	1,399	579	2	577
1992	12,321	11,723	10,264	1,459	598	2	596
1993	12,537	11,919	10,440	1,479	618	2	616
1994	12,758	12,126	10,585	1,541	632	2	630
1995	13,019	12,373	10,782	1,591	646	2	644

E - Estimate

\*Source: FAA APO Estimates

Domestic civil aviation is defined for purposes of the table to include all civil aircraft flights which originate and terminate within the 50 states. Estimates of fuel consumed by airframe and aircraft engine manufacturers, whether for flight testing, or ground testing are not shown here because they are not available for the domestic industry as a whole and estimates cannot be developed with any assurance of accuracy. Estimates of fuel consumed by the supplemental, contract and intrastate carriers are included in the "Air Carrier" columns. It should also be noted that general aviation fuel consumption is not reported and historical series are estimates.

TABLE 11

TOTAL ITINERANT AND LOCAL AIRCRAFT OPERATIONS  
AT AIRPORTS WITH FAA TRAFFIC CONTROL SERVICE  
(millions)

Fiscal Year	Total	Itinerant	Local	Number of Towers
<b>Historical*</b>				
1979	69.0	45.4	23.6	431
1980	66.2	44.3	21.9	432
1981	61.6	42.0	19.5	433
1982	50.6	35.9	14.7	375
1983E	53.3	38.0	15.3	390
<b>Forecast</b>				
1984	57.2	40.6	16.6	399
1985	61.6	43.1	18.5	399
1986	65.8	45.5	20.3	399
1987	70.3	48.0	22.3	399
1988	74.5	50.4	24.1	399
1989	78.8	52.9	25.9	399
1990	83.4	55.5	27.9	399
1991	85.6	57.0	28.6	399
1992	88.3	58.6	29.7	399
1993	91.2	60.3	30.9	399
1994	93.4	61.5	31.9	399
1995	95.6	63.1	32.5	399

\*Source: FAA Air Traffic Activity.

1982-1984 operations reflect the temporary closures of FAA Air Traffic Control Towers. Detail may not add to total because of independent rounding.

An aircraft operation is defined as an aircraft arrival at or a departure from an airport with FAA traffic control service. A local operation is performed by an aircraft that: operates in the local traffic pattern or within sight of the tower; is known to be departing for or arriving from flight in local practice areas; or executes simulated instrument approaches or low passes at the airport. All aircraft arrivals and departures other than local (as defined above) are classified as itinerant operations.

TABLE 12

ITINERANT AIRCRAFT OPERATIONS AT AIRPORTS WITH  
FAA TRAFFIC CONTROL SERVICE  
(millions)

Fiscal Year	Total	Air Taxi/			General Aviation	Military
		Air Carrier	Commuter			
<b>Historical*</b>						
1979	45.4	10.4	4.4		29.4	1.2
1980	44.3	10.1	4.6		28.3	1.2
1981	42.0	9.5	4.9		26.4	1.2
1982	35.9	9.0	5.1		20.7	1.1
1983E	38.0	9.7	5.9		21.3	1.2
<b>Forecast</b>						
1984	40.6	10.1	6.1		23.2	1.2
1985	43.1	10.2	6.5		25.2	1.2
1986	45.5	10.3	6.8		27.2	1.2
1987	48.0	10.4	7.2		29.2	1.2
1988	50.4	10.5	7.6		31.1	1.2
1989	52.9	10.7	7.9		33.1	1.2
1990	55.5	10.9	8.3		35.1	1.2
1991	57.0	11.1	8.6		36.1	1.2
1992	58.6	11.3	9.0		37.1	1.2
1993	60.3	11.5	9.4		38.2	1.2
1994	61.5	11.6	9.7		39.0	1.2
1995	63.1	11.9	10.2		39.8	1.2

\*Source: FAA Air Traffic Activity.

Detail may not add to total because of independent rounding.  
See Table 10 for definition of itinerant operations.

TABLE 13

LOCAL AIRCRAFT OPERATIONS AT AIRPORTS  
WITH FAA TRAFFIC CONTROL SERVICE  
(millions)

Fiscal Year	Total	General Aviation	Military
<b>Historical*</b>			
1979	23.6	22.3	1.3
1980	21.9	20.6	1.3
1981	19.5	18.2	1.3
1982	14.7	13.5	1.2
1983E	15.3	14.0	1.3
<b>Forecast</b>			
1984	16.6	15.3	1.3
1985	18.5	17.2	1.3
1986	20.3	19.0	1.3
1987	22.3	21.0	1.3
1988	24.1	22.8	1.3
1989	25.9	24.6	1.3
1990	27.9	26.6	1.3
1991	28.6	27.3	1.3
1992	29.7	28.4	1.3
1993	30.9	29.6	1.3
1994	31.9	30.6	1.3
1995	32.5	31.2	1.3

\*Source: FAA Air Traffic Activity

Detail may not add to total because of independent rounding.  
See Table 10 for definition of local operations.

TABLE 14  
 INSTRUMENT OPERATIONS AT AIRPORTS WITH  
 FAA TRAFFIC CONTROL SERVICE  
 (millions)

Fiscal Year	Total	Air Carrier	Air Taxi/		General Aviation	Military
			Commuter	Commuter		
<b>Historical*</b>						
1979	36.2 ( 8.6)	10.7	3.7	17.9	3.9	
1980	38.2 (10.2)	10.6	4.1	19.3	4.1	
1981	37.2 ( 9.6)	10.2	4.6	18.5	3.9	
1982	31.6 ( 6.5)	9.5	4.6	13.9	3.6	
1983E	34.0 ( 7.0)	10.1	5.3	14.8	3.8	
<b>Forecast</b>						
1984	36.6 ( 8.1)	10.6	5.5	16.7	3.8	
1985	39.4 ( 9.6)	10.7	6.0	18.9	3.8	
1986	40.8 ( 9.9)	10.8	6.3	19.9	3.8	
1989	42.4 (10.3)	10.9	6.7	21.0	3.8	
1988	44.2 (10.8)	11.1	7.1	22.2	3.8	
1989	45.3 (10.9)	11.3	7.4	22.8	3.8	
1990	46.6 (11.1)	11.5	7.8	23.5	3.8	
1991	47.8 (11.2)	11.7	8.2	24.1	3.8	
1992	49.1 (11.4)	11.9	8.6	24.8	3.8	
1993	50.3 (11.5)	12.1	9.1	25.3	3.8	
1994	51.2 (11.5)	12.3	9.4	25.7	3.8	
1995	52.3 (11.5)	12.5	9.9	26.1	3.8	

\*Source: FAA Air Traffic Activity.

An instrument operation is defined as the handling by an FAA terminal traffic control facility of the arrival, departure, or overflight at an airport of an aircraft on an IFR flight plan or the provision of IFR separation to other aircraft by an FAA terminal traffic control facility. Non-IFR instrument counts at Terminal Control Area (TCA) facilities and Stage III of expanded area radar service are included in the totals and noted in parenthesis as an information item (see Table 14).

The data include instrument operations at FAA operated military radar approach control facilities. Detail may not add to total because of independent rounding.

TABLE 15  
NON-IFR INSTRUMENT OPERATIONS  
(millions)

Fiscal Year	Total	Terminal Control Areas		Expanded Radar Service Area Stage III
		Terminal Control Areas	Expanded Radar Service Area Stage III	
<b>Historical*</b>				
1979	8.6	2.4	6.2	
1980	10.2	2.7	7.6	
1981	9.6	2.8	6.8	
1982	6.5	1.9	4.6	
1983	7.0	2.3	4.7	
<b>Forecast</b>				
1984	8.1	2.4	5.7	
1985	9.6	2.7	6.9	
1986	9.9	2.9	7.0	
1987	10.3	3.2	7.1	
1988	10.8	3.6	7.2	
1989	10.9	3.6	7.3	
1990	11.1	3.7	7.4	
1991	11.2	3.7	7.5	
1992	11.4	3.8	7.6	
1993	11.5	3.9	7.6	
1994	11.5	3.9	7.6	
1995	11.5	3.9	7.6	

\*Source: FAA Air Traffic Activity.  
1982-1983 operations reflect the temporary termination of Stage III Service at 34 locations.

TABLE 16

IFR AIRCRAFT HANDLED  
 FAA AIR ROUTE TRAFFIC CONTROL CENTERS  
 (millions)

Fiscal Year	Total					Aircraft Handled		
	Aircraft Handled	IFR Departures	Overs	Air Carrier	Air Taxi/Commuter	General Aviation	Military	
Historical*								
1979	29.9	11.6	6.6	14.0	2.3	8.8	4.8	
1980	30.1	11.7	6.7	13.9	2.6	3.9	4.7	
1981	29.3	11.4	6.5	12.9	2.9	8.9	4.7	
1982	27.8	10.7	6.4	12.7	3.3	7.5	4.3	
1983E	29.4	11.3	6.8	13.3	3.7	7.8	4.6	
Forecast								
1984	31.2	12.2	6.8	13.8	4.2	8.6	4.6	
1985	32.1	12.6	6.9	14.1	4.4	9.0	4.6	
1986	33.1	13.0	7.1	14.2	4.8	9.5	4.6	
1987	34.0	13.4	7.2	14.3	5.2	9.9	4.6	
1988	35.1	13.9	7.3	14.5	5.4	10.6	4.6	
1989	36.3	14.4	7.5	14.8	5.8	11.1	4.6	
1990	37.4	14.9	7.6	15.1	6.2	11.5	4.6	
1991	38.4	15.3	7.8	15.4	6.4	12.0	4.6	
1992	39.6	15.8	8.0	15.7	6.8	12.5	4.6	
1993	40.7	16.3	8.1	16.0	7.2	12.9	4.6	
1994	41.5	16.6	8.3	16.3	7.4	13.2	4.6	
1995	42.6	17.1	8.4	16.6	7.8	13.6	4.6	

\*Source: FAA Air Traffic Activity.

Detail may not add to total because of independent rounding.

The aircraft handled count consists of the number of IFR departures multiplied by two plus the number of overs. This concept recognizes that for each departure there is a landing. An IFR departure is defined as an original IFR flight plan filed either prior to departure or after becoming airborne. An overflight originates outside the ARTCC area and passes through the area without landing.

TABLE 17

IFR DEPARTURES AND OVERS  
FAA AIR ROUTE TRAFFIC CONTROL CENTERS  
(millions)

Fiscal Year	Air Carrier		Air Taxi/Commuter		General Aviation		Military	
	IFR Departures	Overs	IFR Departures	Overs	IFR Departures	Overs	IFR Departures	Overs
<b>Historical*</b>								
1979	5.0	3.9	1.1	0.1	3.8	1.2	1.7	1.4
1980	4.9	4.0	1.2	0.1	3.9	1.2	1.6	1.4
1981	4.6	3.8	1.4	0.1	3.9	1.2	1.6	1.4
1982	4.4	3.8	1.6	0.1	3.2	1.2	1.5	1.3
1983E	4.7	4.0	1.8	0.2	3.3	1.2	1.6	1.4
<b>Forecast</b>								
1984	4.9	4.0	2.0	0.2	3.7	1.2	1.6	1.4
1985	5.0	4.1	2.1	0.2	3.9	1.2	1.6	1.4
1986	5.0	4.2	2.3	0.2	4.1	1.3	1.6	1.4
1987	5.0	4.3	2.5	0.2	4.3	1.3	1.6	1.4
1988	5.1	4.3	2.6	0.2	4.6	1.4	1.6	1.4
1989	5.2	4.4	2.8	0.2	4.8	1.5	1.6	1.4
1990	5.3	4.5	3.0	0.2	5.0	1.5	1.6	1.4
1991	5.4	4.6	3.1	0.2	5.2	1.6	1.6	1.4
1992	5.5	4.7	3.3	0.2	5.4	1.7	1.6	1.4
1993	5.6	4.8	3.5	0.2	5.6	1.7	1.6	1.4
1994	5.7	4.9	3.6	0.2	5.7	1.8	1.6	1.4
1995	5.8	5.0	3.8	0.2	5.9	1.8	1.6	1.4

\*Source: FAA Air Traffic Activity.

TABLE 18

TOTAL FLIGHT SERVICES, PILOT BRIEFS AND FLIGHT PLANS  
ORIGINATED AT FAA FLIGHT SERVICE STATIONS  
AND COMBINED STATION/TOWERS  
(millions)

Fiscal Year	Flight Plans Originated				
	Total Flight Services	Pilot Briefs	Total	IFR-DVFR	VFR
<b>Historical*</b>					
1979	66.6	18.7	9.5	6.9	2.6
1980	64.3	18.3	9.0	6.6	2.4
1981	62.6	17.7	8.8	6.5	2.3
1982	62.4	17.8	8.5	6.5	2.0
1983	56.9	16.0	8.1	6.3	1.9
<b>Forecast</b>					
1984	60.7	17.1	8.8	6.7	2.1
1985	64.2	18.2	9.3	7.0	2.3
1986	67.5	19.3	9.7	7.3	2.4
1987	71.2	20.4	10.3	7.7	2.6
1988	74.4	21.4	10.8	8.1	2.7
1989	77.8	22.5	11.4	8.5	2.9
1990	80.6	23.6	11.7	8.7	3.0
1991	83.0	24.3	12.2	9.1	3.1
1992	85.4	25.1	12.6	9.4	3.2
1993	87.4	25.8	12.9	9.7	3.2
1994	89.0	26.4	13.1	9.9	3.2
1995	90.8	27.0	13.4	10.2	3.2

\*Source: FAA Air Traffic Activity.

Detail may not add to total because of independent rounding.

Total Flight Services is a weighted workload measurement derived by multiplying pilot briefs and flight plans originated by two and adding the number of aircraft contacted. A flight plan may be filed orally or in writing to qualify for inclusion in the activity count. The data forecast in Tables 17 and 18 are based upon the current number of and configuration of the FSS and CS/T. Changes in their number or configuration may necessitate adjustments in the forecasts.

TABLE 19

AIRCRAFT CONTACTED FAA FLIGHT SERVICE STATIONS  
AND COMBINED STATION/TOWERS  
(millions)

Fiscal Year	Total	IFR-DVFR	VFR	Air Carrier	Air Taxi/		General Aviation	Military
					Commuter			
<b>Historical*</b>								
1979	10.2	2.0	8.1	.4	.9		8.4	.4
1980	9.6	2.0	7.7	.4	.9		7.9	.4
1981	9.6	2.0	7.6	.4	.9		7.9	.4
1982	9.7	2.5	7.2	.4	1.2		7.7	.4
1983	8.6	2.3	6.3	.4	1.1		6.6	.4
<b>Forecast</b>								
1984	8.9	2.4	6.5	.4	1.2		6.9	.4
1985	9.2	2.6	6.6	.3	1.2		7.3	.4
1986	9.5	2.6	6.9	.3	1.2		7.6	.4
1987	9.8	2.7	7.1	.3	1.2		7.9	.4
1988	10.0	2.7	7.3	.3	1.2		8.1	.4
1989	10.0	2.7	7.3	.3	1.2		8.1	.4
1990	10.0	2.7	7.3	.3	1.2		8.1	.4
1991	10.0	2.8	7.2	.3	1.2		8.1	.4
1992	10.0	2.8	7.2	.3	1.2		8.1	.4
1993	10.0	2.8	7.2	.3	1.2		8.1	.4
1994	10.0	2.8	7.2	.3	1.2		8.1	.4
1995	10.0	2.8	7.2	.3	1.2		8.1	.4

\*Source: FAA Air Traffic Activity.

Detail may not add to total because of independent rounding.

Aircraft contacted represent a record of the number of aircraft with which FAA facilities (FSS, CS/T) have established radio communications contact. One count is made for each en route, landing or departing aircraft contacted by a facility, regardless of the number of contacts with an individual aircraft. A flight involving contacts with five different facilities, disregarding the number of contacts with each, would be counted as five aircraft contacted.

TABLE 20

ACTIVE PILOTS BY TYPE OF CERTIFICATE  
(thousands)

As of January 1	Total	Students	Private	Commercial	Airline			Glider	Other	Instrument Rated (1)
					Transport	Helicopter	Other			
Historical*										
1979	798.8	204.9	337.6	185.8	55.9	4.9	6.5	3.2	236.3	
1980	814.7	210.2	343.3	182.1	63.7	5.2	6.8	3.4	247.1	
1981	827.0	199.8	357.5	183.4	69.6	6.0	7.0	3.7	260.5	
1982	764.2	179.9	328.6	168.6	70.3	6.5	7.4	3.0	252.5	
1983	733.3	156.4	322.1	165.1	73.5	7.0	7.8	1.4	255.1	
Forecast										
1984	742.3	153.8	326.9	167.7	76.8	7.4	8.2	1.5	263.7	
1985	761.2	157.9	335.1	170.1	80.2	7.7	8.6	1.6	274.3	
1986	790.2	171.4	343.9	172.3	83.7	8.1	9.1	1.7	285.3	
1987	815.7	181.9	352.7	174.2	87.2	8.4	9.5	1.8	296.7	
1988	840.2	192.1	361.0	175.9	90.7	8.7	9.9	1.9	308.5	
1989	864.5	202.6	368.9	177.5	94.2	9.0	10.3	2.0	317.8	
1990	888.7	213.3	376.5	178.9	97.8	9.3	10.7	2.2	327.3	
1991	910.7	222.4	383.6	180.2	101.4	9.6	11.1	2.4	337.2	
1992	930.7	229.8	390.6	181.3	104.9	9.9	11.6	2.6	347.2	
1993	952.1	238.9	397.3	182.4	108.6	10.2	11.9	2.8	361.2	
1994	971.3	246.4	403.8	183.3	112.1	10.5	12.2	3.0	371.9	
1995	990.6	254.1	410.2	184.1	115.8	10.8	12.4	3.2	380.0	

\*Source: FAA Statistical Handbook of Aviation

Detail may not add to total because of rounding.

(1) Should not be added to other categories in deriving total.

TABLE 21

ACTIVE U.S. MILITARY AIRCRAFT IN  
CONTINENTAL UNITED STATES(1)

Fiscal Year	Total	Fixed Wing Aircraft			Helicopter
		Jet	Turboprop	Piston	
<b>Historical*</b>					
1979	18,526	8,656	1,859	850	7,161
1980	18,969	8,794	1,869	699	7,607
1981	19,363	9,111	1,943	591	7,718
1982 <sup>r</sup>	21,728	9,647	1,900	516	9,665
1983	21,757	9,642	1,919	491	9,705
<b>Forecast</b>					
1984	21,613	9,701	1,945	421	9,546
1985	21,828	9,767	1,956	420	9,685
1986	22,019	9,852	1,968	421	9,778
1987	22,330	10,049	1,974	420	9,887
1988	22,853	10,264	2,000	421	10,168
1989	23,241	10,572	2,021	416	10,232
1990	23,346	10,635	2,022	418	10,271
1991	23,417	10,674	2,035	420	10,288
1992	23,350	10,637	2,023	418	10,272
1993	23,350	10,637	2,023	418	10,272
1994	23,350	10,637	2,023	418	10,272
1995	23,350	10,637	2,023	418	10,272

r = Revised \*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.

(2) Detailed planning information not available beyond 1992. Fiscal Years 1993 through 1995 projected at 1992 level.

TABLE 22

ACTIVE U.S. MILITARY AIRCRAFT FLYING  
HOURS IN CONTINENTAL UNITED STATES(1)  
(Thousands)

Fiscal Year	Total	Fixed Wing Aircraft			Helicopter
		Jet	Turboprop	Piston	
Historical*					
1979	5,319	2,960	684	398	1,277
1980	5,255	2,904	796	235	1,320
1981	5,850	2,966	840	253	1,791
1982 <sup>r</sup>	6,177	3,347	762	192	1,876
1983	6,232	3,417	754	165	1,896
Forecast					
1984	6,323	3,473	757	163	1,930
1985	6,517	3,575	773	164	2,005
1986	6,708	3,699	780	165	2,064
1987	6,908	3,775	836	167	2,130
1988	7,091	3,903	817	168	2,203
1989	7,182	3,950	830	157	2,245
1990	7,223	3,968	850	147	2,258
1991	7,223	3,968	850	147	2,258
1992	7,223	3,968	850	147	2,258
1993	7,223	3,968	850	147	2,258
1994	7,223	3,968	850	147	2,258
1995	7,223	3,968	850	147	2,258

r = Revised \*Source: Office of the Secretary of Defense, Department of Defense  
(1) Includes Army, Air Force, Navy and Marine regular aircraft, as well as Reserve and National Guard Aircraft.

(2) Detailed planning information not available beyond 1990. Fiscal Years 1991 through 1995 projected at 1990 level.

TABLE 23

## ECONOMIC ASSUMPTIONS USED IN FAA FORECASTS

Calendar Year	Gross National Product (Billions 1972\$)				Consumer Price Index (1967=100)				Fuel Price Index (1972=100)				
	OMB 1/	Chase	DRI	Wharton	OMB 1/	Chase	DRI	Wharton	OMB 1/	Chase	DRI	Evans 2/	Wharton
<b>Historical</b>													
1979	1,476.7	1,479.4	1,479.4	1,479.4	211.1	217.5	217.5	217.5	220.4	244.3	244.3	244.3	244.3
1980	1,477.8	1,475.0	1,475.0	1,475.0	239.8	246.8	246.8	246.8	322.4	337.8	337.8	337.8	337.8
1981	1,506.6	1,513.8	1,513.8	1,513.8	266.3	272.4	272.4	272.4	367.0	375.8	375.8	375.8	375.8
1982	1,491.9	1,485.4	1,485.4	1,485.4	285.5	289.1	289.1	289.1	362.2	357.2	357.2	357.2	357.2
1983E	1,512.3	1,531.0	1,533.5	1,532.2	295.3	298.6	298.4	297.4	347.7	346.7	332.2	332.2	346.2
<b>Forecast</b>													
1984	1,598.3	1,601.1	1,610.9	1,608.2	307.1	314.6	312.7	314.1	355.6	360.0	330.2	403.8	366.6
1985	1,665.7	1,654.7	1,664.8	1,667.6	320.9	334.9	328.0	333.4	357.5	379.3	343.7	422.5	392.1
1986	1,732.4	1,711.5	1,717.6	1,710.4	335.6	336.0	344.7	354.3	359.4	422.2	365.7	455.2	411.5
1987	1,801.7	1,763.4	1,780.4	1,747.0	350.0	378.1	362.6	377.2	370.7	467.3	389.1	490.3	444.0
1988	1,873.8	1,816.8	1,836.0	1,807.6	364.0	401.6	384.4	401.3	386.2	521.1	424.6	524.9	472.0
1989	1,947.7	1,870.8	1,887.0	1,898.2	377.4	423.0	407.1	426.4	400.5	574.4	465.3	562.3	500.7
1990	1,998.3**	1,927.5	1,941.7	1,977.2	398.9**	446.8	432.3	453.0	433.7**	633.4	513.7	602.3	528.0
1991	2,062.3**	1,984.5	1,996.8	2,035.9	422.0**	471.1	459.6	480.8	468.0**	691.8	561.5	645.8	559.7
1992	2,120.0**	2,043.4	2,048.7	2,097.4	446.5**	496.3	489.0	509.9	505.0**	746.3	619.9	692.3	592.9
1993	2,179.4**	2,104.7*	2,098.9	2,160.3*	472.4**	522.6*	520.8	541.0*	544.9**	805.3*	683.7	742.1*	628.3
1994	2,231.7**	2,167.8*	2,149.8	2,225.1*	498.4**	550.3*	554.6	574.0*	586.3**	868.9*	754.2	795.6*	659.7
1995	2,298.6**	2,232.9*	2,201.2	2,291.9*	526.3**	579.5*	590.7	609.0*	630.3**	937.5*	829.6	852.9*	692.7

\* Extrapolated to 1995 for forecast purposes

\*\* Based on consensus growth rates of Chase, DRI, Evans and Wharton Forecasts

1/ Fiscal Year Basis

2/ Component of CPI (1967=100)

Source: Office of Management and Budget, December, 1983; Chase Econometrics, October, 1983; Data Resources, Inc., Fall, 1983; Evans Economics, Inc., October, 1983; and Wharton Econometric Associates, November, 1983

TABLE 24

## BASELINE AIR CARRIER ASSUMPTIONS - DOMESTIC OPERATIONS

Fiscal Year	Passenger Load Factor Percent	Average Seats Per Aircraft Number	Average Passenger Trip Length Miles	Revenue Per Passenger Mile		Average Domestic Jet Fuel Price Cents
				Current \$	67¢	
<b>Historical*</b>						
1979	63.0	136.4	719	8.47	4.01	48.7
1980	58.2	139.7	730	10.82	4.51	83.2
1981	57.7	142.9	749	12.93	4.86	100.8
1982	58.4	149.8	761	12.47	4.37	99.3
1983E	59.7	152.5	770	11.90	4.03	90.3
<b>Forecast</b>						
1984	61.0	155	770	12.44	4.05	92.4
1985	62.7	157	773	13.06	4.07	92.8
1986	63.4	160	776	13.73	4.09	93.4
1987	64.3	163	779	14.42	4.12	96.3
1988	65.0	166	782	15.11	4.15	100.3
1989	65.0	169	785	15.78	4.18	104.0
1990	65.0	171	788	16.59	4.16	112.7
1991	65.0	173	791	17.47	4.14	121.6
1992	65.0	175	794	18.40	4.12	131.2
1993	65.0	178	797	19.37	4.10	141.6
1994	65.0	181	800	20.33	4.08	152.3
1995	65.0	184	803	21.37	4.06	163.7

\* Source Civil Aeronautics Board.

# Glossary of Terms

## AERIAL APPLICATION

Aerial application in agriculture consists of those activities that involve the discharge of materials from aircraft flight and miscellaneous collection of minor related activities that do not require the distribution of any materials.

## AIRCRAFT CONTACTED

Aircraft with which the Flight Service Stations have established radio communications contact. One count is made for each enroute, landing or departing aircraft contacted by Flight Service Station regardless of the number of contacts made with an individual aircraft during the same flight.

## AIRCRAFT OPERATION

An aircraft arrival or departure from an airport with FAA airport traffic control service. There are two types of operations—local and itinerant.

1. Local operations are performed by aircraft which:
  - (a) Operate in the local traffic pattern or within sight of the tower.
  - (b) Are known to be departing for, or arriving from, flight in local practice areas located within a 20-mile radius of the control tower.
  - (c) Execute simulated instrument approaches or low passes at the airport.
2. ITINERANT OPERATIONS:  
All aircraft arrivals and departures other than local operations.

## AIRPORT TRAFFIC CONTROL TOWER

A central operations facility in the terminal air traffic control system, consisting of a tower cab structure, including an associated IFR room if radar equipped, using air/ground communications and/or radar, visual signaling and other devices, to provide safe and expeditious movement of terminal air traffic.

## AIR ROUTE TRAFFIC CONTROL CENTER (ARTCC)

A central operations facility in the air route traffic control system using air/ground communications and radar, primarily providing enroute separation and safe, expeditious movement of aircraft operating under instrument flight rules within the controlled airspace of that center.

## AIR TAXI OPERATIONS

Air taxi operations and commuter air carrier operations (takeoffs and landings) carrying passengers, mail or cargo for revenue in accordance with FAR Part 135 or Part 121.

## AIR TAXI OPERATORS

Operators of small aircraft "for hire" for specific trips. They operate under CAB Part 298 and FAR 135 which apply to aircraft of 12,500 pounds or less except under special exemption.

## AIR TRAFFIC HUB

Air traffic hubs are not airports; they are the cities and Standard Metropolitan Statistical Areas requiring aviation services and may include more than one airport. Communities fall into four classes as determined by each community's percentage of the total enplaned passengers.

Large: 1.00 percent (2,657,829 passengers and over in CY 1981).  
Medium: 0.25 percent to 0.99 percent (between 664,457 and 2,657,828 passengers in CY 1981).  
Small: 0.05 percent to 0.24 percent (between 132,891 and 664,456 passengers in CY 1981).  
Nonhub: Less than 0.05 percent (under 132,890 passengers in CY 1981).

#### ALL CARGO CARRIER

One of a class of air carriers holding certificates of public convenience and necessity issued by the CAB, authorizing the performance of scheduled air freight, express, and mail transportation over specified routes, as well as the conduct of nonscheduled operations, which may include passengers.

#### APPROACH CONTROL FACILITY

A terminal air traffic control facility providing approach control service.

#### AVAILABLE SEAT-MILES (ASM'S)

The aircraft miles flown in each 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 the purpose of transportation required by a business in which he is engaged.

#### CERTIFICATED ROUTE AIR CARRIER

An air carrier holding a certificate of public convenience and necessity issued by the Civil Aeronautics Board to conduct scheduled services over specified routes. Certain nonscheduled or charter operations may also be conducted by these carriers.

#### COMMON IFR ROOM

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

#### COMMUTER OPERATOR

Operators of small aircraft of a maximum size of 60 seats who perform at least five scheduled round trips per week between two or more points or carry mail. They operate under CAB Part 298, FAR 135, and at times FAR 121.

#### CONTRACT OPERATOR

An air carrier operating on a private for-hire basis, as distinguished from a public or common air carrier, holding a commercial operator certificate (issued by the FAA under FAR 121) authorizing the carrier to operate aircraft over 12,500 pounds for the transportation of goods or passengers for compensation or hire.

#### EXECUTIVE TRANSPORTATION

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

#### FAA FLIGHT PLAN

Specified 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 which provides preflight pilot briefing and enroute communications with VFR flights assist lost IFR/VFR aircraft, assist aircraft having

emergencies, relay ATC clearances, originate, classify, and disseminate Notices to Airmen, 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, FSSs take weather observations, issue airport advisories, administer airmen written examinations, and advise Customs and Immigration of transborder flight.

#### 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," presumably including those non-U.S. air carriers operating solely within their own domestic boundaries; but in practice the two terms are used interchangeably.

#### GENERAL AVIATION

All civil aviation activity except that of certificated route air carriers and air commuter operations. 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.

#### 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 plan) is equal to the number of landings (IFR flight plans closed).

#### INDUSTRIAL/SPECIAL FLYING

Any use of an aircraft for specialized work allied with industrial activity, excluding transportation and aerial

application. (Examples: pipeline patrol, survey, advertising, photography, helicopter hoist, etc.)

**INTERNATIONAL AND TERRITORIAL OPERATIONS**  
Operators of aircraft flying between the 50 States of the United States and foreign points, between the 50 States and U.S. possessions or territories, and between foreign points. Includes both the combination passenger/cargo and the all cargo carriers engaged in international and territorial operations.

#### INSTRUCTIONAL FLYING

Any use of an 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 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.

#### LARGE REGIONALS

Certificated air carriers with annual operating revenues of between \$10,000,000 and \$75,000,000.

#### MAJORS

Certificated air carriers with annual operating revenues of \$1,000,000,000 or more.

#### MEDIUM REGIONALS

Certificated air carriers with annual operating revenues of less than \$10,000,000.

#### NATIONALS

Certificated air carriers with annual operating revenues of between \$75,000,000 and \$1,000,000,000.

#### OTHER USE FLYING

Use of general aviation aircraft for purposes other than those in specific categories, such as business, personal, air taxi.

#### PERSONAL AND 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, NOTAMS, military activities, flow control information and other items as requested.

#### RAPCON

Radar Approach Control Facility (Air Force)

#### RATCF

Radar Approach Control Facility (Navy).

#### 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. Excluded are aircraft owned and operated in regularly scheduled, nonscheduled, or charter service by an air carrier certificated by the Civil Aeronautics Board or aircraft in excess of 12,500 pounds maximum gross takeoff weight owned and operated by a commercial operator certified by the FAA to engage in intrastate common carriage.

#### REVENUE PASSENGER ENPLANEMENTS

The count of the total number of passengers boarding aircraft. This include both originating and connecting passengers.

#### REVENUE PASSENGER LOAD FACTOR

Revenue passenger miles as a percent of available seat miles in revenue passenger services, representing 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 TON MILE (RTM)

One ton of revenue traffic transported one 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 enroute control procedures.

#### SUPPLEMENTAL AIR CARRIER

One of a class of air carriers holding certificates, issued by the CAB, authorizing them to perform passenger and cargo charter services supplementing the scheduled service of the certificated route air carriers. They are sometimes referred to as nonscheduled carriers.

#### TOTAL FLIGHT SERVICES

The sum of flight plans originated and pilot briefs, multiplied by two, plus the number of aircraft contacted.

#### U.S. FLAG CARRIERS OR AMERICAN FLAG CARRIER

One of a class of air carriers holding a certificate of public convenience and necessity issued by the CAB, approved by the President, authorizing scheduled operations over specified route between the United States (and/or its territories) and one or more foreign countries.

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