

September, 1980



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FAA LEVEL #

Aviation Forecasts

Fiscal Years 1981-1992

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Preface

The Federal Aviation Administration forecasts of FAA workload are developed annually for use in the Agency's future planning and decision making. The aviation activity at FAA towered airports, in the airspace under the control of the Air Route Traffic Control Centers, and the services provided by the Flight Service Stations are forecast for the several user groups—trunk and local service airlines, commuter airlines and air taxis, general aviation, and the military. Discussion of trends and events with special implications for aviation highlight the challenges and opportunities that lie ahead for aviation. Also presented are forecasts based on three alternative scenarios: economic expansion, energy conservation and stagflation. The alternative scenario forecasts provide a range around the

baseline forecasts for planning purposes both within the FAA as well as for other users of the FAA forecasts.

FAA aviation forecasts employ the Wharton Econometric Forecasting Associates', Inc., projections of key economic variables. These projections are combined with projections of aviation variables and professional judgement on the probabilities and consequences of events that affect aviation. The combination is used as input to the econometric models from which the forecasts are generated. Consequently, forecast users are urged to consider the assumptions presented with the baseline forecasts and the alternative scenarios for insight into what effects deviations from the expected state of the general economy will have on aviation.

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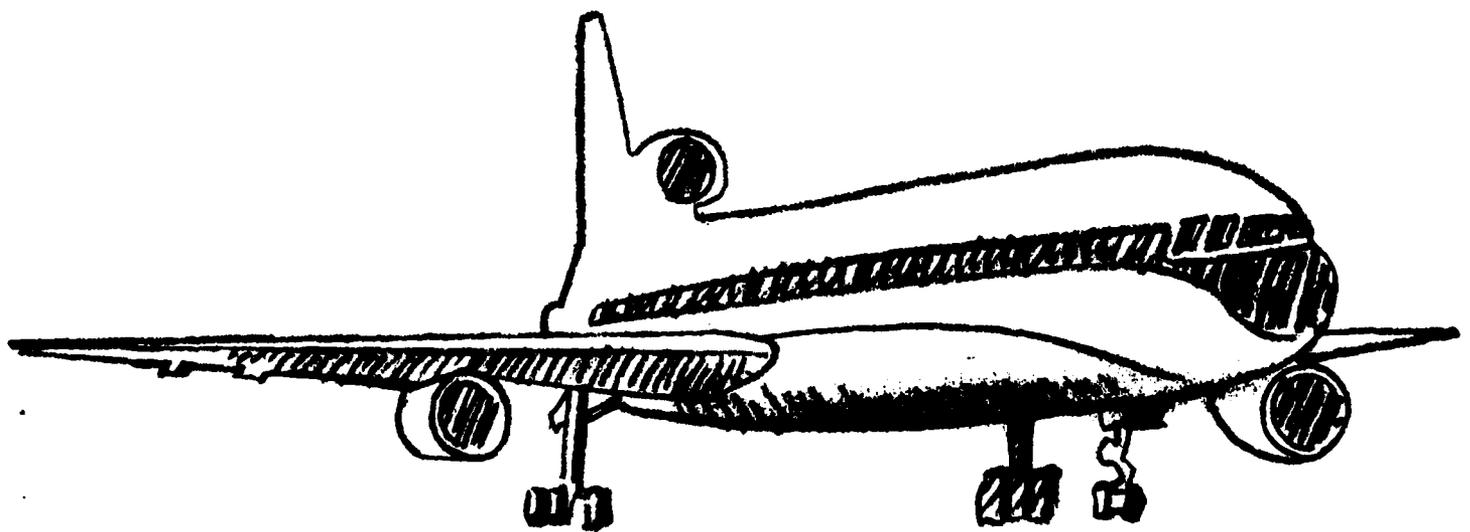
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Chapter I

The 1980's—A Decade of Transition for Aviation



On October 24, 1978, President Carter signed into law, the "Airline Deregulation Act of 1978." Passage of the Act represented the culmination of many years of study, discussion and hard work to forge a major legislative action which would completely change Government-industry relationships developed over 50 years. The Act represented the beginning of a new era for the American air transportation industry. The principal objective of the Act was to reduce Government economic regulation of the U.S. domestic air carrier industry by 1985. The air carriers were to operate virtually unencumbered in a competitive environment, subject only to the anti-trust and similar laws applicable to all U.S. industries. The full impact of deregulation is yet to be measured.

In the two years since the Act was passed, there has already been a considerable change in the character of the industry. The once clear lines of distinction between "trunk," "local service," and "commuter" airlines are becoming increasingly blurred. Patterns of service, route structures and equipment usage are changing in response to conditions in the marketplace for air transportation services.

The history of aviation has been one of change—change in the legislative framework, in technology, in operations, in procedures and in economic conditions. Notwithstanding all of these changes, the long-term trend for the industry has been growth. In this sense, the current changes stemming from economic deregulation are no different from previous changes in the challenges that are presented or in the opportunities for growth that continue to exist. Air travel, whether in a large jet transport or a small private plane, is no longer the novelty or adventure that it once was. The opportunity aviation offers for high speed, long distance travel is a part of everyday life. The safety, comfort and convenience it provides are taken for granted by most users. American aviation has evolved to the point where it now serves a mass market.

Change is underway within general aviation as it is among all sectors of aviation. The value of sales in 1980 by general aviation aircraft manufacturers in some cases is exceeding levels achieved in the first half of 1979. The number of units sold is below the rate obtained in 1979 because of the recession. The discrepancy between the value and number of sales is explained by the still increasing sales of the larger and more

sophisticated aircraft in comparison to smaller aircraft.

An increasing number of individuals are using the general aviation fleet for the same reason they might use the air carriers: fast and efficient transportation. In general, the smaller general aviation aircraft do not possess the instrumentation and capability required for high schedule reliability. Travelers' use of the larger, more sophisticated—and therefore more expensive—aircraft ensures timely arrivals at their destinations.

Cost and resource problems are becoming increasingly critical throughout the aviation community. Many of the aircraft of the airlines have reached the point where they will require replacement. The problem is not so much age, but the need for quieter and more fuel efficient operation. Several years ago, the capital needs of the major airlines for the decade from 1976 to 1985 were estimated at from 20 to 30 billion dollars. Furthermore, it was estimated that the capital needs could more than double during the 1976-1990 time frame. These estimates recognized that in the mid-1980's the airline industry would be entering a major equipment replacement cycle comparable to the replacement of piston engine aircraft with jet transports.

The last five years have added new dimensions to the problem. Inflation has remained higher than expected. Fuel costs have soared. Competition has intensified as newcomers challenge the established major airlines and as the major airlines challenge each other for the most profitable routes.

In a similar manner the large infrastructure that is often referred to as the National Airspace System must undergo capacity and efficiency changes. A network of airports as well as navigation, communication surveillance and air traffic control facilities has been built to serve the thousands of aircraft now operating in the United States and the millions of individuals who use the System. What has evolved is a complex, inter-related system of people, procedures, facilities, and equipment that demands a careful balance between the public and private sectors of the economy.

But, as a mature industry, aviation is now in much the same position as the other modes of transportation. At the Federal level, aviation must compete more directly with other modes for a share of the limited resources available to the

FAA Forecast Economic Assumptions (fiscal years)

Economic Variable	Historical		Forecast				Percent Average Annual Growth				
	1975	1979	1980	1981	1982	1992	75/79	79/80	80/81	81/82	80/92
Gross National Product (billions 1972\$)	1,206.0	1,424.9	1,433.1	1,442.4	1,483.3	1,984.2	4.3	0.6	0.7	2.8	2.7
Civ. Pop. Employed (millions)	85.1	96.0	97.6	98.3	99.7	114.2	3.1	1.7	0.7	1.4	1.3
Disp. Pers. Income (billions 1972\$)	855.2	989.1	997.2	1,004.7	1,031.4	1,384.4	3.7	0.8	0.8	2.7	2.8
Cons. Price Index (CY 1967=100)	157.8	212.2	241.0	269.1	294.4	620.5	7.7	13.6	11.7	9.4	8.2
Oil & Gas Deflator (CY 1972=100)	155.5	228.3	339.0	413.6	468.1	1,106.4	10.1	48.5	22.0	13.2	10.4

Source: Wharton Econometric Forecasting Associates, Inc.

transportation sector. This becomes more important when viewed from the perspective of the substantial capital investments needed in the near future for replacement of plant and equipment. In the early development of the National Airspace System, most public and private capital investment was focused on expansion of existing capabilities and addition of new equipment. Now, however, the System is facing a cycle that requires a large capital investment in the replacement of existing plant and equipment. This means that either less capital will be available for expansion of the System or substantially increased funding levels will be required to assure continued System growth.

Forecast Summary

Virtually no increase in most aviation activity levels is expected in the short-term until the economy recovers from the current recession. As a result, this year's forecasts reflect somewhat less growth over the next 12 years than the forecasts published last year. Overall, the long-term outlook is for a relatively stable, moderate growth rate throughout the forecast period.

Aviation Activity

Domestic air carrier revenue passenger miles are expected to increase at a 4.8 percent annual

growth rate during the 1980-1992 period although 1980 activity is expected to remain at about the same level as 1979 due to the recession. This translates into a 75 percent increase between 1980 and 1992. A modest 21 percent increase in air carrier aircraft operations is anticipated over the same time period. The higher growth in revenue passenger miles relative to operations reflects a continuation of the shift to larger average seating capacity for air carrier transport aircraft and longer average stage lengths.

Air carrier passenger traffic is expected to recover in 1981 as the general economy improves. The carriers will phase in more fuel efficient aircraft that are now on order. As was predicted last year, the growth rate of air carrier traffic will be lower during the forecast period than that achieved in the period 1975 to 1979, 4.3 percent versus 12.1 percent.

In 1980, the commuter carriers will carry 13.8 million passengers, or 4.5 percent of all fare paying passengers in scheduled air service. By 1992, these carriers are expected to carry 35 million passengers and account for 6.8 percent of all passenger enplanements.

Nationally, commuter aircraft operations are expected to more than double the 1980 estimated volume of 4.4 million operations by 1992. As air carriers restructure their routes, commuter airlines will continue to move into available markets in smaller cities, and they will perform

more operations with smaller aircraft than those used by the trunk and local service airlines. In addition, they are expected to develop new markets as they have done in the past.

The Deregulation Act, for the first time, included the commuters in the aircraft loan guarantee program administered by the FAA. Aircraft purchases by these relatively small carriers and opportunities created by the Act have led to a major expansion in the service provided by the commuters. The expansion is expected to continue through the 1980 recession. Future growth will moderate somewhat as this segment develops a mature route structure. Thus, while the number of revenue passengers increased 20 percent in 1979 over 1978 to 12.1 million, the average annual growth rate between 1980 and 1992 is expected to be 8.1 percent.

Business use of general aviation is reflected in the changing character of the fleet. The more expensive and sophisticated turbine powered part of the fixed wing fleet will grow by 143 percent from 1979 to 1992 while the total fleet (80.8 per-

cent single engine piston aircraft in 1979) will grow by only 59 percent. Turbine powered aircraft represented 2.8 percent of the fleet in 1979. By 1992 the percentage will increase to 4.3 percent.

FAA Workload

Demand for FAA operational services is anticipated to increase as a result of the growth in aviation activity. Total aircraft operations at FAA towered airports are forecast to increase to 98.4 million in 1992, a 3.1 percent annual growth rate above the 68.6 million operations estimated for 1980. Local operations, primarily for training purposes, are expected to account for a steadily declining portion of airport activity.

Greater use of avionics among the commuter airlines and by general aviation will contribute most of the growth in instrument operations at FAA towered airports. Instrument operations are expected to increase from the estimated 38.7 million operations in 1980 to 56.6 million in 1992.

The workload at the Air Route Traffic Control Centers is forecast to increase at a 3.2 percent

Aviation Activity Forecasts (fiscal years)

Aviation Activity	Historical		Est.	Forecast			Percent Average Annual Growth				
	1975	1979	1980	1981	1982	1992	75/79	79/80	80/81	81/82	80/92
Air Carrier, Domestic											
Rev. Pass. Enps. (millions)	184.9	291.7	290.5	308.9	331.8	481.1	12.1	-0.4	6.3	7.4	4.3
Rev. Pass. Miles (billions)	127.7	205.6	201.9	215.9	232.9	352.7	12.6	-1.8	6.9	7.9	4.8
Commuter Carriers											
Rev. Pass. Enps. (millions)	6.6	12.1	13.8	15.5	17.2	35.0	16.4	14.0	12.3	11.0	8.1
Rev. Pass. Miles (billions)	0.7	1.4	1.7	1.9	2.1	4.4	18.9	21.4	11.8	10.5	8.2
General Aviation											
Fleet (thousands)	161.0	198.8	208.0	218.7	228.5	315.5	5.4	4.6	5.1	4.5	3.5
Hours Flown (millions)	31.9	41.1	42.1	43.9	46.1	64.3	6.5	2.4	4.3	5.0	3.6

Source: CAB, FAA data. FAA forecasts.

FAA Workload Forecasts (millions)

FAA Workload Measures	Historical		Est.	Forecast			Percent Average Annual Growth				
	1975	1979	1980	1981	1982	1992	75/79	79/80	80/81	81/82	80/92
Aircraft Operations											
Air Carrier	9.4	10.4	10.3	10.5	10.8	12.5	2.6	-1.0	1.9	2.9	1.6
Air Taxi & Commuter	2.7	4.4	4.7	5.0	5.4	9.3	13.0	6.8	6.4	8.0	5.9
General Aviation	44.2	51.7	51.1	54.5	57.5	74.1	4.0	-1.2	6.7	5.5	3.1
Military	2.7	2.5	2.5	2.5	2.5	2.5	-1.9	0.0	0.0	0.0	0.0
Total	58.9	69.0	68.6	72.5	76.2	98.4	4.0	-0.6	5.7	5.1	3.1
Instrument Operations											
Air Carrier	9.5	10.7	10.6	10.8	11.1	12.8	3.0	-0.9	1.9	2.8	1.6
Air Taxi & Commuter	1.9	3.7	4.2	4.4	4.8	9.0	18.1	13.5	4.8	9.1	6.6
General Aviation	10.7	17.9	19.6	22.6	23.3	30.5	13.7	9.5	15.3	3.1	3.8
Military	3.9	3.9	4.3	4.3	4.3	4.3	0.0	10.3	0.0	0.0	0.0
Total	26.1	36.2	38.7	42.1	43.5	56.6	8.5	6.9	8.8	3.3	3.2
IFR Aircraft Handled											
Air Carrier	12.4	14.0	13.9	14.1	14.4	17.0	3.1	-0.7	1.4	2.1	1.7
Air Taxi & Commuter	1.3	2.3	2.5	2.9	3.1	5.6	15.3	8.7	16.0	6.9	7.0
General Aviation	5.5	8.8	9.0	9.7	10.2	16.7	12.5	2.3	7.8	5.2	5.3
Military	4.4	4.8	4.7	4.7	4.7	4.7	2.2	-2.1	0.0	0.0	0.0
Total	23.6	29.9	30.1	31.4	32.4	44.0	6.1	0.7	4.3	3.2	3.2
Flight Services											
Pilot Briefs	16.2	18.7	18.3	19.2	20.2	30.2	3.7	-2.1	4.9	5.2	4.3
Flight Plans Originated	8.0	9.5	9.5	10.0	11.0	16.5	4.4	0.0	5.3	10.0	4.7
Aircraft Contacted	10.0	10.2	9.8	9.9	10.0	10.0	0.5	-3.9	1.0	1.0	0.2
Total	58.3	66.6	65.4	68.3	72.4	103.4	3.4	-1.8	4.4	6.0	3.9

Source: FAA data. FAA forecasts.

average annual rate between 1980 and 1992. The increased demand will come primarily from the commuters and general aviation. Instrument flight rule departures and arrivals by the commuters are projected to more than double in the next 12 years.

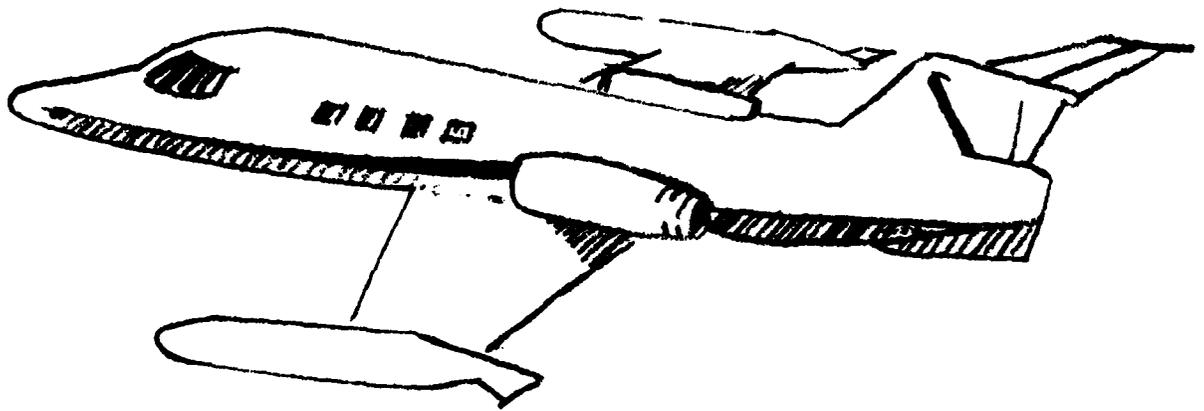
Use of the growing capability of general aviation aircraft joining the fleet now and in the next 12 years is expected to increase the workload at the Flight Service Stations. General aviation business flyers, in particular, are expected to increase their utilization of Flight Service Station assist-

ance to promote safe flying while meeting their schedules.

In summary, aviation activity is expected to continue to grow faster than the general economy, but at a slower rate than was forecast last year. Aviation will continue to dominate in the commercial intercity passenger market. Commuter operations and business use of general aviation are expected to experience greater growth than the larger airlines and personal use of general aviation.

Chapter II

Baseline Forecasts: Aviation in Transition



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Aviation and all its components—the manufacturers, the airlines, airports, service providers and Government agencies—are participants in a major transition. Relationships and products that have served aviation well in its years of development must now be realigned to meet new demands.

Several carriers have recently been added to the long established list of certificated carriers. Major mergers have already occurred. The commuter airlines are continuing their rapid expansion of service despite the 1980 recession. Significant change in the route structures of all airlines is expected to continue for several years. The 1980's will be a period when more cost-effective aircraft will be introduced into the certificated air carrier and commuter fleets. While individual carriers may standardize their fleets by using fewer types of aircraft, the mix of aircraft using the Nation's airspace will become more diverse.

The character of general aviation will continue to change. An increasing number of people use general aviation to meet demands on their time. These flyers will concentrate their activities at those airports where aviation facilities are most extensive and where groundside services are most convenient.

Government action will be directed at maintenance of the high level of safety in aviation. As the airspace—especially at and around terminals—becomes more congested, action will be taken to reduce the potential of danger. For example, additional Terminal Control Areas and Terminal Radar Service Areas will be established and efficient navigation and landing systems will be installed at satellite airports to improve safety and reduce congestion at major hub airports.

These are some of the immediate effects evident from current and forecasted aviation activity. The official forecasts of aviation activity and FAA workload for the years 1981 to 1992 are discussed below. The baseline forecasts are presented in tabular form in Chapter IV.

Economic Overview

During 1979, world oil prices more than doubled. The U.S. consumer price index rose by over 10 percent. The growth in the Nation's output of goods and services slowed considerably from the 5 percent average annual growth rate of the preceding three years. Gross national product,

adjusted for inflation, rose by less than 3 percent. Real disposable income increased by approximately 2.8 percent in 1979 over 1978. The 1979 economy showed considerable strength in the labor sector. Civilian employment increased 2.8 percent, and the unemployment rate reached its lowest level in five years—declining from 7.7 percent in 1975 to 5.9 percent.

The national economy turned down early in 1980. The unemployment rate increased to 6.6 percent by March. Inflation, which was at an 18 percent yearly rate during the first three months, declined to approximately 11 percent in the second quarter. The recession is expected to moderate by the end of 1980.

The sharp rise in fuel prices, declining consumer purchasing power, and falling corporate profits have all had a strong dampening effect on the aviation industry. Air carrier and general aviation activity were down significantly in the first and second quarters of 1980 relative to the first two quarters of 1979. However, activity is expected to rebound with the economy early in 1981.

Forecast Assumptions

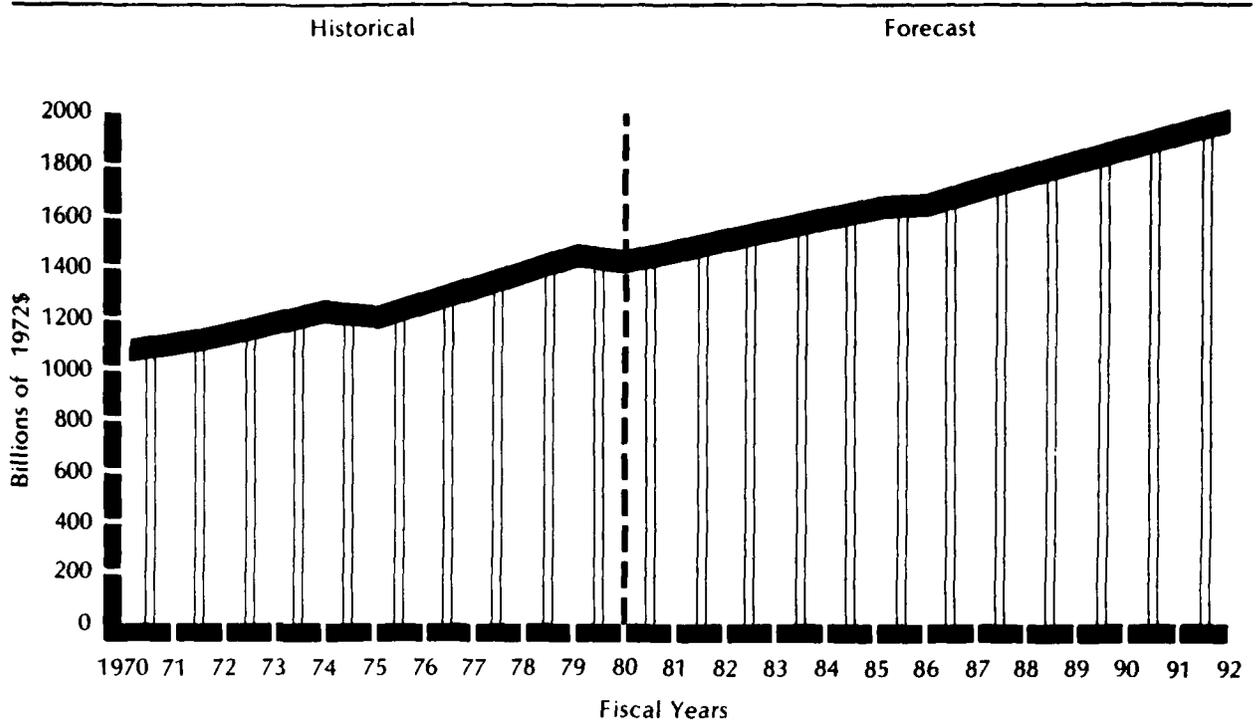
The baseline forecasts are based on the assumption that the current relationship of the Federal Government to the aviation industry remains essentially unchanged during the forecast period. That is, deregulation, as set forth in the Act, will be accomplished; noise and pollution standards will continue to be implemented; and there will be no new environmental or policy constraints on aviation.

The economic projections used in developing the FAA baseline aviation forecasts were prepared from the Wharton Long-Term Industry and Economic Forecasting Model. The principal Wharton series used in the forecasts are presented here. Specific assumptions used in the individual models are discussed in the following pages.

Gross national product has been forecast by Wharton to grow in real terms, i.e., adjusted for inflation, at an average annual rate of 2.7 percent throughout the forecast period. This compares with an average rate of 3.1 percent over the last five years.

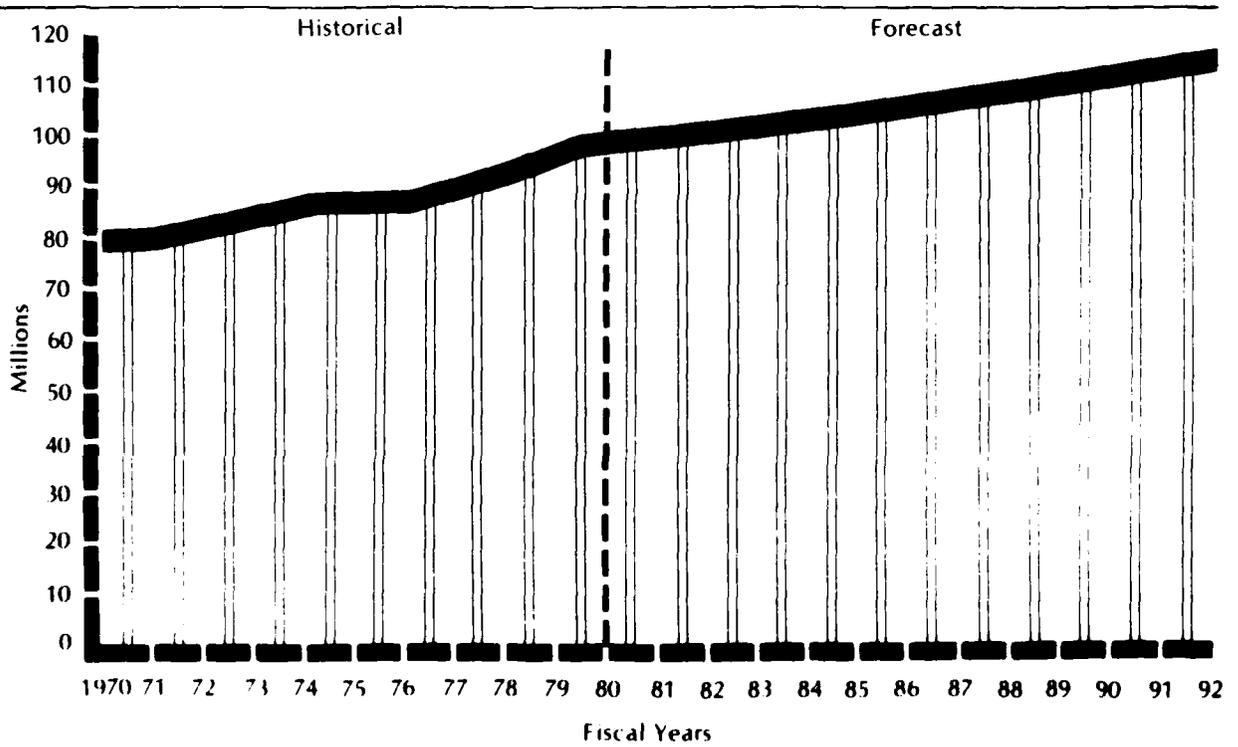
Employment is expected to increase from 96.0 million in 1979 to 114.2 million by 1992 at an average annual rate of 1.3 percent. The latter is

Gross National Product



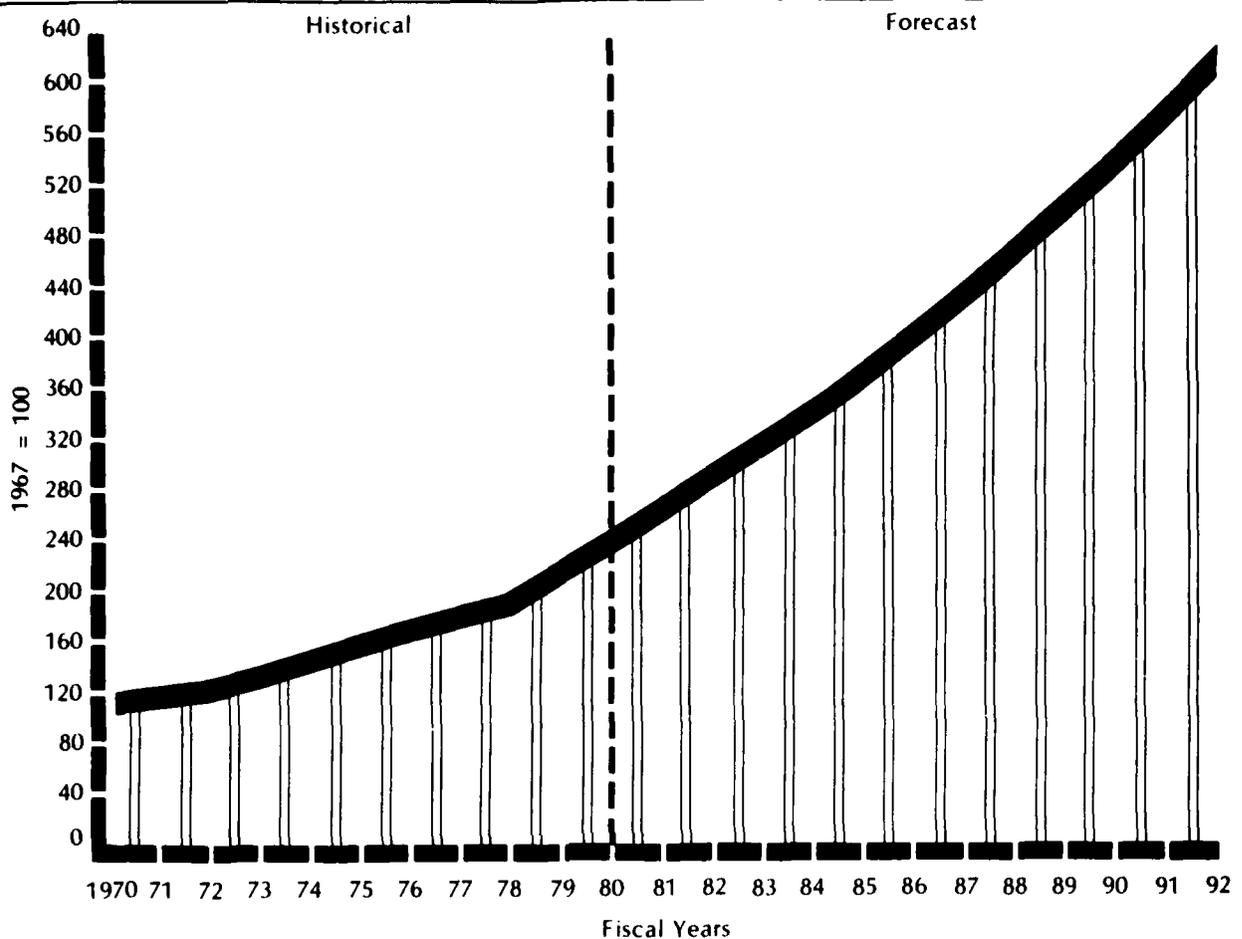
Source: Wharton Econometric Forecasting Associates, Inc

Employment



Source: Wharton Econometric Forecasting Associates, Inc

Consumer Price Index



Source: Wharton Econometric Forecasting Associates, Inc.

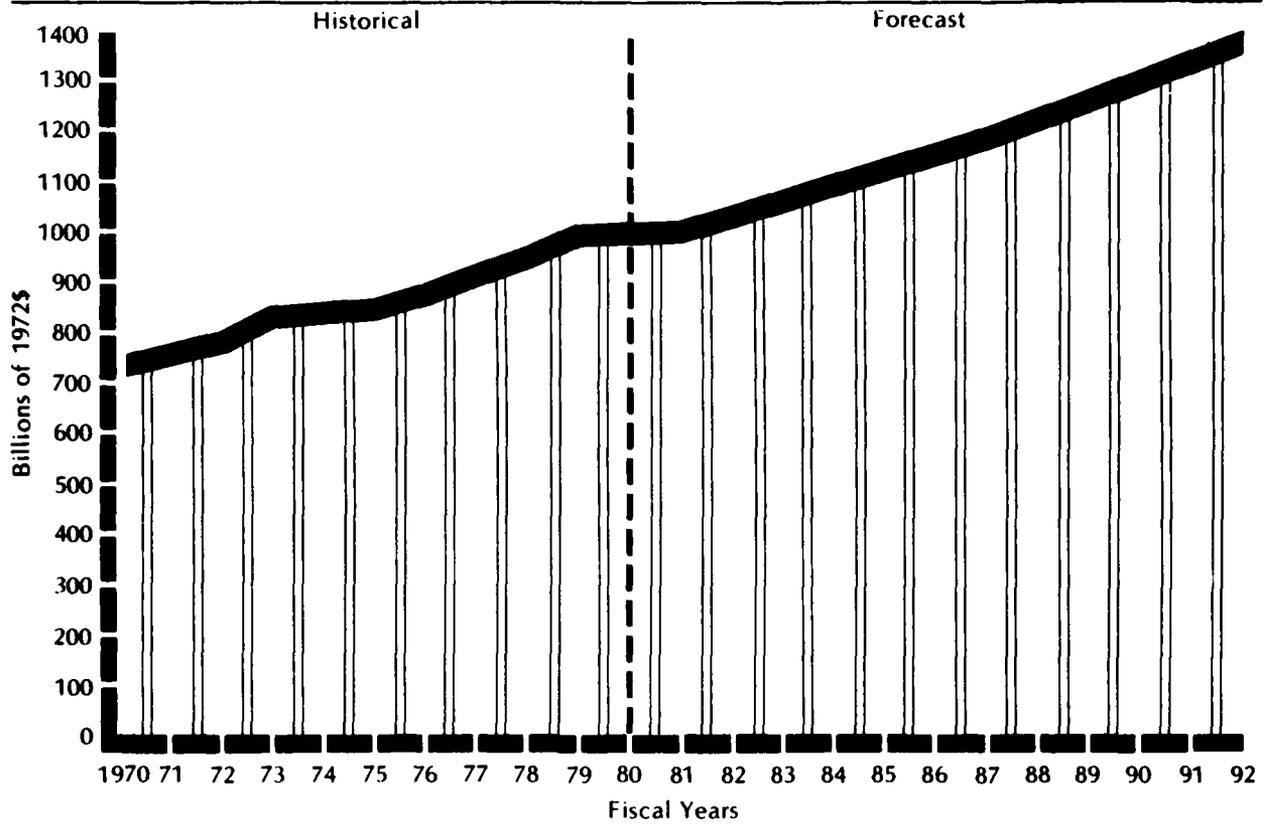
somewhat below the previous ten year rate because a shift in the age distribution of the population indicates that fewer people will be entering the labor force.

The unemployment rate declined to 5.9 percent in 1979 from a peak of 7.7 percent reached during the 1974-1975 recession. It is assumed that the rate will increase in 1980 and 1981 and then decline to 5.0 percent by 1992. Consumer prices are forecast to continue to rise, but at a rate considerably below the 1979-1980 rate. It is assumed that the consumer price index will rise 11.7 percent in 1981. However, by 1992 the rate of increase will slow to 7.3 percent.

Disposable personal income, in 1972 dollars, is expected to grow at a moderate 2.8 percent rate, from \$997.2 billion in 1980 to \$1,384.4 billion in 1992. Consumption patterns will continue to shift as rising energy and fuel costs take a higher percentage of disposable income.

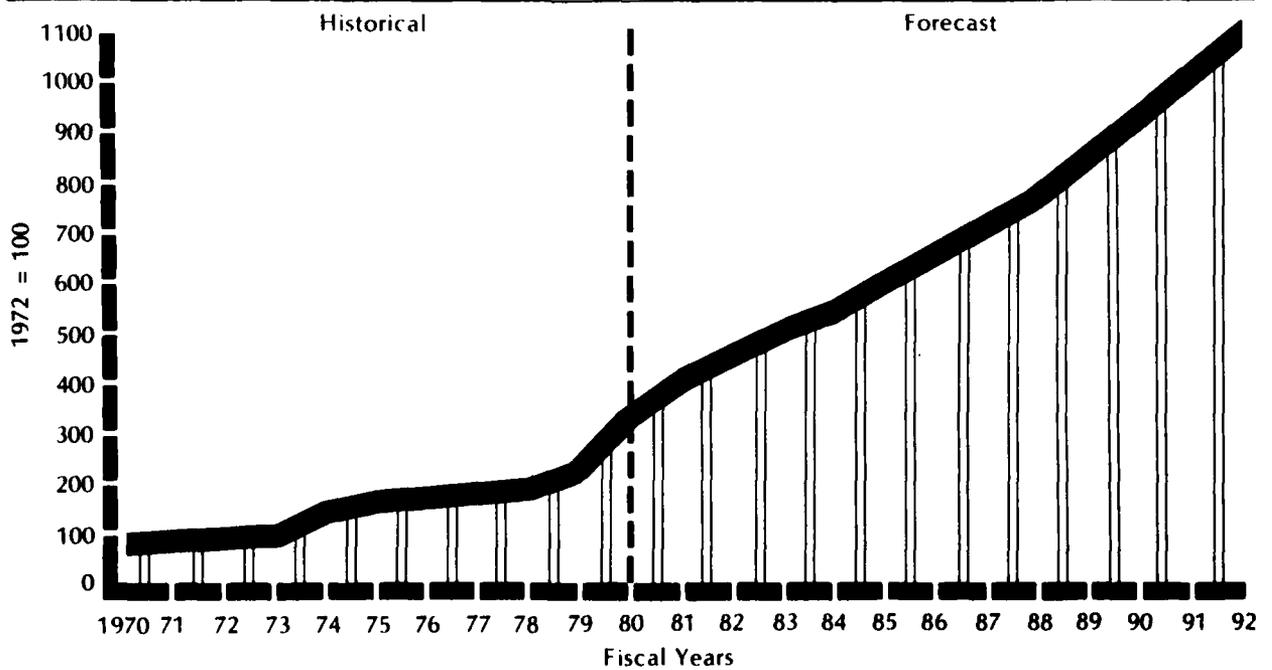
Fuel prices, based on the Wharton projection of the oil and gas deflator, are forecast to increase by 225 percent between 1980 and 1992. The FAA baseline forecast assumes the general availability of fuel for aviation. The only rationing mechanism used in developing the activity forecasts is that of price.

Disposable Personal Income



Source: Wharton Econometric Forecasting Associates, Inc.

Oil and Gas Deflator



Source: Wharton Econometric Forecasting Associates, Inc.

AVIATION ACTIVITY FORECASTS

GENERAL AVIATION: Adapting to a New Environment

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, rapid escalation of fuel prices, business dispersion and centralized management, changing air carrier route structures and the cost advantage of general aviation relative to the automobile or air carrier for certain travel distances and geographical areas. Evidence for this increase in business

use may be drawn from the patterns of growth in the general aviation fleet, aircraft sales, and in total hours flown.

Fleet Composition and Aircraft Sales

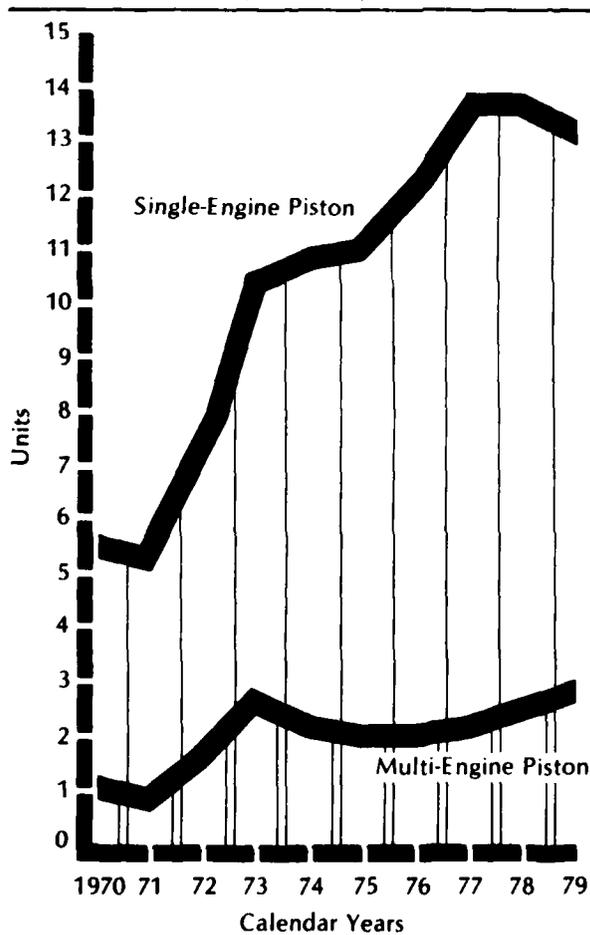
At the end of 1979, the general aviation fleet consisted of 208,000 aircraft. Of these, 6,400 were turbo-prop and jet fixed wing aircraft. The turbine powered part of the fleet grew 14.3 percent between 1978 and 1979, while the total fleet grew only 4.6 percent.

Total production of general aviation aircraft (excluding helicopters, balloons, dirigibles, and gliders) equalled 17,048 in 1979, about 90 less than were produced in 1978. Just under 30 percent of production is exported. Latest industry estimates indicate that 1980 production levels will be down by 2,000 units to around 15,000 aircraft. While production of jet aircraft and of single engine piston aircraft in 1979 was slightly less than in 1978, the production of multi-engine aircraft and turbo-prop aircraft increased.

Orders for turbo-prop and jet aircraft are approaching backlogs of three years. In contrast, some of the smaller aircraft production was suspended for varying periods in early 1980.

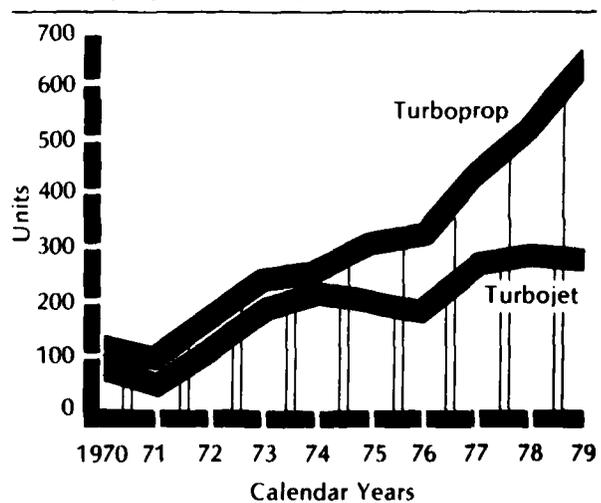
The sales of the heavier and more sophisticated types of aircraft are predominantly for business use. An industry source indicates that approximately 90 percent of the sales of general aviation jet aircraft are intended for business use. Personal, governmental and other uses account for

Piston Aircraft Production
(thousands)



Source: Aviation Data Service, Incorporated
General Aviation Manufacturers Association

Turboprop and Turbojet Aircraft Production



Source: Aviation Data Service, Incorporated
General Aviation Manufacturers Association

the remainder. This percentage has remained relatively constant over the past decade. Similarly, 80 to 85 percent of the turbo-prop aircraft and about 60 to 70 percent of the multi-engine piston aircraft are purchased for business use. Less than 30 percent of single engine piston aircraft and helicopters 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. In contrast, 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.

Fuel Cost and Availability

General aviation fuel prices (aviation gasoline and jet) have more than tripled since 1972, increasing from \$0.43 to \$1.50-\$1.70 per gallon in April 1980. The average price for aviation gasoline rose from approximately 90 cents in 1978 to \$1.29 in 1979. By May 1980 the price had increased to \$1.57.

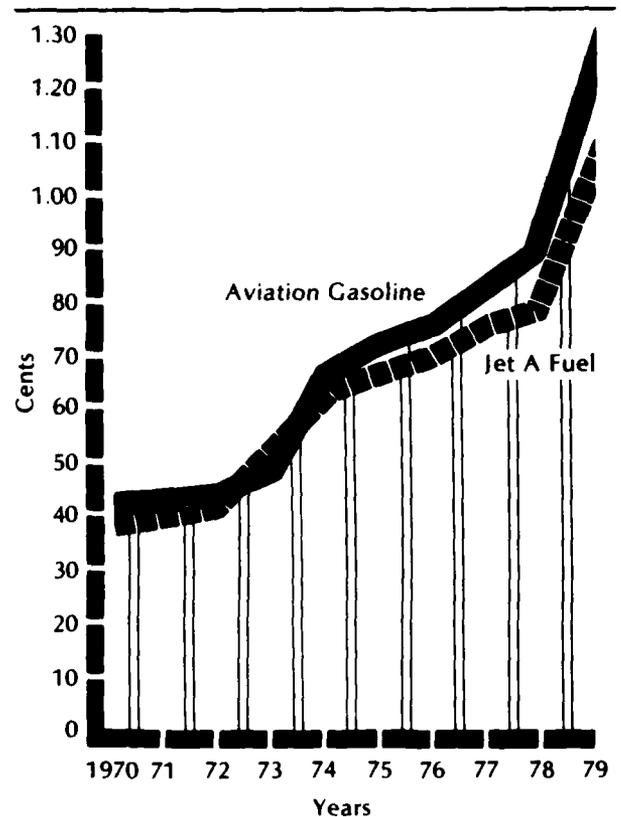
Fuel availability is a growing concern to general aviation. In the past five years, both national and localized shortages have been experienced occasionally. In June 1980, the major refiners reported the intention of meeting their then current contractual obligations. However, one refiner gave notice in early 1980 for more limited delivery schedules as a cost cutting measure. This may affect operations at smaller airports without extensive storage facilities. In February 1980, a fire at a major aviation gasoline refinery created shortages in a wide area across the south and southwestern parts of the country. By June, however, supply levels had increased to meet current demand.

Hours Flown

The FAA estimate of total hours flown in general aviation for all purposes has grown from 38.5 million hours per year in 1978 to 41.1 million hours in 1979, an increase of 6.8 percent. The annual rate of increase has been slowing since the late 1960's. This may be attributed to the increasing rate of inflation since 1968 and the series of fuel price escalations experienced since 1973.

In 1978, personal and instructional use, including rental, accounted for 24 percent and 21 percent of all hours flown, respectively. Use of

Retail Fuel Prices
(annual average)



Source: Aviation Data Service

general aviation for business grew at a 7.6 percent annual rate between 1970 and 1978. Personal use of general aviation grew at a 4.2 percent rate during the same period, while instructional use grew only at a 2.5 percent rate.

General aviation features schedule flexibility and potential use of over 6,500 public-use airports compared to less than 900 served by scheduled passenger air service. Moreover, this use is on an "on-demand" basis. Escalating costs are having a limiting effect on air carrier services. As a result, use of general aviation is increasingly justified as a means of reducing total travel time.

Pilot Population

Recent trends within the general aviation pilot population provide further evidence of this sector's changing character. One indicator is the growing percentage of pilots who have an instrument rating. As of January 1, 1980, 247,100 of 604,500 licensed pilots (41 percent) possessed an instrument rating. Only 32 percent of pilots were

instrument rated in 1970. While the total pilot population is currently growing at a 2 percent rate, the number of instrument rated pilots is growing at a 5 percent rate.

The number of new student pilot starts declined during the first four months of 1980. The current decline is attributable to the economic recession and the high cost of fuel. Between 1974 and 1977, a period of economic growth and relatively stable real fuel costs, the number of student starts increased from approximately 114,000 to 138,800. Thus, while the number of new student pilots will probably show a decline for the year 1980, the long-term trend suggests the number of individuals who want to become pilots will continue to grow, although at a slower rate than that experienced in the past.

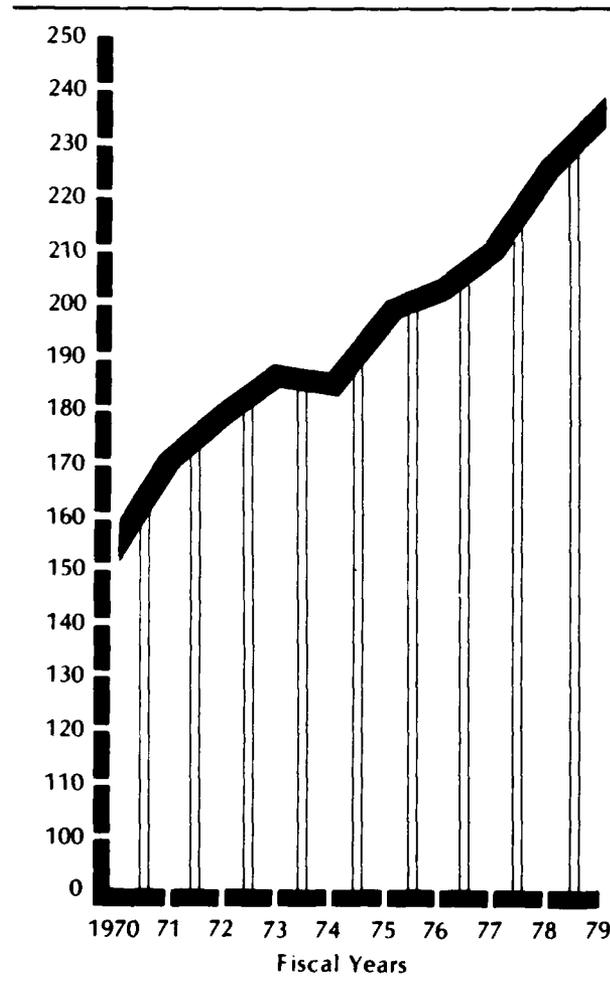
One constraint on the number of new student

starts is the passing of the "baby boom" children beyond their twenties and thirties. This is the period during which most individuals learn to fly. The declining birth rate of the last 25 years means that the prime population from which student pilots are drawn will not be growing as rapidly as it has historically.

Since 1970, the proportion of student starts to the total population within these age groups has remained nearly constant. Approximately 0.13 to 0.15 percent of 16-24 year olds, 0.14 to 0.16 percent of 25-34 year olds and 0.04 percent of 35 year old and older individuals begin flight training.

In the short term, the aging of the general population implies that general aviation will continue to draw student pilots from the 25-34 age group. The number of younger potential student pilots is declining, while the number of older individuals learning to fly remains a small fraction of all student starts.

Instrument Rated Pilots
(thousands)



Sources: U.S. Civil Airmen Statistics

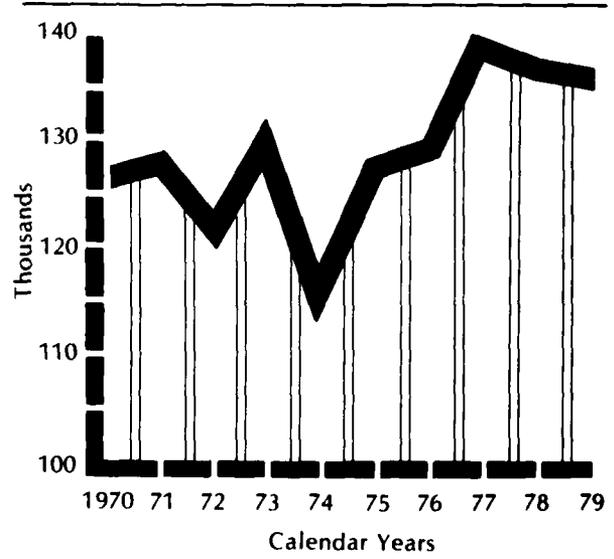
Assumptions for General Aviation Forecasts

The trends of rising costs and increasing use of general aviation for business are expected to continue during the forecast period. Specific assumptions used in development of the general aviation forecasts are detailed below.

Fuel

The cost of aviation fuel is expected to rise at an average annual rate of about 10.4 percent dur-

Student Starts



Source: FAA data

ing the forecast period compared with 8.2 percent for the consumer price index. Occasional shortages in availability of fuel, either on a geographical or on a supplier basis, might be experienced. However, the baseline forecast is predicated on fuel being available although at increasing prices.

Fixed and Variable Costs

The average annual fixed cost of owning and operating a general aviation aircraft is expected to increase by more than 100 percent during the forecast period. This equates to an average yearly increase of approximately 6 percent which is below the forecast rate of growth of the consumer price index. The index of variable costs, which includes fuel prices, is expected to grow at approximately 7 percent throughout the forecast period.

Forecast

The short range forecast for general aviation hours flown calls for a period of recovery from the effects of the 1980 recession. Thus, the total hours flown is forecast to increase at a 4.6 percent annual rate between 1980 and 1982. Growth over the entire forecast period will average 3.6 percent per year. The result of this rate of growth is an expectation that an estimated 64.3 million hours will be flown in 1992 compared to 41.1 million hours in 1979.

It is anticipated that the general aviation fleet will experience a net increase of approximately 10,250 aircraft per year in the 1980-1982 time period. Although there will be variations caused by cyclical economic forces, the net additions to the fleet will be about 8,700 aircraft per year between 1982 and 1992.

The significant trend that is masked by the large number of single engine piston aircraft in the fleet is the continued growth among turbine powered aircraft. The number of turbo-prop and turbo-jet aircraft is projected to more than double from 6,400 in December 1979 to 13,600 in 1992.

AIR CARRIERS: Restructuring of an Industry

The two years since deregulation have been a time of experimentation and learning for the Na-

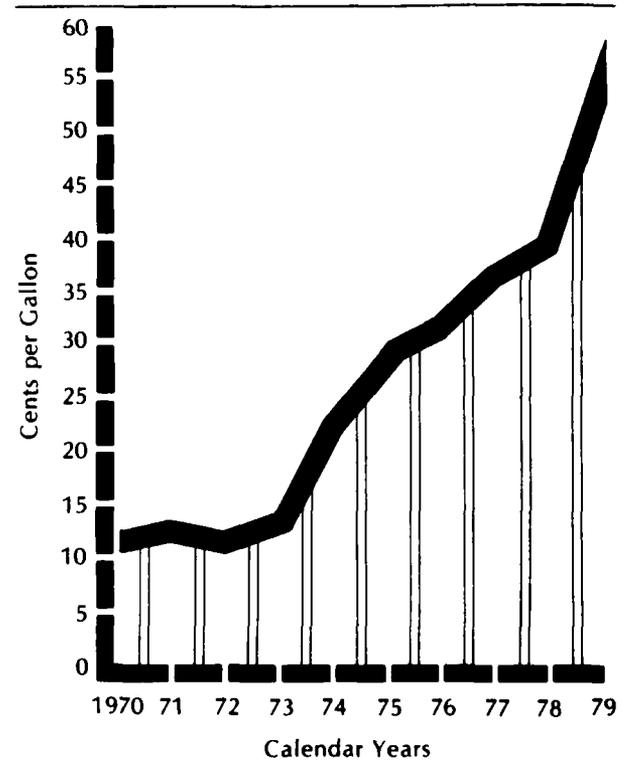
tion's air carriers. The air carriers entered new markets, dropped out of some markets, reorganized route structures, and revised fares. During 1979, the air carrier industry also was subjected to a rapid rise in operating costs led by the increase in the price of fuel. The domestic air carriers were paying 40.3 cents per gallon at the end of 1978. One year later, the price was up to 73.0 cents per gallon. In the fourth quarter of 1978, fuel accounted for 19.5 percent of total operating costs. By the end of 1979, the figure was up to 27.6 percent.

Cost/Revenue Relationship

The air carriers introduced a variety of discount fares to promote new services established under deregulation. However, operating expenses began rising sharply due to higher fuel costs, the costs of introducing new services and general inflation. The carriers petitioned for, and were awarded, increases in basic fare levels, but revenue increases did not match the growth in costs.

Compounding these problems, the Nation's basic economic growth slowed throughout 1979

Air Carrier Fuel Prices



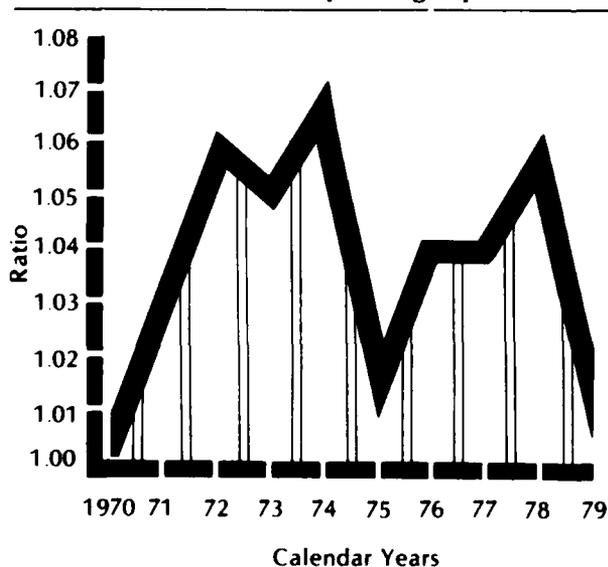
Source: Civil Aeronautics Board

and ended the year only slightly higher than 1978. The economic downturn continued during the first half of 1980 and air travel demand dropped below year-ago levels. As a result, operating losses were encountered in the fourth quarter of 1979 and have continued at record levels in the first and second quarters of 1980.

The effect on the financial condition of the industry is illustrated by a comparison of revenue and expense trends for 1979. Operating revenues increased by 19 percent over 1978, but operating expenses rose by 25 percent. This revenue/cost relationship continued into 1980 and was made worse by declining load factors as well as declining total traffic. The industry was also adversely affected in 1979 by the two month strike at United Airlines, the Nation's largest carrier, and the grounding of DC-10 aircraft at the start of the peak summer season.

Total domestic airline revenue passenger miles grew throughout 1979 and ended the year about 16 percent above 1978. Some of the gain, however, was due to the inclusion, for the first time, of traffic from newly certificated carriers that had not previously reported traffic data to the Civil Aeronautics Board. The domestic trunklines and local service carriers reported 1979 increases over 1978 in revenue passenger miles of 10 and 21 percent, respectively.

Ratio of Total Operating Revenues to Total Operating Expenses



Source: Civil Aeronautics Board

Route Structure

The operating structure of the domestic air carrier industry changed markedly in 1979 and in 1980. The trunklines, in an effort to develop more profitable and energy efficient route systems, discontinued service on many unprofitable and less profitable short haul, low density routes. At the same time, many of them established new city-pair services and expanded services in existing markets as well as added competition in certain markets. The local service carriers followed a similar pattern but generally in lower density and shorter distance markets. Former intrastate carriers in California, Texas and Florida expanded their operations into interstate and international markets.

The net effect of these changes is reflected in the distribution of the aircraft miles scheduled, the number of departures offered, and average stage length for each of the three carrier groups. The trunklines still dominate the U.S. air carrier industry, but their proportion of miles and departures scheduled is declining while their average stage length is increasing. For example, a comparison of airline schedules listed in the Official Airline Guide for July 1978 and July 1980 shows the trunk airline share of aircraft miles scheduled declining from 79.5 percent to 75.7 percent. Scheduled departures dropped from 51.4 to 46.9 percent of total departures for the month of July of these two years. Their average stage length increased from 616 to 692 miles.

During the same period, the local service carriers increased their share of scheduled aircraft miles from 13.3 to 15.1 percent and reduced departures from a 25.0 to a 23.6 percent share. Their average stage length has shown a sharp increase from 213 to 275 miles. The former intrastate carriers increased scheduled miles to a 2.9 percent share from 2.4 percent, departures from a 3.6 to a 4.3 percent share and stage length from 262 to 271 miles by moving into interstate markets.

The above computations included data reported for the top 70 commuter carriers. These carriers have increased their share of scheduled miles from 4.8 percent to 6.4 percent and of departures, from 20.0 percent to 25.2 percent. Their stage lengths have increased from 96 to 109 miles.

These shifts in the distribution of miles, departures, and stage lengths summarize the different

approaches of, and the extent to which, the respective carrier groups have responded to changes in the economy and the market entry and exit freedom. The shifts also reflect the carriers' attempts to best utilize their aircraft fleets for the most fuel efficient and profitable operations.

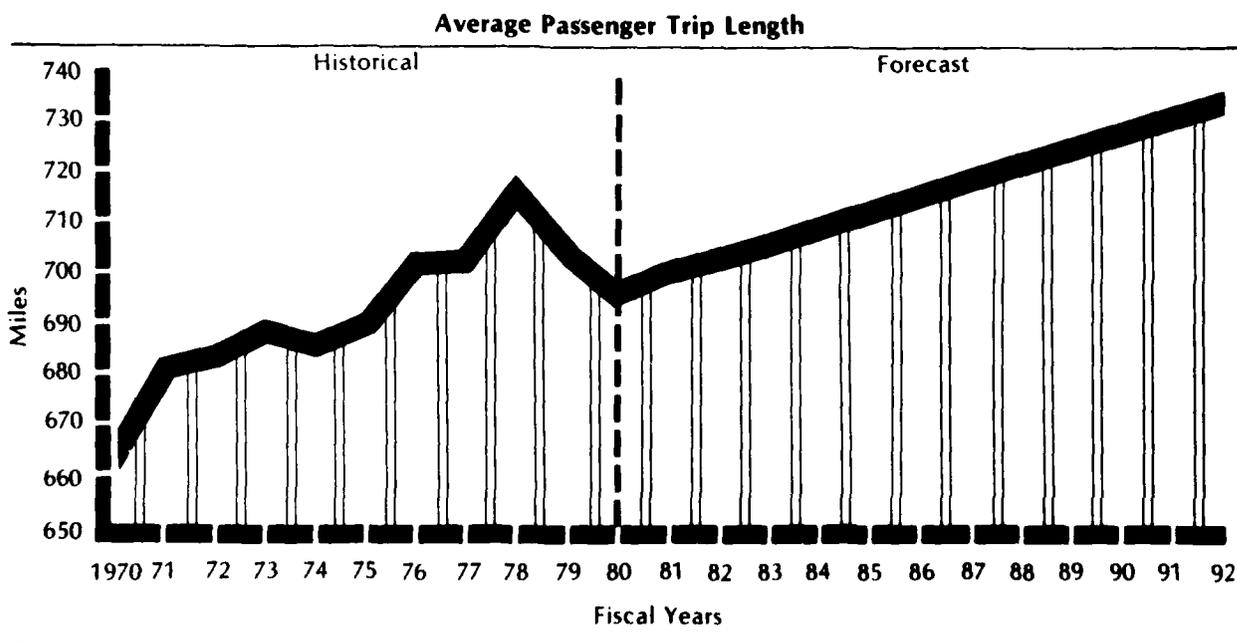
The average seating capacity of trunkline and local service aircraft went up in 1979 and continued to increase in 1980. The trunks averaged 152 seats on their aircraft in 1979, up by one seat over 1978. The locals' average was 94 seats in 1979, up six seats over 1978. Data for the first part of 1980 showed a continued increase in the average number of seats.

Passenger load factors rose sharply by around 5 percentage points between 1977 and 1978 on both the trunkline and local service systems, but there was only a small rise between 1978 and 1979. The trunks averaged 63.2 percent seat occupancy in 1979, up two points, and the locals were up only one-tenth of one point to 58.7 percent. These load factors were the highest on record for the local service carriers and the highest for the trunk carriers since the mid-1950's. Data for the first half of 1980 show a drop of 3.5 points for the trunklines and 2.7 points for the local service carriers. These figures reflect the industry's 1980 traffic decline.

Assumptions for Air Carrier Forecasts

The baseline forecasts of air carrier activity over the next 12 years anticipate that the industry will continue to be affected by the deregulation process for several more years. It is impossible to foresee all of the changes that will occur in the industry in the years ahead, but it is likely that there will be some additional mergers of carriers and some new carriers entering the market. On the other hand, the resulting 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 costs than would be the case under a closely regulated system. The carriers will be able to continue their experimentation with new, innovative ways of developing travel markets. Likewise, the carriers will be able to come closer to utilizing their particular fleets of aircraft in the most fuel efficient and profitable manner.

With respect to specific assumptions, it is anticipated that the type of route structure changes evident in 1979 will continue. However, considering all carrier groups, the overall certificated air carrier average passenger trip length is anticipated to continue to grow at about the historical rate of three miles per year. The inclusion of former commuter and intrastate carriers who previously did not report to the Civil



Source: Civil Aeronautics Board

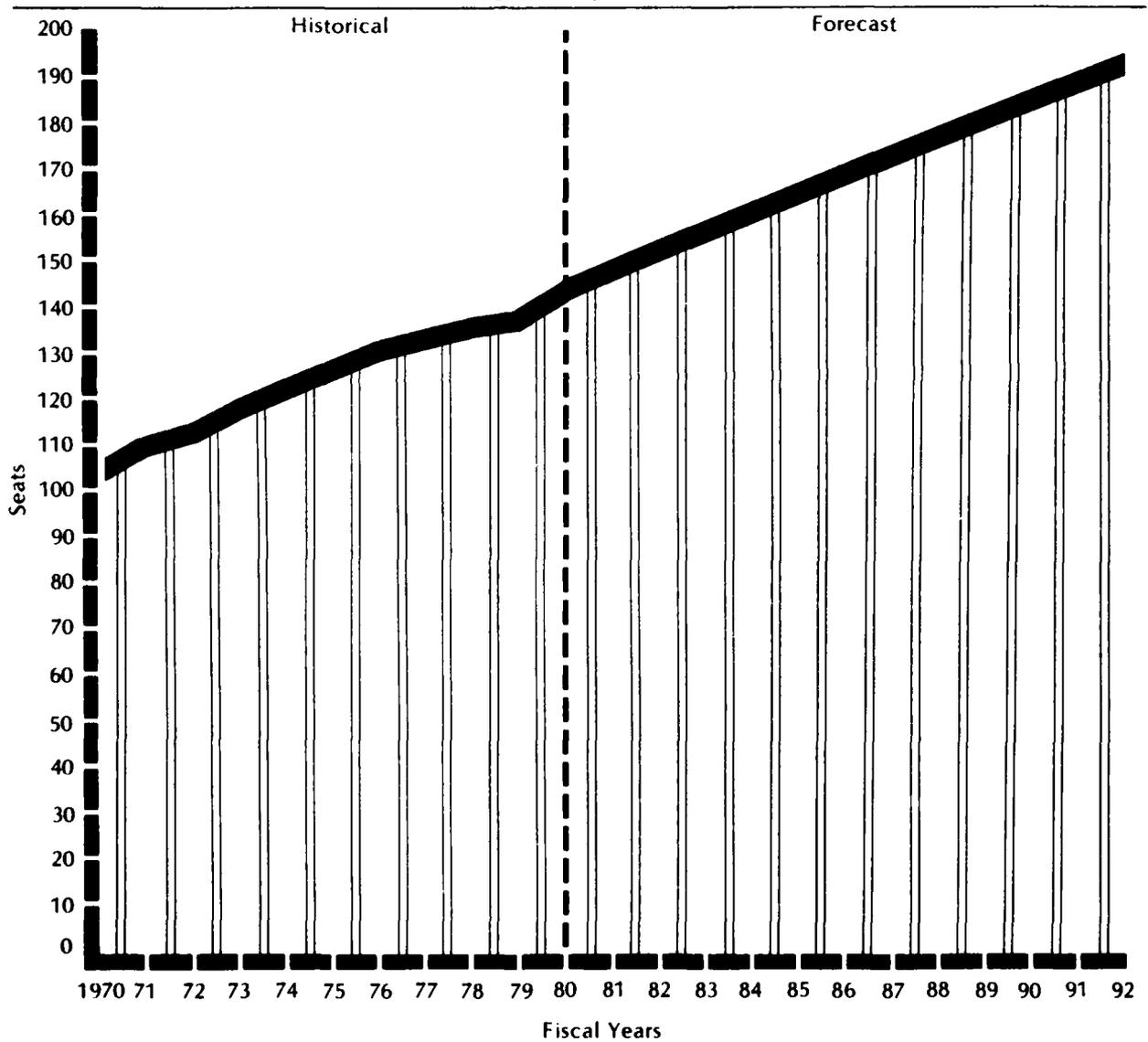
Aeronautics Board results in the dip in trip length beginning in 1979. In 1981, average trip length will resume its historical growth rate.

The average revenue received per passenger mile (yield) is forecast to increase each year through 1992. After adjustment for inflation, however, the yield is forecast to decline slowly during the 1980-1985 period after which time it is expected to remain constant. The "real" decline is based on the assumption of further system optimization, greater market competition, and the introduction of new, larger, more fuel efficient aircraft with lower unit operating costs than today's aircraft.

It is also assumed that the carriers will offer a wide range of fare options for competitive reasons and to keep load factors high. The latter are forecast to average about 63 percent throughout the forecast period.

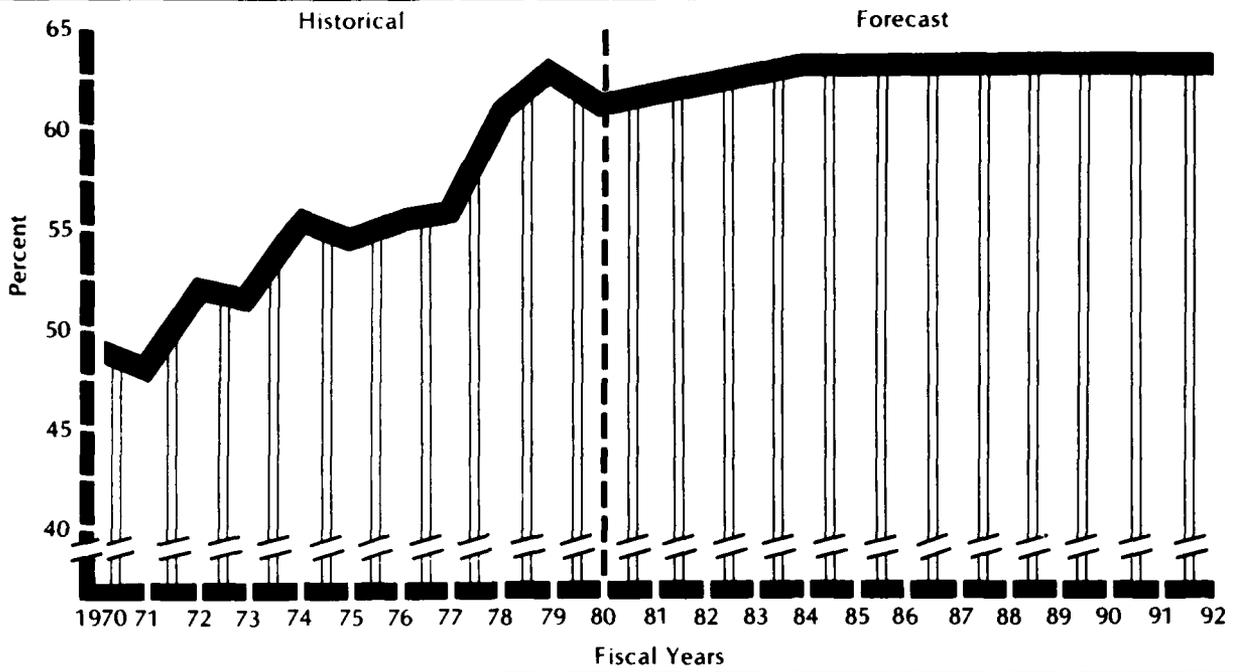
It is assumed that the industry will continue to replace older aircraft with quieter, larger capacity, and more fuel efficient aircraft to meet growing traffic demand. As a result, the industry's average aircraft seating capacity is forecast to increase at about the historical average of four seats per year.

Average Seats per Aircraft



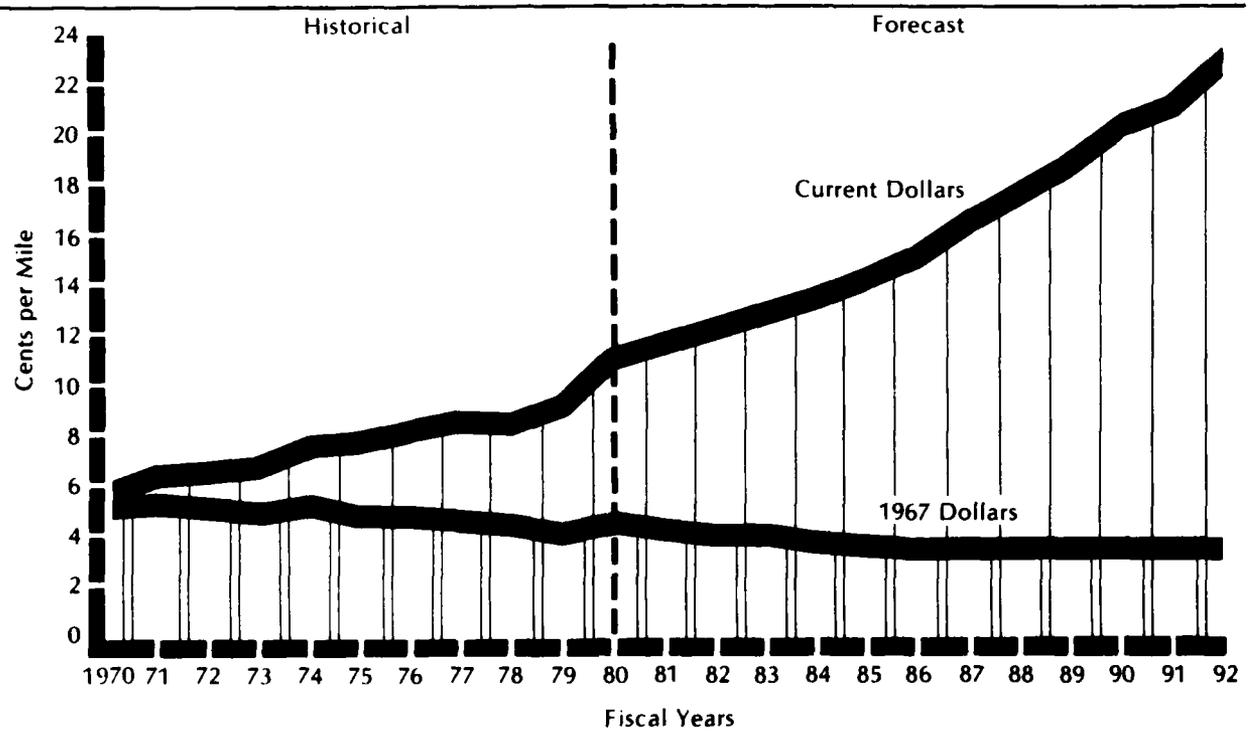
Source: Civil Aeronautics Board

Passenger Load Factor



Source: Civil Aeronautics Board

Revenue per Passenger Mile



Source: Civil Aeronautics Board

Forecast

It is expected that the certificated route air car-

riers' domestic enplanements will increase 6.3 percent in 1981 over 1980 as the general economy begins growing again. In 1982, the growth rate

will increase to 7.4 percent. Over the entire forecast period, growth in enplanements is expected to be more modest. Domestic enplanements will increase an average of 4.3 percent per year between 1980 and 1992 to 481.1 million passengers.

The growth in revenue passenger miles is expected to occur at a slightly faster rate than enplanements. Revenue passenger miles will increase an average of 4.8 percent per year between 1980 and 1992 to 352.7 billion miles.

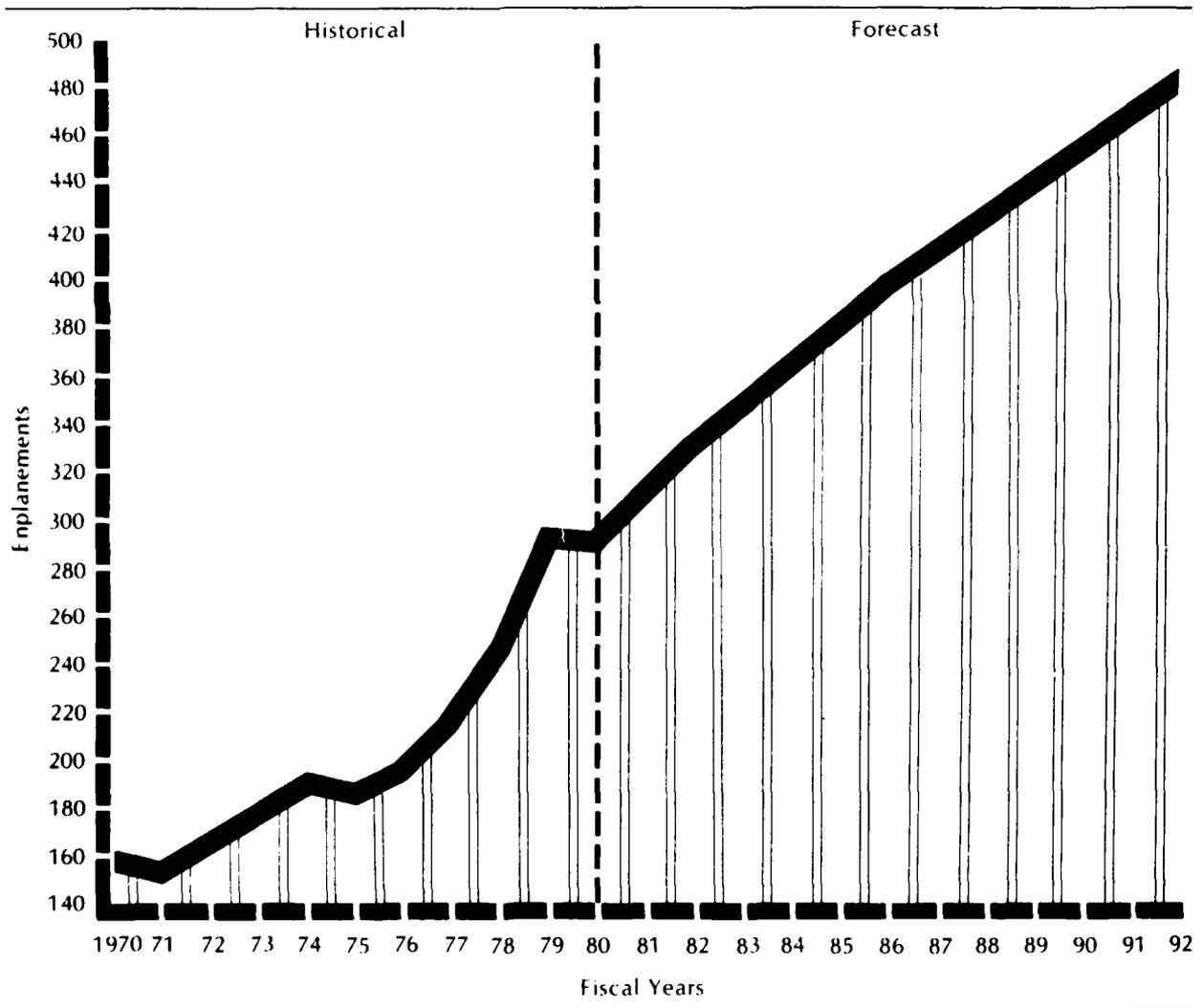
The international portion of U.S. air carrier markets will continue growing somewhat faster than the domestic portion. Both enplanements and revenue passenger miles are expected to rise

approximately 76 percent between 1980 and 1992.

COMMUTER AIRLINES: Developing an Infrastructure

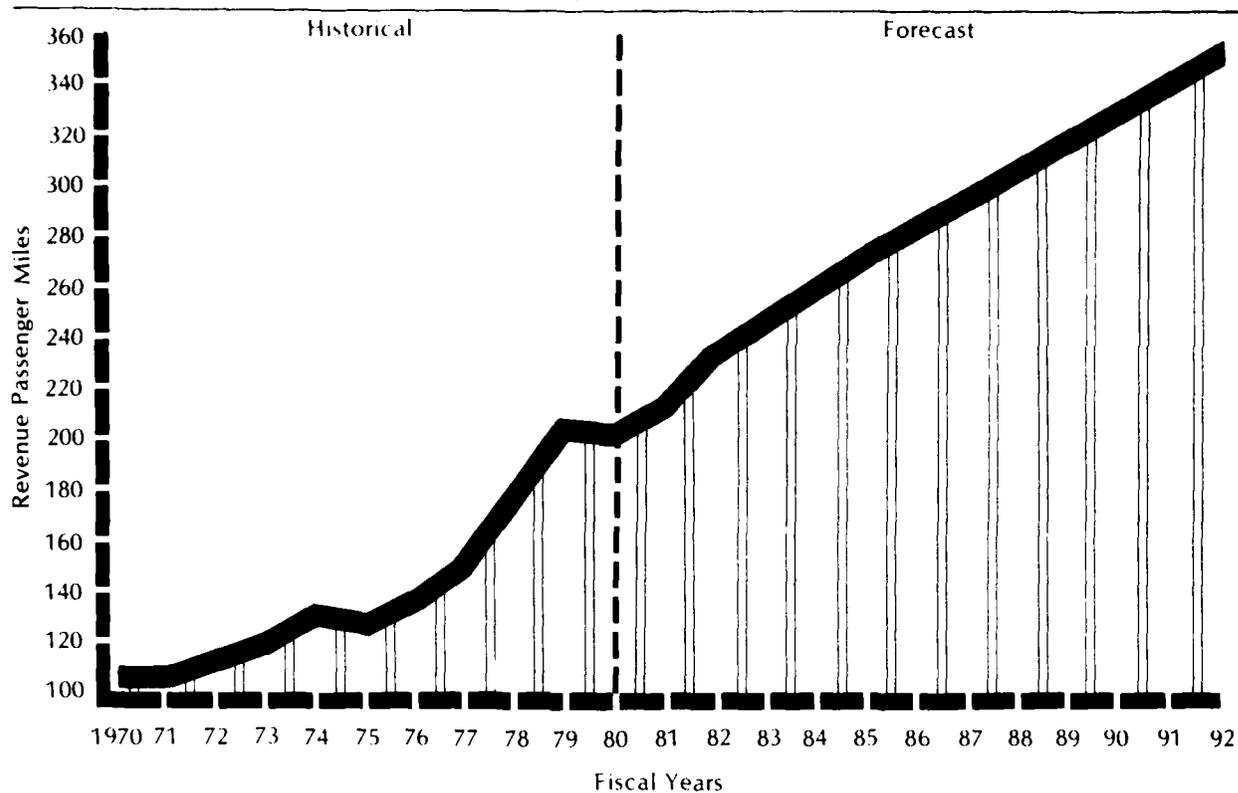
Data collected for early 1980 indicate that the commuter airlines will experience gains of 14 percent in enplanements and 15 percent in revenue passenger miles this year over 1979. The commuter airlines will enplane 13.8 million passengers according to counts available as of June 1980. The commuters' continued growth during this recession stands in contrast to their experi-

United States Certificated Route Air Carrier Domestic Revenue Passenger Enplanements
(millions)



Source: CAB Air Carrier Traffic Statistics

**United States Certificated Route Air Carrier
Domestic Revenue Passenger Miles
(billions)**



Source: CAB Air Carrier Traffic Statistics

ence of 1975, another recession period. In that year enplanements totaled 6.6 million passengers, down from the 6.8 million passenger total of 1974.

The number of commuter carriers has grown very rapidly over the past decade as new carriers were formed and air taxi operators received certification for scheduled service. The number appears stable in 1980 at approximately 260 commuter carriers. Several commuter carriers have petitioned for, and been awarded, certificated route air carrier status for all or part of their route networks.

Recognition and Growth

Passage of the Airline Deregulation Act in 1978 may be considered the single most important event in focusing attention on the commuter airlines. That Act provided added Federal recognition for an important segment of air transportation. It raised the maximum number of seats permitted in a commuter aircraft to 56, later increased to 60 by Civil Aeronautics Board

regulatory action. For the first time, the Act made these smaller carriers eligible for Federal loan guarantees for aircraft purchases and also extended subsidy qualification to them under the Essential Air Service Program. While only a small portion of commuter aircraft and markets are supported by these programs, passage of the legislation has contributed to the greater presence of these carriers in their markets. Communities know that Federal assistance is available to support their air service.

The commuters' gain in traffic is also attributable to the rising cost of fuel—particularly for automobiles, the primary competitor of the commuters—and to the greater market freedom granted to the major air carriers under deregulation. The cost and availability of fuel are a concern for the commuters. They do not use fuel in sufficient quantities to be a significant force in the fuel market. In 1979, fuel availability was a problem at several points.

In the past several years, the air carriers have been transforming their route structures to in-

crease aircraft utilization and fuel efficiency. The result has been that the commuters have been able to assume markets that have proved inefficient for the jet aircraft of the trunk and local service carriers.

In many cases, the affected communities have gained from commuter replacement of the air carriers. In general, where replacement of service has occurred, the new commuter service offers greater schedule frequency than the 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.

The aircraft manufacturers have announced development plans in the last two years for several new aircraft designed especially for the thin, short haul markets served by the commuters. This is one more indication of the marketplace presence enjoyed by these carriers. In the past, commuters were largely restricted to the use of general aviation aircraft. Today, manufacturers in the United States and, more significantly, in other countries are delivering aircraft designed to efficiently serve commuter markets. These larger aircraft are proving attractive to travelers accustomed to the amenities of the air carrier jets.

With the move to a 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 and reservation tie-ins with the major carriers all contribute to their professionalism and ability to serve the public.

Assumptions for Commuter Forecasts

The number of commuter carriers is expected to decrease over the forecast period as competition among these carriers results in a number of mergers. As the commuter marketplace matures, the fuel distribution problems encountered in the past should decrease. The commuter forecasts do not assume significant fuel shortages during the forecast period.

Because of the direct competition between the personal automobile and the commuter, events resulting in a change in the current automobile gasoline and aviation fuel relationship can have a strong impact on commuter traffic. These forecasts assume that the relationship will remain stable over the forecast period. However, if addi-

tional taxes are imposed on automobile gasoline for conservation purposes and are not imposed on aviation fuel, or vice versa, then commuter traffic will be affected accordingly.

The average number of seats per aircraft and stage length will increase over the forecast period. However, it is assumed that the commuters will continue to serve primarily the under 200 mile markets where they are now concentrated. Growth achieved through replacement of air carrier service will cease to be a major factor by 1984. After that time, growth for the industry is expected to come from increasing demand placed on a stable, mature industry.

Forecast

The forecast of demand for commuter service anticipates a high growth rate in the early years of the forecast period. There will be a gradual decline in the magnitude of that growth as 1992 is approached.

By 1982, the commuters are forecast to enplane 17.2 million passengers (42 percent over 1979). Revenue passenger miles will be 45 percent above 1979 levels at 2.1 billion miles according to this forecast. Passenger enplanements are anticipated to grow 12.3 percent in 1981 and 11.0 percent in 1982.

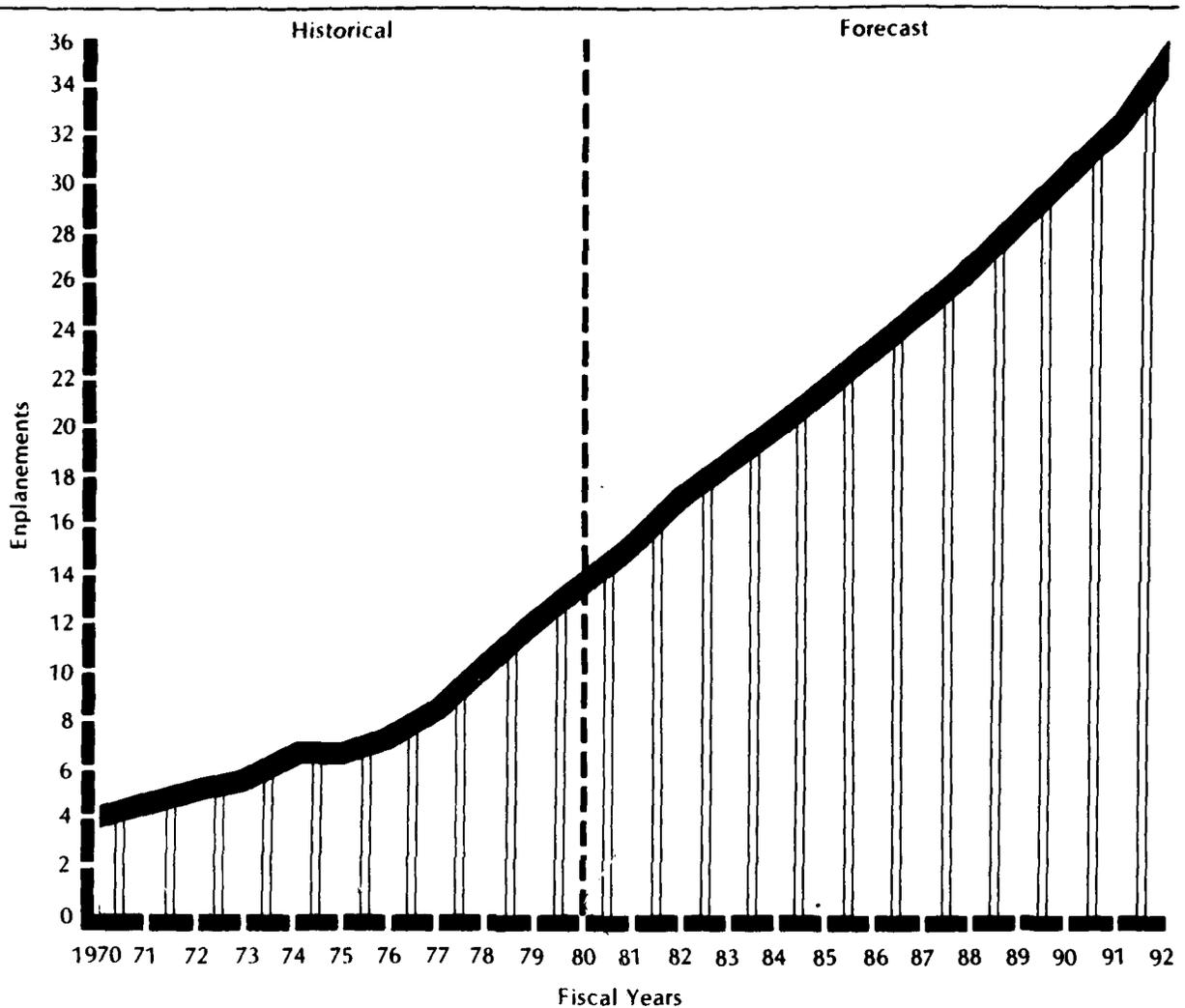
However, these rates of growth are not expected to be maintained over the entire forecast period as the commuter market matures. Thus, the expected average growth rate for 1980 through 1992 is 8.1 percent for enplanements and 8.5 percent for passenger miles. This means that enplanements and revenue passenger miles will almost triple their 1979 levels during the period to 35 million passengers and 4.4 billion miles in 1992.

FAA Workload Forecasts

AIR TRAFFIC CONTROL: Accommodating Demand

The FAA provides the aviation community with three operational services: air traffic control at selected airports, traffic surveillance and separation at Air Route Traffic Control Centers, and flight planning and pilot briefs at the Flight Service Stations. All four categories of aviation—general aviation, air carrier, commuter

Commuter Enplanements (millions)



Source: Civil Aeronautics Board

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 grew by 2.7 percent in 1979 over 1978 to 69.0 million aircraft operations. Demand by all categories of

users increased in 1979 with the exception of military operations and general aviation local operations; they remained constant. Local operations are conducted primarily for training purposes. As costs rise and itinerant traffic increases at towered airports, an increasing amount of training occurs at nontowered airports.

Data collected for the first quarter of fiscal 1980 indicate that the 1980 count of operations at FAA towers will be 0.6 percent below 1979. General aviation and the air carriers are expected to show declines of 1.2 and 1.0 percent, respectively. Itinerant operations by general aviation are holding even with 1979—a reflection of the increasing utility of general aviation to business. Air taxi operations, the fastest growing category

over the past year, are growing at an estimated 6.8 percent rate this year. Military use of FAA facilities has held constant over the past several years.

Instrument operations handled at FAA towers have shown uninterrupted growth over the past decade. Based on early 1980 data, it is expected that this year will show another increase. The only category that is expected to decline this year—by approximately one percent—is air carrier operations. Since all air carrier operations are conducted under instrument flight rules, regardless of weather, this decline conforms to the decline in air carrier arrivals and departures.

Center Traffic

In the three years between 1976 and 1979 the number of aircraft flying under instrument rules handled by Air Route Traffic Control Centers' personnel increased dramatically from 23.9 to 29.9 million, or six million additional aircraft handled in 1979. The growth for the six years from 1970 to 1976 was just 2.3 million. As is the case with the instrument operations at FAA towers, this recent rapid increase is attributed to the growth of the commuter industry as well as increasing capability of general aviation pilots and aircraft.

Flight Service Station Activity

User demands on the Flight Services Stations began to soften in 1979 and are expected to show a decline in 1980. In 1979, the total number of pilot briefings, flight plans originated and aircraft contacted increased 2.6 percent over 1978 to 66.6 million. The 1975-1979 annual growth rate was 3.4 percent. The 1980 decline is estimated at 1.2 million (1.8 percent).

Assumptions for FAA Workload Forecasts

Growth in FAA workload measures is a function of demand imposed on the National Airspace System plus inclusion of activity at locations previously not covered. Thus, the number of aircraft operations at FAA towered airports in 1992 will consist of traffic at the 431 towers existing in 1979 plus the traffic at the additional 64 airports expected to have FAA staffed towers in 1992. Most of the expected growth between now and 1992 will be experienced at the currently FAA

staffed towers. The additional towers will be installed at airports with generally lower traffic levels.

It is anticipated that because of increasing air traffic density at airports with FAA traffic control service, the number of Terminal Control Areas and Terminal Radar Service Areas will increase during the 1980-1992 forecast period. The establishment of a Terminal Control Area at an airport has the effect of reducing existing visual flight rule traffic and increasing instrument operations. Since use of terminal radar service is optional, the change in FAA workload is not as great. However, it is estimated that the increased safety which these services will provide will induce more aircraft operators to file instrument flight plans.

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.

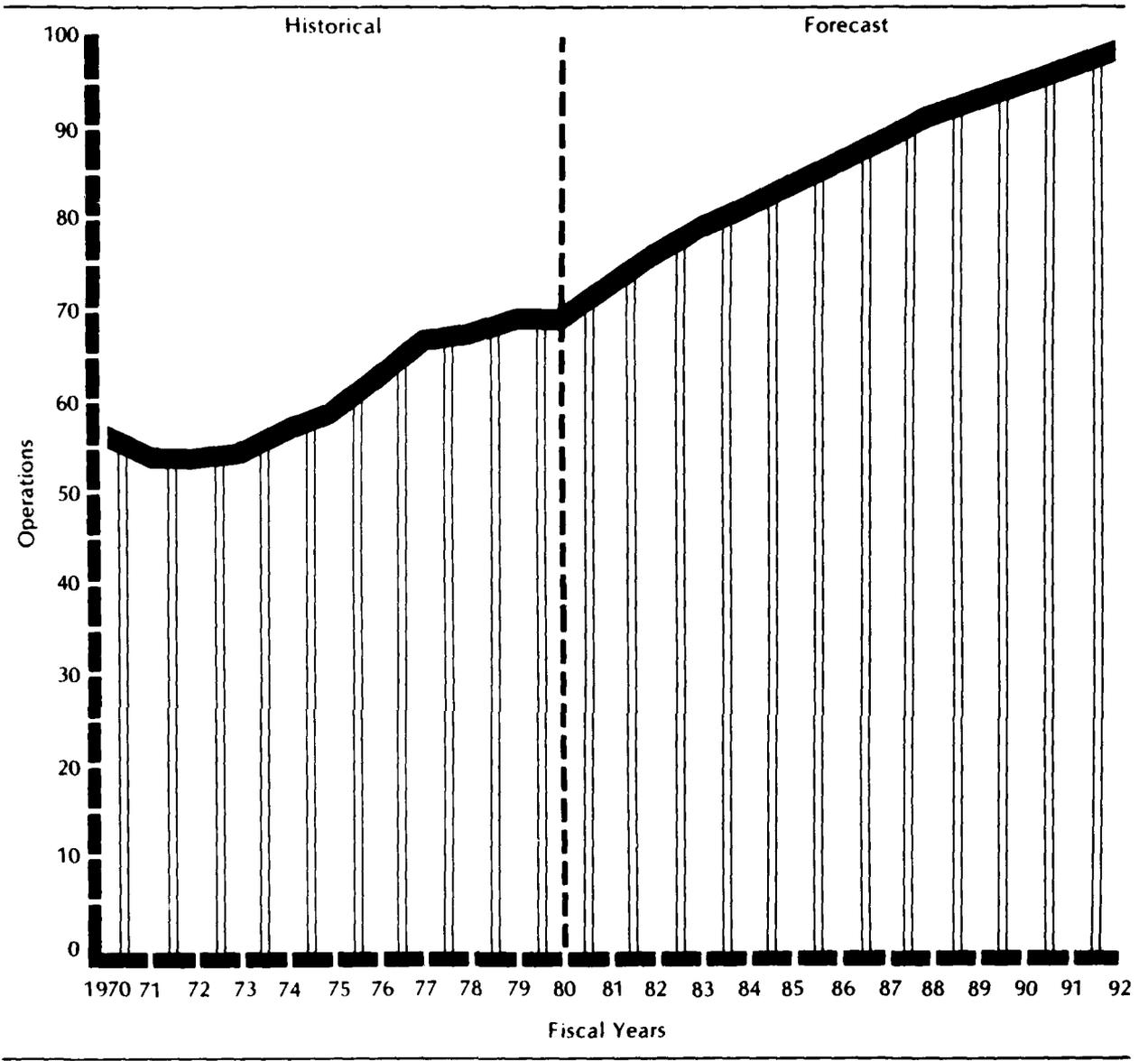
In 1979, there were about 320 FAA operated Flight Service Stations and combined station/towers (excluding six international Flight Service Stations), down from 385 in 1970. A program to consolidate and automate flight services is now underway. The greater convenience of the planned automated facilities is likely to induce greater utilization of those facilities. However, this increase in demand has not been factored in to these forecasts.

Forecast

Aircraft operations at FAA towered airports are expected to increase at a 3.1 percent average annual rate from 68.6 million in 1980 to 98.4 million in 1992. During the first two years of the forecast period (1980-1982), it is anticipated that the rate will average 5.4 percent as aviation recovers from the recession. The mix of traffic is likely to become increasingly more heterogeneous since the general aviation and commuter fleets of smaller aircraft are growing at a faster rate than the air carrier fleet of larger jets. Instrument operations at and near airports with FAA towers are forecast to increase about 46.3 percent from 1979 to 1992.

The growth in workload by the Air Route Traffic Control Centers during the same period is estimated at 46.2 percent. Approximately 46 percent of the traffic now handled at the Centers are

**Total Operations at Airports
with FAA Traffic Control Service
(millions)**



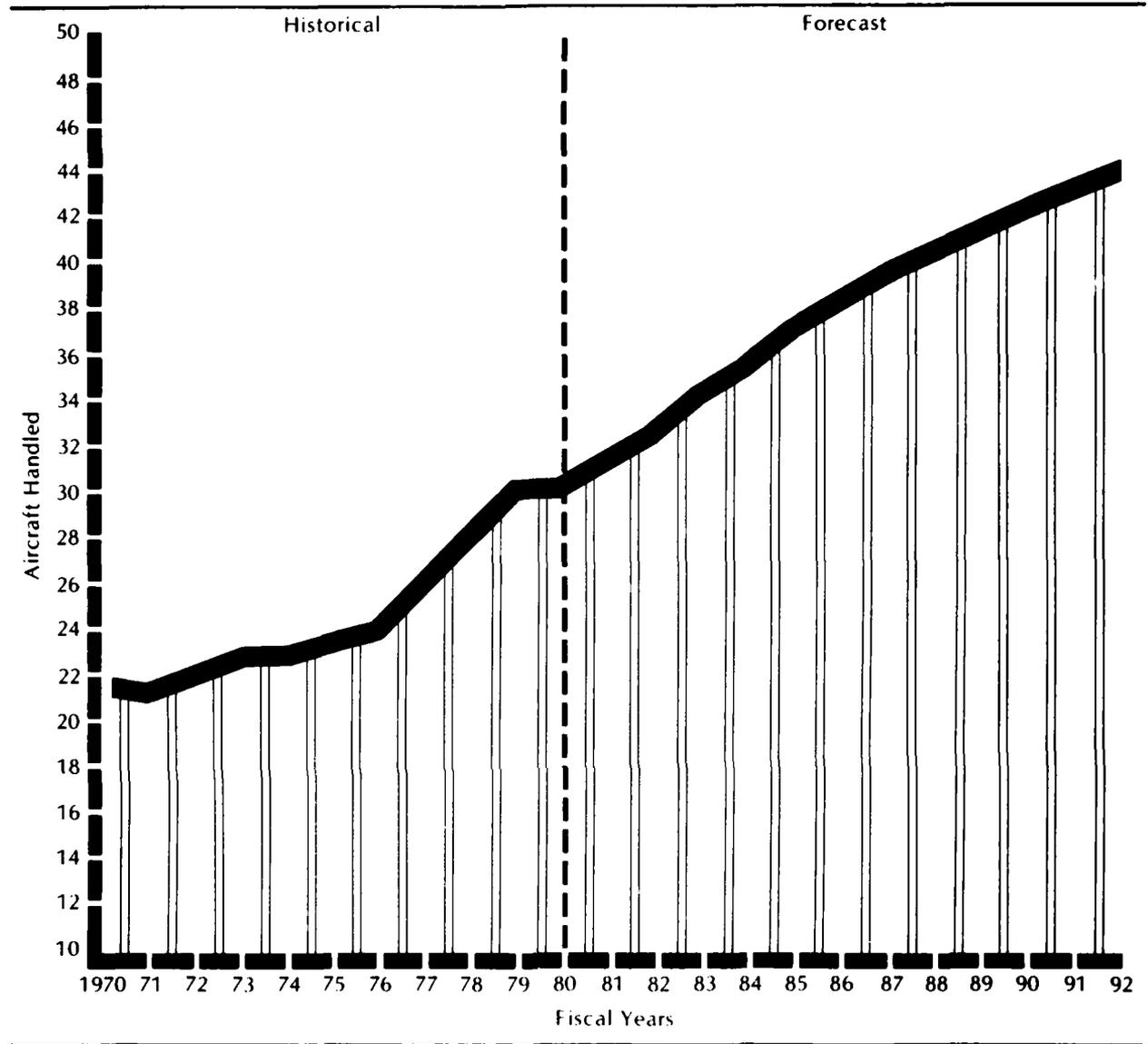
Source: FAA Air Traffic Activity

air carrier flights. By 1992, only 38.6 percent of the Centers' workload is expected to be generated by the air carriers.

The forecast for the Flight Service Stations calls for a 58.1 percent increase in total services

rendered between 1980 and 1992. In the short term from 1980 to 1982, it is anticipated the growth rate will average 5.2 percent per year and slow down to an overall average of 3.9 percent per year for the entire 1980-1992 forecast period.

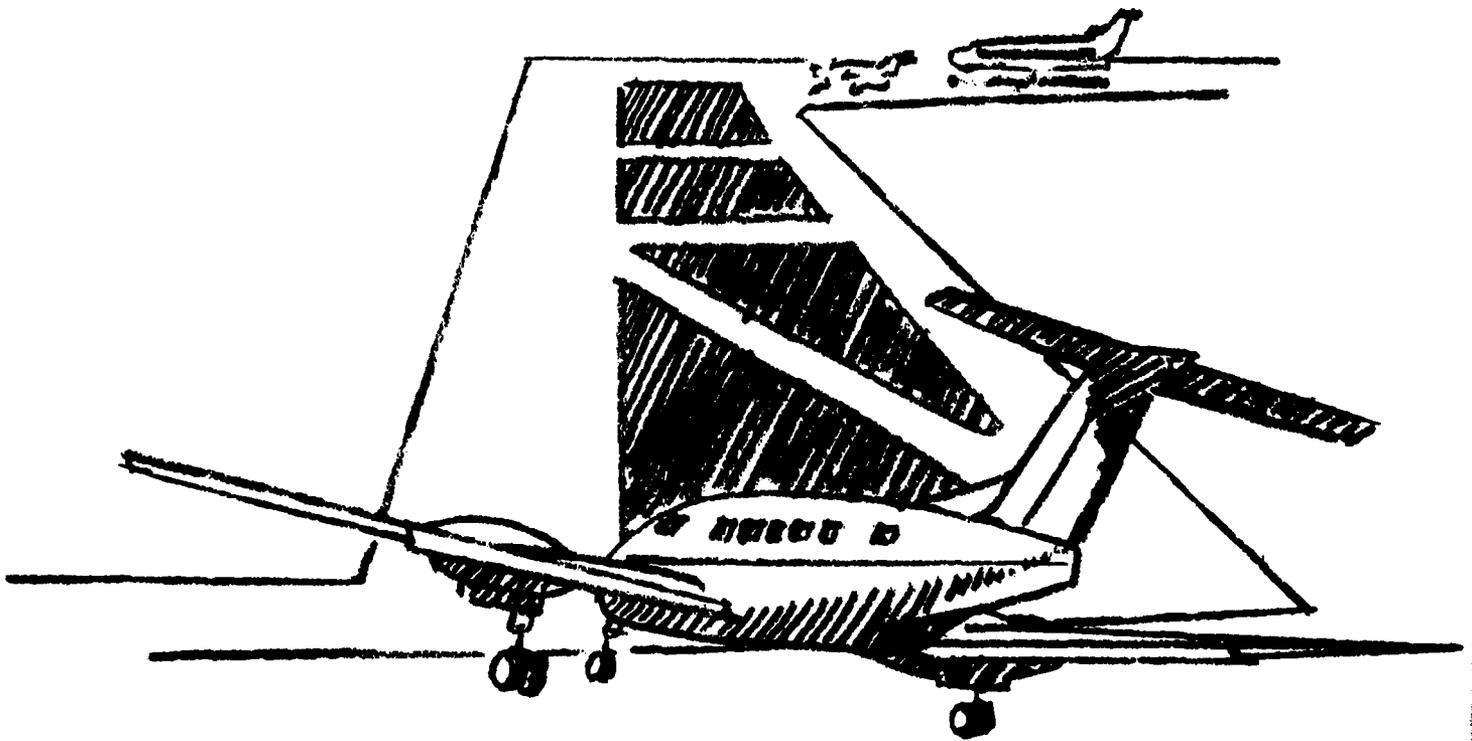
IFR Aircraft Handled (millions)



Source: FAA Air Traffic Activity

Chapter III

Alternative Scenarios



The view into the future is always uncertain. Events, now unknown, will occur and upset the best calculations. Forecasting techniques employing historical relationships and accounting for expected events provide a rational and controlled basis for prediction of future trends. The baseline forecasts presented in the previous chapter represent the most likely outcome now foreseeable for aviation in the United States.

Three alternative forecasts of aviation activity and FAA workload have been prepared based on different sets of economic and event scenarios. The intent of these scenarios is not to forecast what is expected to happen, but rather to reflect what could happen to aviation if the driving economic and societal events should change. The economic and societal assumptions underlying these forecasts are defined. Certain events—such as vacation and travel attitudes, video conferencing, fuel rationing, vertical take off and landing service, airport groundside congestion, general aviation taxes, and instrument pilot population growth—were assessed in developing the alternative scenarios. The formal processes of trend impact analysis and cross impact analysis were

employed, resulting in either increases or decreases in the forecasts generated with the alternative economic parameters.

Forecast users are encouraged to incorporate these alternative forecasts as an element in their long range planning activities. The forecasts are national in scope. The trends and events discussed here are intended as examples of what might happen, not necessarily what is expected to happen, if: (1) rapid economic expansion were to occur; (2) if, by regulation and taxation, energy conservation is intensified; and, (3) if recovery from the current recession is significantly delayed. Thus, formal or informal scenarios may be developed in support of specific capital projects using these alternative scenarios as a starting point.

The tables on the following pages provide a summary of the three scenarios in comparison to the baseline forecasts for the year 1992. The scenarios cover the entire 12 year period. Thus, the reported values for the economic, aviation activity and FAA workload measures represent the end states if the scenarios were to transpire.

**Comparison of Alternative Scenario Forecasts
Economic Variables
FY 1992**

Economic Variable	Economic Expansion	Baseline	Energy Conservation	Stagflation
GNP (billions of 72\$)	2,279.0	1,984.2	2,077.6	1,865.4
Employment (thousands)	115,957.0	114,249.0	114,025.0	107,916.6
CPI (1967 = 100)	612.5	620.5	548.3	563.4
DPI (billions of 72\$)	1,613.8	1,384.4	1,424.4	1,265.4
Oil & Gas Deflator (1972 = 100)	1,160.9	1,106.4	1,013.2	896.6

**Comparison of Alternative Scenario Forecasts
Aviation Activity
FY 1992**

Aviation Activity Measure	Economic Expansion	Baseline	Energy Conservation	Stagflation
Scheduled Domestic Passenger Traffic				
Revenue Passenger Miles (billions)	431.8	352.7	358.7	327.1
Revenue Passenger Enplanements (millions)	589.0	481.1	489.3	446.2
Fleet Size				
Air Carrier	4,124	3,202	2,664	2,331
General Aviation (thousands)	346.4	315.5	305.8	268.8
Hours Flown (millions)				
Air Carrier	11.2	8.7	7.2	6.3
General Aviation	70.6	64.3	62.3	54.8

**Comparison of Alternative Scenario Forecasts
FAA Workload
FY 1992**

FAA Workload Measure	Economic Expansion	Baseline	Energy Conservation	Stagflation
Tower Operations (millions)				
Total	116.8	98.4	83.5	62.1
Itinerant	81.7	66.9	60.6	48.0
Air Carrier	16.1	12.5	10.4	9.1
Air Taxi and Commuter	11.9	9.3	7.8	6.8
General Aviation	52.5	43.9	41.2	30.9
Military	1.2	1.2	1.2	1.2
Local	35.1	31.5	22.9	14.1
General Aviation	33.8	30.2	21.6	12.8
Military	1.3	1.3	1.3	1.3
Instrument Operations (millions)				
Total	79.5	56.6	59.3	45.4
Air Carrier	16.4	12.8	10.7	9.4
Air Taxi and Commuter	11.6	9.0	7.5	6.5
General Aviation	47.2	30.5	36.8	25.3
Military	4.3	4.3	4.3	4.3
IFR Aircraft Handled (millions)				
Total Handled	58.8	44.0	42.0	33.5
Air Carrier Handled	23.4	17.0	16.2	12.5
Air Taxi Handled	7.7	5.6	5.3	4.1
General Aviation Handled	23.0	16.7	15.8	12.2
Military Handled	4.7	4.7	4.7	4.7
Flight Services (millions)				
Total	120.4	103.4	99.9	76.8
Pilot Briefs	35.1	30.2	29.2	22.4
Flight Plans Originated	19.3	16.5	16.0	12.3
Aircraft Contacted	11.6	10.0	9.5	7.4

ECONOMIC EXPANSION SCENARIO

Summary

A radical reduction in economic intervention by Government and a change in social attitudes toward the free enterprise system create an environment of rapid expansion in the national economy. All segments of aviation participate in the boom, creating capacity problems in the National Airspace System.

As viewed from the perspective of 1992, the following conditions and activity are postulated to have occurred.

Economic and Social Conditions

Recovery from the economic malaise of the early 1980's, is accompanied by significant changes in attitudes and economic relationships. Public sentiment gives high priority to reestablishment of American military and economic pre-eminence in the world. Individuals place increased importance on improved work performance. The work ethic comes to dominate leisure activity, thus reducing pressure for a shorter work week and other leisure time.

The growth of employment in services relative to that in manufacturing increases in pace as automation takes over many manufacturing jobs. Personal incomes rise rapidly but are not translated into longer vacations because of the greater social and psychological importance attached to career advancement. Poverty becomes an historical artifact as low unemployment and high wages become the norm.

Business continues the trend of dispersing plants and operations. The population follows, leading to a greater balance of the proportion of people in the cities, in the suburbs and in rural areas.

The demand for energy grows strongly throughout the period without Government price intervention. High prices encourage sufficient investment in domestic alternative energy sources to reduce but not eliminate dependency on foreign oil. High technology is used increasingly to conserve fuel. Environmental restrictions are eased in support of energy independence. Air and water pollution, consequently, become a problem. Not until late in the period do judicial damage awards rise to a level where industry finds it less expensive to install pollution equipment as a means of reducing litigation.

Government action plays a declining role in the economic life of the country. Environmental regulations are not the only regulations eased. In general, the Government steps back to allow market forces a greater role in regulation of the Nation's economic affairs. Federal spending declines as a percentage of gross national product. However, the Government increases defense spending and plays a more interventionist role in international affairs.

Demand for Transportation

Time becomes an ever more precious commodity as rapid economic expansion progresses. As a consequence, major investments in all modes of transportation occur. Automobile travel growth rates increase again to those experienced in the 1960's. Train travel, at first, declines as Government subsidy ends. However, travel demand in the major corridors leads to private investment in high-speed trains. By 1992, rail travel is increasing rapidly after sale of AMTRAK to regional holding companies. "Face-to-face" video conferencing becomes wide-spread but does not affect travel growth rates. Essentially, every trip avoided by video conferencing is balanced by another trip to exercise growing opportunities or for personal travel.

Technological innovation in transportation centers on fuel efficiency in the 1980's. Within aviation, development occurs in airframe and avionics as well as in engine design. The market for aircraft becomes more segmented as both commercial and general aviation match aircraft characteristics against specific utilization patterns.

Air Carrier Activity

Commercial air transportation experiences a period of rapid growth through 1992. The abolition of all Federal fare and route regulations creates intense competition and the addition of newly created carriers. A number of carriers fail financially and others merge as a result of high competition and operating costs. While demand for air travel is high, extreme pressure exists on carrier managements to meet that demand without letting costs get out of hand. By 1992 most carriers have become highly specialized in the markets they serve. Thus, a carrier serving the transcontinental markets rarely serves the short haul markets.

Fares become more differentiated. Use of discount fares continues as the airlines strive to keep their planes full. However, peak hour demand stays ahead of capacity leading to the imposition of peak hour fares. The abolition of aviation taxes does not lead to reduced fares as aviation users assume the costs of maintaining and expanding the system.

Passenger enplanements almost double by 1992. Total aircraft operations grow more slowly but at a higher rate than in the 1970's. The short haul operations of the former commuter carriers account for most of the increase. The increase in operations by smaller aircraft is greater than the reduction generated by the increase in average number of seats per aircraft across the entire fleet.

General Aviation

Business and personal flying experience strong growth as a result of economic prosperity and mobile lifestyles. The high value placed on time for both business and personal use propels this growth despite rising costs. By 1992, most pilots are instrument rated, an added expense incurred because of the greater reliability it gives the pilot in meeting schedules.

Fuel and System costs also rise steeply. New aircraft added to the fleet are at least 25 percent more fuel efficient than the typical 1970 built aircraft. However, fuel prices remain the principal reason for continually rising operating costs. With the end of Federal subsidy of System costs, general aviation experiences tremendous increases in user fees at airports and for air traffic control.

Airports

Meeting the demands imposed by aviation users becomes a major problem for airports. Since Federal subsidies decline and are finally eliminated during the forecast period, airports must finance capacity and safety improvements from user charges. The strength of demand allows user charges (i.e., landing fees, tie-downs, concessions) to increase dramatically. However, many airports are lost to competing land uses before the requirement for their capacity and the economic means to maintain them are established.

Particularly in the larger hubs, airports begin exercising their control of user fees to spread peak hour demand. The air carriers pass these

fees on to their passengers while general aviation makes increasing use of reliever airports.

ENERGY CONSERVATION SCENARIO

Summary

The national goals of conserving America's natural resources and protecting the public well-being are actively promoted by the Federal Government through regulation and taxation. The Government's effort to reduce energy use by restraining consumption result in slow but steady economic growth and a change in lifestyle typical of a more slow-paced culture. Aviation benefits from increased leisure time, but is, at the same time, a special target of energy conservation and environmental regulation. Commercial aviation grows slowly; hampered by slow growth in airport capacity, most sectors of general aviation stagnate.

As viewed from the perspective of 1992, the following conditions and activity are postulated to have occurred.

Economic and Social Conditions

A continuing series of energy shocks such as major power plant accidents or embargos during the 1980's results in major changes in Government practices and in the national consensus. The Government adopts stringent fuel conservation measures to achieve energy independence. A consensus develops in support of conservation. Slow but steady economic growth and environmental protection are also perceived as desirable national goals.

Government begins to re-exert a very strong influence in the marketplace, contrary to the trends evident in the late 1970's. Consumption, particularly if energy intensive, and environmental damage are two major Federal marketplace concerns. Federal employment rises because of the escalation in regulatory functions. Federal spending, except for defense, rises. The areas of health and social welfare dominate the Federal budget.

The shift away from consumption and a corresponding increase in savings cause some economic dislocation. However, energy saving industries such as electronics and a more regulated building industry benefit from the shift.

As demand for energy is brought under control, economic growth assumes a steady but slow rate. Incomes increase slowly with very progressive taxation leveling out income differences.

The pace of American life also slows in line with the conservation ethic. U.S. involvement in international affairs takes on a more measured tone without the demand for U.S. superiority in all fields. Massive investment in alternative energy forms and sources becomes necessary despite conservation. Government agencies play a major role both in production and in areas such as land use and building codes. The result of conservation, Government action and steady growth is that most people feel well-off.

The four day work week, promoted at first as an energy conservation measure, becomes the national standard. An increasing number of workers take advantage of improved office communication technology to work at home most of the time. The freedom from commuting allows greater choice in where people live.

Population growth is slowed by a declining birth rate, generally attributed to the desire to achieve a stable population. Some critics of American culture argue that too high a priority has been placed on stability, so that initiative and creativity suffer. However, most Americans are pleased with their lifestyles and proud of their society.

Demand for Transportation

The conservation ethic produces a profound change in attitudes toward transportation. Intra-area rapid transit gains in popularity. The largest area of investment is rail—both for urban transit use and intercity transportation. The visibility and energy intensiveness of aviation lead to political and social pressure for its containment.

Air Carrier Activity

The growth of commercial aviation is constrained by increasing restrictions designed to conserve resources and to protect the environment as well as by changes in lifestyle. The Federal Government reinstitutes control over routes and fares. The new controls on carrier schedules eliminate competing flights while insuring adequate frequency of service. Discount fares are discouraged, except for standby passengers who keep load factors high. The new regulatory structure results in mergers of carriers with

complementary routes. The merged carriers join forces to invest in the essential, new, large, fuel efficient aircraft.

Passenger traffic increases gradually, particularly in long haul markets. The growth in short haul markets experienced in the 1970's is not maintained as rail transportation becomes more reliable. The annual number of aircraft operations remains flat during the 1980's.

General Aviation

General aviation activity is severely affected by changes in lifestyle. New aircraft are required to be more fuel efficient and all aircraft must be equipped with elaborate new safety equipment, including collision avoidance systems for multi-engine aircraft. Standards become comparable to those required for commercial aircraft. Operating costs also rise because of increased airport charges, new fees for previously subsidized flight services, and highly taxed, expensive fuel. Fuel rationing to discourage recreational flying is instituted for a time, but soon becomes unnecessary as fuel use drops. The number of pilots declines as licensing requirements become stricter and aircraft become more sophisticated. Nearly all pilots have instrument ratings, and more aircraft are shared.

Airports

Increasingly stringent environmental standards place severe constraints on airport capacity. Despite Federal standards that mandate new aircraft noise below FAR-36 stage 3 levels, local communities insist on strict nighttime curfews and force runway realignments that further reduce noise exposure but also restrict operations. In a few metropolitan areas, older airports are closed and replaced with new air carrier facilities distant from population centers. However, in most communities, opposition to the loss of open space and the environmental impacts prevent any new major airport construction.

Terminal congestion is a continuing problem with airports unable to expand their land holdings. One of the solutions is to move most of the passenger processing and baggage handling operations off airport grounds to terminals in downtown areas. These are readily accessible by efficient public transportation systems—heavy and light rail and bus. Transportation and terminal improvements are financed by increased ticket

taxes on airline passengers and through a new combined Transportation Trust Fund that is also used to subsidize improvements in other modes.

General aviation is affected adversely by the airport capacity problem. Most large metropolitan airports bar small aircraft, or, at least restrict them to off-peak hours when landing slots are not fully allocated.

STAGFLATION SCENARIO

Summary

Recovery from a prolonged world-wide recession and economic stagnation is the major concern of the United States Government and its citizens. Strong Federal intervention through nationalization and reorganization of major industries, including air transportation, helps restore public confidence, but recovery is slow because of high energy costs. Aviation experiences high costs and slack demand, resulting in Federal takeover of most commercial service and drastic declines in general aviation.

As viewed from the perspective of 1992, the following conditions and activity are postulated to have occurred.

Economic and Social Conditions

In the early 1980's, unrest in the Middle East causes several of the major oil producing countries first to cut off oil supplies for an extended period of months and then to substantially and continually raise the price of oil. The resulting imbalance of payment sets off a prolonged period of worldwide recession, stagnation, and painfully slow growth. Although not as severe as the great depression of the 1930's, the duration of economic difficulties in the 1980's leaves the decade with the slowest economic growth rates since the depression.

The Government gains support of business and the general public for financial assistance to troubled industries, encouragement of mergers and Federal takeover of failing industries. Research, largely Federally sponsored, on alternatives to foreign energy and on conservation proceeds, but no quick fixes are discovered that do not require massive investment. Coal becomes increasingly important as domestic oil and gas reserves dwindle. However, the major thrust of energy policy is conservation, stimulated by rationing and by high prices. Energy use is heavily

taxed to promote conservation and to provide public revenues.

World tensions increase because of economic and political instability. U.S. defense spending rises to protect vital interests. Welfare costs to aid the unemployed rise rapidly as do the costs of subsidizing troubled industries, requiring increased taxes despite cutbacks in other areas. Federal employment grows dramatically as a result of jobs programs and the need to oversee the economic recovery effort. Antitrust laws are repealed. Failing basic industries are turned into quasi-public corporations on the model of CONRAIL.

Personal income rises slowly in the period. Income distribution become more equal as the wealthy are popular targets for new taxes needed to support increased Government programs. Government welfare and jobs programs eliminate the worst poverty, engineering a perception that the economic burdens of the Nation are fairly apportioned.

Leisure time in the form of holidays and vacations grows very slowly, as many workers are on part-time schedules to share the work. Recreation centers around the home as low incomes and high fuel costs discourage travel. Fuel costs also affect residential patterns as people move closer to central cities to reduce commuting costs. Migration to warmer areas of the country from the frost belt is slowed by declining employment opportunities.

Demand for Transportation

Society recognizes the need to preserve mobility as essential to economic recovery. The Federal Government takes action to maintain air and ground transportation modes. The automobile remains the principal transportation mode but growth in its use is severely limited by the price and availability of fuel. Fuel rationing limits supplies to 1979 levels throughout the period. Railroads, both commuter and intercity, are targets of Federal public works programs. Video conferencing is used by the Government and big business to cut down on travel costs, but even more trips are replaced by the cheaper alternatives of telephone calls or letters.

Air Carrier Activity

The air carriers face a crippling problem of overcapacity as economic conditions lead to slug-

gish demand in the 1980's. A period of cutthroat price competition increases load factors but also increases losses. Mergers improve financial strength, but the airlines are still faced with a staggering burden of debt on partially mothballed fleets. Toward the end of the 1980's the imminent threat of industry collapse forces the Federal Government to reorganize the airlines as a quasi-independent agency, as the railroads were taken over in earlier years. The new monopoly radically restructure routes and schedules, raising load factors by reducing service levels.

Commercial operations decline as a result and air travel becomes less convenient. High fares and limited capacity are used to divert travel to trains and buses in short haul markets.

General Aviation

General aviation is hard hit by the combination of economic slowdown and fuel crisis. Improved aircraft design makes greater efficiency possible, but the lack of demand delays the introduction into service of new types of equipment. General aviation has a low political priority. Both itinerant and local operations peak in the mid-1980's and then fall steadily. Personal and

recreational flying suffer the most, as fewer people can afford the costs of ownership and operation. Business flying grows as air carrier service to smaller communities deteriorates.

Airports

Physical obsolescence and economic viability are the major challenges to airports. Federal aid helps keep essential facilities open and provides funds for badly needed maintenance. Smaller airports, particularly those dependent on general aviation are especially hard hit and many marginal airports close. Others remain open but reduce services for lack of any alternative economic use for the sites.

Existing airside capacity proves adequate in all major airports, but, with the gradual increase in the number of passengers, terminals become more crowded. As facilities age, services like ticketing and baggage handling become less efficient—although more personal—as people replace worn out automated machinery. The decline in operations is welcomed by at least one segment of society—airport neighbors. Noise and pollution levels, despite relaxation of emission standards, improve.

Chapter IV

Year-by-Year Data for FAA Aviation Forecasts, Fiscal Years 1981-1992



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Chapter IV provides the detailed data for the national aviation and FAA workload series forecasted by the FAA Office of Aviation Policy. The change in definition of certificated route air carriers that occurred last year should be noted. Additionally, Table 5 include traffic for eight recently certificated carriers that is also included in Table 1.

TABLE 1
United States Certificated Route Air Carrier
Scheduled Passenger Traffic

Fiscal Year	Revenue Passenger Enplanements (millions)			Revenue Passenger Miles (billions)		
	Total	Domestic	International	Total	Domestic	International
Historical*						
1970	171.4	156.9	14.5	129.0	104.1	24.9
1971	170.0	153.0	17.0	132.3	104.2	28.1
1972	182.9	164.5	18.4	144.2	112.3	32.0
1973	197.3	178.4	19.0	157.9	122.6	35.4
1974	208.1	189.5	18.6	165.0	130.0	35.0
1975	201.9	184.9	17.0	159.0	127.7	31.3
1976	211.8	195.1	16.7	169.5	137.3	32.2
1977	234.2	216.6	17.6	187.7	152.3	35.4
1978	266.7	246.7	20.0	218.9	176.8	42.1
1979(1)	315.3	291.7	23.6	257.3	205.6	51.7
1980E	315.6	290.5	25.1	257.1	201.9	55.2
Forecast						
1981	335.3	308.9	26.4	274.0	215.9	58.1
1982	359.3	331.8	27.5	293.7	232.9	60.8
1983	377.4	348.3	29.1	310.7	245.9	64.8
1984	396.3	365.7	30.6	327.2	259.3	67.9
1985	413.0	380.8	32.2	342.5	271.1	71.4
1986	432.0	398.2	33.8	359.7	284.7	75.0
1987	446.8	411.5	35.3	374.0	295.4	78.6
1988	462.2	425.5	36.7	388.6	306.8	81.8
1989	477.7	439.5	38.2	403.5	318.2	85.3
1990	493.7	454.0	39.7	418.7	330.0	88.7
1991	508.4	467.2	41.2	433.2	341.0	92.2
1992	525.4	481.1	44.3	449.7	352.7	97.0

E — Estimate *Source: CAB Air Carrier Traffic Statistics.

Prior to 1977, the fiscal year ended on June 30.

Detail may not add to total because of independent rounding.

(1) Introduces scheduled passenger traffic, principally intrastate air carrier traffic, not previously reported to Civil Aeronautics Board.

TABLE 2
U.S. Air Cargo Traffic(1)
All Services at U.S. Airports(2)

Calendar Year	Revenue Cargo Enplaned Tons(3) (thousands)			Revenue Cargo Ton-Miles(4) (millions)		
	Total	U.S. Domestic	International	Total	U.S. Domestic	International
Historical*						
1974	4356	3427	929	9480	3632	5848
1975	3999	3182	817	9051	3470	5581
1976	4242	3379	863	9820	3664	6156
1977	4604	3587	1017	10828	3947	6881
1978 ^r	5065	3843	1222	12566	4371	8195
1979	4982	3736	1246	12622	4407	8215
1980 ^E	4795	3510	1285	12187	4149	8038
Forecast						
1981	4966	3613	1353	12703	4268	8435
1982	5319	3861	1458	13763	4641	9122
1983	5656	4083	1573	14835	4963	9872
1984	6101	4406	1695	16091	5410	10681
1985	6576	4747	1829	17445	5886	11559
1986	7037	5062	1975	18838	6326	12512
1987	7517	5385	2132	20275	6728	13547
1988	8003	5703	2300	21847	7176	14671
1989	8513	6028	2485	23528	7637	15891
1990	9040	6355	2685	25318	8098	17220
1991	9580	6680	2900	27216	8561	18655
1992	10185	7051	3134	29295	9081	20214

E — Estimate r — revised *Source: CAB Air Carrier Traffic Statistics and U.S. Department of Commerce, Bureau of the Census

(1) Includes Freight, Express and Mail

(2) Includes scheduled and nonscheduled service of all U.S. and Foreign Flag Carriers

(3) Exports only

(4) Includes Imports plus Exports

TABLE 3
Total Aircraft in the Service of
United States Air Carriers by Aircraft Type

As of January 1	Total	Fixed Wing						Helicopter	
		Piston		Turboprop		Jet			
		2 Engine	4 Engine	2 Engine	4 Engine	2 Engine	3 Engine		4 Engine
Historical*									
1975	2,526	84	42	223	73	541	926	627	10
1976	2,523	76	43	189	72	514	1,003	619	7
1977	2,505	63	37	178	69	536	1,025	593	4
1978	2,495	32	33	176	63	563	1,074	551	3
1979	2,623	28	45	178	78	618	1,164	509	3
1980	2,745	22	44	175	76	665	1,262	501	0
Forecast									
1981	2,722	19	40	177	74	669	1,284	459	0
1982	2,707	16	35	179	72	674	1,306	425	0
1983	2,776	13	30	181	70	757	1,328	397	0
1984	2,833	10	25	183	68	829	1,349	369	0
1985	2,920	10	20	185	64	927	1,370	344	0
1986	2,960	10	15	187	60	970	1,369	349	0
1987	3,002	10	10	189	56	1,015	1,368	354	0
1988	3,041	10	5	191	52	1,061	1,367	355	0
1989	3,077	10	0	193	48	1,105	1,365	356	0
1990	3,118	10	0	195	44	1,148	1,364	357	0
1991	3,159	10	0	195	40	1,191	1,362	361	0
1992	3,202	10	0	195	38	1,235	1,360	364	0

*Source: FAA Aircraft Utilization and Propulsion Reliability Report

Included here are all passenger and cargo aircraft owned or leased by, and in the domestic or international service of, the United States certificated route, supplemental, intrastate, and commercial air carriers. Aircraft used for training and aircraft that have been withdrawn from service and are awaiting disposal are not included here. Aircraft in the service of air taxi operators are shown in the general aviation aircraft fleet on another page of this report.

TABLE 4
Total Airborne Hours, United States Air Carriers
by Aircraft Type
(millions)

Fiscal Year	Total	Fixed Wing							Helicopter
		Piston		Turboprop		Jet			
		2 Engine	4 Engine	2 Engine	4 Engine	2 Engine	3 Engine	4 Engine	
Historical*									
1975	6.17	.07	.03	.33	.11	1.40	2.56	1.66	.01
1976	6.09	.07	.02	.33	.12	1.26	2.60	1.68	.01
1977	6.25	.05	.02	.30	.12	1.21	2.73	1.79	.01
1978	6.39	.02	.03	.30	.12	1.41	2.97	1.53	.01
1979	6.94	.03	.05	.34	.12	1.58	3.35	1.46	.01
1980	7.56	.02	.05	.39	.12	1.67	3.63	1.68	—
Forecast									
1981	7.48	.02	.04	.39	.12	1.68	3.69	1.54	—
1982	7.45	.02	.04	.40	.11	1.69	3.76	1.43	—
1983	7.61	.01	.03	.41	.11	1.90	3.82	1.33	—
1984	7.76	.01	.03	.41	.11	2.08	3.88	1.24	—
1985	7.96	.01	.02	.41	.10	2.33	3.94	1.15	—
1986	8.09	.01	.02	.42	.09	2.44	3.94	1.17	—
1987	8.20	.01	.01	.42	.09	2.55	3.93	1.19	—
1988	8.31	.01	.01	.43	.08	2.66	3.93	1.19	—
1989	8.41	.01	—	.43	.08	2.77	3.93	1.19	—
1990	8.51	.01	—	.43	.07	2.88	3.92	1.20	—
1991	8.62	.01	—	.43	.06	2.99	3.92	1.21	—
1992	8.73	.01	—	.43	.06	3.10	3.91	1.22	—

*Source: Estimate based on FAA Aircraft Utilization and Propulsion Reliability Report.

Included here are hours flown by all passenger and cargo aircraft that are owned or leased by and are in the domestic or international service of the United States certificated route, supplemental, intrastate, and contract air carriers.

TABLE 5
Commuter Airlines Traffic and Operations(1)
(millions)

Fiscal Year	Revenue Passenger Enplanements	Revenue Passenger Miles	Aircraft Operations(2)
Historical*			
1975	6.6	698.5	2.5
1976	7.3	770.8	2.7
1977	8.5	946.2	3.1
1978	10.1	1,116.9	3.3
1979(3)	12.1	1,449.5	4.0
1980E	13.8	1,669.8	4.4
Forecast			
1981	15.5	1,883.3	4.8
1982	17.2	2,098.4	5.3
1983	18.7	2,290.8	5.7
1984	20.4	2,509.2	6.1
1985	21.8	2,692.3	6.5
1986	23.3	2,889.2	6.9
1987	24.9	3,100.5	7.3
1988	26.7	3,337.5	7.8
1989	28.6	3,589.3	8.2
1990	30.6	3,855.6	8.6
1991	32.7	4,136.6	9.0
1992	35.0	4,445.0	9.3

E — Estimate *Source: Civil Aeronautics Board

(1) Total U.S. Traffic and Operations Including Puerto Rico.

(2) Based on Official Airline Guide Published Schedules, including Passenger and All-Cargo Operations.

(3) Includes traffic reported by eight commuter carriers (1.3 million enplanements in 1979) holding Section 401 certificates and not reporting on CAB Form 298-C.

TABLE 6
Estimated Active General Aviation
Aircraft by Type of Aircraft
(thousands)

As of January 1	Fixed Wing					Rotorcraft		Balloons Dirigibles Gliders
	Total	Piston		Turboprop	Turbojet	Piston	Turbine	
		Single Engine	Multi- Engine					
Historical*								
1975	161.0	131.5	19.7	2.1	1.6	2.3	1.3	2.5
1976	168.0	136.6	20.3	2.5	1.7	2.5	1.6	2.8
1977	178.0	144.8	21.3	2.5	1.9	2.7	1.7	3.1
1978	184.3	149.3	21.5	2.9	2.3	2.7	2.1	3.6
1979	198.8	160.7	23.2	3.1	2.5	2.8	2.5	4.0
1980E	208.0	167.1	24.5	3.4	3.0	2.9	2.9	4.2
Forecast								
1981	218.7	175.8	25.0	3.8	3.2	3.1	3.2	4.6
1982	228.5	183.2	26.0	4.2	3.4	3.3	3.4	5.0
1983	237.1	189.4	26.9	4.6	3.7	3.4	3.7	5.4
1984	245.8	195.7	27.9	5.0	4.0	3.5	4.0	5.7
1985	254.5	202.1	28.8	5.3	4.3	3.6	4.3	6.1
1986	263.2	208.5	29.7	5.6	4.6	3.8	4.6	6.4
1987	271.4	214.4	30.7	5.9	4.8	3.9	4.9	6.8
1988	280.7	221.2	31.6	6.2	5.1	4.1	5.3	7.2
1989	289.4	227.6	32.6	6.5	5.4	4.2	5.6	7.5
1990	298.1	234.0	33.5	6.8	5.7	4.3	5.9	7.9
1991	306.8	240.4	34.4	7.1	6.0	4.5	6.2	8.2
1992	315.5	246.8	35.4	7.4	6.2	4.6	6.5	8.6

E — Estimate *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 during the previous calendar year.

TABLE 7
Estimated Active General Aviation
Aircraft by FAA Region
(thousands)

As of January 1	Total	FAA Region										
		ANE	AEA	ASO	AGL	ACE	ASW	ARM	AWE	ANW	AAL	APC
Historical*												
1975	161.0	6.2	21.1	24.3	30.6	11.6	21.6	8.3	25.0	8.6	3.4	.3
1976	168.0	6.4	21.1	24.8	30.9	12.3	23.0	9.3	25.8	9.8	4.2	.3
1977	178.0	6.4	21.7	26.2	32.6	13.3	24.2	10.0	27.5	11.0	4.7	.4
1978	184.3	6.6	21.7	26.9	33.2	13.6	25.8	11.1	28.4	11.4	4.9	.6
1979	198.8	7.5	23.7	29.5	34.6	13.7	26.7	12.2	30.8	13.8	5.8	.5
1980E	208.0	7.9	24.5	30.7	35.8	14.3	27.9	13.1	32.3	14.7	6.2	.6
Forecast												
1981	218.7	8.3	25.5	32.1	37.3	15.1	29.3	14.1	34.0	15.7	6.6	.7
1982	228.5	8.6	26.5	33.4	38.8	15.8	30.6	15.1	35.5	16.6	6.9	.7
1983	237.1	8.8	27.4	34.7	40.1	16.5	31.8	15.9	36.8	17.2	7.1	.8
1984	245.8	9.1	28.4	35.8	41.5	17.1	32.9	16.7	38.1	17.9	7.4	.9
1985	254.5	9.3	29.3	37.0	42.9	17.7	34.0	17.5	39.5	18.7	7.7	.9
1986	263.2	9.5	30.1	38.1	44.3	18.2	35.2	18.7	40.7	19.4	8.0	1.0
1987	271.4	9.7	30.9	39.3	45.7	18.7	36.4	19.4	41.9	20.1	8.2	1.1
1988	280.7	9.9	31.8	40.8	47.1	19.2	37.6	20.2	43.4	21.1	8.5	1.1
1989	289.4	10.1	32.5	42.0	48.5	19.7	38.7	21.0	44.9	22.0	8.8	1.2
1990	298.1	10.3	33.3	43.2	49.9	20.2	39.9	21.8	46.5	22.7	9.1	1.2
1991	306.8	10.5	34.0	44.5	51.3	20.7	41.1	22.7	48.0	23.4	9.4	1.2
1992	315.5	10.7	34.7	45.7	52.7	21.1	42.3	23.6	49.5	24.2	9.7	1.3

E — Estimate *Source: FAA Statistical Handbook of Aviation

Detail may not add to total because of independent rounding

Totals include a small number of aircraft located in foreign countries. Also see Table 6 footnotes.

TABLE 8
Estimated Hours Flown in
General Aviation by Type of Aircraft
(millions)

Fiscal Year	Fixed Wing					Rotorcraft		Balloons Dirigibles Giders
	Total	Piston		Turboprop	Turbojet	Piston	Turbine	
		Single Engine	Multi-Engine					
Historical*								
1975	31.9	22.8	5.3	1.3	.8	.7	.8	.2
1976	33.4	23.9	5.4	1.3	.9	.7	.9	.3
1977	35.2	24.8	5.9	1.5	1.1	.6	1.2	.3
1978	38.5	27.0	6.2	1.6	1.2	.8	1.4	.3
1979	41.1	28.8	6.4	1.7	1.3	.8	1.7	.4
1980E	42.1	29.0	6.6	1.9	1.4	.9	1.9	.4
Forecast								
1981	43.9	30.2	6.8	2.1	1.5	.9	2.0	.4
1982	46.1	31.3	7.1	2.3	1.7	1.0	2.2	.5
1983	47.8	32.3	7.3	2.5	1.8	1.0	2.4	.5
1984	49.7	33.4	7.5	2.7	1.9	1.0	2.7	.5
1985	51.6	34.4	7.8	2.8	2.0	1.1	2.9	.6
1986	53.3	35.4	8.0	3.0	2.1	1.1	3.1	.6
1987	55.2	36.5	8.3	3.1	2.3	1.1	3.3	.6
1988	57.2	37.6	8.5	3.3	2.4	1.2	3.5	.7
1989	58.8	38.6	8.7	3.4	2.5	1.2	3.7	.7
1990	60.9	39.7	9.0	3.6	2.6	1.3	3.9	.8
1991	62.5	40.7	9.2	3.7	2.7	1.3	4.1	.8
1992	64.3	41.7	9.4	3.9	2.8	1.3	4.4	.8

E — Estimate *Source: FAA Statistical Handbook of Aviation.

Prior to 1977, the fiscal year ended on June 30.

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	Fixed Wing					Rotorcraft		
	Total	Piston		Turboprop	Turbojet	Piston	Turbine	Other
		Single Engine	Multi-Engine					
Historical*								
1975	945.4	216.0	185.8	153.0	351.5	9.6	28.9	.6
1976	1013.2	230.0	191.5	153.0	395.5	9.8	32.5	.9
1977	1159.2	236.0	209.8	176.6	483.3	9.2	43.3	1.0
1978	1232.4	251.0	211.4	188.3	517.8	12.3	50.6	1.0
1979	1343.1	272.7	224.2	200.1	571.2	12.3	61.4	1.2
1980	1430.9	277.7	230.3	224.9	615.2	12.9	68.6	1.3
Forecast								
1981	1550.9	302.0	253.8	248.6	659.1	13.9	72.2	1.3
1982	1693.6	313.0	264.9	272.3	746.9	15.4	79.5	1.6
1983	1785.9	323.0	272.4	295.9	790.9	15.4	86.7	1.6
1984	1882.9	334.0	279.9	319.6	834.9	15.4	97.5	1.6
1985	1968.9	344.0	291.1	331.5	878.8	16.9	104.7	1.9
1986	2061.1	354.0	298.6	355.1	922.7	16.9	111.9	1.9
1987	2190.3	365.0	309.8	366.9	1010.6	16.9	119.2	1.9
1988	2285.6	376.0	317.2	390.7	1054.6	18.5	126.4	2.2
1989	2366.0	386.0	324.7	402.5	1098.5	18.5	133.6	2.2
1990	2465.0	397.0	335.9	426.2	1142.4	20.0	140.9	2.6
1991	2545.4	407.0	343.3	438.0	1186.4	20.0	148.1	2.6
1992	2641.3	417.0	350.8	461.7	1230.3	20.0	158.9	2.6

*Source: FAA AVP Estimates

Prior to 1977, the fiscal year ended on June 30.

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		
		Total	Air Carrier	General Aviation	Total	Air Carrier	General Aviation
Historical*							
1975	8,825	8,393	7,860	533	432	20	412
1976	8,855	8,403	7,822	581	452	20	432
1977	9,563	9,088	8,385	703	475	19	456
1978	9,919	9,426	8,669	757	493	17	476
1979	10,632	10,107	9,275	832	525	15	510
1980	11,814	11,279	10,370	909	535	13	522
Forecast							
1981	12,074	11,492	10,512	980	582	11	571
1982	12,410	11,806	10,707	1,099	604	9	595
1983	12,695	12,076	10,902	1,174	619	7	612
1984	12,986	12,349	11,097	1,252	637	6	631
1985	13,266	12,607	11,292	1,315	659	5	654
1986	13,554	12,878	11,488	1,390	676	5	671
1987	13,878	13,180	11,683	1,497	698	4	694
1988	14,167	13,450	11,878	1,572	717	3	714
1989	14,441	13,708	12,073	1,635	733	2	731
1990	14,736	13,978	12,268	1,710	758	2	756
1991	15,011	14,236	12,463	1,773	775	2	773
1992	15,301	14,509	12,658	1,851	792	2	790

*Source: FAA AVP Estimates

Prior to 1977, the fiscal year ended on June 30.

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
Historical*				
1970	56.2	34.9	21.2	331
1971	54.2	33.6	20.6	343
1972	53.6	33.6	20.1	348
1973	53.9	34.0	19.9	362
1974	56.8	36.1	20.8	394
1975	58.9	37.6	21.4	416
1976	62.5	39.7	22.8	423
1977	66.7	42.4	24.3	426
1978	67.2	43.6	23.6	428
1979	69.0	45.4	23.6	431
1980E	68.6	45.6	23.0	435
Forecast				
1981	72.5	48.2	24.3	440
1982	76.2	50.7	25.5	445
1983	78.9	52.7	26.2	450
1984	81.6	54.8	26.8	455
1985	84.1	56.7	27.4	460
1986	86.7	58.7	28.0	465
1987	89.1	60.5	28.6	470
1988	91.5	62.3	29.2	475
1989	93.3	63.5	29.8	480
1990	95.2	64.8	30.4	485
1991	96.8	65.9	30.9	490
1992	98.4	66.9	31.5	495

E — Estimate *Source: FAA Air Traffic Activity.

Detail may not add to total because of independent rounding.
Prior to 1977, the fiscal year ended June 30.

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 Carrier	Air Taxi	General Aviation	Military
Historical*					
1970	34.9	10.8	—	22.6	1.5
1971	33.6	10.1	—	22.0	1.5
1972	33.6	9.7	2.0	20.4	1.5
1973	34.0	9.8	2.1	20.6	1.5
1974	36.1	9.5	2.4	22.9	1.3
1975	37.6	9.4	2.7	24.2	1.3
1976	39.7	9.3	2.9	26.2	1.3
1977	42.4	9.8	3.3	28.1	1.3
1978	43.6	10.1	3.8	28.5	1.2
1979	45.4	10.4	4.4	29.4	1.2
1980E	45.6	10.3	4.7	29.4	1.2
Forecast					
1981	48.2	10.5	5.0	31.5	1.2
1982	50.7	10.8	5.4	33.3	1.2
1983	52.7	11.1	5.8	34.6	1.2
1984	54.8	11.4	6.3	35.9	1.2
1985	56.7	11.6	6.7	37.2	1.2
1986	58.7	11.8	7.2	38.5	1.2
1987	60.5	11.9	7.6	39.8	1.2
1988	62.3	12.0	8.0	41.1	1.2
1989	63.5	12.1	8.4	41.8	1.2
1990	64.8	12.3	8.8	42.5	1.2
1991	65.9	12.4	9.1	43.2	1.2
1992	66.9	12.5	9.3	43.9	1.2

E — Estimate *Source: FAA Air Traffic Activity.

Prior to 1977, the fiscal year ended June 30.

Detail may not add to total because of independent rounding.

See Table II for definition of itinerant operations. Air taxi included with general aviation prior to 1972.

Air taxi includes commuter.

TABLE 13
Local Aircraft Operations at Airports
with FAA Traffic Control Service
(millions)

Fiscal Year	Total	General Aviation	Military
Historical*			
1970	21.2	19.4	1.9
1971	20.6	18.6	2.0
1972	20.1	18.1	2.0
1973	19.9	18.1	1.8
1974	20.8	19.3	1.5
1975	21.4	20.0	1.4
1976	22.8	21.4	1.4
1977	24.3	22.9	1.4
1978	23.6	22.3	1.3
1979	23.6	22.3	1.3
1980E	23.0	21.7	1.3
Forecast			
1981	24.3	23.0	1.3
1982	25.5	24.2	1.3
1983	26.2	24.9	1.3
1984	26.8	25.5	1.3
1985	27.4	26.1	1.3
1986	28.0	26.7	1.3
1987	28.6	27.3	1.3
1988	29.2	27.9	1.3
1989	29.8	28.5	1.3
1990	30.4	29.1	1.3
1991	30.9	29.6	1.3
1992	31.5	30.2	1.3

E — Estimate *Source: FAA Air Traffic Activity

Prior to 1977, the fiscal year ended on June 30.
Detail may not add to total because of independent rounding.
See Table 11 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
Historical*					
1970	17.5	10.2	—	4.1	3.2
1971	17.5	9.5	—	4.6	3.4
1972	19.4	9.6	.9	5.0	3.9
1973	22.5 (1.5)	9.8	1.1	7.4	4.2
1974	24.1 (2.6)	9.5	1.4	9.2	4.0
1975	26.1 (2.9)	9.5	1.9	10.7	3.9
1976	28.1 (6.2)	9.5	2.2	12.8	3.7
1977	31.7 (7.4)	10.1	2.6	15.2	3.8
1978	33.5 (7.8)	10.4	3.1	16.3	3.7
1979	36.2 (8.6)	10.7	3.7	17.9	3.9
1980E	38.7 (10.1)	10.6	4.2	19.6	4.3
Forecast					
1981	42.1 (11.7)	10.8	4.4	22.6	4.3
1982	43.5 (11.9)	11.1	4.8	23.3	4.3
1983	45.2 (12.2)	11.4	5.3	24.2	4.3
1984	46.6 (12.4)	11.7	5.7	24.9	4.3
1985	48.1 (12.7)	11.9	6.1	25.8	4.3
1986	49.4 (12.9)	12.1	6.5	26.5	4.3
1987	50.6 (13.0)	12.2	6.9	27.2	4.3
1988	51.5 (13.1)	12.3	7.1	27.8	4.3
1989	53.0 (13.2)	12.4	7.8	28.5	4.3
1990	54.2 (13.3)	12.6	8.2	29.1	4.3
1991	55.4 (13.4)	12.7	8.6	29.8	4.3
1992	56.6 (13.6)	12.8	9.0	30.5	4.3

E — Estimate *Source: FAA Air Traffic Activity.

Prior to 1977, the fiscal year ended June 30.

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 parentheses as an information item (see Table 15).

The data include instrument operations at FAA operated military radar approach control facilities.

Air taxi includes commuter

TABLE 15
Non-IFR Instrument Operations
(millions)

Fiscal Year	Total	Terminal Control Areas	Expanded Radar Service Area Stage III
Historical*			
1973	1.5	—	1.5
1974	2.6	—	2.6
1975	2.9	—	2.9
1976	6.2	1.7	4.5
1977	7.4	2.0	5.4
1978	7.8	2.1	5.7
1979	8.6	2.4	6.2
1980E	10.1	2.9	7.2
Forecast			
1981	11.7	3.4	8.3
1982	11.9	3.6	8.3
1983	12.2	3.8	8.4
1984	12.4	4.0	8.4
1985	12.7	4.2	8.5
1986	12.9	4.3	8.6
1987	13.0	4.3	8.7
1988	13.1	4.4	8.7
1989	13.2	4.4	8.8
1990	13.3	4.5	8.8
1991	13.4	4.5	8.9
1992	13.6	4.6	9.0

E — Estimate *Source: FAA Air Traffic Activity.

Prior to 1977, the fiscal year ended June 30.
TCA count not available prior to 1976.

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	General Aviation	Military
Historical*							
1970	21.6	8.4	4.9	13.5	—	3.6	4.5
1971	21.3	8.2	5.0	13.0	—	3.8	4.6
1972	22.0	8.5	5.1	12.4	.8	3.9	4.9
1973	22.8	8.9	4.9	12.6	.9	4.6	4.7
1974	22.9	9.0	5.0	12.4	1.1	5.1	4.3
1975	23.6	9.3	5.1	12.4	1.3	5.5	4.4
1976	23.9	9.4	5.1	12.4	1.4	6.0	4.2
1977	26.0	10.2	5.6	13.0	1.6	6.9	4.5
1978	28.1	11.0	6.0	13.6	1.9	7.8	4.7
1979	29.9	11.6	6.6	14.0	2.3	8.8	4.8
1980E	30.1	11.8	6.5	13.9	2.5	9.0	4.7
Forecast							
1981	31.4	12.4	6.6	14.1	2.9	9.7	4.7
1982	32.4	12.8	6.8	14.4	3.1	10.2	4.7
1983	34.2	13.5	7.2	14.9	3.4	11.2	4.7
1984	35.6	14.1	7.4	15.4	3.6	11.9	4.7
1985	37.2	14.8	7.6	15.7	4.0	12.8	4.7
1986	38.4	15.3	7.8	16.0	4.2	13.5	4.7
1987	39.5	15.8	7.9	16.2	4.4	14.2	4.7
1988	40.5	16.3	7.9	16.2	4.8	14.8	4.7
1989	41.3	16.7	7.9	16.4	5.0	15.2	4.7
1990	42.2	17.1	8.0	16.5	5.2	15.8	4.7
1991	43.2	17.5	8.2	16.8	5.4	16.3	4.7
1992	44.0	17.9	8.2	17.0	5.6	16.7	4.7

E — Estimate *Source: FAA Air Traffic Activity.

Prior to 1977, the fiscal year ended June 30.

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. Air taxi includes commuter.

TABLE 17
IFR Departures and Overs
FAA Air Route Traffic Control Centers
(millions)

Fiscal Year	Air Carrier		Air Taxi		General Aviation		Military	
	IFR Departures	Overs	IFR Departures	Overs	IFR Departures	Overs	IFR Departures	Overs
Historical*								
1970	5.2	3.1	—	—	1.5	.5	1.6	1.3
1971	4.9	3.1	—	—	1.6	.5	1.6	1.4
1972	4.6	3.2	.4	0	1.7	.6	1.8	1.2
1973	4.7	3.2	.4	0	2.0	.6	1.7	1.1
1974	4.6	3.1	.5	0	2.2	.7	1.6	1.1
1975	4.6	3.1	.6	.1	2.4	.7	1.6	1.2
1976	4.6	3.2	.7	.1	2.6	.8	1.5	1.1
1977	4.8	3.4	.8	.1	3.0	.9	1.6	1.2
1978	5.0	3.6	.9	.1	3.4	1.0	1.7	1.3
1979	5.0	3.9	1.1	.1	3.8	1.2	1.7	1.4
1980E	5.0	3.9	1.2	.1	3.9	1.2	1.7	1.3
Forecast								
1981	5.1	3.9	1.4	.1	4.2	1.3	1.7	1.3
1982	5.2	4.0	1.5	.1	4.4	1.4	1.7	1.3
1983	5.4	4.1	1.6	.2	4.8	1.6	1.7	1.3
1984	5.6	4.2	1.7	.2	5.1	1.7	1.7	1.3
1985	5.7	4.3	1.9	.2	5.5	1.8	1.7	1.3
1986	5.8	4.4	2.0	.2	5.8	1.9	1.7	1.3
1987	5.9	4.4	2.1	.2	6.1	2.0	1.7	1.3
1988	5.9	4.4	2.3	.2	6.4	2.0	1.7	1.3
1989	6.0	4.4	2.4	.2	6.6	2.0	1.7	1.3
1990	6.0	4.5	2.5	.2	6.9	2.0	1.7	1.3
1991	6.1	4.6	2.6	.2	7.1	2.1	1.7	1.3
1992	6.2	4.6	2.7	.2	7.3	2.1	1.7	1.3

E — Estimate *Source: FAA Air Traffic Activity.

Prior to 1977, the fiscal year ended June 30. Air taxi included with general aviation prior to 1972. Air taxi includes commuter.

TABLE 18
Total Flight Services, Pilot Briefs and Flight Plans
Originated at FAA Flight Service Stations
and Combined Station/Towers
(millions)

Fiscal Year	Total Flight Services	Pilot Briefs	Flight Plans Originated		
			Total	IFR-DVFR	VFR
Historical*					
1970	45.7	11.9	6.0	3.3	2.6
1971	47.7	12.7	6.2	3.5	2.7
1972	50.2	13.5	6.6	3.9	2.7
1973	53.7	14.7	7.2	4.5	2.7
1974	56.2	15.4	7.8	5.0	2.8
1975	58.3	16.2	8.0	5.2	2.8
1976	58.1	16.0	8.1	5.4	2.7
1977	61.3	16.9	8.7	5.9	2.8
1978	64.9	18.3	9.1	6.4	2.7
1979	66.6	18.7	9.5	6.9	2.6
1980E	65.4	18.3	9.5	7.1	2.4
Forecast					
1981	68.3	19.2	10.0	7.5	2.5
1982	72.4	20.2	11.0	8.4	2.6
1983	76.5	21.4	11.8	9.1	2.7
1984	80.3	22.7	12.4	9.7	2.7
1985	83.9	23.9	13.0	10.3	2.7
1986	87.4	25.0	13.6	10.8	2.8
1987	90.8	26.1	14.2	11.4	2.8
1988	93.5	27.1	14.6	11.9	2.7
1989	96.0	28.0	15.0	12.4	2.6
1990	98.6	28.8	15.5	12.9	2.6
1991	100.8	29.5	15.9	13.3	2.6
1992	103.4	30.2	16.5	13.8	2.7

E — Estimate *Source: FAA Air Traffic Activity.

Prior to 1977, the fiscal year ended June 30.

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 18 and 19 are based upon the current number of and configuration of the FSS and CS/T. A change in their number or configuration could have a corresponding change on the forecast.

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
Historical*							
1970	10.0	1.3	8.7	.8	—	8.5	.7
1971	9.9	1.3	8.6	.7	—	8.6	.7
1972	10.0	1.4	8.6	.5	.6	8.2	.7
1973	9.9	1.5	8.4	.6	.7	8.0	.7
1974	9.9	1.5	8.4	.4	.7	8.1	.7
1975	10.0	1.6	8.4	.4	.7	8.1	.7
1976	9.8	1.5	8.3	.4	.8	8.0	.6
1977	10.2	1.7	8.5	.4	.8	8.4	.6
1978	10.2	1.9	8.3	.4	.8	8.4	.5
1979	10.2	2.0	8.1	.4	.9	8.4	.4
1980E	9.8	2.2	7.6	.4	.9	8.1	.4
Forecast							
1981	9.9	2.3	7.6	.4	.9	8.2	.4
1982	10.0	2.4	7.6	.4	.9	8.3	.4
1983	10.1	2.5	7.6	.4	1.0	8.3	.4
1984	10.1	2.5	7.6	.4	1.0	8.3	.4
1985	10.1	2.6	7.5	.4	1.0	8.3	.4
1986	10.2	2.7	7.5	.4	1.0	8.4	.4
1987	10.2	2.7	7.5	.4	1.0	8.4	.4
1988	10.1	2.7	7.4	.4	1.0	8.3	.4
1989	10.0	2.7	7.3	.4	1.0	8.2	.4
1990	10.0	2.7	7.3	.4	1.0	8.2	.4
1991	10.0	2.7	7.3	.4	1.0	8.2	.4
1992	10.0	2.8	7.2	.4	1.0	8.2	.4

E — Estimate *Source: FAA Air Traffic Activity.

Prior to 1977, the fiscal year ended June 30.

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. Air Taxi included with General Aviation prior to 1972.

TABLE 20
Active Pilots by Type of Certificate
(thousands)

As of January 1	Total	Students	Private	Commercial	Airline Transport	Helicopter	Glider	Other	Instrument Rated (1)
Historical*									
1975	733.7	180.8	305.8	192.4	41.0	5.6	4.8	3.2	199.3
1976	728.2	177.0	305.9	189.3	42.6	4.9	5.3	3.1	204.0
1977	744.2	188.8	309.0	187.8	45.1	4.8	5.8	3.0	211.4
1978	783.9	203.5	327.4	188.8	50.1	4.8	6.2	3.1	226.3
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
Forecast									
1981	831.1	205.9	351.6	192.1	65.6	5.2	7.3	3.4	255.8
1982	857.9	209.2	360.2	202.1	70.1	5.2	7.7	3.4	265.8
1983	885.3	212.5	368.8	212.6	74.6	5.3	8.1	3.4	275.8
1984	907.1	215.9	377.4	217.5	79.1	5.3	8.5	3.4	285.9
1985	931.5	219.4	386.0	224.6	83.7	5.4	8.9	3.5	295.9
1986	956.4	222.9	394.6	232.4	88.2	5.5	9.3	3.5	305.9
1987	980.2	226.5	403.2	239.0	92.7	5.6	9.7	3.5	315.9
1988	1003.7	230.1	411.8	245.3	97.2	5.6	10.1	3.6	325.9
1989	1028.0	233.8	420.4	252.2	101.8	5.7	10.5	3.6	335.9
1990	1052.3	237.5	429.0	259.1	106.3	5.8	10.9	3.7	345.9
1991	1076.0	241.3	437.6	265.5	110.8	5.8	11.3	3.7	355.0
1992	1099.3	245.5	446.2	271.3	115.3	5.9	11.7	3.7	366.0

*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)
1975-1992

Fiscal Year	Total	Fixed Wing Aircraft			Helicopter
		Jet	Turboprop	Piston	
Historical*					
1975	19,889	9,526	1,298	1,927	7,138
1976	19,775	9,255	1,511	1,360	7,649
1977	18,670	9,168	1,382	1,075	7,045
1978	18,931	8,898	1,794	1,056	7,183
1979	18,526	8,656	1,859	850	7,161
1980E	19,206	9,023	1,927	798	7,458
Forecast					
1981	19,402	9,194	1,965	608	7,635
1982	19,719	9,358	1,993	554	7,814
1983	19,751	9,343	2,013	471	7,924
1984	19,922	9,370	2,039	435	8,078
1985	20,095	9,361	2,061	412	8,261
1986	19,923	9,390	2,110	261	8,162
1987	19,887	9,397	2,103	247	8,140
1988	19,881	9,465	2,078	243	8,095
1989	19,881	9,465	2,078	243	8,095
1990	19,881	9,465	2,078	243	8,095
1991	19,881	9,465	2,078	243	8,095
1992	19,881	9,465	2,078	243	8,095

E — Estimate *Source: Office of the Secretary of Defense, Department of Defense.

Prior to 1977, the fiscal year ended June 30.

(1) Includes Army, Air force, Navy and Marine regular service aircraft, as well as Reserve and National Guard aircraft.

TABLE 22
Active U.S. Military Aircraft Flying
Hours in Continental United States (1)
1975-1992
(thousands)

Fiscal Year	Total	Fixed Wing Aircraft			Helicopter
		Jet	Turboprop	Piston	
Historical*					
1975	6,510	3,478	677	902	1,453
1976	5,928	3,109	646	559	1,614
1977	5,401	2,932	577	489	1,403
1978	4,837	2,843	595	328	1,071
1979	5,319	2,960	684	398	1,277
1980E	5,290	3,023	663	367	1,237
Forecast					
1981	5,147	2,975	659	330	1,183
1982	5,217	3,074	662	312	1,169
1983	5,253	3,149	661	300	1,143
1984	5,273	3,186	663	285	1,139
1985	5,280	3,227	662	268	1,123
1986	5,267	3,225	661	259	1,122
1987	5,276	3,237	661	256	1,122
1988	5,284	3,245	661	256	1,122
1989	5,284	3,245	661	256	1,122
1990	5,284	3,245	661	256	1,122
1991	5,284	3,245	661	256	1,122
1992	5,284	3,245	661	256	1,122

E — Estimate *Source: Office of the Secretary of Defense, Department of Defense

Prior to 1977, the fiscal year ended June 30.

(1) Includes Army, Air Force, Navy and Marine regular aircraft, as well as Reserve and National Guard Aircraft.

TABLE 23
Economic Assumptions Used in FAA Forecasts

Fiscal Year	Disposable Personal Income (billions 1972\$)	Consumer Price Index (CY 1967 = 100)	Gross National Product (billions 1972\$)	Employment (millions)	Oil & Gas Deflator (CY 1972 = 100)
Historical*					
1970	734.2	114.7	1,076.2	78.4	97.7
1971	762.3	120.0	1,099.4	79.0	98.5
1972	793.3	124.3	1,155.2	81.1	99.7
1973	841.2	131.1	1,219.0	83.7	106.8
1974	845.1	144.0	1,222.1	85.6	138.1
1975	855.2	157.8	1,206.0	85.1	155.5
1976	883.8	168.2	1,255.3	86.8	163.1
1977	920.0	178.7	1,323.6	89.8	171.9
1978	961.8	191.8	1,384.5	93.4	180.1
1979	989.1	212.2	1,424.9	96.0	228.3
1980	997.2	241.0	1,433.1	97.6	339.0
Forecast					
1981	1,004.7	269.1	1,442.4	98.3	413.6
1982	1,031.4	294.4	1,483.3	99.7	468.1
1983	1,063.8	318.8	1,532.1	101.4	512.8
1984	1,098.1	342.7	1,581.4	103.0	556.9
1985	1,124.4	370.1	1,623.6	104.4	606.4
1986	1,158.3	400.7	1,672.7	105.9	660.8
1987	1,191.5	434.5	1,723.7	107.4	720.8
1988	1,227.0	468.2	1,775.9	108.9	785.4
1989	1,264.5	502.2	1,826.8	110.2	855.1
1990	1,303.7	538.9	1,877.7	111.5	931.2
1991	1,344.1	578.2	1,930.2	112.9	1,015.0
1992	1,384.4	620.5	1,984.2	114.2	1,106.4

Source: Wharton Econometric Forecasting Associates, Inc.

TABLE 24
Baseline Air Carrier Assumptions — Domestic Operations

Fiscal Year	Revenue Per Passenger Mile Cents	Passenger Load Factor Percent	Average Seats Per Aircraft Number	Average Passenger Trip Length Miles
Historical*				
1970	5.2	49.6	109.5	663
1971	5.2	48.6	115.1	681
1972	5.1	52.6	117.7	683
1973	5.0	52.1	123.7	687
1974	5.0	56.0	127.4	686
1975	4.8	55.0	130.3	691
1976	4.8	56.2	134.0	703
1977	4.8	56.4	136.8	703
1978	4.4	61.3	139.6	717
1979	4.1	62.6	140.5	705
1980	4.5	61.0	144.0	695
Forecast				
1981	4.3	61.5	148.0	699
1982	4.1	62.0	152.0	702
1983	4.0	62.5	156.0	706
1984	3.9	63.0	158.0	709
1985	3.8	63.0	162.0	712
1986	3.7	63.0	166.0	715
1987	3.7	63.0	170.0	718
1988	3.7	63.0	174.0	721
1989	3.7	63.0	178.0	724
1990	3.7	63.0	182.0	727
1991	3.7	63.0	186.0	730
1992	3.7	63.0	190.0	733

*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

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% (2,071,729 passengers and over in FY 1976)

Medium: 0.25% to 0.99% (between 517,932 and 2,071,728 passengers in FY 1976)

Small: 0.05% to 0.24% (between 103,586 and 517,931 passengers in FY 1976)

Nonhub: Less than 0.05% (under 103,585 passengers in FY 1976)

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

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.

Domestic Trunk Carriers

One of a group of certificated route air carriers which operates primarily within and between the 50 states of the United States and the District of Columbia over routes serving primarily the larger communities.

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.

Intrastate Air Carrier

A carrier licensed by a state to operate wholly within its border but not permitted to carry interline passengers from out of state. They are not regulated by the CAB.

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.

Local Service Carriers

Certificated domestic route air carriers operating routes of lesser density between the smaller traffic centers and between those centers and principal centers.

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 includes 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

One revenue passenger transported one mile in revenue service.

Revenue Ton Mile

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 Carrier 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 routes between the United States (and/or its territories) and one or more foreign countries.