

## LIGHT GENERAL AVIATION (FIXED WING)

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Light General Aviation (LGA) is defined for this purpose as both single- and multi-piston-engine powered, fixed-wing airplanes weighing less than 12,500 lbs. This definition does not include rotorcraft, which are discussed in the previous section of this Circular.

Since approximately 75 percent all of the world's light general aviation aircraft are operated in the United States, the status of LGA in this country is probably indicative of its worldwide status.

### Important Factors Affecting LGA

Product Liability. Product liability costs have helped cause new piston-engine aircraft sales to decline from over 16,000 units in 1978 to an estimated 1,100 units in 1989. The single largest cost of building a small aircraft -- larger than material or labor -- is product liability. Entire aircraft model line have been discontinued and factories closed. U.S. manufacturers have announced, however, that should legislation pass which reforms general aviation product liability laws, they will immediately reintroduce small piston-engine powered aircraft. Low rates of new aircraft production have increased the average age of U.S. LGA aircraft to 23 years. Twenty-five percent of the general aviation fleet is more than 32 years old. Employment by aircraft manufacturers has plummeted by more than 65 percent.

Innovation in LGA products has slowed as manufacturers are forced to cancel the introduction of new technology. Start-up manufacturers find it very difficult to obtain financing for new aircraft models. Lending institutions are very reluctant to provide start-up capital for a new company that could be subject to irrational and unpredictable product liability lawsuits. Consumers often find it difficult to purchase high quality used aircraft and replacement parts. The U.S. general aviation manufacturing industry is losing its position as the world's leading supplier of LGA airplanes. Foreign manufacturers are making plans to fill the void left by the U.S. product liability crisis.

Aviation Infrastructure. The number of airports open for public use in the United States declined five percent between 1983 and 1988 (from 5,628 down to 5,352).

Most of the decline in the number of public-use airports occurred in privately owned, public-use airports. These airports account for 25 percent of all public-use airports in the United States. Ten states

account for over half of the 298 privately-owned, public-use airports lost since 1983. (Texas, Ohio, New York, Pennsylvania, Oklahoma, Illinois, Michigan, California, Indiana, and Iowa lost a total of 152 airports in this period.)

Access to existing airports and airspace by LGA aircraft is under constant challenge and review. Recent court decisions which overturned the Massachusetts Port Authority's PACE plan (which sought to restrict airport access to large aircraft by setting much higher landing fees for small aircraft) affirmed that it is the role of the Federal Government, not local airport authorities, to regulate the operational mix of aircraft at an airport. Other proposals to ration airport capacity, such as peak hour pricing, are likely to be proposed in the near future. With the precedent established by the Massport PACE decision however, it is unlikely that any system prohibiting general aviation operations, either directly or indirectly, would be allowed.

The most likely cause of local restrictions on airport operations is noise. Communities often seek to limit noise by instituting bans on aircraft certificated under the Stage 2 noise standards. Although "Stage" standards apply only to jet aircraft, general aviation business jets are included. This approach completely ignores the fact that, because certification standards were designed to allow larger aircraft to make more noise than smaller ones, many Stage 2 general aviation aircraft actually make less noise than the supposedly more advanced Stage 3 air carrier aircraft. Small propeller drive airplanes are certified to a different standard that recognizes their generally lower noise levels. For these reasons, bans on general aviation aircraft because of noise are unlikely.

However, restrictions on general aviation operations (such as training prohibitions) because of noise proliferate at many airports. Many of these restrictions will continue to handicap the national transportation system until the federal government institutes a national noise policy.

Although access to existing major airports is a significant factor influencing LGA, a more important factor is the total number of general aviation and reliever airports. Given an adequate alternative, LGA operators will not operate at congested major airports.

The percent of LGA traffic at the 22 busiest major airports has been consistently declining. Much of the remaining traffic operates during non-peak hours or non-interfering general aviation runways. Recent increases in air traffic delays are not being caused by increased general aviation traffic at major airports. Bans on general aviation operations at major airports, therefore, are unlikely.

**Demographics.** By 1990, 25 million Americans will be between the ages of 45 and 54, by 1995 there will be 30 million, and by the year 2000 38 million. The average age of an individual holding a student pilot certificate was 32.5 years in 1988, and increases in the population's mean age could indicate fewer people will enter pilot training.

On the other hand, student pilots entering training today are more likely to be starting an aviation career rather than learning to fly solely for recreational purposes. With anticipated strong demand for airline pilots, student pilot training could increase.

Americans are also becoming wealthier. Currently, 18.5 percent of the population earns more than \$50,000 per year. Much of this wealth comes from the fact that five percent of those now in the work force hold a second job. Increasing wealth and decreasing leisure time suggest that available leisure time will be more highly valued, and that individuals may be willing and able to spend more money for their leisure activities. Increasing numbers of business and pleasure travellers may seek to make their travel more efficient by chartering general aviation aircraft or learning to fly.

**Regulatory Environment.** U.S. airspace is becoming more complex, congested, and regulated. The Federal Aviation Administration (FAA), in order to assure safety, has placed several new requirements on aircraft operators. Aircraft operating within 30 miles of the main airport inside a Terminal Control Area (TCA) must now have altitude-encoding transponders, even if they are not within the TCA. TCAs are currently located at the 26 busiest airports, and their number is expected to grow. Regulated airspace, known as Airport Radar Service Areas (ARSA), now surrounds nearly 150 midsize airports, requiring pilots to establish radio contact before entering space.

Higher standards of pilot training, especially recurrent training, are being considered. Currently, many insurance companies will not insure pilots unless they agree to additional or recurrent training. While these equipment and operating requirements may increase safety, they also increase the cost of flying to some degree and may decrease the perceived utility of general aviation.

Operators of piston-powered airplanes, especially those that operate older, less sophisticated aircraft primarily for recreation, are very price-sensitive. Even the slightest increase in operating expense or the need for additional aircraft equipment may cause the operator to reduce the annual hours flown or to stop flying completely. This current regulatory environment is believed by some to be a significant factor in the decline in flight hours and activity levels in the general aviation fleet over the last decade. At the

same time, this regulatory environment has probably made a significant contribution to general aviation's improving safety record.

General aviation is a fleet of older aircraft; 25 percent of U.S. general aviation aircraft are more than 32 years old. As with any piece of capital equipment, older LGA aircraft may reach a point where the maintenance required to keep the aircraft airworthy is prohibitively expensive.

Although a properly maintained and inspected LGA aircraft does not necessarily have a life limit, many years of poor maintenance or inspection are likely to leave the aircraft unairworthy. The result of these additional inspections, therefore, could be the retirement of older LGA aircraft that are in poor condition.

**Economic Environment.** Although shipments of new aircraft have declined in recent years for reasons previously discussed, the existing fleet of 188,000 active general aviation piston-engine aircraft remains a significant provider of transportation in the U.S. economy. In 1988, for instance, general aviation transported approximately 120 million passengers and flew nearly 34 million hours. As such, general aviation is affected by changes in U.S. Gross National Product, expendable income, interest rates, corporate profits, inflation rates, business confidence, and the overseas value of the dollar.

Since 1980, however, external factors, such as uncertainties about product liability in the U.S. legal system, have changed and obscured the traditional relationship between general aviation and the economy. The general aviation industry has certainly restructured since 1980, but not to the point where it operates independently of the U.S. economy. More research is needed to discover these current relationships.

A recent study commissioned by the Partnership For Improved Air Travel on the economic impact of general aviation on the U.S. economy shows earnings of \$12.2 million and employment for 532,528 people.

### Current Status of Light General Aviation

**Fleet Size.** There are currently about 187,500 active piston-engine aircraft in the U.S. general aviation fleet -- a number that has remained relatively constant since 1979. New piston-powered aircraft production declined rapidly in the early 1980s and then stabilized. Product liability problems have caused Cessna Aircraft Company, which at one time produced half of all world's new piston-engine airplanes, to halt production completely. This uncertain environment has also prevented many (but not all) U.S.

manufacturers from bringing new models to market. Some manufacturers are attempting to overcome product liability problems by implementing unique aircraft marketing programs. The Commander Aircraft Company, for instance, plans to lease newly produced aircraft, not sell them. Lessee's must agree to carry a minimum amount of liability insurance, which may be part of the monthly lease amount, and to undergo a minimum amount of transition and annual pilot training. As part of the lease agreement, the manufacturer may also set minimum pilot experience and certification standards.

While several foreign manufacturers have been exporting piston-powered aircraft to the United States for several years, they have not yet taken the markets recently abandoned by U.S. manufacturers. For instance, no foreign manufacturer is currently marketing a two-seat training aircraft in this country. Manufacturers from Korea, France, Germany, and other countries, however, have announced their intentions to export LGA aircraft to the United States.

While few new piston-engine aircraft have been entering the fleet, the number of aircraft leaving the U.S. fleet has accelerated. Foreign aircraft operators took advantage of favorable exchange rates and bought U.S. aircraft, increasing the number of used aircraft exported from the United States fivefold in only three years.

Hours Flown. The number of hours flown by the U.S. piston-engine fleet peaked at 37.3 million hours in 1979 and has declined every year since. There are, however, significant differences in the activity of each component of the piston-engine aircraft fleet.

Personal hours flown in the piston-engine aircraft fleet gradually increased from a low of 8.0 million hours in 1985 to an all-time high of 10.5 million hours in 1987. This increase is most likely attributable to relatively stable aircraft operating costs, increased expendable income for consumers, and the increased utility of general aviation travel as commercial airfares and congestion at major airports increased. Hours flown in instructional use peaked at 6.3 million hours in 1979, and then hit a low of 4.1 million hours in 1985. Since 1985, instructional-use hours have gradually risen, reaching 5.1 million hours in 1988. During this recent period of increased training activity, the number of students starting pilot training has actually been relatively stable.

The steady decline in the "All Other" category of piston-engine aircraft flight hours, which is mainly business travel, is surprising. One possible explanation is that businesses are not willing to use older, air-weary aircraft in their business. Since the average piston-engine aircraft now is 32 years old, businesses

may be turning to the newer, used turbine-aircraft fleet for their transportation needs. In addition, the cost of purchasing a used turbine-aircraft is now relatively low, which may have brought the cost of turbine-powered aircraft into the range of small business owners. Another explanation for the decline in piston-engine aircraft business travel is that, since businesses use aircraft as productivity tools, they may not be satisfied with the cruise speeds offered by most piston-engine aircraft.

### Outlook for Light General Aviation

Flying for personal use and instructional use will continue to increase; and as the current fleet of piston-powered aircraft ages, used aircraft will not be able to satisfy demand adequately. New aircraft sales will be stimulated, bringing additional aircraft into the fleet.

Piston-engine aircraft flying for other than personal or instructional use will continue to decline. General aviation business travelers will continue to choose to travel in turbine-powered aircraft.

New models of LGA aircraft are planned, but production will increase gradually. One U.S. manufacturer has already significantly increased production of piston aircraft in spite of product liability problems. Others have announced innovative plans to overcome high product liability costs. Several foreign manufacturers have also announced plans to export new LGA aircraft to the United States.

Because of increased inspection requirements for older aircraft and better understanding of the affects of aging, aircraft buyers will be better able to ascertain the true airworthiness of used aircraft. The attrition rate for piston aircraft will increase.

The number of airports open for public use will continue to decline, somewhat mitigating the growth possibilities for general aviation.

Because of the continuing federal deficit and the surpluses accumulating in the Aviation Trust Fund, small airports will find it increasingly difficult to get federal funding assistance for airport improvements, thus reducing the utility of these airports.

Federal regulations will require more equipment on LGA aircraft, especially if those aircraft operate near large metropolitan areas. Even though each additional piece of equipment may have a small incremental cost, the combined effect will increase the cost of flying beyond the means of some operators, especially those that fly for recreation. Pilots who fly relatively few hours per year may become inactive or sell their aircraft.

Mandatory additional recurrency training for pilots will cause relatively inactive pilots to become completely inactive. Those pilots who remain active, however, will be more competent and skilled. Since most accidents involve pilot error, the general aviation accident rate will continue to improve.

The U.S. LGA fleet, therefore, will grow at a rate about the same as real U.S. GNP during the next five years, but it will then accelerate to a growth rate somewhat higher than GNP. Passage of legislation instituting product liability reform could cause the fleet to grow at double these rates.