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AIRPORTS FOR SMALL AIRCRAFT IN METROPOLITAN AREAS

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AIRPORTS FOR SMALL AIRCRAFT IN METROPOLITAN AREAS

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SUMMARY

The number of small aircraft in the United States is increasing. In metropolitan areas such aircraft are being used more and more for business, for recreation, and for air taxi service. In the face of this increase in the number of this type of aircraft, the number of airports for small aircraft in metropolitan areas is decreasing. This is largely due to the demand for airport land for other purposes in rapidly expanding urban areas.

The purpose of this study was to investigate small aircraft and their functions, to discover the problems facing airports serving them, and to offer recommendations to solve the problems. The method of approach was to obtain and review available literature on the subject of small airports, and to interview local operators and federal officials connected with airport planning. As a result of the study, the following conclusions were obtained:

The location of airports for small aircraft should be based on the airport's relation to local, transient, and industrial users, public open spaces, ground transportation facilities and other airport control zones. Certain site requirements involving runways, topography, approaches and adjacent development must also be met. Small aircraft airports can be located near populated areas since they are not particularly noisy, have a good safety record, and do not substantially adversely affect nearby property values.

The majority of small aircraft airports are privately owned. The private owner in a metropolitan area faces two basic problems: (1) rising taxes, and (2) lack of control over surrounding land uses. Unless private airport owners are given public protection against these problems, they are likely to sell their airport land and move to an outlying area when urban growth begins to encroach upon them.

Where private individuals cannot provide needed small aircraft airports, a public agency must meet this need. These airports can be developed by the local government, by authorities or special districts, or by a private corporation under a leasing arrangement. The publicly-owned small aircraft airport may be operated by a private operator or by the public agency itself.

General obligation bonds and revenue certificates, together with federal and state funds, are used to finance land acquisition and construction of publicly-owned small aircraft airports. The local government may have to subsidize the operation of a publicly-owned small airport; however, careful leasing arrangements and the judicious use of user charges will bring in revenue and help reduce required public subsidies.

CHAPTER I

INTRODUCTION

In the last several decades there has been a growing public awareness of the time savings to be realized through air travel, especially by jet aircraft. As a result, people are now conscious of the large airport serving the commercial airline fleet and are no doubt convinced of that airport's importance.

People are not as aware, however, of the smaller airports throughout the country serving small aircraft* and of the importance of these airports to the community. During the 1950s and continuing into the early 1960s, the number of small aircraft in the United States increased, while the number of airports serving this type of aircraft decreased. Ellis, in his thesis The Small Community Airport . . . (1), attacks the problem of the lack of airports in small communities. He purposely did not cover, however, the problem of small airports in metropolitan communities which already have a major airport.

Increase in Numbers of Small Aircraft

Prior to 1940, people tended to think of most flying activities

* Small aircraft, for purposes of this discussion, include all aircraft not in the commercial airline or military fleets up through the Beechcraft E-18 class (12,500 pounds or less).

as a novelty, and associated most pilots with the "silk scarf and goggles" barnstormer of previous years who carried thrill-hungry spectators aloft for "5 minutes for \$5." The use of aircraft during the Second World War proved that an aircraft, aside from being an extremely effective tactical weapon, could also be an efficient means of transportation.

At the end of the war, there were only some 12,000 small aircraft in the United States. In 1946, manufacturers who expected former military pilots to fly for pleasure turned out 14,349 primarily two-place small aircraft. The anticipated market, however, did not fully develop and several manufacturers went out of business. Nevertheless, by 1950 the small aircraft fleet had grown to 40,781.

An important impetus to small aircraft came in 1954 when the Booz-Allen-Hamilton Company of Chicago made a scientific market potential study for Cessna Aircraft Company (2). The study pointed out that there was a tremendous potential for aircraft to be used for business purposes. Consequently, Cessna prepared for the production of four-place aircraft that could be used by businessmen and launched a gigantic advertising campaign. Sales increased immediately. Observing these results, two other small aircraft companies, Beech and Piper, also went into production of aircraft to be used for business purposes. As a result, annual sales increased from 2,058 small aircraft in 1954 to 5,207 in 1956. During the 1957-1958 period light twin-engine planes also entered the small aircraft market and were rapidly accepted. In 1962, the small aircraft fleet totaled 84,456,

of which 6,983 were twin-engine types (3).

The Federal Aviation Agency (FAA) estimates that by 1970 there will be 105,000 small aircraft in the United States. This would include 14,000 multi-engine and 56,000 four-place (or more) single-engine aircraft (4). The remaining 35,000 aircraft would probably consist of two-place single-engine aircraft used primarily for recreational flying.

Small aircraft are versatile machines and are used for a variety of purposes, including transportation for executives and salesmen, recreational flying and air taxi service. These activities are the ones most found at airports for small aircraft located in metropolitan areas. Other small aircraft activities such as crop dusting and pipeline patrolling are normally not found at these airports.

For Business

Aircraft used in connection with business activities comprise the largest number of small aircraft. Out of the total small aircraft hours flown, they also log the most hours of operation. In 1931, 152,000 hours, or 14 per cent of the total small aircraft hours flown, were devoted to business flying (5). By 1963, 34,000 corporation planes logged 5,600,000 flying hours (43 per cent of the small aircraft total and twice the total logged by all United States domestic airlines)(6). Many companies own more than one plane--for example, Socony Mobil with 28 aircraft and General Motors with 22 have more aircraft than some local commercial airlines.

Aircraft used for executive transportation account for a large part of the total volume of business flying. Many corporations and

small businesses are finding it increasingly necessary to move their executive personnel around the country quickly and are purchasing their own aircraft for this purpose. Donald M. Kendall, president of the Pepsi-Cola Company, says: "It would be impossible to get our business done without the plane. It's a practical convenience that saves our executives' time and gives us the mobility to get to out-of-the-way places fast." (7) Montgomery Ward & Company has found that flying its executives in company aircraft costs one-third more than putting them on commercial flights, but saves 58 per cent of the executives' travel time (8). H. McKinley Conway, president of an Atlanta industrial development research concern, says his company's Aero Commander, which he pilots himself, provides matchless mobility. After making an industrial site survey of Costa Rica in 1963, Conway said: "I suppose we covered more miles in a day by air than we could have on land in two or three weeks." (9)

Although executive transportation is important, business aircraft are not used solely for this purpose. Corporations with branch plants save valuable time in transporting specialists and technical personnel to the branches for special or emergency assignments. Company planes are also used in sales programs, to broaden marketing areas, and to maintain closer contact with customers. The sales manager of a Pennsylvania corporation lists the costs for two trips over a single sales route made first by automobile and then by small aircraft. He states:

The \$789.64 saving through use of the Cessna is not the real saving, however. It took ten weeks by automobile, as com-

pared with four weeks by airplane. This makes me equal to two and one-half salesmen in automobiles who are willing to drive late at night and sell all day. [This results in] another \$30,000 a year saved for the Company. Then there is business prestige to be considered, and I can assure you that our customers are impressed by the faster service we can give them by airplane. Many sales are made on an air trip that would not be made during a longer automobile trip. I get to many potential customers before competitors get there by automobile (10).

Business corporations, however, do not account for all business flying. Many professional and individual businessmen make extensive use of small aircraft in essentially business-oriented travel. For instance, a consulting engineer in Texas says, "[Through the use of a small plane] I am able to put in an additional day per week, besides spending a lot more time at home." (11)

Although business flying will continue to increase, its present relative percentage of total small aircraft hours flown is expected to drop from 43 per cent in 1960 to 38 per cent in 1970 (12). Manufacturers, however, are still optimistic. Wyman L. Henry, vice president of marketing for Beech Aircraft Company, says:

There are almost one million corporations in the country. Over 200,000 of these have assets of \$250,000 or more with additional tens of thousands of independent businessmen, sales representatives, executives of small firms and professional people with need for executive travel . . . We're going after those new markets . . ." (13)

This discussion then gives some indication of the tremendous increase in the use of small aircraft for business purposes. As new and old air-minded industries and businesses locate and expand, metropolitan and other heavily urbanized areas must be prepared to provide airports to handle these companies' aircraft.

For Recreation

Although flying for business purposes now commands the greatest portion of small aircraft activities and will continue to grow, personal flying (which is essentially recreational) is expected to increase from 25 per cent of the total small aircraft flight hours in 1960 to 33 per cent by 1970 (14). Statistics show that personal flying has increased from 1,880,000 hours in 1951 to 3,160,000 in 1961 (15).

Some pilots fly just for the sake of flying. Others use small aircraft for travel to vacation spots, sporting events and hunting and fishing hideaways. Many people plan flights in the Western States to follow the still-visible wagon trails that cross the country from east to west. These trails are not visible from the ground.

The Bahamas and the Caribbean Islands are attracting flying tourists. The Grand Bahama Hotel, for instance, advertises: "Short hop to an island paradise--just 55 miles from West Palm Beach . . ." (16).

Fly-ins (social get-togethers for pilots and friends) are gaining in popularity. Bluffton, Ohio, for example, holds an annual fly-in that last year attracted 750 pilots and more than 5,000 people for the day (17). Pilots around the country have an open invitation to these events, where breakfast is served and aviation exhibits are displayed.

Flying clubs are becoming important in recreational flying. The members of these non-profit clubs own aircraft on a cooperative basis, thereby eliminating the need for a large individual capital

outlay (which is usually the deterrent to owning an aircraft). By offering inexpensive flying rates, these clubs are making flying for enjoyment available to people who might otherwise be unable to afford it.

Easier aircraft financing is contributing to the increase in recreational flying. Aircraft financing today is no different from boat or automobile financing. It was not always this easy. After World War II, many surplus airplanes were purchased on limited funds to pursue enterprises that never quite materialized. The companies and banks that financed these ventures took heavy losses. As a result, for the next decade they refused to finance any aircraft, regardless of whether it was to be used for business or pleasure.

Since 1960, however, many banks have returned to aviation financing. As a rule, they no longer consider the aircraft's ability to make a profit but rather the individual's ability to pay back the loan. The president of the Manchester National Bank in Manchester, New Hampshire, says:

Aircraft are just another form of transportation . . . We use the same credit formula when we make a loan on an automobile, housetrailer, or anything else. We've never had a loss on aircraft . . . (18).

The Richard J. Brelow Insurance Company at Teterboro Airport, New Jersey, says the individual's need for an airplane has no great bearing on the decision to loan money to a prospective airplane owner. "A lot of aircraft are bought for private pleasure flying, and financing is based on the individual's ability to pay. Just that the airplane is to be used for fun doesn't throw a loan out

of the picture." (19)

Hill Aircraft Company at the Fulton County Airport in Atlanta, Georgia, offers a five-year contract with as little as 10 per cent down payment. General Aero Finance of San Antonio, Texas, advertises "Genuine bank rates, to 7 years, from 4-1/2%." (20) No doubt, more institutions will finance aircraft when they realize that small aircraft financing can be handled as any other loan.

Some of the other factors contributing to the increase in recreational flying are higher incomes which allow people to spend more money on small aircraft and flying and more leisure time because of more holidays, longer vacations, earlier retirement and improvements in household appliances.

For Air Taxis

Air taxi service will become increasingly important in the coming years. The president of the National Air Taxi Conference predicts that during the 1960s "large cities with three or more satellite fields will have air taxi operators running schedules to the main airport all day." (21) This can be better understood when it is realized that an airline passenger can spend a considerable amount of time traveling to or from a large airport in metropolitan areas in heavy traffic, thereby losing the effectiveness of time initially saved by air travel. Air taxi from an outlying field can carry a passenger to the large airport in a matter of minutes.

Decrease in Number of Small Aircraft Airports

In the years immediately following the Second World War, when private flying surged in popularity, many privately-owned small aircraft airports were maintained primarily to teach flying under G. I. Bill financing. During the 1950s, however, the G. I. Bill financing began to run out. In addition, there arose a tremendous increase in the demand for land in metropolitan areas. Thus, with dwindling support from flying instruction activities and with increasingly attractive offers for airport land--flat and easily developable--many privately-owned airports in metropolitan areas went out of business just at the time when they were about to be needed the most. Mr. Clyde Barnett, California's State Aviation Director, points out that, since World War II, California has lost more than 2,000 airports and that approximately 180 were lost during 1960 alone (22). Undoubtedly, some of these airports were poorly located and it was inevitable that they would eventually be lost. However, many well located airports in metropolitan areas were sold and the land subdivided or put to some other use. This is typical throughout the country.

Functions Served by Airports for Small Aircraft

Properly planned airports for small aircraft in a metropolitan community can: (1) relieve air traffic congestion at commercial airline airports; and (2) produce community economic gains.

Relief of Air Traffic Congestion at Commercial Airline Airports

In 1961, small aircraft operations at large airports with FAA

control towers exceeded commercial operations by 43 per cent and, at medium-sized airports, by 112 per cent (23). One of the major problems in connection with the operation of large metropolitan airports today is aircraft traffic congestion which is building up faster than air traffic control facilities can handle it.

Two principal causes for traffic congestion at commercial airline airports are: (1) the large numbers of commercial airline, military, and small aircraft using the facility; and (2) the divergent flight performance characteristics of these different aircraft. For example two small aircraft with similar landing approach speeds can land one right after the other, causing no problem. On the other hand, a jet airliner with a much higher approach speed caught behind a small aircraft in the landing pattern would have to circle the field using up valuable fuel and time until the small aircraft had landed and cleared the runway.

This then points up the need for separation of aircraft. The FAA planning guide, Economic Planning for General Aviation Airports, (24) states that small aircraft operations (take offs and landings) at an airport tend to increase as commercial airline operations increase. Separation of aircraft according to flight performance characteristics would reduce the total number of aircraft using the large airport and would solve the problem of commercial airliners and small aircraft having to wait on each other.

One of the more practical solutions, then, to the congested airport problem is the development of airports primarily to serve small aircraft. The FAA has calculated that 259 airports would have to be

developed to relieve 65 presently congested commercial airports in 59 metropolitan areas (25). As urban areas continue to increase in size, major airports will become more and more crowded, thereby creating a need for still more airports to serve small aircraft.

By providing a system of small airports, the efficiency of the commercial airline airports will be increased. Total aircraft traffic at these airports will be reduced and commercial airliners will have less trouble meeting schedules.

It is more economical to construct separate airports for small aircraft than to construct additional runways at commercial airline airports. Small aircraft, due to their relatively low weight and their ability to take off and land in short distances, require shorter and less heavily constructed runways than do commercial airliners, thereby saving on construction costs. New runways at the large airports would undoubtedly require additional land, which is usually expensive due to its suitability for related commercial and industrial development. The small airport normally requires less total land than that needed for the additional runway. The small airport can also be located nearer its users and will therefore be more convenient than the large airline airport.

Production of Community Economic Gain

A community can gain economically from money spent by those using the airport. For example, the Atlanta Magazine, reporting on the Atlanta air transportation industry, says:

Pleasure pilots are already doing their part for Atlanta's airports. An estimated \$250,000 to \$350,000 of outside

money found its way into airport pockets from tourist transients last year. This year will be even better. This money came mostly from fuel and food purchases with a small percentage attributed to tie-down fees and motels. The figures do not even include money spent on sight-seeing, entertainment and shopping (26).

A Michigan survey showed that the itinerant small aircraft pilot spent an average of \$15.44 during an average stay of 0.8 of a day in a host community. His passengers, whose average stay was 1.1 days, each spent an average of \$21.34 during that time (27). Utilizing the data collected by the survey, analysts developed a formula by which a community could estimate the annual income realized from small aircraft itinerant passengers and pilots. The formula uses a unit value of \$5.31. In Adrian, Michigan, for example, the survey determined that there were 34,666 small aircraft passengers during 1962. By multiplying 34,666 by the \$5.31 unit value, the town could estimate that small aircraft passengers spent \$183,076 in 1962. Money spent by pilots would be figured in a like manner.

Some authorities (28) estimate that more than \$1,000,000,000 are spent annually on small aircraft sales and services in the United States.

Summary

In metropolitan areas throughout the United States, airports for small aircraft are decreasing in number due to the increased demand for land in these areas and the high values being placed on that land. In the face of this decrease in airports, small aircraft are increasing in number. There are several reasons for this increase.

Many corporations and businesses are finding it necessary to move their personnel around the country quickly and are purchasing their own aircraft for this purpose. Many companies also use aircraft in sales programs and in maintaining closer contact with customers. In addition, many professional and individual businessmen use small aircraft in business travel. Although business flying now commands the greatest percentage of small aircraft hours flown, recreational flying is also becoming increasingly important. Easier financing, increased incomes and more leisure time are important factors contributing to the increase in recreational flying. Air taxi service is also growing in importance as air taxi operators provide service between small, outlying airports and the main airline airport.

By providing properly planned small aircraft airports, the community can relieve air traffic congestion at the large commercial airline airports. The metropolitan community can also gain economically from money spent by local and transient small aircraft pilots and passengers.

CHAPTER II

LOCATION

Airport location in a metropolitan area becomes increasingly difficult as more and more people crowd into the area.

Nearly two out of three Americans today live in metropolitan areas. From 1950-60, metropolitan areas account for 85 per cent of the total population growth in the United States. By 1980, metropolitan areas are expected to house three out of every four Americans (29).

All of these people demand valuable space. Some live in apartments, others in sprawling subdivisions. Naturally, space for residential, commercial and recreational areas subtracts from the space available for other developments, such as airports. Where then should airports for small aircraft be located in relation to these other developments?

Location Within the Metropolitan Area

The location of an airport for small aircraft within a metropolitan area should be based on the airport's relation to users, parks and public open spaces, ground transportation facilities and airport control zones.

Relation to Users

An airport for small aircraft should, if possible, be located where it will be convenient to its users. There are basically three types of users: local users, transient users, and industrial users.

Local Users. Local users are those living within the metropolitan area who will use their aircraft for recreation or business. Those using their planes primarily for recreational purposes will want the airport near their homes. Those using their aircraft for business purposes may wish to have the airport located in residential areas where they live or near the central city where they work. Most residential areas have lower land values than downtown commercial areas. As a result, it is usually more feasible to develop an airport for local users in or near residential areas. Unless there is a sizeable piece of vacant land available, the best location for these airports is on the edge of a residential section.

In selecting an airport location, a check should be made of the residence location of all small aircraft owners in the metropolitan area. These locations should then be plotted on a map of the area to see if any concentrations exist. The FAA states that in metropolitan areas a neighborhood with a minimum of ten small aircraft owners justifies an airport (30). Under normal conditions, 50 to 60 based small aircraft would be the maximum number the airport could effectively handle (this might vary somewhat, depending on the size of the airport). Beyond this number, consideration should be given to the construction of an additional airport to handle the overload. The airport should be located no farther than 15 minutes driving time (which might reasonably be converted to a five or six mile radius) from the group it will serve (31).

Transient Users. Transient users are normally interested in getting into downtown areas as quickly as possible. Therefore, they desire a central location or one convenient to public transportation going to the central area. Near downtown areas land values are extremely high. Buying and clearing land to provide an airport is generally not feasible. Under certain conditions, however, an airport for small aircraft can be built close to downtown areas.

For a downtown area located on a large body of shallow water, be it river, lake, or ocean, there is a practical solution to the problem. Build the airport on a land-fill. St. Petersburg, Florida, for instance, has such an airport. The Albert Whitted Municipal Airport is located on a large land-fill in Tampa Bay only five blocks from downtown St. Petersburg. This excellent facility, open only to small aircraft, makes the St. Petersburg area readily available to businessmen who need to conduct business downtown or to pilots merely seeking convenient lodging, restaurants, or entertainment. Chicago's downtown airport, Meigs Field, was built on a land fill in Lake Michigan to provide downtown convenience for small aircraft.

A New York construction firm has proposed putting airports on man-made islands (32). Such a project involves using concrete "ships" 300 to 400 feet long to form a sea wall enclosure. These ships are made on land, towed to the area, filled with sand and sunk. The enclosed area is filled with sand pumped from the lake bed (or from pits on shore) and joined to the mainland by a causeway. This method has the advantage of flexibility. If a new runway is needed,

the island can be reshaped and enlarged by refloating and moving the concrete ships and installing additional ones.

The advantage of building an airport on a land fill is that it requires neither the acquisition of expensive real estate nor the relocation of families and businesses. It also offers natural approach corridors and eliminates the problems of noise and safety.

If a central area location is not possible, the airport can be located farther away adjacent to an expressway giving quick access to downtown areas. For example, the Fulton County Airport in Atlanta, which is located nine miles from the center of the city and near a downtown connector expressway, will be no farther than 11-12 minutes driving time from downtown Atlanta when the expressway is completed. Rapid transit lines, which some metropolitan areas are considering installing, also offer good possibilities for adjacent or nearby airport location.

Industrial Users. Industrial users will consist mainly of executives, company personnel and those doing business with industrial concerns. Light freight can also be shipped into and out of industrial small aircraft airports.

To determine the need for an airport to serve this group, a survey of industrial users to discover the adequacy of existing airport service should be made. As with local users, a concentration of industrial users without convenient airport facilities constitutes a need for an airport in the vicinity.

Airports for small aircraft are compatible with industrial areas.

Approaches can be located over open areas, parking lots, railroad tracks, or low-level warehousing. In addition, the airport can serve as an excellent buffer between industrial and adjacent residential areas.

Many air-minded industries are looking for industrial airparks. Metropolitan communities should be sensitive to the needs of these industries and provide an airport convenient to a suitable industrial district. Some communities are taking the opposite approach and are encouraging industries to locate at already existing airports. This approach is satisfactory in most cases if the added industrial air traffic does not create congestion problems at the airport.

Relation to Parks and Public Open Spaces

Airports for local users are often more feasible when combined with parks or other public open spaces. The Supreme Court of Kansas, in City of Wichita v. Clapp et al, 263 Pacific 12 (1928), said that the devotion of a reasonable portion of a public park to an airport, for recreation and "other attendant purposes," comes within the proper and legitimate uses for which public parks are created. Other recreational uses can also be included with an airport for small aircraft. "Such open land uses as golf courses, botanical gardens and passive recreation areas are desirable in combination with the airport in the approach areas . . . Active recreational areas consisting of swimming pools, playgrounds, picnic areas, bridle paths, etc., are desirable transitional land uses between the airport and the adjacent residential areas." (33) By locating airports within parks and other public open spaces, the metropolitan community could provide three

facilities at once: (1) an airport with an excellent location convenient to the residential area it was intended to serve; (2) additional desirable recreational facilities; and (3) a buffer between the airport and the adjacent residential district.

Relation to Ground Transportation Facilities

Small aircraft airports, in order to be convenient to their users, should be located as close as possible to the proper ground transportation facilities. Major streets should serve an airport located on the edge of a residential neighborhood and collector streets should serve airports located within a neighborhood (34). The airport should be located as close as possible to a downtown expressway since those people using their planes for business purposes will want it convenient to downtown offices as well.

Airports designed to give accessibility to downtown areas should be located near expressways leading into the downtown, or near transit lines. While the neighborhood airport has a preponderance of local users who take their own cars to the airport, the downtown airport serves many itinerant pilots who depend on public transportation.

Relation to Airport Control Zones

An airport control zone is an established air space reservation surrounding an airport. Control zones permit aircraft from an airport to safely take off and land without risking collision with other aircraft from nearby airports.

When locating an airport for small aircraft, care should be

taken to allow for proper airport separation so that control zones do not overlap. Air traffic pattern conflicts have already taken place in some larger cities, lowering the traffic capacity of the affected airports. Desirable distances between airports should afford exclusive air space as shown below:

Table 1. Desirable Radius of Air Space by Airport Type (35)

Airport Type	Radius of Air Space, Miles
Military	4
Commercial-Passenger	4
Multi-Purpose	3
Commercial-Cargo	3
Small Aircraft	1
Industrial	1

This means that a small aircraft airport and a military airport should be separated by five miles, center to center.

In certain instances, where single runways and approach areas of adjoining airports are parallel, airports could be located one-half mile closer without violating each other's air space reservation. For example, a small aircraft airport would have to locate only one and one-half miles from another small aircraft airport, or four and one-half miles from one for military aircraft.

Site Requirements

Before an airport for small aircraft can be constructed there are certain requirements that the prospective site should meet. These requirements involve runways, topography, approaches and adjacent developments.

Runways

Federal Aviation Agency standards consider a single runway adequate for an airport for small aircraft. The traditional criss-cross variety of runways allowing into-the-wind operations under all conditions is not necessary. The modern light plane is capable of landing and taking off safely in moderate cross winds. Additional runways to eliminate cross wind conditions are not worth the additional expense. This is a very important concept for the metropolitan community. A single runway requires roughly one-third as much land as two runways at right angles. Furthermore, the necessity to maintain safe air approaches without obstructions along a single axis instead of along two allows much greater flexibility in locating the airport.

Although modern aircraft with tricycle landing gear can be safely landed in moderate cross winds, there is always the danger that a non-alert pilot will drift off the runway into a serious accident. Therefore, in the interest of safety, a runway should be aligned with the prevailing winds to make the pilot's job easier. Weather bureau records give the wind data necessary to establish this alignment.

Areas susceptible to ground fog, haze, or smoke should be avoided. Taking off and landing are critical periods in the operation of an aircraft and good visibility at the airport is essential if these

operations are to be conducted safely.

Runway length will vary from place to place. Since air density decreases with altitude, high altitude airports require longer runways than do low altitude airports. Temperature, which affects aircraft take off distance, must also be considered. For example, the Beechcraft D-18 (one of the largest in the small aircraft category) requires at sea level approximately 3,200 feet at 100° F., or 2,900 feet at 75° F. The same aircraft at Denver, Colorado (altitude 5,470 feet) requires approximately 4,900 feet at 100° F., or 4,400 feet at 75° F. (36). Under normal circumstances, most locations will find a 3,600 foot runway sufficient for small aircraft.

Topography

A second important factor in site selection is topography. The area selected for an airport should lend itself to development at a reasonable cost. Often less expensive land is costly to grade and drain. A more expensive site costing less to develop may prove to be the most economical for airport purposes.

Grading and drainage are an integral part of topography considerations. The purpose of grading is to provide surface areas on which aircraft can maneuver with safety and which will assure adequate drainage. Adequate drainage is necessary so that aircraft operations will not be hampered or precluded by impounded surface water or saturated soil conditions.

Grading and drainage must be considered jointly because the direction of surface runoff is fixed by the slopes resulting from

cannot be done, sufficient control over the land should be acquired to allow for the removal of existing obstructions and to control the future use of the land and any construction thereon which would interfere with operations at the airport (38).

The clear zone should not be regarded as an overrun area for runway extension. It need not be graded but major obstructions must be removed. Fences, ditches, and other minor obstacles are permissible. Roads and railroads are not objectionable in clear zones providing they comply with recognized clearance standards. This clearance should not be less than 15 feet over highways, or 25 feet over railroads. Regardless of the topography, the end of the runway should never be closer than 100 feet to the nearest edge of a highway or railroad (39). Clearance does not ordinarily present a problem in the approach areas beyond the clear zone.

Effect of Airport on Nearby Development

Nearby development must be considered when locating an airport for small aircraft. Most of the material written about the location of large airline airports tends to depict airports as a public nuisance, largely due to the tremendous noise factor, and suggests that they be far removed from human habitation. Small aircraft airports, however, are of an entirely different character.

When considering the location of an airport for small aircraft, one should study the factors of noise, safety, and values of property in the vicinity of the airport.

Noise. A study by the Cornell Aeronautical Laboratory showed that at 100 feet from a single-engine plane the noise level is only

80 decibels*, or about the same sound level as a major thoroughfare (40). At 1,000 feet total distance the noise level dropped to 60 decibels, about the same as a quiet residential street, and at 10,000 feet dropped to 40 decibels. Stated another way, residences located at least 1,000 feet from the airport runway would receive no more noise than that from a quiet residential street. Houses 500 feet from the airport would receive approximately the same noise level as that from a collector street. Residences only 100 feet from the airport could expect noise equivalent to that from a major thoroughfare.

Safety. Although most people are concerned about the safety of small aircraft operations, such operations are not a safety hazard to occupants of nearby areas. Out of the 115 fatal small aircraft accidents occurring in the vicinity of small aircraft airports in 1962, only six people on the ground were killed (41). There are 6,847 airports for small aircraft in the United States. This is equivalent to 0.0009 people killed on the ground per airport.

Property Values. In general, it does not appear that airports for small aircraft significantly affect nearby property values. Mr. Edwin E. Kelly of the Atlanta FHA office has stated that each airport must be considered as a separate case, and that judgments regarding property values around that airport are left up to the discretion of

* The decibel is a unit of sound; the zero decibel level being close to silence, the conversational level about 70 decibels, and the 140 decibel level actually painful to human ears.

an appraiser (42). He cited, for example, the Peachtree-DeKalb Airport (which handles a heavy volume of small aircraft traffic, including many twin-engine aircraft) and said that FHA would handle some mortgages adjacent to the airport, but would not insure properties located directly under the approach areas. He went on to say that he knew of no cases where FHA had failed to insure a home next to a small airport with relatively light traffic and serving primarily single-engine aircraft.

Several Atlanta real estate appraisers indicated that while residential property values were hurt in the vicinity of the Atlanta Municipal Airport, they were not necessarily hurt near the smaller airports (43). They said that they would have to pass judgment on an individual basis.

An official with the FAA regional office in Atlanta, commenting on a possible FAA ban on home ownership near any new airports built with federal funds (44), says that he does not know whether the ban will cover small aircraft airports (45). He indicated that the FAA has had few complaints from residents living near small airports.

Some communities evidently do not feel that small airports are harmful. Tulsa, Oklahoma, for example, is anticipating the development of a residential airpark designed for air-minded citizens who desire to taxi their planes from airport runways to hangars adjoining their homes (46).

CHAPTER III

DEVELOPMENT AND OPERATION

An airport for small aircraft, regardless of who develops or operates it, is in effect a public utility. The Supreme Court of Georgia, in Thrasher v. Atlanta, 173 S.E. 817 (1934), said that airplanes have been used for many years in the transportation of passengers, that large sums of money have been devoted to the development of aircraft as a commercial industry and that airports which serve aircraft have become "an important, if not indeed, a well-nigh indispensable public utility." Other courts have repeatedly held that an airport serves a public purpose. In Dysart v. St. Louis, 11 S.W. (2d) 1045 (1928), the Supreme Court of Missouri said:

An airport with its beacons, landing field, runways, and hangars is analogous to a harbor with its lights, wharves, and docks; the one is the landing place and haven of ships that navigate the water, the other of those that navigate the air. With respect to the public use which each subserves they are essentially of the same character

There is other supporting evidence of this concept*.

* Lutz v. Alleghany Co., 153 Atlantic 903 (Sup. Ct. of Pa., 1930); Spokane v. Williams, 288 Pacific 258 (Sup. Ct. of Wash., 1930); Fishel v. Denver, 108 Pacific (2d) 236 (Sup. Ct. of Colo., 1940); Burnham v. Beverly, 35 N.E. (2d) 242 (Sup. Ct. of Mass., 1941).

Although an airport will serve relatively few people, it is still considered a public use. In Rindge Co. v. Los Angeles County, 262 U. S. 707, 43 Supreme Court 689 (1923), where a public highway was constructed to serve only several families, the U. S. Supreme Court said, "It is not essential that the entire community, or even a considerable portion, should directly enjoy an improvement in order to constitute a public use . . ."

With the public purpose concept in mind, consideration can now be given to the actual development and operation of an airport for small aircraft.

At the beginning of a small aircraft airport development program, thought must be given to the operation of the airport. Generally, an airport will be constructed with a particular operation in mind; therefore, construction and operations must be considered together.

When an airport for small aircraft is privately owned, it will usually be privately operated. However, when an airport is owned by a public agency, it may either be operated by that agency or the facilities may be leased to a private party for operation.

Privately-Owned Airports

The majority of small aircraft airports (58.8 per cent) are privately owned and operated as a private business. A National Airport Survey made jointly by the Airport Operators Council, the American Association of Airport Executives, and the National Association of State Aviation Officials, gave the following information on ownership (47).

Table 2. Airport Ownership 1960

Type Ownership	Commercial Airline	Small Aircraft	Total
Public	811	2820	3631
%	10.6	36.8	47.4
Private	2	4027	4029
%		52.6	52.6
Total	813	6847	7660
%	10.6	89.4	100.0

Many privately-owned airports have been developed by flying enthusiasts who went into the airport business because it gave them an excuse to be around small aircraft while earning a living. Some of these private owners have done and continue to do well, but others operate under marginal business conditions and are on the brink of bankruptcy. Other privately-owned airports have been developed by individuals who have considered their airports a business venture and have aggressively promoted them. The majority of these owners are successful.

Most privately-owned airports have been developed in the predominantly rural sections of metropolitan areas, away from high land values and congested land uses. Urban expansion, however, is beginning to create problems for the private owner.

Problems

The private airport owner in a metropolitan area faces two

basic problems. In many cases, he is having to pay continually rising taxes on his large tract of land. In addition, the private owner suffers from lack of control of surrounding land uses, which may affect the airport's approaches, clear zones, and ultimately, the airport itself.

Rising Taxes. Small aircraft airport land which becomes surrounded by expanding urban development increases in market value. This increase in market value of the land results in increased taxes. In addition, demands for services (roads, schools, sewers, etc.) to the surrounding development cause the entire community tax rate to rise.

The annual tax bill of a small, busy airport in the sprawling San Fernando Valley of California, for example, has risen in the last five years from \$4,000 to \$18,000 (48). Most owners are not willing to pay such high taxes.

There are two generally accepted solutions to the small aircraft airport tax problems. First, tax relief can be given for the non-revenue producing areas of an airport, i.e., the runways and taxiways which take up most of the space of an airport. Two states, Michigan and Massachusetts, have already given tax relief to privately-owned airports (49). Secondly, in order to encourage privately-owned airports to stay in operation, a deferred tax arrangement can be used. For example, when taxes on the surrounding development are increased, the airport's taxes can remain unchanged (although the airport land has increased in value). The difference between the tax on

the land as an airport and as some other appropriate use can then be annually deferred until the airport land is converted to the other use. At the time of conversion, the accumulated deferred taxes would come due. If the land continued to be used for an airport, a point would eventually be reached when the deferred taxes on the property would equal its value. The airport would then remain permanently, because the deferred taxes would be greater than the property value.

Lack of Control Over Surrounding Land Uses. The private airport owner faces difficulties as land uses surrounding the airport for small aircraft begin to develop. He has no way to control adjacent development which might be detrimental to airport operations--for example, an industry producing a dense smoke that would reduce visibility. In addition, he has no way to control removal or construction of obstructions in his approach areas, especially in the clear zones (which in most cases were unobstructed when the airport was initially built).

Although the private airport owner cannot pass a zoning ordinance protecting his airport, he can petition the local government to pass such an ordinance. An airport zone created for the protection of a private airport is similar in principle to a residential zone protecting private residences. Under such an ordinance, not only the airport can be protected, but the airport's approaches as well.

The only portion of the airport's approaches which cannot be protected under a zoning ordinance is that portion of the clear zone which must remain free of normal obstructions, such as houses and other buildings. A zoning ordinance prohibiting normal and reasonable

use of this land would be declared unconstitutional by the courts, since it would, in effect, permit a taking of the land. The only alternative for the private airport owner is to acquire an easement or the land itself. If the adjacent property owner refuses to sell his land, the private airport owner can do little until state legislation is passed declaring that privately-owned airports serve a public purpose (this legislation may already be in existence). After the required legislation is in effect, the private owner can apply to the State Utility Commission for a Certificate of Public Necessity. If the certificate is granted and if proper state statutes exist, the private owner can then be given the power of eminent domain to condemn the needed land or land rights. The courts have held that an individual may be granted the power of eminent domain for public purposes after payment of just compensation and after due process of law is afforded the owner. In Chestatee Pyrites Co. v. Cavenders Creek Gold Mining Co., 46 S.E. 422 (1904), the Supreme Court of Georgia said:

The right of eminent domain is a sovereign right of the state . . . It lies dormant until the legislature sets it in motion. As the legislature cannot in every case supervise the condemnation, it may confer the power upon agencies. These agencies may be individuals . . .

Future Outlook

From all present indications, privately-owned airports with good management can operate profitably in relatively undeveloped sections of the metropolitan area. These airports are a valuable asset to the community since they provide a public service with no cost to the public.

Local governments should be able to depend on privately-owned airports for small aircraft until urban development starts encroaching on the airport. When this happens, private airport owners, unless given proper protection, will begin to sell their airport land and move farther away to establish new airports in less developed areas.

If the local government desires that the privately-owned small aircraft airport remain in operation, it must take steps to provide tax relief and zoning protection. Even with tax relief and zoning protection, the private airport owner may still decide to sell his airport land someday. As a result, the local government would find itself without an airport. The best solution, therefore, is for a public agency to purchase the private airport (through negotiation or condemnation) when urban development begins to encroach upon it. This will help to assure the airport's permanency.

Publicly-Owned Airports

It has been established that airports for small aircraft serve a public purpose, even though only a small portion of the inhabitants of the metropolitan area may ever use the facility, and that private developers no longer find it profitable to build airports in rapidly expanding urban areas. Under these circumstances, it is necessary that a public agency, in order to provide needed small aircraft airports, assume the responsibilities of providing these airports in metropolitan areas.

Development

There are three approaches normally used in the development

of a public small aircraft airport: (1) development by local government; (2) development by authorities and special districts; and (3) development by a private corporation with lease-back arrangements (50).

By Local Government. The development of publicly-owned small aircraft airports is usually a function of an established local government, whether it be city or county. Local governments have assigned the responsibility of developing these airports to: (1) a non-aviation department, such as Public Works; (2) a separate Airport Department responsible for a major airline airport; or (3) an airport commission.

The most commonly used method for developing small aircraft airports has been to include the development activities within the jurisdiction of an existing non-aviation department of the local government, such as Public Works. This has been done because the small airport has not been considered sufficiently important to warrant the expense and complication of a separate department.

Experience has shown that this arrangement can work fairly well where development problems are relatively simple. This method of development has several advantages. The Public Works department already has the necessary equipment and staff engineers needed to construct the airport and also has experience in building public facilities. The main objection to this arrangement is that the Public Works department has other responsibilities. As a result, the airport may not receive the attention it needs, details may be overlooked, and

the development program may suffer accordingly. A citizens advisory group is sometimes appointed to advise the Public Works department, thereby giving guidance to the small airport project.

Some small aircraft airports have been developed by an Airport Department which has responsibility for the establishment and operation of a major airline airport. If small airport development is taken over by an existing Airport Department, it could benefit from related experience gained in the development of an airport and a singleness of purpose could be achieved.

Other airports for small aircraft have been developed by separate airport commissions. These commissions, which usually consist of five to nine members, are appointed by the local government under appropriate state enabling legislation. Local governments normally finance small airport projects undertaken by these commissions. Usually, airport commissions have a semi-independent status and resemble the independent authority type of administration rather than the city department type.

Small aircraft airport development by a commission has some advantages: (1) if small airport development is a new and unfamiliar problem to the local government, a commission can usually do a better job of getting the project under way; (2) if the commissioners' jobs are unsalaried, personnel who are interested in getting the job done will usually be attracted; and (3) local groups interested in small airports may be represented on the commission. Disadvantages of the commission are: (1) confusion arises where the commission is appointed by and reports to the chief executive, but receives its

powers from the council (as is often the case); (2) decisions are often unduly delayed by the inability of the commissioners to agree among themselves; and (3) commissioners' jobs may be filled with non-interested individuals to repay political favors.

There is no preponderance of any one type of local government organization for small aircraft airport development. Each type may work well under certain situations. The suitability of any particular type of organization appears to depend on such local circumstances as size and complexity of the airport problem, number of existing departments in the local government, degree of public interest in aviation and size of the local budget for small airport development.

By Authorities and Special Districts. Airports for small aircraft have been developed by authorities and special districts. In general, authorities and special districts may be defined as special governmental corporations having prescribed powers to carry out a specific public purpose (51). They are created by the state legislature and act as more or less autonomous units independent of the local municipal government. The basic difference between an authority and a special district is the financing arrangement. An authority may issue revenue bonds and contract with the local government for services. The special district, which may use these financing methods too, may also levy taxes and issue general obligation bonds.

Many reasons have been given for referring the mechanisms of an authority to that of a department of the local government:

- (1) An Authority . . . is believed to provide the necessary latitude for executive action, a continuity

of management, and a desired freedom from local politics; (2) an Authority is often a convenient instrument for financing certain types of public facilities and for removing debt burden from the local treasury; (3) an Authority is a useful device for spreading the management responsibilities and financing of an undertaking over an area which includes several political jurisdiction, particularly where the individual political units at interest are unable to agree on joint action (52).

These same reasons also apply to a special district.

Students of public administration have said that the principal advantage of an authority and a special district is that these corporations, through their autonomous nature, are free from the inefficiency and politics of government. Yet, after the public has given its control of a project to an authority or special district, it often finds that the corporation is not free of politics. Many housing authorities are good examples of this. From a planning standpoint, another disadvantage of an authority and a special district is that the local government loses control over the programming of capital improvements. With such great power invested in an authority or special district not subject to political control, nor accountable, except in a very general way, to the local government, one can readily see how an authority, if permitted to proliferate and to operate without control, may undermine the entire program of long-range capital improvement planning. However, making the authority or special district more subservient to public policy control curtails its flexibility and autonomy, the keystones of their ability to get things done.

The main advantage of an authority or special district, with regard to development of small aircraft airports, is its ability to

deal with facilities affecting several political jurisdictions. In the Atlanta metropolitan area, for example, there are some 45 different local governments. Although in metropolitan areas the small airport may be located within the boundaries of a single political unit, the benefits and responsibilities frequently extend beyond the political unit's boundaries. Furthermore, small airport development and administration in metropolitan areas in the future will involve more than the construction of a single airport. It will include the planning and development of a system of airports, both large and small. This is a regional problem and calls for coordinated action among all the political units in the region. The difficulties of bringing two or more independent groups to agreement on specific courses of action are obvious, even though all may agree on the major purposes to be served. The authority or special district is especially suitable under these circumstances since it can cross political boundaries and has a singleness of purpose.

Many metropolitan areas already have an Airport Authority for the development and operation of a major airline airport. Assigning responsibility for small airport development to an existing Airport Authority would give an overall view to a system of airports within the metropolitan area and would provide experience already gained in airport development.

By Private Corporation with Lease-Back Arrangements. Airports for small aircraft have been developed by private corporations under a lease-back arrangement. Under this plan, the local government contracts

with a private corporation to develop a small aircraft airport built to the local government's specifications, many times on publicly-owned land. A lease agreement is then drawn whereby the local government rents the airport and has the option of acquiring the property for roughly the development and financing costs, less rent payments made up to the time of purchase.

This arrangement has been used in recent years by local governments who wish to borrow in excess of their constitutional debt limit or who wish to conserve their borrowing power for other purposes. Rent for the airport is usually paid over a period of years from airport revenues and from general operating funds. Another advantage is that the local government will not have to bother with development details which may be time-consuming and costly.

Operation

Airports for small aircraft, owing to the usual small size of operation, are normally operated by a private operator under lease contract with the public owner. Under certain circumstances, however, the airport may be publicly operated.

Private. Most cities prefer to turn over the operation of their small aircraft airports to a private operator under lease contract. Nelson, in an airport study done for the Texas Aeronautics Commission, says:

It is seen that the Lubbock airport administration aggressively places the private operator into every possible airport activity on the theory that a private operator functioning under the positive incentive of profit will provide for better service at lower cost than can be supplied by municipally operated facilities (53).

An advantage of the publicly owned-privately operated arrangement is that the public agency can control a private operator by refusing to renew his lease if he fails to provide satisfactory service. In this way, a new operator can be brought in without substantially affecting the continuity of operation of the airport.

Publicly-owned airports for small aircraft will normally be operated by a private operator if the airport was developed by the Public Works Department, by an airport commission, or by a private corporation. The Public Works Department and the private corporation both have other duties and generally do not want to be bothered with operating the airport. The airport commission is normally abolished when the airport (or airports) is built. Hence, a private operator is suitable to operate the airport.

Public. Normally there are only three occasions when a publicly-owned airport for small aircraft will be publicly operated. First, if the business potential at the airport is not enough to attract a private operator, someone in public office may operate the airport as a part-time job. Secondly, if the airport for small aircraft is a relatively large one, some public agencies have hired a full-time salaried airport manager to run the airport in the same manner as the manager of any other business operation. For example, in the Atlanta metropolitan area, both the Fulton County and Peachtree-DeKalb Airports are operated by managers. Thirdly, if the airport is developed by an authority, special district, or an Airports Department, it is more apt to be operated by a public operator, although

concessions may still be leased to private operators. Authorities and special districts are concerned about revenues derived from airport operations and will be in existence for many years until their bond issues are retired. Hence, they may want to operate the airport.

An Airports Department is already in the business of operating an airline airport and may want to integrate the operation of the small aircraft airport into their overall operation.

CHAPTER IV

FINANCING PUBLICLY-OWNED AIRPORTS

Adequate financing is essential to any airport development program. This chapter will describe methods of financing land acquisition, construction and operation of publicly-owned airports for small aircraft.

Land Acquisition and Airport Construction

An airport for small aircraft cannot be constructed until land is acquired; hence, funds for land acquisition and airport construction are normally considered together. Land for a publicly-owned small airport may be purchased outright, or it may be paid for after condemnation by a public agency using its power of eminent domain. Small airports may also be constructed on already publicly-owned land, which would eliminate the need for further land acquisition.

The amount of work to be done in the construction of a small aircraft airport will affect financing arrangements. For example, construction of an entirely new airport will normally take more work and require more money than renovation of an existing run-down airport with grass-covered runways which was formerly owned by a private individual.

If the small aircraft airport is to have a private operator,

construction costs can be reduced by requiring the operator to provide his own buildings and hangars. This method is employed at approximately 50 per cent of the publicly-owned small aircraft airports in the country (54). This will be discussed further under the section on "operations."

General obligation bonds and revenue certificates, together with federal and state funds, are used to finance land acquisition and construction of publicly-owned small aircraft airports. In addition, a local government can have a private corporation acquire land and construct an airport to the local government's specifications, and then lease the airport with an option to purchase.

General Obligation Bonds

The issuance of general obligation bonds is the most common method of borrowing money to acquire land and construct small aircraft airports. In issuing these bonds, which pledge the full faith and credit of the local government, the local government agrees to levy whatever tax is necessary to retire these bonds. A referendum is normally required to issue general obligation bonds. If the public does not fully understand the need for small aircraft airports there is a chance that the airport proposal will be defeated in a referendum.

Revenue Certificates

Revenue certificates are another means of borrowing money for land acquisition and airport construction. These certificates, which do not pledge the credit nor affect the constitutional debt limit of the local government, in theory constitute a lien only on revenues

produced by the airport. Revenues produced by a small airport are almost never adequate to repay the entire cost of the loan. As a result, local governments may supplement revenues to retire these certificates, usually with money from their general operating funds.

Authorities use revenue certificates exclusively. Interest and retirement payments on authority revenue certificates are normally obtained from airport earnings plus supplementary contracts from the local government.

Borrowing money through the issuance of revenue certificates is more expensive than borrowing through general obligation bonds.

. . . estimates made by a Philadelphia investment firm showed that interest rates on municipal revenue certificates for water and sewage projects ran one-half to one and one-half per cent higher than those on general obligation municipal bonds . . . These figures are further confirmed by unpublished data prepared by Robert Funk of the Municipal Finance Officers Association which compare interest rates on general obligation bonds with interest rates on revenue certificates for the same time period. Both in average and in range, the interest rates for revenue certificates are consistently higher than those for general obligation bonds (55).

This would be even more true of small aircraft airports with limited and uncertain revenues.

Lease Agreements

Lease agreements for the development of a small airport are advantageous when the local government does not wish to pledge its credit and go further in debt. By entering into a lease agreement to have a private corporation develop an airport, the local government can circumvent its constitutional debt limit and save its borrowing capacity for other purposes.

Lease agreements have other advantages. The private corporation can devote all of its time to the development of the airport; therefore, land can be acquired and the airport can be constructed quickly. In addition, private corporations are not bound by rigid rules and regulations, as are local governments, and can therefore operate more flexibly when problems arise.

Lease agreements with private corporations generally are more costly. A private corporation must make a profit on its investment. This profit is normally greater than the interest on either general obligation bonds or revenue certificates.

Federal Assistance

With the passage of the Federal Airport Act in 1946, the federal government began subsidizing airport acquisition and development. The Act authorized Congress to prepare and annually revise a National Airport Plan and Federal Airport Aid Program. Grants under the Federal Airport Aid Program may be used both to purchase land and to construct an airport. To be eligible for a federal grant, the airport must be included in the National Airport Plan (although inclusion in the Plan is no guarantee that the airport will receive a grant) and must be owned by a public agency. The airport must also conform to federal standards.

The federal government will normally contribute 50 per cent of the allowable costs of an approved airport project. In ten states (Arizona, California, Colorado, Montana, Nevada, New Mexico, Oregon, South Dakota, Utah, and Washington), all of which have metropolitan

areas and in which the "unappropriated and unreserved public lands and nontaxable Indian lands are more than 5 per cent of its total land," the federal grant may be for more than 50 per cent--Nevada, for example, may receive 62.5 per cent (56). A complete breakdown of allowable costs can be found in Federal Aviation Regulations, Part 151--Federal Aid to Airports (57).

Most federal airport aid funds in the past have gone to commercial airline airports. However, Congress is now giving more attention to the problem of small aircraft airports. Section 5 of the 1946 Federal Airport Act was amended in September, 1961, to include specific authorization for additional appropriations for small airports only.

State Assistance

Many states are beginning to realize the value of having a system of airports throughout the state to enhance the state's transportation system. As a result, states that in the past have not contributed funds for land acquisition and airport construction are now beginning to do so. The most common arrangement today is the "25-25-50 agreement," with the local government contributing 25 per cent, the state 25 per cent and the federal government 50 per cent of the cost of the project.

State financial aid for airports varies from state to state. Some states have a policy limiting their contribution to 25 per cent of the project cost, while other states contribute more. Tennessee, for example, can contribute up to 100 per cent of the airport's cost

if the community is unable or unwilling to share costs, although in metropolitan areas this has not been the case. On a non-federal aid airport project in a metropolitan area where state aid is desired, the state usually contributes 50 per cent (58).

Operations

A continuing subsidy by the local government may be necessary to operate a publicly-owned airport for small aircraft. However, careful leasing arrangements and the judicious use of user charges will help to ease the burden on the local treasury.

Leases and Licenses

The most common arrangement of leasing is for the local government to lease all rights of the airport to one operator. It was previously mentioned that the private operator of approximately 50 per cent of these airports rents only the airport land itself under a long-term lease and provides his own buildings and hangars (59). In the remaining 50 per cent, the local government leases buildings, hangars and the airport land to the operator in a "package deal." Local conditions normally dictate the arrangement.

There are two methods of leasing or licensing when two or more operators are involved. One method is to lease all rights of the airport to one individual, who in turn sub-leases various facilities. A second method is for the local government to retain control of the airport and lease only buildings or parcels of land or license concessions to various individuals. Under the first method the principal operator may monopolize the more desirable facilities, leaving the

undesirable ones to other operators on a "take it or leave it" basis. Therefore, the latter method is generally considered superior since the public owner may receive competitive bids for leases or licenses. Each operator has a fair chance to bid on the facilities or concession in which he is interested.

When awarding a lease contract or license, consideration must be given to: length of time it runs; cancellation options; and, financial arrangements. A study by the Cessna Aircraft Company of lease agreements between private operators and public airport owners showed that the average lease runs for 19 years and 4 months (60). Some leases run for as short a time as a few months and some for as long as 50 years. It is imperative that private operators have contracts allowing them sufficient time to promote their businesses and prove their efficiency.

Local governments must protect themselves against permanent entrenchment by an unfit operator. A clause should be included in the lease contract stating that if after a certain period (sufficient to allow the operator time to develop an efficient operation) the operator fails to provide satisfactory service, the lease may be cancelled. This would allow the local government to get a new operator who could provide the required service.

In over 75 per cent of the cases studied by Cessna, the lease rent was based on a flat, predetermined rate. This method gives the operator maximum incentive and allows him the greatest reward for conducting an efficient business. In a minority of cases the rent

was based on the gross income of the operator. The Cessna study found no case where the rent paid by the private operator was based on a per cent of his profits.

User Charges

User charges are those direct fees charged by an airport operator to an aircraft owner or pilot for use of the airport. Most user charges are made in the form of a landing fee or a parking fee. Although there is a great deal of opposition to user fees, airport operators consider such fees justified:

Although any comparison with other types of quasi-public undertakings cannot be exactly parallel, the airport might in some ways be likened to a municipally owned water company. Essentially a publicly owned public utility, the water company provides water for general purposes as a service paid for by taxes, such as fire fighting, sewage disposal, and street cleaning; yet for the water supplied to individual householders and commercial consumers, it collects by user charges proportionate to the amounts used. Thus total costs of providing both the general public services and the individual or commercial services are covered by a combination of taxes and user charges. By this analogy, the costs of maintaining an airport as essentially a publicly owned utility would be apportioned against tax revenue to the extent that facilities are provided for general public benefits; and apportioned against individual corporate users to the extent that the facilities are provided for and used by them (61).

Most aircraft owners and pilots, however, violently object to paying landing fees. They are backed by the Aircraft Owner's and Pilots Association (AOPA). The AOPA is a national organization representing approximately 100,000 members and is a very vocal group which makes itself heard at all levels of government. The AOPA gives the following reasons for its opposition to user charges, especially landing fees:

1. Damage to the growth of the industry--widespread airport user tolls can become an unpopular nuisance that will tend to limit the sale and use of aircraft.
2. Importance to national economy--as the growth of our national economy during the 19th century was largely attributable to the railroads and during the first half of the 20th century to the automobile, our economy during the last half of this century may well be keyed to the airplane. Anything which tends to reduce the utility of the airplane will therefore work to the detriment of our national economy.
3. Importance to local economy-- . . . The airport is an economic asset to the community it serves.
4. An analogy to our public roads system--When the Federal Aid Road Act was passed by Congress in 1916, Section I provided that all roads constructed under the provisions of the act should be free from tolls of all kinds. The phenomenal growth of the auto industry resulted from this policy. Only by a system of toll free airports may we hope to have a similar growth in the aircraft industry.
5. Free use of tax supported facilities--Since many airports are owned and operated by some type of governmental agency and do receive tax support, the public expects those facilities used in common to be free of charge.
6. A deterrent to airport sales--(Most pilots object to paying landing fees and will make their purchases at other airports which do not charge these fees (62)).

The AOPA has a tremendous influence on its members. Most AOPA members contacted by the author, as stated above, refuse to do business with airports charging landing fees.

Opponents of landing fees say that the legislative intent of Federal Airport Aid legislation was to create a national system of airports supported by various governmental units, justified on the basis of public welfare, and free from landing fees. There is speculation that a widespread policy of landing fees will result in future legislation prohibiting the charging of these fees in airports

which have received federal aid (63). This may account in part for the fact that out of 3,631 publicly-owned airports only 60 in 17 different states charge landing fees to small aircraft (64).

There is a great deal of variation in charging landing fees at airports around the country. Some airports charge all users except students on cross-country flights. Others charge a fee only for students on cross-country flights. Some airports make a distinction between aircraft used for pleasure and those used for business, regardless of the ownership classification. Others are not concerned with the purpose of the flight, but base fees on whether the aircraft is owned by a business or an individual. Fifteen airports charge landing fees to all aircraft without exception. One of two conditions prevail at these airports: (1) the airports are major airline terminals and landing fees are charged to discourage use of the airport by non-airline aircraft; or (2) the airport occupies an extremely advantageous position geographically, like Meigs-Chicago or Downtown-Oklahoma City, and is usually in an area of high land values (65).

The individual airport operator, whether public or private, must decide whether or not landing fees should be charged. The decision by an airport operator to employ landing fees should be based on the following:

(1) Does the operator wish to discourage use of the airport by small aircraft? This may be the case at commercial airline airports.

(2) Does the convenience of the airport location justify a landing fee and will people be willing to pay for this charge?

(3) What is the best and least expensive method of collecting a landing fee?

(4) What will be the effect on public relations?

Another method of collecting a user charge is through the parking, or "tie down" fee. This method, which is used at many small aircraft airports, is a charge to the airport user when he parks his aircraft at the airport. This method is actually more equitable to all concerned, since only those aircraft which are parked and taking up valuable space are charged a fee for that space. It is easier to get public acceptance for a parking fee since most people have already been conditioned to paying for parking their automobiles. In fact, paying for parking a small aircraft at a publicly-owned airport is no different in principle from paying for parking an automobile at a publicly-owned parking lot.

For those interested in learning more about user charges, the author suggests Personal Aircraft Business at Airports, by Bollinger and Tully (66), as an excellent source. Chapter 12 of this book discusses "Relation of Airport Investment to Annual User Charges," and Chapter 13 covers "Methods of Charging for Landing Area Use."

Conclusions

Once the local government in a metropolitan area recognizes the need for publicly-owned small aircraft airports, it can undertake

a program to fill this need. From the several available alternatives, local governments should be able to find a satisfactory method of financing small airports that will meet their particular requirements and will allow them to undertake a development program.

Only by providing airports for small aircraft in metropolitan areas can local governments meet one of today's growing transportation needs.

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