CHAPTER III
COMMUNITY PERSPECTIVES

INTRODUCTION

Chapters I and II have presented the technological and human components of general aviation and the regulatory, competitive, and physical environment within which it operates. General aviation is usually of little concern either to those communities which have its service or to those which do not. It becomes a matter of public concern, however, when someone urges local authorities to obtain or improve access to general aviation services. (It also becomes a matter of public concern when general aviation becomes incompatible with other community values—noise, conflicts with other land use or development, etc.—but that is not a concern of this chapter.) At that point, general aviation becomes a public and political question which may involve such issues as taxation, lifestyle, and land use, as well as other community goals and individual aspirations. The objective of this chapter is to put general aviation into the perspective of the local community's decision-making process. The basic questions addressed by this chapter are: How can a community decide whether it needs better access to general aviation services? And, if such improved access is desired, how can it best be acquired? "Access to general aviation services" rather than "a general aviation airport" is discussed because the best policy in some cases may be to utilize or expand the services available at an existing airport not too far away.

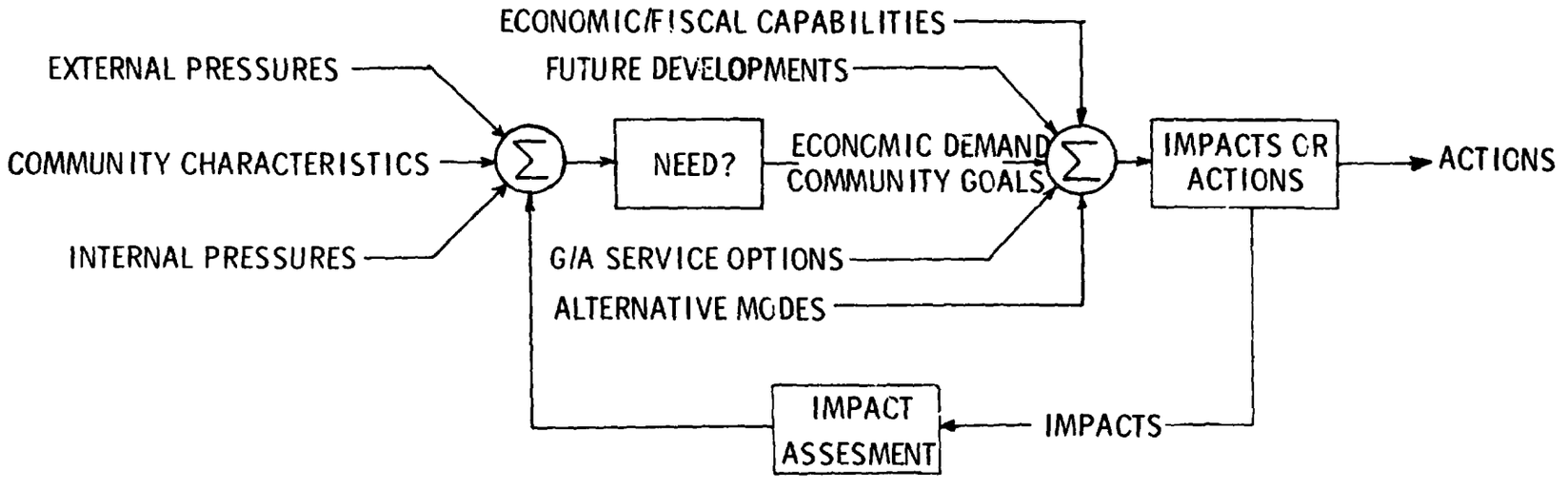
The object of this analysis—the local community—is difficult to define or describe in general terms. Communities vary enormously in size and density of population; in geography, form of government, and styles of life; in economic base, level of incomes, and education; and, in a host of other ways which make it almost impossible to prescribe the best course for each and every community. Even if the best course could be prescribed, the communities would still have to be persuaded. Rather than prescribing, this chapter analyzes the factors which any community considering general aviation ought to take into account and also outlines a decision-making process to be followed. But the facts of the case and the importance accorded each of the factors involved can only be known and decided upon at the local level. To assist local decision-makers, the conclusions of this chapter are presented again in a concise and schematic form in Chapter V.

THE DECISION-MAKING MODEL

While many studies have been done concerning the development of general aviation facilities, a survey seems to indicate that all of them are based on estimates of the future **requirements for the services** offered by the general aviation facility. These requirements are generated by the direct users, the private airplane owners, the pilots (both private and those employed by commercial enterprises), and other individuals and corporations who are direct users (or beneficiaries) of aviation. Another approach to planning is to base decisions on the **needs of the community** with respect to the addition, expansion, or improvement of, a public facility. The purpose of this section is to look at the needs of the community rather than the requirements of the user in order to determine the advisability of alternative actions. In order to determine those needs, an analysis of the community characteristics and the pressures brought on the community, both internally and externally, should be undertaken (See Figure 3-1).

The facilities concerned are those which permit an interface between available ground and air transportation. Considering the present state of the art, these facilities are airports or heliports, but the future may bring other possibilities. Naturally, the type and size of airport, as well as the services available at the airport, become a function of the type and magnitude of services needed by the community.

In the initial evaluation of the need for the services of general aviation, community characteristics such as demographic data, socio-economic characteristics, and institutional structures must be considered. In addition, internal and external sources exert various pressures on decision-makers. External sources are defined as those outside the control of the community. Internal pressures are those that are generated from within the community. These three determinants of need are brought together by the decision-maker and affect the initial decision as to whether or not the community needs the services of general aviation and whether or not it should investigate further the desirability of constructing a new facility or implementing changes in an existing facility or service. If the decision-maker finds that no need has been demonstrated, then the process ends; if need is demonstrated, it should take the form of an estimate of economic



MODEL OF COMMUNITY/GENERAL AVIATION DECISION-MAKING PROCESS
FIGURE 3-1

demand for service and of the community's goals to make sure they are in accord with general aviation.

Once the economic demand for general aviation services is established and found consonant with community goals, additional factors must be considered prior to taking any action. These factors include the economics and fiscal capabilities of the community; the future possibilities concerning items such as the growth and potential need of the community; general aviation technology, fuel supplies, future lifestyles, etc.; the specific services that general aviation can be expected to offer and which can satisfy the economic demands and social and political community goals as specified in the needs analysis; and, finally, an analysis of alternative modes capable also of satisfying these future needs.

As this information is synthesized by the decision-makers, they will be in a better position to determine whether or not any action needs to be taken. If, the decision is that no action is warranted, the entire project would be dropped. If, however, some action is called for, alternative options must be specified and an assessment of the various impacts of each of these options must be undertaken. The results of these impact assessments are then fed back into the decision-making process to determine whether the proposed change in the supply of aviation services and the impacts of such a change do in fact satisfy community needs or whether the plans need to be revised. The cycle of option specification, impact assessment, and option respecification continues, until an option has been found which satisfies the needs of the community and which is within the constraints and limitations set by different factors in the system's service area. At that point, the decision-maker is ready to initiate action which will change the existing structure of the aviation services available to the community of interest.

THE PRELIMINARY DECISION

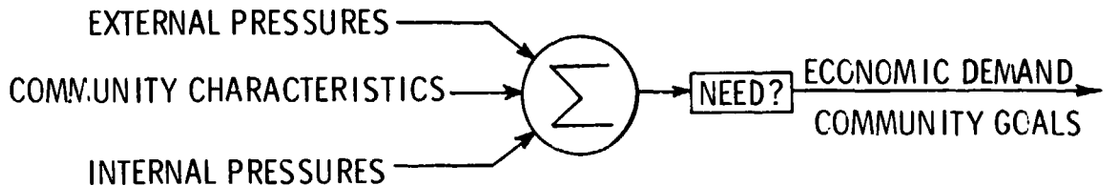
When the question of the acquisition of general aviation services is raised in a community, the decision-maker must be able to make a preliminary determination as to whether it is worthwhile to initiate a detailed investigation of the options available concerning the building, improvement, or change in the aviation service system in view of the real needs of the community.

The criterion of "need" differs from that of "requirement." "Requirement" for an airport, for example, is determined by the number of aircraft or aircraft engines owned by people within the service area of the proposed airport. The simple fact that a number of people in an area own airplanes is, however, no more adequate a reason for constructing a **publicly-owned** airport, than is the existence of a number of boat owners adequate reason for creating a publicly-owned lake. Other factors must be taken into consideration.

The criterion of "need" provides a way to take other factors into account. Need may be defined as a pressing lack of something essential. Thus, need for general aviation services is not merely the lack of them. A determination that the services are essential and that the lack of the services is pressing also must be made. The terms "pressing" and "essential" must be defined relative to the special character of the community involved. A community which regularly faces floods may find that the construction of a dike is essential while the construction of an airport is not. A community with more than adequate public services in other respects may find that an airport is the most pressing "lack" it has.

The decision-making process of initial need-determination is represented by the section of Figure 3-1 reproduced in Figure 3-2. The decision process is usually initiated when someone in the community—perhaps the decision-maker—urges the development of new or better general aviation services. Sometimes internal pressures result from external pressure, as would be the case when a representative of the state aviation agency addresses the local Chamber of Commerce on the subject. External pressure itself, however, sometimes initiates the process, as when a firm promises a community that it will locate there if an airport is constructed which can accommodate its corporate aircraft.

Whatever the pressures, the responsible decision-maker should evaluate them in the light of community characteristics. In this phase of the process, need is determined by estimating economic demand and community goals. The economic demand estimate is a projection of the willingness and ability of people in the area to purchase the service. The estimate of community goals determines whether the acquisition of the service promotes, hinders, or is indifferent with respect to the objectives of the community as a whole. Sometimes the goals alone may justify the service: an island community may wish to build an airport in order to provide access in emergencies, even though the airport would not be used often.



THE PRELIMINARY NEED-DETERMINATION
FIGURE 3-2

If there is no demonstrable need or even likelihood of need, the decision process comes to an end and the decision-maker decides not to pursue the matter. If there appears likelihood that a need for general aviation services exists, the decision-maker will proceed to the next step.

The remainder of this chapter deals with the components of the preliminary decision-making process in detail: the three main inputs to the decision (external and internal pressures, and community characteristics) and the decision-making process itself.

External Pressures

External pressures on the community to alter its policy toward general aviation services influence the local decision-making process. Such pressures arise from government planners, special interest groups, economic factors, and legal restrictions. The community should be aware of the nature of these inputs so that they may be evaluated as to which are unavoidable, which may be modified, and to what degree they should be considered.

Through comprehensive planning, federal, state, and regional aviation planning agencies influence local general aviation policy. The Federal Aviation Administration (FAA) is responsible for the development of the airways system. Since the FAA measures the need for airport improvement funds by the level of activity, some FAA officials tend to promote aviation in small communities on the premise that the facilities are required in order to generate the traffic necessary for "expansion."[1] If the problem facing a community is too much air traffic, the FAA usually recommends acquisition of new facilities rather than improving the efficiency of the existing ones.[2] The FAA acts in part on the basis of a number of studies of the community impacts of aviation which it has sponsored. Two problems arise in relying solely on these studies: (1) political pressures tend to make the analysis conform to established policy objectives instead of evaluating them, and (2) the studies tend to emphasize quantifiables to the point of discounting qualitative aspects.[3]

Many state aviation agencies are involved in planning statewise airport systems. Criteria for measuring airport need differ from state to state and sometimes between the states and the FAA. Ohio and Georgia, for example, had a high rate of success in convincing local communities that every county needed its own airport. The airport plan for Virginia uses population, income, and rate of growth of an area as principal measures for determining the need for air facilities.[4]

One example of community reaction to state planning is the Cottage Grove State Airport, owned by the State of Oregon, Board of Aeronautics. "Although Cottage Grove has one of the better general aviation airports in Oregon, community acceptance of the airport is low. Many reasons for the antipathy of the community are given, but the most frequently mentioned reason is that many citizens of Cottage Grove feel that the airport was forced on the city by the Board of Aeronautics."[5]

Port Authorities, Airport Commissions, and other regional aviation bodies influence general aviation development in the community. One solution to congestion at hub airports has been peak pricing, which tends to price general aviation aircraft out of the airport during peak hours. The airport commission's answer to this situation is to seek to establish general aviation airports close to urban centers.[6] Under those conditions, external pres-

[1] Steven E. Rhoads, *Policy Analysis in the Federal Aviation Administration*, (Lexington, D.C. Heath and Company, 1974), p. 24.

[2] George P. Howard, *Airport Economic Planning*, (Cambridge: The MIT Press, 1974), p. 425.

[3] Rhoads, *op. cit.*, p. 28.

[4] Talk by James Gray, Division of Aeronautics, Commonwealth of Virginia, July 11, 1975.

[5] Lane Council of Governments, *Airport Needs Study*, (HUD Project No. Oregon P-145, January 1971), p. 33.

[6] *Ibid.*, p. 108.

sure for a community to acquire a general aviation airport may come from a nearby congested hub airport that seeks a reliever airport. The Minnesota Airport Commission, which was created in 1943 to develop the airports in the Minneapolis-St. Paul area, built a reliever airport at Ham Lake. The Los Angeles Department of Airports decided on the basis of demand estimates that it should build a reliever airport at the City of Palmdale.[7]

National special interest groups such as aviation interests or environmentalists lobby on all levels in order to affect aviation policy. In an article entitled "The Fine Art of Communication with the Public," Barney Oldfield, an aviation enthusiast, proposed that the desire for acquiring aviation facilities and the acceptance of the consequences must be sold to the public under the banner of progress.[8] The Air Transport Association of America (representing the air carriers) and the Aircraft Owners and Pilots Association (representing general aviation) are the most effective lobbies on the national level.[9] The General Aviation Manufacturers Association seeks to persuade industry and the community that "business aircraft are an essential component of America's economic machinery and a significant contributor to the nation's economic well-being."[10] As the construction of new airport facilities affects the environment, national environmental groups become interested in projects which have the potential for adverse ecological consequences. National conservation groups so aroused the general public that the plans for the new Miami Everglades Airport were halted. General aviation airports, if planned near critical areas of the environment such as wetlands, would also draw criticism from advocates of the environment.

Economic pressures can influence community decision-making with respect to general aviation services. Sometimes an industry will offer to locate in a community, on condition that the local government provides adequate general aviation facilities. A candy company located in Clarksville, Virginia, only after the airport it required had been constructed.[11] The City of Manchester, New Hampshire, negotiated with the Air Force in order to provide the airport location insisted upon by the Marian Electric Company in order to establish its new plant. Two companies purchased private airports for industrial development in neighboring northwestern Virginia towns, and then notified the communities that they would require an airport to serve their corporate aircraft before they would begin development.[12]

Funding available from the federal and state governments or the airport commission can make the acquisition of general aviation facilities more attractive to the community. Federal assistance to airports has long been relied on, through a history of federal involvement in aviation, and such subsidy programs as the Federal Aid to Airports Program, the Airport Development Aid Program, and airport access improvements through highway funding; as well as maintenance of the air traffic control system and air vehicle and new airport certification.[13] The Commonwealth of Virginia is involved in the funding and operation of airports through the Division of Aeronautics of the State Corporation Commission which is the agent for federal and state funds for county and municipal airports, and the Virginia Airports Authority, which has the power to build and operate airports.[14]

If Virginia believed that a particular area needed a general aviation airport, it could provide partial or total funding. In Tennessee, funds for airport construction are available from both the Tennessee Department of Transportation, Bureau of Aeronautics, and the Appalachian Regional Commission.[15] Airport commissions may be self-supporting and could be in a position to provide for new aviation facilities without community financing. The commission may, for example, issue revenue bonds to provide needed funds, on the condition that income from the airport will be used to retire them.[16]

Many states have created regional planning districts, typically consisting of a contiguous group of counties which share

---

[7] Gary H. Lanter, *Community Opposition to Airport Development* (Cambridge Massachusetts Institute of Technology 1972), pp. 185, 108.

[8] Angelo J. Cerchione, *et al.*, *Master Planning the Aviation Environment*, (Tucson: The University of Arizona Press, 1970), p. 138.

[9] Rhoads, *op. cit.*, p. 39.

[10] GAMA, *Airplanes Are Business Tools*, p. 3.

[11] Interview with Tom Ferguson of Piedmont Aviation at Norfolk Regional Airport, Norfolk, Virginia, June 26, 1975.

[12] Federal Aviation Administration, Eastern Region, *General Aviation and Its Relationship to Industry and the Community* (Jamaica, New York: May 1, 1962, Revised February 28, 1963, April 7, 1964), pp. 33, 24-5.

[13] Department of Transportation and National Aeronautics and Space Administration, *Civil Aviation Research and Development Policy Study—Supporting Papers*, (Washington, D.C.: March, 1971), p. 6-42.

[14] Va. Code Ann. §§ 5.1-46, 5.1-48 and 5.1-56 to 5.1-76.

[15] R. Dixon Speas, Tennessee Airport System Plan, December, 1972, p. 23.

[16] Howard, *op. cit.*, p. 248.

geographic or economic characteristics. Planning districts can be an important source of external pressure on a community. This problem is discussed in some detail in Chapter IV with reference to conflicts between state and regional planners and the local communities and citizens involved in airport planning for Roanoke, Virginia.

Legal restrictions on the aviation environment affect community planning processes concerning general aviation. Regulations, common law suits, and zoning options must be dealt with by every community which decides to build a general aviation airport.

The areas of regulation which are most likely to influence general aviation airports are energy, environmental, economic, and safety concerns. Comprehensive energy allocation plans are being explored by both Congress and the President. As the program of gasoline allocation in 1973-74 indicates, general aviation fuel supplies may be restricted as crude oil becomes less available. The community should consider the fuel situation in estimating demand for new transportation facilities.

In addition to FAR Part 36 explained in Chapter II, the area of common law nuisance affects the operation of airports. Those responsible for airplanes flying low over a person's property are liable to the property owner for any diminution in the value of his property brought about by the airplanes' noise.[17] The Los Angeles city attorney estimated that potential damage claims based on nuisance caused by the city airport could cost the city $4.5 billion.[18] These suits primarily concern jet noise, but it is possible that a substantial amount of general aviation traffic could breed nuisance suits for a community-operated general aviation airport.

Through the use of available zoning procedures, the community may establish an airport which is in harmony with the local environment. The safety regulations of the FAA establish the minimum approach zones and boundary conditions for the airport itself.[19] Some states control zoning in the airport interface, and others allow the local governments to do so.[20] One reason for proper zoning is to prevent airport encroachment, which can spawn nuisance suits and prohibit future airport expansion. The right of a community to use comprehensive rezoning procedures to avoid this problem was upheld in Santa Barbara, California.[21] The locality could also buy all of the land needed for careful planning, and then either rent the surrounding plots or sell them with restricted deeds.

Internal Pressures

The impact of internal pressure on policy decisions must be based on a number of assumptions including: (1) that at least some citizens play a role in both the formation and the content of public policy; (2) that opinions are expressed by a variety of groups (individuals in many different ways with varying degrees of intensity); (3) the belief that local political decision-making leads to an uneven distribution of rewards and disadvantages, depending on such factors as the issue and groups involved in the decision-making process.

An application of these assumptions to the field of policy analysis, including the general aviation field, suggests that citizens often have little positive policy impact. Past studies have demonstrated that the general public has no knowledge of, or opinions about, many public policy questions. Even V.O. Key, who was convinced that mass preferences have an impact on policy was forced to conclude "that the supposition that public opinion enjoys weight in public decisions is a myth and nothing more, albeit a myth that strengthens a regime as long as people believe it."[22] In the same context, Frank Munger, in an analysis of five policy areas about which people have some opinions, concluded that the chances of a state matching the policy preferences of its citizens is only a little better than 50-50.[23]

It is apparent that the political system frequently does not act in congruence with the preferences of the general public and that some individuals have influence disproportionate to their numbers.[24] Policy in this context reflects the preferences of an elite and flows downward from the elite to the masses. This does not imply that public policy resulting from elite preferences is necessarily anti-mass or not in the public interest, since it is possible that

---

[17] Richard A. Posner, *Economic Analysis of Law*, (Boston: Little, Brown and Company, 1972), p. 26

[18] The Aviation Advisory Commission, *The Long Range Needs of Aviation*, (Washington, D.C.: The Government Printing Office, 1973), p. 14

[19] Cerchione, *op. cit.*, p. 197

[20] H. Floyd Sherrod, Jr., ed., *Environment Law Review—1973*, (New York: Clark Boardman Company, 1973), p. 387-388

[21] *Smith v. Co. of Santa Barbara*, 243 A.C.A. 126, 52 Cal. Rptr. 292 (Dist. Ct. App., 2nd Dist., 1966)

[22] V.O. Key, Jr., *Public Opinion and American Democracy*, (New York: Knopf, 1967), p. 411

[23] Frank Munger, "Opinions, Elections, Parties and Policies: A Cross-State Analysis," paper delivered at the annual meeting of the American Political Science Association, NY, 1969

[24] Thomas R. Dye and Harmon Ziegler, *The Irony of Democracy*, (Belmont: Wadsworth, 1970)

values of the elite may be public-regarding and not private-regarding. Thus, the elite may feel responsible for the welfare of the masses.

The elite model of decision-making has also been applied to the study of local communities. Various researchers have indicated that communities vary in their degree of elitism depending on such factors as the size of the community and the degree of community integration. [25] In many communities policy decisions can best be viewed as a product of the interactions of the members of the elite. Depending on the policy area then, this product might be ratified by the masses.

Although none of these studies has dealt with general aviation policy, a reasonable assumption is that the elite model would also apply to this area of decision-making. Caution is required, however, in applying this model to the community's support and the use of general aviation for at least three reasons. First, communities vary greatly in their economic and socio-political makeup. Second, general aviation includes a wide range of activities. Third, general aviation activity has not developed as a coherent policy field

The variation in community types and characteristics has been shown in numerous studies which have classified communities by their demographic, social, and economic characteristics. [26] One would expect, for example, upper-middle class communities with a technically oriented economic base to generate a greater economic demand and political pressure for all types of general aviation including business flying, commercial flying, and pleasure flying, than would lower class communities with a general industrial tax base and large numbers of blue collar workers. Again, many individuals are convinced that general aviation is of importance only to those in the upper socio-economic levels Thus, an attitudinal factor constraining the development of general aviation is the widespread conviction that air transport is important to only a small segment of the population. This limited political constituency inhibits aviation supporters from translating their desires into market demands. In general, one can safely assume that "the overall attitude of the community toward airports is invariably negative." [27] This attitudinal problem would not be as great in an upper class community as in a community comprised of working class individuals. [28]

A second difficulty in assessing the demand for general aviation in a given community lies in the nature of general aviation itself. General aviation, which encompasses all civilian aviation activity except that associated with the operation of CAB-certified air carriers, has a serious identity problem. George Coker wrote that "the role of General Aviation can best be described as 'filling in the gaps' left by the common carrier airline services." He argued that the importance of general aviation is not readily recognized because: (a) the industry is composed of many uncoordinated segments; (b) the magnitude and glamour of the certificated airline industry; and (c) the reluctance of the vast majority of large corporations to publicize their ownership and use of business aircraft. [29]

A study conducted by the Opinion Research Corporation in June, 1973 indicated that a majority of the general public (59 percent) has not heard the term "general aviation" and that most of those who have heard the term equate general aviation with air travel in general, despite the finding that 41 percent of them claim to have flown in a private or business plane or used a commuter service Nevertheless, most members of the public agree that general aviation provides many benefits such as: emergency service (95 percent), jobs (95 percent), and industrial growth (76 percent) [30] Thus, although members of the general public are not knowledgeable about what comprises general aviation, they expressed positive views about its impact once the polling team defined general aviation to the interviewees. One can conclude that the pressure for general aviation is probably created by community leaders or a small group of individuals either from inside or outside the community In sum the development of general aviation is frequently constrained by the lack of broad, and supportive, constituency. It should be kept in mind, however, that the size of a constituency in a policy area may not be as important as the characteristics of that constituency Frequently a small group, which is well-organized and high in socio-economic status,

---

[25] Nelson Polsby *Community Power and Political Theory*, (New Haven Yale University Press, 1973)

[26] Robert Lineberry and Ira Sharkansky *Urban Politics and Public Policy*, (Englewood Cliffs N J Prentice Hall, 1974)

[27] Joint DOT-NASA Study Civil Aviation *Research and Development Policy Study*, March 1971 pp 6-4 and 6-6

[28] Jeremy J Warford *Public Policy Toward General Aviation*, (Washington D C Brookings Institution 1971)

[29] Aviation Advisory Commission, *General Aviation*, (January 1 1973) p C-54

[30] Opinion Research Corporation *General Aviation Today*, (Princeton N J June, 1973)

can exercise authority disproportionate to its numbers.[31]

A third problem in assessing the demand for general aviation is the lack of a national transportation policy. According to a study commissioned by the Aviation Advisory Commission, the transportation policy of the United States can best be described as

> . a patchwork of disorderly transportation policies which are an agglomeration of explicit statutory provisions and implicit approaches, resulting from usually unstated assumptions, changing social priorities, and scattered responses to random developments over the years. **National transportation 'policies' are better revealed in what is done, or not done, than in what is said.**[32]

The lack of a transportation policy system, which is reflected in the general confusion about the proper role of the various levels of government in general aviation, increases the difficulty of attempting to determine the demand for general aviation activity. It is, for example, difficult to measure the impact of mass public opinion on policy when the policy is not clearly known. There is little evidence that mass opinion is an important independent determinant of public policy, particularly in a policy area as vague as general aviation.

The lack of national policy has been one factor which has led the federal government to adopt the approach that policy decisions should be decentralized and made by local units of government. The advocates use of special revenue-sharing funds for transportation planning does little to solve this lack of direction. The revenue-sharing approach, which is based on the principle that local units of government should have greater discretion in the spending of funds, leads to further confusion since the combination of local transportation policies does not necessarily lead to any type of national policy.

The above discussion has distinguished between the mass public and the various specific publics involved in the development of general aviation activity. Another distinction, based on the propensity to use general aviation also should be made. This is the distinction between the consumers of service and the non-consumers. Rai Okamoto, a member of the Aviation Advisory Commission, has classified the non-consumers into two groups.[33] **First,** those who use the system but do not want to be disturbed by it once they are on the ground. This group uses air services but at the same time is very concerned about avoiding its negative impacts. This group can be compared to automobile drivers who drive their cars but do not want expressways located close to their homes. The **second** group of non-consumers is comprised of those who rarely or never use the system. This group could be composed of the community's taxpayers who use other modes of transportation on a daily basis. To them, an airport is something exotic and perhaps not necessary. Transportation problems are viewed in terms of highways and local mass transit. Consequently, they would not be in favor of the development of general aviation facilities.

Evidence suggests that general aviation proponents are usually the only members of the public involved in the initial stages of airport development. Only when specific issues are put in the context of the decision-making process, do other individuals and groups become involved. These groups, which are usually composed of residents near the proposed facility, generally play a negative role—they want to stop something (an airport) from happening.[34] This negative role of various community groups is demonstrated most clearly in the environmental assessment review process in which local citizens become involved only once certain basic decisions about the facility have been made. Clearly, citizens frequently lack the resources to participate effectively against the proponents of the airport who have the money and/or expertise to obtain the facility.

The response of the political system to the demand for specific actions, such as the growth or establishment of general aviation activities, can only be understood by recognizing that politics involves the distribution of rewards and disadvantages. One must recognize that

---

[31] It should be kept in mind, however, that the size of a constituency in a policy area may not be as important as the characteristics of that constituency. Frequently a small group which is well-organized and high in socio-economic status can exercise authority disproportionate with its numbers. This concept is developed by David B. Truman, *The Governmental Process* (New York: Knopf, 1951). General aviation policy may be the result of elite preferences and not the preferences of the masses. See, for example, Thomas R. Dye and Harmon Ziegler, *The Irony of Democracy*, (Belmont: Wadsworth, 1970).

[32] Richard J. Barber, *Report on National Transportation Policies—Part I, Analysis and Trends*, (U.S. Department of Commerce: National Technical Information Service, September 1971).

[33] Aviation Advisory Commission, *Aviation in a Long-Range Public Planning Context*, February 15, 1973, p. 44.

[34] Andrew J. Winfrey, Joseph C. Corradino, and Charles Schimpeler, "Developing An Environmental Assessment Report For a Regional Airport—Industrial Complex," *Transportation Research Record*, 529 (Washington, D.C., 1975).

transportation policy, particularly from the vantage of the local community, does not constitute a set of coherent directions. It is most probably no more than the sum of actions taken in response to the expressed demands of various segments of the community at various times. Although decision-makers engage in broad activities such as organizing, ranking priorities, and allocating costs and benefits, they also tend "to respond positively to every demand without worrying about the total costs or total benefits (consequences) or considering alternatives." [35] In addition, the political system functions in a way that enables the definer of the problem to set the agenda for action and to play the key role in formulating the solutions to the problem. [36] Given the fact that the meaning of the term "general aviation" is not clearly understood by the general public, one would expect the aviation support to be in many cases the only initial influence on the policy-making process.

In some cases, such as in the development of the Creswell, Oregon airport, the airport is desired by a narrow group of users. According to a local study, "the original purpose of the Creswell Airport was to meet the general aviation needs for pilots in the Creswell area." The study indicated that aviationists involve local government to qualify for federal aid and warns that "local governments must be aware that general aviation airports are expensive." [37]

The desire to fulfill the specific demands of aviationists is not the most frequently expressed basis on which a community's need for air service is justified. A recent workshop on low/medium density air transportation concluded that communities justify their need on four basic grounds—community pride, economic development, population dispersion, and isolation. [38]

Community pride is a significant reason for seeking general aviation services because many individuals, particularly elected officials, attach a great value to being in a progressive community. George P. Coker, Vice-President of Airport Services for the Southwest Airmotive Company, used this type of rationale when he suggested that communities without general aviation services "may find themselves outmanuevered by competitive communities." [39] In addition, the airport as a physical entity is a specific thing leaders of the community can point to when discussing their achievements.

Second, some communities seek airports due to their isolation from certain markets or services. These communities do not want an airport for business reasons, or for community prestige, but desire air services because other modes of transportation are either unavailable or impractical.

Third, communities want an airport to further their economic development. These communities, which are probably governed by city administrations embodying a growth philosophy, desire an airport to provide a service for the industrial business community which is probably located (or to be located) in an industrial park area within the community's boundaries. Assessing the economic impact of a proposed airport is a complicated matter. The airport alone is unlikely to draw new industry into a locality unless many other attractive community characteristics exist as well. The role of airports in economic development is discussed later in this chapter

The supposed economic advantages of airport development are an important part of the arguments used by those who attempt to promote community interest in, and pressure for, general aviation services. Many members of the community have to be sold on general aviation because of its lack of identity in the public mind or other negative factors mentioned above. The persuaders may be outsiders or members of the community. One prominent proponent of aviation development is Norman Crabtree, Ohio's Aviation Director, who did a "gigantic selling job to drum up community interest." As a result of his effort "community spirit blossomed with the excellent help and footwork performed by service groups, including the Kiwanis, Lions, and Rotary." [40] In a community in another state the demand for a new airport also came from a local service organization, the Jaycees, who were successful in "sweeping the cobwebs away from community inertia and set a record for ambition and ingenuity." Without expen-

---

[35] See William Mitchell *The American Policy*, (New York Free Press 1962) for a discussion of decision-making. The quote is taken from Norman Wengert "Political and Administrative Realities of Regional Transportation Planning" in Joseph De Salvo ed *Perspectives on Regional Transportation Planning* (Lexington Mass D C Heath 1973) p 381

[36] Wengert *op cit* p 382

[37] Lane Council of Government *Airport Needs Study*, Eugene Oregon January 1971 pp 36 and 47

[38] Joseph Vittek ed *Air Service to Small Communities Directions for the Future Final Report of the Workshop on Low Medium Density Air Transportation*, Cambridge MIT Flight Transportation Laboratory February 1974) pp 39-41

[39] George P Coker "General Aviation in Our Air Transportation System" in *Airports Challenges of the Future*, American Society of Civil Engineers p 133

[40] Don W Farnsworth *The Ohio County Airport Story, 1964-1972* State of Ohio, Department of Commerce, Division of Aviation, p 24

diture of public funds, the community has an airport due to the efforts of several dozen men who took the time and effort to learn that an inexpensive, satisfactory airport development project could be both possible and profitable." [41]

The involvement of local service organizations in developing aviation activity for the economic benefit of the community is indicated in other examples of how communities have started airport planning projects. The city manager of La Crosse, Kansas predicted that the small towns "will have to have an airport, just like they needed a railroad in the old days" to survive.[42] The following examples are taken from an FAA report.[43] Lincoln, Rhode Island developed an airport study because the city's chamber of commerce detected "intense enthusiasm for such a project." In Manchester, New Hampshire the "city did not at first recognize the importance of the new airport to future city development." Later, however, the owner of Marian Electric Company "felt so strongly about improving the economy of the area that he donated one-half million dollars" to develop an airport. Once again, the community was described as "giving whole-hearted support to the airport development." Springfield, Vermont also felt a need to provide aviation facilities and responded by obtaining funds from the state legislature and from industries and individuals within the town. The FAA commented that "such an expression of faith and confidence on the part of industry and outstanding citizens in Springfield underscores the economic significance which the donors attach to this facility." Similar support by the economic interest of the community was also expressed in Hayward, California; Islip, Long Island, New York; and, South Plainfield, New Jersey. A different case in point, but one which also shows the significant role of the business community in airport development is Oneonta, New York, which failed to attract industry because of its lack of aviation facilities. One firm "did not visit Oneonta due to a lack of an airport." Another firm "rejected the area because it felt that too much time would be wasted and high travel expense would result if a new plant were established in an area without suitable airport facilities." (Oneonta established an airport in 1966. Despite a mild increase in population, however, the work force of the city in manufacturing fell from 800 to 537 between 1960 and 1970.) In a similar situation, the Sunbeam Corporation agreed to locate in Forest, Mississippi, only when the city agreed to build an adequate general aviation airport. [44]

The cases cited above indicate that the impetus to airport development often comes from the business community of a given city. Business leaders are concerned with the economic costs of general aviation activity although the social costs may be of significance equal to the economic ones. At the same time, one must be careful not to attribute benefits to general aviation which the specific aviation activity did not cause. A preliminary analysis of the Quakertown, Pennsylvania and the Mannontown, New Jersey projects indicated that general aviation led to high levels of prosperity; however, a later examination of those communities indicated that both communities would have had high levels of prosperity, regardless of the existence of general aviation activities there. [45]

While the initial internal pressure for the acquisition of general aviation facilities generally stems from the local aviationists or the business community, other internal pressures, both for and against such acquisition are likely to develop as plans become more concrete and more certain of implementation. Such pressures will appear to public authorities to have arisen out of the blue, and the authorities' reaction to the new pressures may well be an important factor in the strength of new opposition. Citizens who believe an airport is being forced on them on behalf of a special interest group may show intense hostility to an airport where none existed before. Consequently, authorities must make some effort in the initial planning stages to consider the goals and values of citizens who have not yet voiced an opinion about the airport. This will be done if decision-makers use the criterion of "need" within the context of relevant community characteristics in their initial decision as to whether or not the community needs better access to general aviation services.

Community Characteristics

The decision-maker who must make a preliminary deterimination as to whether or not there is a community need for improved general aviation services faces that decision because of some pressure, internal or external, for those

[41] Bascom Nelson "An Airport for a Small Town" *Flying*, (May, 1962) Vol 70 No 5 pp 74 80 84 and 86 The airport was provided without expenditure of public funds

[42] *Ibid*

[43] Aviation Advisory Commission, *The Long Range Needs of Aviation* January 1973 p 10

[44] *General Aviation and Its Relationship to Industry and the Community*, *op cit* pp 30-45

[45] *Ibid*

services. The decision to pursue the matter must, however, take into account not only those pressures for public action and the expenditure of public money but also the degree of willingness and ability to purchase general aviation services (economic demand) and the extent to which the acquisition of facilities supports, hinders, or is unrelated to community goals and objectives.

The "community" is defined for the purposes of this study as a group of individuals living within a specific spatial unit. These individuals possess a feeling of, or in fact have, common objective economic, social, or political bonds. These objective bonds are, indeed, the characteristics of the community that define its fixed or political boundaries, its sphere of economic influence or its social interaction space. This so-called "community of interest" encompasses a wide range of political, economic, and social activities. The type and breadth of each of these classes of activity delimits the extent of the interaction space called "community."

In the broadest sense, the nation, region, state, SMSAs, cities, towns, or villages are communities. But at the local levels each community is defined, obviously, within the local framework and context of the individual interaction space and community characteristics. In turn, the decision-making process in general, and the decision-making process with regard to general aviation services in particular, is related to individual community characteristics. Significant community characteristics will be discussed in terms of their relevance to the general aviation services decision-making process.

Once the community has been defined from the viewpoint of general aviation services, i.e., the area to be served by a proposed or existing general aviation facility, certain demographic characteristics can be considered. Population size, structures, density, and rate of change appear to be important variables in the determination of the need for general aviation services. For example, there is, perhaps, a threshold population for each service industry below which the service will not be provided. In Virginia, for example, there are presently only eight airport facilities serving areas with populations of less than 50,000 persons. The exact number of persons required before general aviation services can be provided is an elusive figure. Other community characteristics such as density, income, and age structure should be considered in combination with the community's population size in an attempt to arrive at that threshold figure.

Population density (i.e., persons per square mile) can also be a determinant of community types. The range is large but there appears (at least regionally) to be a positive correlation between aircraft ownership and lower levels of population density. Lower levels of population density figures imply a degree of rurality or agricultural activity. The degree of rurality versus urbanization can be an important consideration in assessing some types of general aviation services. Agricultural areas may make use of, for example, crop dusting, spraying, and seeding services.

Still within the realm of demographic consideration, the age structure and rate of population change, also have direct bearing upon general aviation service demand. Usually, general aviation services tend to be used with greater consistency by younger populations. The community's relative rate of population growth or decline can also be indicative of economic conditions and hence general aviation services need. A stagnant or declining population is less likely to elicit effective demand for general aviation services than a growing or stable population base (unless one accepts the argument that general aviation is a godsend to end economic debility).

The community's economic characteristics are not unrelated to, and, in fact, determine, some of its demographic and social characteristics. There is, for example, considerable difference in the quality of life and life-style between communities having a balanced or diversified economic base and communities dominated by one economic activity. Regardless of these differences, all communities can be examined within a framework of basic economic factors. Those factors to be examined in assessing a community's economic base relative to general aviation services are income, education levels, employment sectors, unemployment rate, industrial mix, tax base and tax rate, land values, degree of agricultural activity, and markets. All of these variables appear to be correlated positively to general aviation service need. For example, communities which are marketing or institutional centers (and therefore possess below average industrial employment) are more likely to generate traffic than are industrial or "balanced" centers.[46]

Many of the factors mentioned are related

[46] John A. Nammack, "Airports and Their Economic Impact," *Airport Services Management*, November 1971

to each other. One of the most important is income. High levels of per capita income, median family income, and disposable income directly impact general aviation service demand and availability. In other words, income levels can provide a valid indication of a community's ability to support general aviation services.

All of the community characteristics expressed above are quantifiable. Various United States Bureau of the Census publications (*Census of Population, Census of Manufacturing, Census of Business, Census of Agriculture,* etc.) provide general, and in some cases detailed, information about the community.

Other community characteristics are of a less tangible nature. Individual community "goals" as perceived by the members of the community are often immeasurable but are nevertheless real. Depending upon the power structure, i.e., those setting, establishing, and carrying out policy, these goals can vary widely from place to place and time to time. At one extreme is the "no-growth" or stability policy. At the other extreme is the more common "bigger is better" approach to community development, in which steady and continual expansion of the economic base is deemed desirable. Individual goals at both poles and at intermediate positions, should be assessed as they intuitively become a part of the decision-making process concerning general aviation services. One should keep in mind, too, that different elements of the community may harbor or avow contradictory "community goals."

Many of the same factors which indicate the likelihood of demand for general aviation service provide clues to community goals. Goals are likely to vary with socio-economic class and education. Age can be an important variable: the goals of a largely-retired community will differ considerably from those of "young-marrieds." In addition, history and geography may play a role. Long-term residents are likely to have the goals of their parents. Communities near metropolitan areas may seek to become growth centers in opposition to the spreading metropolis or they may prefer to serve as "bedroom" communities.

Implicit in the above is the realization that all pertinent community characteristics in relation to the general aviation services decision-making process are totally relative to each individual community as defined by its decision-makers. No generalizations can or should be drawn at this point.

Making The Preliminary Decision

The factors involved in making the preliminary decision about general aviation services are presented in schematic form in Chapter V. The lists found there are drawn from the analyses presented in the foregoing sections of the present chapter. The preliminary decision is whether or not to begin serious planning for the acquisition of general aviation services. If and when such a plan is undertaken, all the relevant factors will be considered more thoroughly than they are in this preliminary stage. As will be evident, there exist some methods for estimating the future economic demand for general aviation services in the community. Much more difficult to assess is the future degree of political support and opposition. Without political discussion or controversy in a community the decision-maker has difficulty in discovering community goals. In the case of general aviation, the community input to the decision-maker is primarily informal in nature and restricted to a relatively small number of individuals favoring general aviation development (i.e., aviationists and the business community). The major input from the public at large is apathy, rather than either support or opposition.

One can safely predict that this general community apathy will only be awakened and become non-support if controversies arise concerning the social and environmental impacts of the airport facility and/or the financing of the new or expanded facility. The decision-maker should attempt to foresee such possible developments as early as possible. It is difficult, however, to generalize in this area because of a number of recent political events, which have changed, at least to some extent, the interaction patterns of elites and masses. The most significant of these are the growing suspicion about the bureaucracy, the questioning of the supposed benefits of technological advancement, the uncertainty about the type of growth or no-growth policy a community should assume, the demand by citizens for self-determination, and the requirement that citizens be involved in planning decisions. These events clearly impact on the development of general aviation. Citizens have frequently banded together through "political mobilization" to stop the expansion of airport facilities.[47] In mobilizing, the citizens have challenged the view—generally shared by bureaucrats—that the public bureaucracy involved with airport

[47] Nevins Baxter E. Philip Howry and Rudolph Penner *Public Investment in General Aviation Airports An Application of Cost-Benefit Economics* (Federal Aviation Administration, Washington D.C., May 1 1967)

planning and operations is necessarily acting in the public interest. [48] In the mobilization process, certain special publics, not the mass public, demand accountability. The proponents of airport development must show what the costs and benefits involved in the development are. In addition, many members of the public no longer readily accept claims of efficiency nor do they believe that the expansion of technical facilities, such as airports, is always a means of progress. In brief, the cost/benefit calculus no longer includes only the more readily quantifiable economic costs but also social costs and value orientations. [49]

Rai Y. Okamoto, a member of the Aviation Advisory Commission, noted that "evidence continued to mount that aviation's failures were inextricably bound to those of a non-aviation or institutional nature. [50] One must reasonably assume that air transportation is only one means to achieve a goal, although many of the statements made by its proponents do not reflect this. At the same time, the proponents often fail to use a systemic perspective in their evaluation of the need for airports Airport proponents must realize that the public is not a passive element in the system, that technical mystique is no substitute for public support, and that the public may also have its own goals which are quite inconsistent with the goals of the airport development proponents. At the same time, the proponents of further development should realize that the negative and positive impacts of aviation activity are unevenly distributed within a given community, and that it is extremely difficult, if not impossible, to develop aviation activities without a willing public.

Consequently, decision-makers must not respond simply to the pressures exerted by interest groups; they must justify proceeding with the planning process in terms of public interest. The section on the impact of general aviation discusses these issues in more detail, but at the preliminary stage one must ask what are the beneficial impacts of general aviation on the community. Some of the intangible, unmeasurable impacts include:

(1) Value of time saved (by passenger plus "domino effect")
   (a) Business flying
   (b) Pleasure flying
   (c) Utility flying

(2) Emergency value (human life and property)
   (a) Natural disaster (earthquakes, floods, wind, weather)
   (b) Crime control and law enforcement
   (c) Riots and civil disturbance
   (d) Rescue and life saving
   (e) Forest fire fighting
   (f) Business decisions
   (g) Food drops for animals; other forms of remote resupply
   (h) Ambulance service
   (i) Industry equipment and repairs

(3) National defense value
   (a) Pilot training and availability
   (b) Saving in military aircraft through joint sharing of aircraft development and production costs
   (c) Value to wartime combat use
   (d) Civil Air Patrol
   (e) Efficient and productive plant operations during war time

(4) Promotion or stimulation of air carrier flying (ticket sales).

(5) Entertainment value
   (a) Value to general aviation passengers (in terms of gratification):
      (1) Air shows
      (2) Radio, TV, movies
      (3) Vacation and resort area development
      (4) Sightseeing and other transportation modes
   (b) Value to entertainment industry

(6) General business industry associated with General Aviation Travel
   (a) Hotels
   (b) Ground transportation (taxi, limousine, car rental, etc.)
   (c) Air carrier helicopter services
   (d) Meals

(7) Specific benefits related to General Aviation
   (a) Aerial photography and mapping
   (b) Fish spotting and fish saving
   (c) Forest fire patrol
   (d) Power and pipe line patrol
   (e) Corporation internal business aircraft management, maintenance and operations, personnel and expenses

---

[48] Robert Horonjeff, *The Planning and Design of Airports*, (New York: McGraw Hill, 1962)

[49] Dorothy Nelkin, *Jetport: The Boston Airport Controversy*, (New Brunswick. Transaction, Inc , 1974).

[50] Aviation Advisory Commission, *Aviation in a Long-Range Public Planning Context*, February 15, 1973, p 2.

TABLE III-I

DEMAND MODELS APPLICATION TO FORECASTING AIRPORT USAGE

MODEL	COMMENTS
Direct Demand	
Economic Demand Model	Good theoretical structure but calibration has not been fully tested and is limited because of the requirements of a large sample size.
McLynn Model	Never fully tested in application.
Bauman-Quandt Model	One of the few "abstract" mode models; good formulation, but has calibration problems.
Trip Generation	
Trip Generation Regression Model	The most widely used trip generation technique. Used mostly by scheduled airlines in route planning.
Cross Classification Technique	Computer programs exist. The model cross-classifies people (usually according to income, education, and occupation), and calculates a percentage used to determine usage.
Trip Distribution	
Growth Factor Distribution Models —Uniform factor —Average factor —Detroit —Fratar	Simple to use. None of the models relate demand to explanatory factors. These models, however, have been widely used only because of their simplicity.
Gravity Model	Used widely by scheduled airlines for planning new flights.

(8) Related business development
   (a) Development of industry near general aviation airports (factories and plants)
   (b) Development of geographically isolated areas (mining, oil, timber)

(9) Incentive to foreign businesses who then emulate, interact with, and stimulate United States business, including their second order effect in generating facilities and services.

(10) National prestige (growing fleets of aircraft in under-developed countries).

(11) Social cohesion and unity through increased avenues of personal contact and communication.

(12) Political benefits derived from the positive influences of relative stability and growth in income and employment, and foreign trade impact. [51]

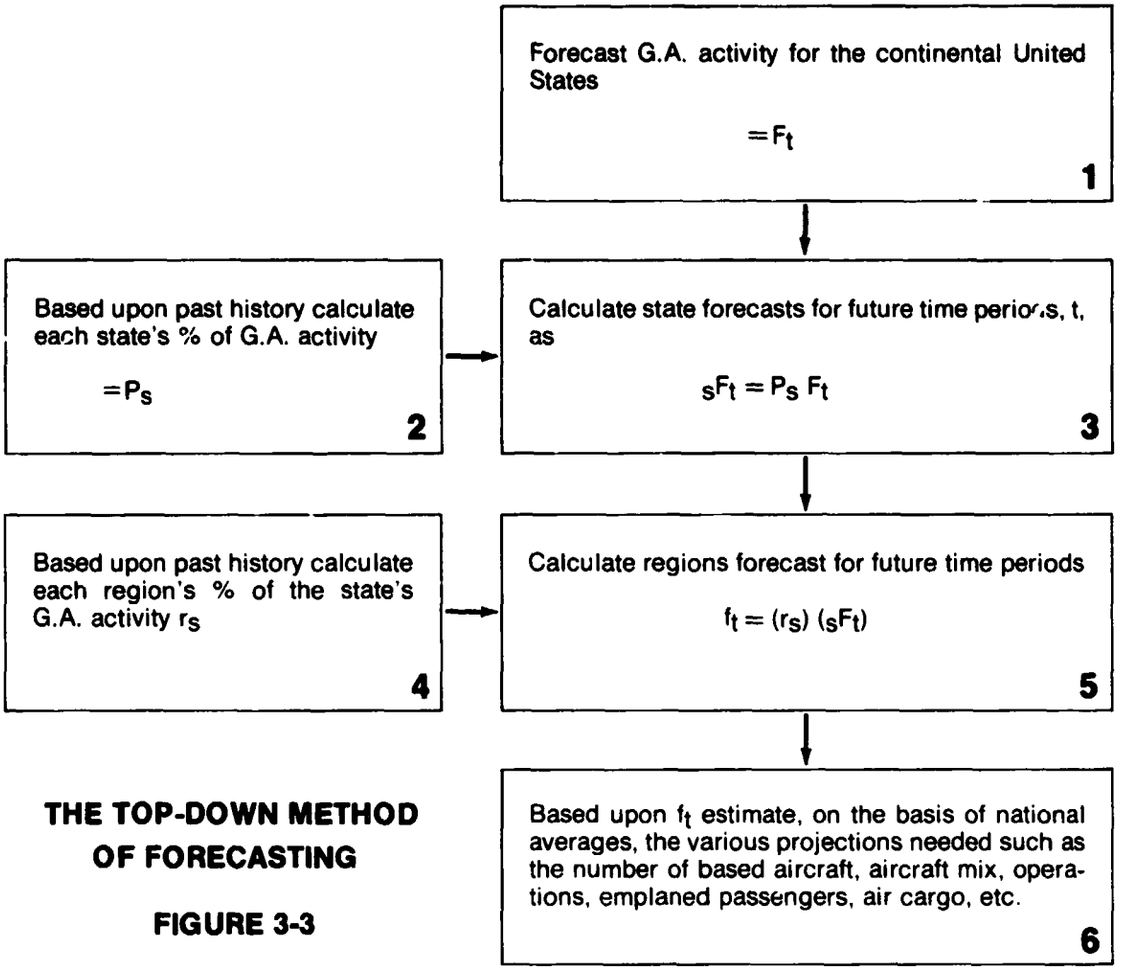
[51] R Dixon Speas Associates. *The Magnitude and Economic Impact of General Aviation, 1968-1980*, (Manhasset, New York Aero House, 1970), pp 141-142

The benefits of general aviation cited above only become meaningful once they are interpreted in terms of the specific benefits various local community people think are to be derived from this activity. These benefits are dependent upon the goals a community seeks to achieve.

The questions of intangibles—community goals and community support—have been dealt with first because they are the most difficult to think about. The question of expected usage of general aviation services—economic demand—is more straightforward.

Forecasting Demand

Economic demand forecasting is essential for the proper planning and evaluation of community alternatives. According to the FAA Advisory Circular AC 150/5070-6 on airport master plans, forecasts of usage are required in four of the five planning phases. Because of their importance, and because they have not been thoroughly analyzed, it is important first to discuss present approaches and techniques for estimating economic demand in a community planning context.



THE TOP-DOWN METHOD OF FORECASTING

FIGURE 3-3

Table III-I presents a general view of existing models applicable to forecasting demand for the services offered at an airport, along with comments on the model itself.

In application the most widely used procedures are the growth factor distribution models in a top-down fashion. Figure 3-3 charts this approach. The first box requires estimating general aviation activity for the United States as a whole. The measure used is usually the number of licensed aircraft or aircraft operations. A forecast of licensed aircraft (F_t) is obtained by regressing the number of aircraft against historical values of such independent variables as time, population, and per capita income, and forecasting the future value of these variables.

The second step is to estimate, on the basis of historical data, the share of a given state of the national general aviation acitvity (P_S). This share is then forecast into the future and adjusted for differences in growth patterns between those of the state in question and the nation as a whole. For example, if a state is expected to grow at a faster rate than the nation, the state will be projected to have a larger future share of the national fleet of licensed aircraft. It then becomes possible to calculate the projected licensed aircraft in the state ($_sF_t$) as the product of the future national forecast and the future expected share for the state.

For each subregion within the state, the same type of calculation can be made, by again adjusting for differential growth rates among regions. This yields the local forecast of licensed aircraft.

On the basis of the total number of licensed local aircraft, the aircraft mix, the number of takeoffs and landing, or the number of

enplaned passengers, the last step is to estimate breakdowns for each category at some designated future date. Information can be obtained by using national averages for such values as the percentage of single engine aircraft or the number of operations performed by a certain type of licensed aircraft. By multiplying the projection of licensed aircraft by these average figures, forecasts of the expected numbers of single engine aircraft or operations to be performed on an airport can be estimated.

The procedure described here (and used in the Virginia Air Transportation System Study) potentially can lead to inaccurate projections for several reasons. First, since the number of operations is estimated on the basis of forecasts of the number of based aircraft at an airport, an error in forecasting the number of based aircraft would be compounded in the operations subsequently forecast.

Second, forecasts of operations depend critically on the base-year level of operations assumed for each airport. At non-tower airports the current estimated level of operations could be grossly in error. Some method needs to be used to determine accurately the number of operations at these airports (perhaps through actual counts).

Third, present forecasts are often conducted using data obtained prior to the occurrence of the energy cirsis and the current economic recession. Forecasts made using these data should be adjusted accordingly.

Forecasting for Community Planning

In its analysis for the need of general aviation services, a community initially must forecast the future use of such services and the returns that it can expect from the provision of these services. In determining needs, the community must review the total list of service options discussed previously, in order to determine those which it might demand. The different categories of services for which a demand assessment will be needed are:

A. Transportation
   1. People
      a. Business
      b. Personal
   2. Cargo (mail)

B. Industrial Aid
   1. Primary
   2. Service
   3. Manufacturing

C. Special Community Services
   1. Emergency
   2. Law enforcement
   3. Environmental management

D. Recreational
   1. Flying
   2. Other

E. Based Aircraft

These categories are discussed in detail in a later section of this chapter. They will be briefly reviewed here. Transportation includes the itinerant carriage of people or cargo by commercial air carrier, air taxi, air freight, or business aircraft. Recreational service is basically local, but includes private flying to another point as well. Aircraft are used as industrial aids and for special community services. The former includes crop dusting and utility inspection, etc., while the latter covers such areas as traffic control, fire-spotting, and air ambulance. The number of based aircraft will provide some estimate of the income to an airport.

Formal forecasts can be done only for the transportation, based aircraft, and recreational categories. The need for the services available in the industrial and community services categories is highly dependent on the nature of the community and its goals.

To project the economic demand for the services listed above, it is necessary to develop a profile of the community involved in terms of its socio-economic and environmental characteristics. This profile is composed of the following sets of data:

A. Demographic
   1. Population
   2. Density
   3. Age distribution
   4. Rate of change of population

B. Economic
   1. Income
      a. Average disposable per capita income
      b. Family income
      c. Distribution
   2. Employment
      a. Primary
      b. Service
      c. Manufacturing
   3. Assessed valuation

C. Social
   1. Educational level
   2. Number of pilots and other personnel
   3. Availability of emergency service

D. Environmental
   1. Isolation index
   2. Community of interest index

It then becomes possible to develop regression models which give the number of expected passenger trips, tons of cargo, number of recreational and instructional operations, or the number of based aircraft as functions of such variables as community population, average disposable per capita income, percent employed in certain types of industries, and level of educational attainment. It also becomes possible to estimate the number of instrument landing, maintenance needs, aircraft operations, and fuel sales, on the basis of the estimates of demand obtained above.

For example, Table III-II provides a way to obtain an approximate number of based aircraft from the average household income and the size of the population. The table gives a Based Aircraft Factor according to the Average Income of the community. To obtain the expected number of based aircraft, the Based Aircraft Factor must be multiplied by the Community Size Factor which is the population of the community divided by 10,000 and raised to the 0.71 power:

$$\text{Expected Based Aircraft} = \text{Based Aircraft Factor} \left(\frac{\text{Population}}{10{,}000}\right)^{0.71}$$

This equation will provide a rough estimate for any community. It is however least accurate for communities of less than 15,000 people

Another way of estimating the number of based aircraft uses the number of households in the community which have an annual income exceeding $15,000. Figure 3-4 is a scatter diagram of the relationship between the number of such households (which is easily obtainable from 1970 Census information) and the number of based aircraft for communities in Virginia. Each point in Figure 3-4 represents a community with an airport. ("Community" includes counties and independent cities.) The data show a positive relationship between the number of families with income in excess of $15,000 and the number of based general aviation aircraft.

In addition, the user costs of aircraft are also related positively to the number of families with incomes over $15,000, as shown in the scatter diagram, Figure 3-5, also for Virginia. User costs cover the total annual costs of aircraft ownership in the community, and are reflective of the maintenance, repair, and operating costs of these vehicles. These costs are also indicative of the volume of business and the direct economic impact that general aviation can have on communities with different income distribution characteristics. The trends demonstrated in Figures 3-4 and 3-5 have an upper limit, which is probably due to the capacity limitation of the general aviation airports.

Virginia, however, is no more typical of the nation than many other states. The fifty states were tabulated according to population, area, per capita income, and degree of urbanization. To measure probable economic impact, a unit known as the Equivalent Single-Engine Airplane (ESEA) was used. Two-engined piston, turboprop, and turbojet aircraft were assigned ESEA weights according to their relative capital cost, operating costs, hours of operation, and fuel consumption (Table III-III). By using these equivalents, a more accurate estimate of the economic impact of aircraft on an area can be obtained. The annual cost (taken as the varia-

TABLE III-II

THE BASED AIRCRAFT FACTOR

Average Annual Household Income ($)	Based Aircraft Factor
8,000	9
10,000	12
12,000	15
15,000	20
17,000	24
20,000	30

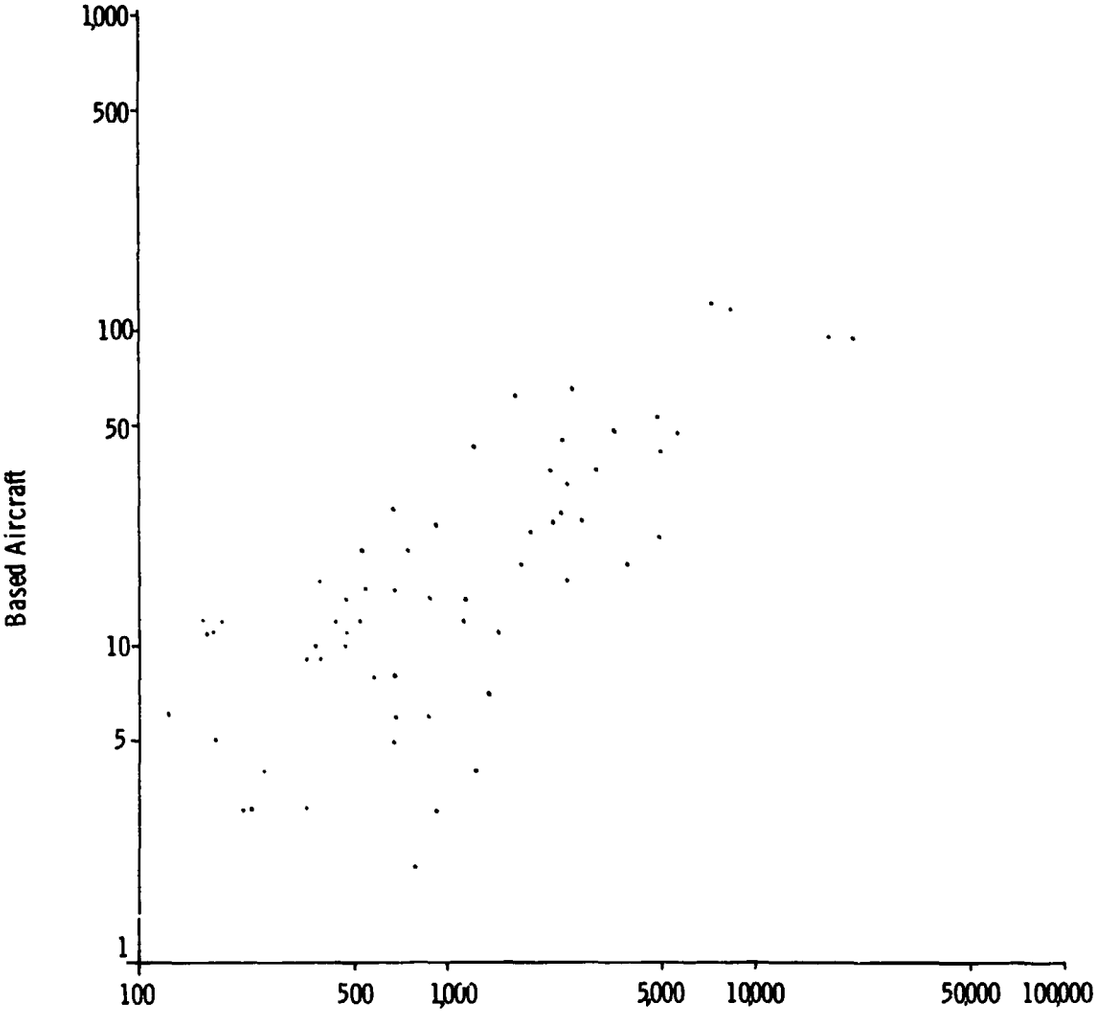
Source: Based on equation obtained from Virginia Air Transportation System Study, Final Draft, June 1975.

ble cost plus 20 percent of the capital costs) of one ESEA is approximately $5,300 (in 1971). Table III-IV shows the relevant figures for the fifty states, grouped by region. None of the variables reflect the degree of aviation activity with any degree of consistency. Rather, it appears that the degree of activity as reflected economically is a complex function of a large number of variables. However, several trends do emerge.

First, aviation activity rises as population and population density decrease. However, population densities are found in less urbanized states which have larger distances between population centers. This places a premium on rapid transportation over long distances. Thus, in general the demand for aviation services increases from east to west.

Second, regions seem to be statistically similar. For instance, the Eastern states are similar to each other but different from the states in the Great Lakes region. The Great Lakes states are, however, similar to each other.

Third, aberrant cases can be spotted on a regional basis. For instance, in the relatively low activity rate associated with the Eastern



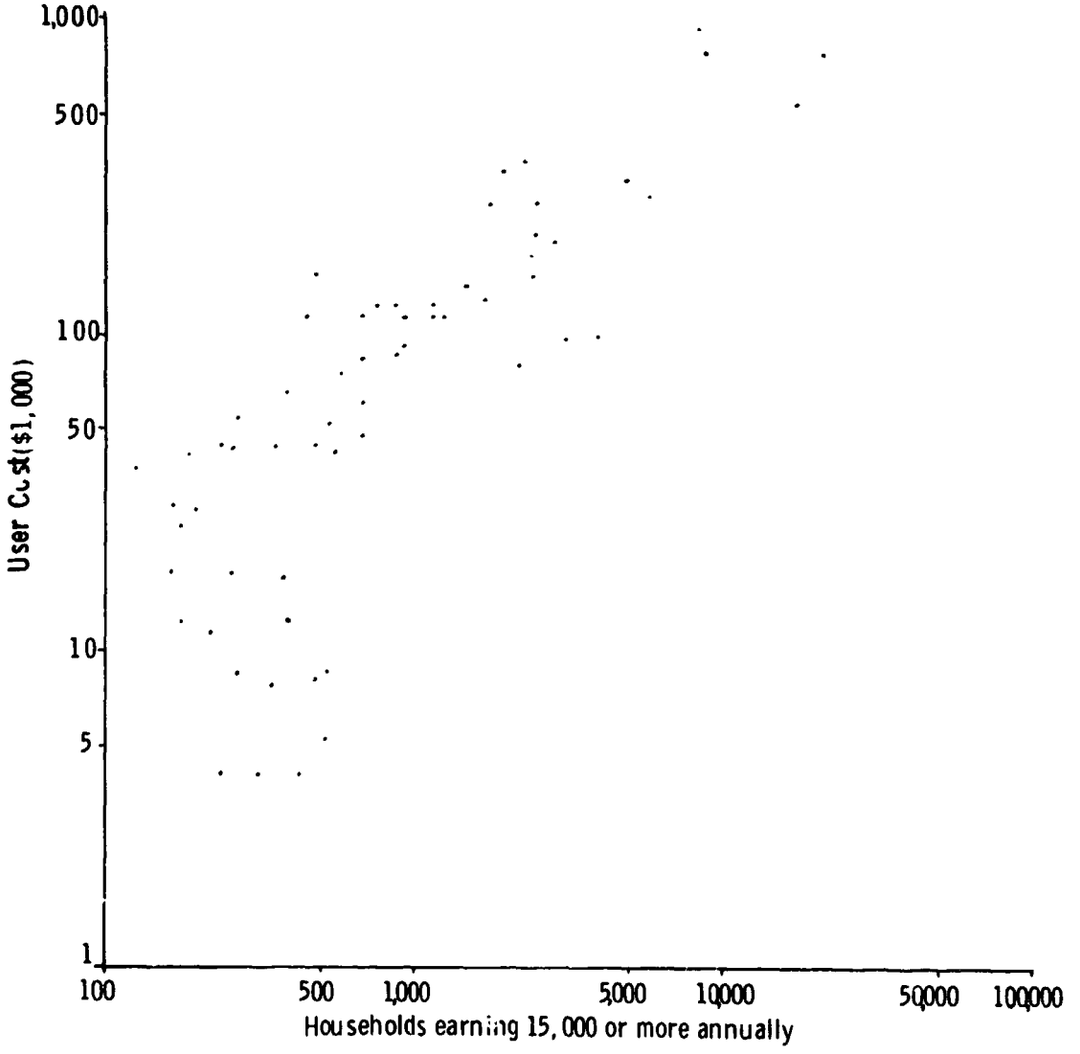
BASED AIRCRAFT VS. NUMBER OF HOUSEHOLDS WITH INCOME OVER $15,000/YEAR FOR VIRGINIA AIRPORTS

FIGURE 3-4

TABLE III-III

EQUIVALENT SINGLE-ENGINE AIRPLANE WEIGHTS

Type of Aircraft	ESEA Weights
Single engine piston	1
Multi-engine piston	5
Turboprop	25
Turbojet	50



USER COSTS VS. NUMBER OF HOUSEHOLDS WITH INCOME GREATER THAN $15,000/YEAR FOR VIRGINIA AIRPORTS

FIGURE 3-5

TABLE III-IV

AVIATION ACTIVITY VARIABLES

FAA Region	State	Population (millions)	Area (1,000 sq. mi.)	Pop. Density	A/C	Per Capita Income	% Urban	ESEA	ESEA per 1,000 Population
Alaska	Alaska	0.3	586	0.5	3,268	3,725	48.4	4,295	14.32
Central	Iowa	2 83	56.3	50.5	2,884	2,884	57 2	5,224	1.85
	Kansas	2.95	82.3	27.5	3,070	2,929	66 1	6,232	2.77
	Missouri	4 69	69 7	67.8	3,313	2,952	70.1	6,036	1.39
	Nebraska	1 49	77.2	19.4	1,826	2,797	61.6	3,728	2.50
Eastern	Delaware	0 55	2.06	277	446	3,265	72.2	2,165	3,94
	Maryland	3.94	10 6	397	2,163	3,512	76.6	4,189	1.06
	New Jersey	7 19	7.84	953	3,403	3,674	88 9	8,417	1.17
	New York	18 3	49.6	381	5,621	3,608	85.6	13,162	0.72
	Pennsylvania	11 8	45 3	262	5,045	3,066	71 5	12,327	1.04
	Virginia	4 66	40.8	177	2,228	2,996	63 1	4,871	1.05
	W. Virginia	1 75	24.2	72 5	846	2,333	39 0	2,014	1.15
Great Lakes	Illinois	11 1	56.4	144	6,326	3,495	83.0	13,565	1.22
	Indiana	5 2	36 3	144	3,677	3,070	64.9	2,163	1.38
	Michigan	8.89	58.2	156	6,077	3,357	73.8	12,361	1.39
	Minnesota	3 82	84.1	45 0	3,518	3,038	66.4	6,628	1 74
	Ohio	10 7	41 2	260.0	6,586	3,199	75.3	15,976	1.49
	Wisconsin	4 43	56 2	81 1	2,921	3,032	65.9	6,245	1.41
New England	Connecticut	3.04	5.0	264	1,190	3,885	77.4	2,490	0.82
	Maine	1.00	33.2	32	821	2,548	50.8	1,218	1.22
	Massachusetts	5 71	8.26	227	2,268	3,408	84.6	3,834	0.67
	New Hampshire	0 74	9.30	81 7	699	2,985	56.4	1,239	1 67
	Rhode Island	0 96	1 21	903	240	3,121	87.1	363	0.33
	Vermont	0 45	9 61	47 9	331	2,772	32.2	575	1.28
Northwest	Idaho	0 72	83 6	8 6	1,390	2,644	54.1	2,269	3.15
	Oregon	2 10	97 0	21 7	2,953	3,148	67 1	4,870	2.32
	Washington	3 41	68.2	51 2	4,005	3,357	22.6	5,839	1.71

TABLE III-IV (Continued)

FAA Region	State	Population (millions)	Area (1,000 sq. mi.)	Pop. Density	A/C	Per Capita Income	% Urban	ESEA	ESEA per 1,000 Population
Pacific	Hawaii	0.77	6 45	119 6	277	3,373	83.1	552	0.72
Rocky Mountain	Colorado	2 22	104	21 3	2,682	3,106	78.5	5,193	2 34
	Montana	0.70	147	9.8	1,449	2,696	53.4	2,243	3.20
	N.Dakota	0.62	70.6	8.9	1,117	2,469	44.3	1,420	2.37
	S.Dakota	0 67	77 0	8 8	1,009	2,387	44 6	1,325	1.98
	Utah	1 07	84 9	12.9	970	2,697	80.4	1,565	1.46
	Wyoming	0 33	97 4	3 4	670	2,895	60 5	1,373	4.16
Southern	Alabama	3 45	51 6	67 9	2,572	2,317	58.4	5,419	1.57
	Florida	6 85	58 6	126	2,241	3,058	80 5	16,596	2.42
	Georgia	4 61	58 9	79 0	3,256	2,640	60 3	7,125	1.56
	Kentucky	3 23	40 4	81 2	1,241	2,425	54.6	2,799	0.87
	Mississippi	2 22	42 7	46.9	1,691	1,925	44.5	2,968	1.34
	North Carolina	5 10	52 6	104	3,186	2,474	45.0	6,869	1.35
	South Carolina	2 60	31 1	85 7	1,379	2,303	47 6	3,043	1.17
	Tennessee	3 94	42 2	94 9	2,185	2,464	58.8	6,474	1.64
Southwest	Arkansas	1 95	53 1	37 0	1,935	2,142	50 0	4,511	2.31
	Louisiana	3 65	48 5	81 0	2,524	2,330	66.1	4,624	1.28
	New Mexico	1.02	122	8.4	1,376	2,437	69 8	2,360	2.31
	Oklahoma	2 57	69 9	37 2	3,713	2,694	68 0	8,010	3.12
	Texas	11 2	267	42 7	11,115	2,742	79.7	28,439	2.54
West	Arizona	1 79	114	15.6	3,081	2,937	79.6	5,254	2 94
	California	20.0	159	128	19,774	3,614	90.0	32,389	1.62
	Nevada	0 49	111	4.4	1,138	3,994	80.9	2 335	4 77

Sources: Compiled from General Aviation Manufacturers Association, *Statistical Data*, 1973; ***McNally Road Atlas*** (United States, Canada, Mexico), Rand McNally & Co., 1974; *U.S. Fact Book*, 95th Annual Edition, Grosset & Dunlap, 1975; *U.S. Statistical Abstract*, Bureau of the Census, 1975.

region, Delaware shows a high rate of activity. This is probably attributable to the fact that Delaware's corporation laws encourage many corporations to be chartered in that state, thereby increasing the degree of business aviation. Again, Nevada shows a relatively high rate of activity, probably because of the Las Vegas air fleet which ferries in people for entertainment. Even more variation could be expected on the local level, where countervailing factors will be less likely to average out.

While estimates of local general aviation service demand are necessarily inexact, they are needed in order to provide some guidance to the decision-maker. If the community is sufficiently distant from a large hub, it may provide enough traffic to interest a third-level (commuter) airline or perhaps only an air-taxi. The foregoing tables and figures may help project the number of based aircraft. Local conditions will indicate the demand for industrial aids or special community services.

THE PLANNING PROCESS

Once it has been determined that the community has a need for better access to general aviation services, the planning process has begun. This, however, does not necessarily indicate a commitment to positive action. The decision that a community has a need for general aviation services may have to be revised in the light of such factors as cost; economic, social, and environmental impacts; or, unexpected projections of use or development. Planners and decision-makers must bear in mind that (1) there are many "needs" which are not "musts," and that (2) the conclusion that action is unwarranted may in itself be a benefit to the community.

The planning process takes into account all the factors which went into the initial decision as well as a host of other factors which could include (1) the economic and fiscal capabilities of the community, (2) general aviation service options open to it, (3) alternative modes of satisfying community needs, and (4) future developments affecting the general aviation system, its environment, and the community.

This stage in the decision-making process is illustrated in Figure 3-6. The information on the left-hand side of the figure is collected and fed into the decision box labeled "impacts or actions." This box represents the process of planning to satisfy whatever needs have been established in the preliminary analysis. The plan which is developed can be the basis for either action or a subsequent impact analysis and evaluation study. If the plan is to do nothing or to implement marginal changes in the system, then it is possible that action could be taken without an impact analysis. If, on the other hand, an action or project of some significance is proposed, the impact of the project must be analyzed and evaluated to determine if revisions to the plan need to be made.

The following sections describe the four additional factors listed above, as well as the method of incorporating them in the development of a plan.

Economic/Fiscal Capabilities

The ability of a community to finance, maintain, and operate general aviation services depends on its sources of funds, its choice of funds, its choice of service and facility options, and the costs and revenues associated with those services and facilities.

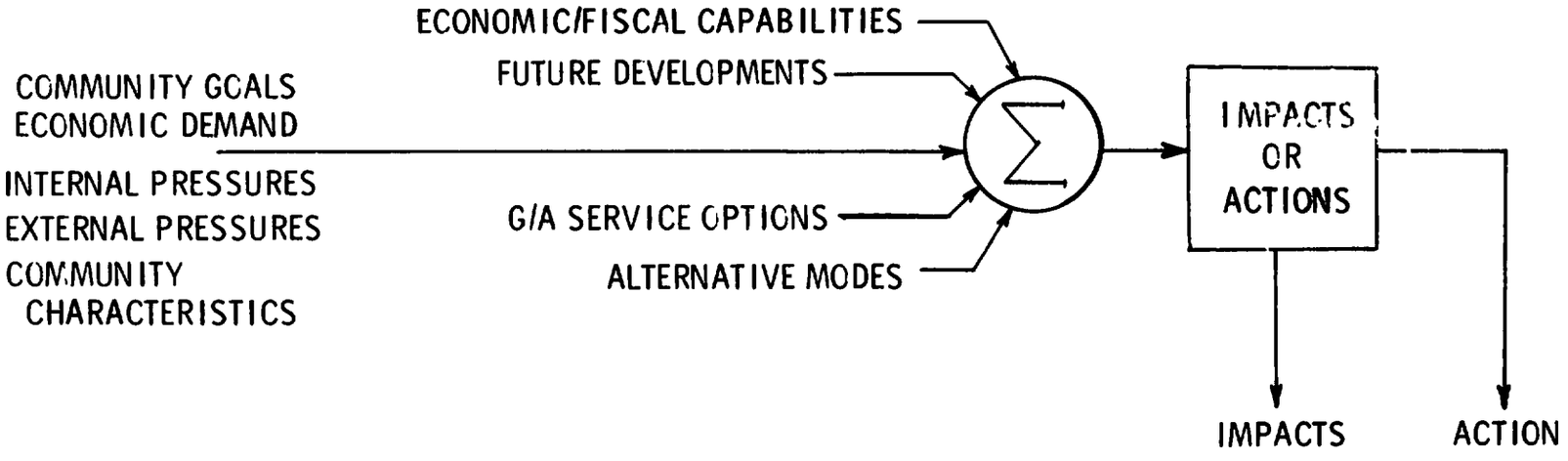
Sources of Funds

Funds for airport construction are available from federal and state sources as discussed in Chapter II. Decision-makers will have to obtain current information about these sources since the Airport and Airway Development Act expired in June 1975 and has not yet been replaced and since state policies may undergo similar revision. Local financial support through general obligation, revenue, and special purpose bonds was also discussed in Chapter II. Other local support is sometimes available in the form of individual and corporate donations. Ohio's county airport system was developed in several instances through donations. Sometimes land-owners donated a portion of their land to the community in hopes of increasing the value of the remainder. Mining companies donated strip mined acreage which was no longer of value to them. Local unions or corporations contributed labor or the use of construction equipment for the construction of facilities.

If the alternative chosen does not involve the construction or improvement of an airport, other sources may have to be investigated. For example, if a road is built or improved to provide better access to an existing airport, federal or state highway funds may be obtained.

Alternatives

Communities considering the construction of an airport should investigate the costs of construction under FAA specifications as opposed to other specifications. Building to FAA specifications is often much more expensive since they were written primarily with the heavy

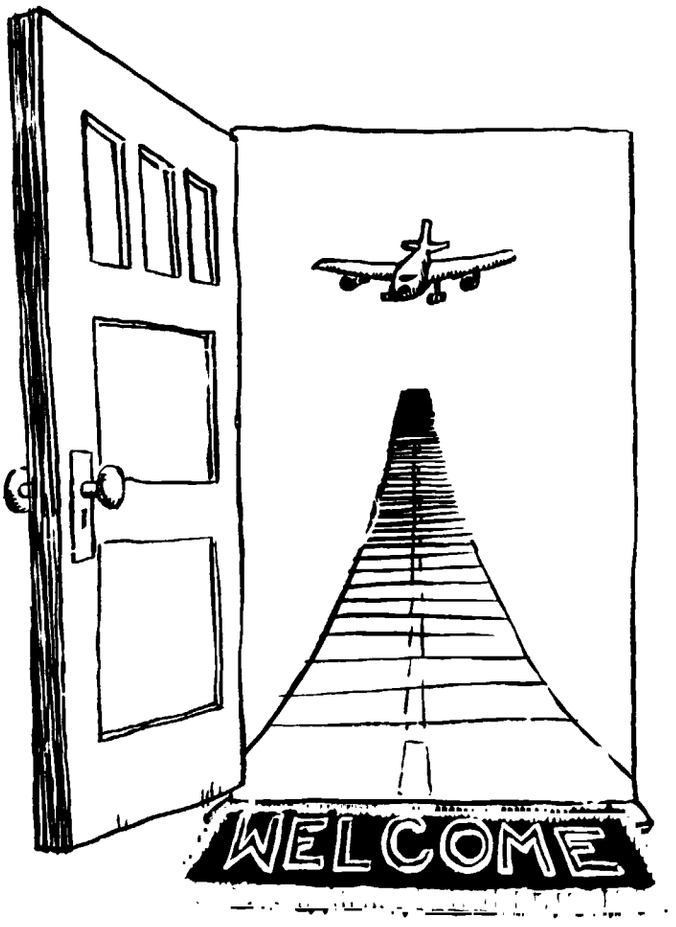


THE PLANNING PROCESS
FIGURE 3-6

air-carrier aircraft in mind. The State of Ohio avoided federal support for its county airport system and urged local communities to consider an airstrip for general aviation to be a road, 4,000 feet long and 75 feet wide, designed to bear a certain load under certain conditions. In the future it may be possible to secure federal funds without conforming to FAA construction requirements. This will depend on whether the final version of the legislation which replaces the Airport and Airway Development Act of 1970 1970 will allow the states more freedom in setting technical standards.

Better access to an existing airport may be secured, according to conditions, by the construction or improvement of highways or by the institution of scheduled or demand-activated ground transportation such as bus, limousine, or taxi service. A helicopter service may also be feasible for this purpose.

Alternatives to the use of air service may



THE FRONT DOOR TO YOUR COMMUNITY IS A HIGHWAY 4,000 FEET LONG AND 75 FEET WIDE

also be found in alternative modes of transportation and communication as discussed in Chapter II. If, for example, the community's main need is better medical service, it may be more feasible to hire a qualified nurse and establish a closed circuit television connection with an out-of-town doctor than to construct an airport for the purpose of flying a doctor to town, or the patient to the doctor.

Costs and Revenues

Alternative fiscal arrangements for airports are discussed in Chapter II, where it is noted that small general aviation airports usually lose money and require some sort of subsidy. J.A. Neiss stated that as the number of passengers at an airport decreases, the airport can be expected to show less profit; that "generally only those metropolitan general aviation airports with a large commercial/industrial revenue base which generate over 160,000 annual aircraft movements earn sufficient revenues to meet their operating expenses."[52]

Discussions with FBOs indicate that the largest, most stable revenue producers at an airport are line service (fuel, oil, and aircraft parking), hangar rental, and office space rental.

Operating revenues which an airport can expect to derive can be classified as airfield, hangar and buildings, non-aviation functions, terminal, and concessions. Each of these sources of revenue will be discussed below. In the airfield area, revenues can be derived from air carrier landing fees, landing fees for other aircraft, fuel and oil sales, airline catering fees, aircraft parking (overnight and long-term), and use fees for military reserves and air guards. Obviously, the revenues derived are very closely associated with the size of the airport.

Hangar and building area revenues are derived from hangar rental, office space rental to commercial and industrial concerns, rental of cargo and freight forwarding areas, rental of space to governmental agencies—such as the FAA or the National Weather Service—and the rental of facilities (hangars and offices) to FBOs. Frequently, the airport administration does not provide the buildings directly, but leases the land on a 25- to 30-year basis to an operating organization which will build the facilities; the ownership of the facilities will revert to the administration and will be rented back to the operator at the end of the lease period.

Non-aviation revenues can be derived from the sale or lease of property for industrial or commercial enterprises which desire access to an airport.

Most of the revenue derived from the terminal area comes from the airlines for their ticket counters, waiting rooms, and offices; and, from automobile parking. In addition, many other concessions tend to congregate about the terminal area. Among those are auto rental, restaurants, various shops, flight insurance, hotel or motel facilities, and advertising spaces.

Each of the revenue producing areas also has associated costs. In the airfield area, costs include the maintenance of the runways (resurfacing, regrooving, rubber removal, snow removal, etc.), replacement of runway lights, and mowing the grass. Hangar and building costs consist of the general upkeep of the buildings (roofs, doors—hangar doors can be especially troublesome). Facilities that are rented to FBOs are usually maintained by the FBO. In the terminal area, costs include those of security police (particularly if air carriers are using the facility), utilities, general upkeep of halls, corridors, main lobbies, rest rooms, and other unassigned spaces; concessions at an airport are usually expected to provide the upkeep of their own facilities with the exception of parking surfaces.

Future Developments

A consideration of future developments is central to any planning effort. These developments could be local, regional, or national in nature. They could also be social, economic, political, or technological. It is, of course, difficult to see very far or very clearly into the future but some projections must be made and considered by local planners. If, for example, there were a high probability that a cheap and efficient VTOL or STOL vehicle would be developed, future runways requirements for general aviation aircraft might well be very short and much less land would have to be acquired. Again, if it be likely that general aviation aircraft will become much more expensive to own and operate, projections of demand for facilities and services would have to be revised. On the local level, it may be possible to foresee the development of strong anti-airport sentiments among the citizens which would affect the siting or even the existence of an airport in future plans.

The conclusions reached below are of a tentative nature and are indicative only of the type of concerns which must be addressed regarding the future. Communities considering

[52] J. A. Neiss, *Economics of Airport System Planning* (New York: American Institute of Aeronautics and Astronautics, Inc., 1973)

the acquisition of general aviation services would be well advised to check the validity of what appears below, for unexpected developments may change the probabilities of important factors.

Population Dispersion

There has been considerable discussion of the desirability and feasibility of a national policy of population dispersion. If such a policy were to be adopted, the allocation of federal funds for the establishment of airports in designated regional growth centers or in exurban areas generally might well be increased.[53] Such an approach could change the present funding criteria for airport development, which is based on accommodating existing and projected aircraft ownership in an area, rather than guiding the location of aviation activity.

A policy of population dispersion has been suggested in view of the increasing metropolitan-area problems which are magnified by the rise in urban population on the national level. Proposed programs include such options as the encouragement of the location and relocation of jobs in non-metropolitan areas to draw people away from the cities and suburbs; the provision of economic support for the non-metropolitan population in order to stem the tide of migration from rural to urban areas; the creation of new small and medium-sized cities away from heavy concentrations of population; the revitalization of viable small towns; and the development of underdeveloped regions. The development of airports might play a role in many of these proposals in order to overcome the disadvantages of isolation and to make such areas and places more attractive to business.

Among the trends most frequently mentioned in support of such programs is the decentralization tendency of some sectors of the economy. For various reasons, many firms have located or relocated manufacturing plants away from central cities and even away from the suburbs. In larger companies, the tendency is to locate assembly plants in scattered locations while maintaining headquarters in urban centers near transportation, communication, and financial facilities. This trend is presently small, however, involving between 500 and 750 locations each year and is unlikely to accelerate or have much impact without the stimulus of a national policy.[54] Industries which relocate are those which can make use of the generally low-skilled labor available in non-urban areas. Such industries are typically those in their later stages of development because they have routinized procedures and automated production. Older industries tend to be slow-growth since ample time has passed for the market to become relatively saturated. Even if more of such industry relocated in the countryside, it will be unlikely to induce growth at rates equal to those found in metropolitan areas. In addition, the proportion of industry devoted to manufacturing has been undergoing a steady decline while service-oriented industry has dramatically increased to 62 percent of the non-agricultural jobs. Service-oriented firms are unlikely to locate away from population centers, since it is to their benefit to be very close to large markets.[55]

The creation of new towns and communities has definitely begun, but, again, the enterprise is presently of limited size. In 1970, the Department of Housing and Urban Development (HUD) compiled a list of large communities and new developments. While the list was not exhaustive, it was made as complete as possible. HUD located a total of 63 new communities which had been completed or begun between 1947 and 1969. The total projected population of these developments amounted to less than four million residents.[56] Other trends which are relatively small, but may become more important, are the use of small towns as places for retirement, due to the lower cost of living and slower pace of life; and the growth of leisure activities in the form of tourism and recreation.

The importance of these trends could be modified by a significant national policy aimed at redistributing metropolitan population or at least slowing the migration to metropolitan areas, but at present, population dispersion does not seem to be a clearly recognized goal.

---

[53] This concept is discussed in the following: Vary T. Coates, Technology Assessment Group, Program of Policy Studies in Science and Technology, the George Washington University, *Revitalization of Small Communities: Transportation Options* (Washington: Department of Transportation, May 1974). Joseph F. Vittek, Jr. (ed.), *Air Service to Small Communities: Directions for the Future, Final Report of the Workshop on Low/Medium Density Air Transportation*, (Cambridge: MIT Flight Transportation Laboratory, February, 1974), articles by Haren, Hansen, Rosenblatt, Chinitz, and Heady in Larry R. Whiting (ed.), *Rural Industrialization: Problems and Potentials*, (Ames, Iowa: Iowa State University Press, 1974). Richard J. Barber, *Report on National Transportation Policies*, (Washington: Aviation Advisory Commission, September 1971). Louis H. Mayo, The Program of Policy Studies in Science and Technology of the George Washington University, *Social Inpacts of Civil Aviation and Implications for R and D Policy*, (Washington: Department of Transportation, 1971). Jerome R. Pickard, "Is Dispersal the Answer to Urban Overgrowth," *Urban Land*, 29:3-12 (January 1970).

[54] Niles M. Hansen, "Factors Determining the Location of Industrial Activity," in *Whiting, op. cit.*, p. 42.

[55] *Ibid.*, pp. 28 and 35-42. Benjamin Chinitz, "Public Intervention and Guidance of Market Forces to Achieve Redistribution," in *Whiting, Ibid.*, p. 55.

[56] Pickard, *op. cit.*, pp. 11-12.

In 1970, President Nixon stated it as a goal in his State of the Union address, but as late as 1974 that goal had not been reaffirmed. There are, however, a host of programs to improve the quality of rural life, which may imply a national goal of increasing the relative attractiveness of rural areas, thereby decreasing the trend toward migration to rural areas and making it more possible for people to relocate in the exurban regions. Such programs include the Appalachian Program and the Rural Development Act of 1972.[57]

It is not clear, furthermore, whether population redistribution should be a national goal. The United States has a relatively homogeneous culture—metropolitan and non-metropolitan populations have much the same idea of the good life. Many of their goals relate better to urban living than to rural. At present the majority of the population seems to prefer urban life, but it is unclear how important economic factors are—especially the supply of jobs—in that preference. Various studies offer vastly different estimates of the number of people who would like to live in non-metropolitan areas if jobs were available.[58]

Without information about the true desires of the citizenry, one cannot assume that simple redistribution, without regard to the types of people likely to be redistributed, is a good thing; such a policy might simply accelerate the flight of those who are better-off from the centers of cities leaving others behind.

Finally, it is not clear that non-coercive policies could, in fact, reverse present migration trends

In sum, there seems to be a real possibility of a national policy to redistribute population, but such a policy has a low probability of being enacted in the near future. Consequently, planners should assume perhaps, that the federal government will give little support to exurban industrial relocation and no more support than is presently available to airport development.

Cost of Aircraft Ownership

There are several reasons to believe that the cost of aircraft ownership and operation will increase significantly in the near future. Such increased costs might tend to drive the private owner of smaller craft out of aviation and thus change the mix of aircraft in general aviation. This may have significant consequences for decision-makers.

The increased costs will be due primarily to the congestion of the airways and the expense of fuel. As was discussed in Chapter I, general aviation's use of airspace has been increasing steadily. Safety problems are posed by this increase as well as by conflicts which arise between general aviation on the one hand, and military and air carrier aircraft on the other, especially near air bases and hubs. The result of these problems has been an increase in the amount of avionics equipment required on aircraft and an increasing sophistication and cost of operation of the airways and air traffic control systems. At present, general aviation aircraft are excluded from some congested areas and airports unless they are equipped with certain avionics devices. Increasing demands for improved safety and the growing traffic at hubs are both likely to increase location in which planes are required to have more elaborate electronic capabilities. Inexpensive aircraft will become, therefore, less attractive, while better equipped and more useful aircraft become more costly.

Aircraft operating expenses will also increase as the cost of airways system operation increases. This cost is presently borne by taxes on aviation fuel and passengers. Such taxes may increase in the future and general aviation may be charged a larger share of the system operating cost.

Fuel costs are likely to increase also as all forms of energy become more expensive. While there are possibilities for the use of liquid hydrogen as an alternative to fossil fuels, at present this technology seems to be applicable only to larger aircraft. In addition, there seems to be little likelihood of a significant increase in fuel efficiency resulting from changes in design of smaller general aviation aircraft, although some increases are probable.

As general aviation becomes more expensive the private flier will find it less and less attractive. Therefore general aviation will be composed of a higher percentage of business aircraft; air taxi, commuter, and cargo services; as well as industrial aid and special community services. In addition, many smaller companies which might have used their own aircraft in the past will find it prohibitively expensive and may turn to commercial air services and to alternative modes of transportation and communication. Decision-makers should therefore be cautious in estimating the future economic demand for general aviation services, especially when their projections are based on the present number of aircraft owners or aircraft engines

[57] Vittek, *op cit*, p 31

[58] Vittek *Ibid*, pp 31 and 56 Coates, *op cit*, pp 8-9. Hansen, *op cit*, p 31

owned in the service area. It may be also true that airports of the future will be viable only if they can accommodate the larger types of aircraft used for business and commuter services.

State and Local Plans

Many states are presently developing state airport system plans and some are formulating intrastate commuter airline plans. Such plans may have important effects on the future of local communities and may indicate the future allocation of state funds.

Decisions affecting the future of the local community are made by many people and in many sectors. Decision-makers concerned with general aviation would do well to coordinate their plans with other planning efforts in their community and in neighboring areas, and to consider the variety of future options discussed in this chapter and procedures recommended in Chapter V of this report.

General Aviation Service Options

A community's utilization of general aviation services is derived from its socio-economic, geographic, and functional characteristics. An ocean-front community may require aerial fish spotting; one which grows or manufactures perishable goods may find its most important need for general aviation service to be air cargo service to remote markets; or, a community with strong ties to a metropolitan area 200 miles away might seek some form of public air transportation. Each of these communities will probably find that it has needs for services other than the primary ones described previously. While a single-purpose aviation facility might not be justifiable, a multi-purpose facility might be more viable, with decreasing marginal costs for improved utilization and community service.

General aviation services can be classified into three basic categories: (1) transportation, (2) industrial and community service, and (3) sports and recreational. These are described below.

Transportation

This category covers the movement of people and goods by commercial service. Passenger air transportation can be provided by (1) certificated air carriers, (2) commuter airlines, (3) air taxi operators, and (4) privately owned business and corporate aircraft.

The transportation of people and cargo by the certificated air carriers is not a part of general aviation by definition, and will not be discussed here in detail. The interface between the certificated air carriers and the other three means of transportation will be considered, however.

Determination of whether the certificated air carrier, the commuter airline, or the air taxi will be the primary option suited for a community depends largely on the population of the area being served and the area's industrial and service mix. Of all the airports served by certificated air-carriers, 25 handle approximately 70 percent of the total airline passenger traffic.[59] The certificated airlines primarily serve large hubs with a population of one million or more. An analysis of the commuter ("third level") air carriers shows that they serve both large hubs and smaller communities. They provide passenger and cargo feeder service from the small communities or to the large hubs, and frequently provide connecting flights.

Three hundred and fifty-five (355) towns and cities are served by commuter airlines in the United States.[60] A preliminary analysis of commuter airline services reached no firm conclusions about factors which would indicate the potential success in establishing such a service, but states having the best commuter service are in order, California, Kansas, Texas, Washington, and Hawaii, suggesting that commuter airlines provide more service in states where population centers are spread out. Geographic location and tourist attractions seem to be significant factors governing the number of departures per day for population centers of less than 2,500. In that category, Hawaii offers the best commuter and intrastate service and is second in the number of departures per day. Nevertheless, the degree of isolation of the population centers seems to be the major determinant of the existence of commuter services.

Air taxi operators fill a gap in public air travel by providing demand-activated air transportation By necessity, air taxi operations depend on both the population base, and the economic character of the community. Service-oriented communities tend to require more intercity and interstate travel and are inclined to support air transportation services. Many commuter airlines began as air taxis and have continued to provide both types of service. An air taxi operation is the least expensive of the listed air transportation methods and the easiest to establish under federal regulations

[59] Aviation Advisory Commission, *The Long Range Needs of Aviation, op cit*

[60] Listed in the *Official Airline Guide* of May 1975

Although air taxi operations are usually considered to be short-haul air transportation, some operate both nationally and internationally. Executive Jet Aviation which is based in Columbus, Ohio, for example, provides jet air taxi service from any point in the United States, to any airport in the world capable of accommodating its Learjets.

Business and corporate aviation includes trips performed in owned or leased aircraft which are operated by the business or corporation. This category covers 44 percent of all hours flown by general aviation aircraft.[61] If the business or corporation establishes a particular airport as its primary base of operation, the local community will derive significant revenue from tie-down or hangar fees, fuel and oil costs, and wages paid to mechanics and flight crews.

The potential for air-cargo is usually limited to high priority items and perishable goods which could not reach many of their markets without rapid transportation. "The reasons for the sudden interest in the cargo-transport capabilities of general aviation is, of course, the drastic deterioration of the postal services, coupled with the unacceptable increases in rates, and the increasingly frequent mishandling of air freight, which, unless personally brought to and picked up from the aircraft, may end up for days on some out-of-the-way loading dock, gathering dust."[62] Goods transported by air include such items as:

(1) high priority machine parts or materials which may be needed for full production capabilities;

(2) bank paper delivered to the Federal Reserve Banks in order to obtain maximum interest benefits;

(3) perishable cargoes of fruits, vegetables, flowers, and tropical fish;

(4) remains of deceased persons; and,

(5) mail and newspapers.

Industrial and Community Service

Service related functions performed by aircraft can be divided further into industrial aid services and special community services. Some of the possible industrial aid service related functions performed by aircraft are: agricultural seeding, spraying, and dusting; livestock management; fish stocking and spotting; utilities patrol; advertising, photography, mapping, surveying, and prospecting; construction, such as placement of utility poles by helicopters; and, carrying television cameras for aerial views of sports events.

Special community services aid the general community in health, safety, and public welfare. They are functions normally performed by local government organizations such as the police, fire department, or forest service. Among some of the functions performed by aircraft are: shark patrol, medical emergency services (air ambulance), disaster patrol (forest fires, floods), wildlife management, firefighting, meteorological observations and law enforcement (traffic patrol).

Industrial aids and special community services may not only bring in revenue after they arrive but also serve as justification for some public subsidy of the cost of providing the necessary facilities.

Sport and Recreational Flying

This category includes those operations which are performed primarily for pleasure, recreation, entertainment, or other non-commercial purposes. The majority of sports and recreational flying is performed by individuals who own airplanes or periodically rent an airplane from an FBO. It accounts for 28 percent of all general aviation transportation hours flown.[63] This type of flying contributes to airport financial support in the form of tie-down and hangar fees, fuel and oil sales, and periodic maintenance. Other types of aviation activities which are considered in this category include: sport flying, sailplaning, sky-diving, local area rides, and air shows.

Sport aviation refers to that segment of general aviation which designs and builds its own aircraft and is usually associated with the Experimental Aircraft Association (EAA), an international organization devoted to the purposes of sport aviation. Sailplaning depends largely on the type of airport facilities—primarily the runway landing area. An optimum landing area for sailplanes would be relatively wide so that the sailplane approach can be adjusted for its lack of power. The airport should not expect to derive tie-down and hangar revenues similar to those of powered craft since sailplanes are easily disassembled, loaded on trailers, and hauled away for storage. The main tie-down or hangar revenue would be derived from the tow-plane. Special considerations

[61] Aviation Advisory Commission, *General Aviation* (Washington, D.C. Aviation Advisory Commission, January 1, 1973), p. C-55.

[62] Paul Garrison, "Keep on Haulin'," *Air Progress Magazine*, July, 1975, p. 35.

[63] Aviation Advisory Commission, *General Aviation*, January 1, 1973, p. C-56.

should be given to try separate airplane and sailplane traffic patterns whenever possible.

Sky-diving, or parachuting, contributes to the direct support of an airport through tie-down or hangar fees paid by airplanes which are used to carry the parachutists to their "jump" altitude. As with sailplaning, one aircraft can handle several participants and therefore is not considered a large potential source of revenue.

Air shows usually are offered at airports at the rate of no more than one per year, if at all. Direct revenues to the airport operator are minimal, but such shows improve the public image of the airport and contribute to community support of airport operating costs.

Ground Services

The direct aviation services described above are usually accompanied by secondary services in the form of ground support aircraft operations, including aircraft maintenance, repair, and fueling, and flight instruction and aircraft rental. Each FAA certificated aircraft is required by law to have **at least** one major inspection annually, performed by an FAA licensed airframe and powerplant mechanic. The availability of a licensed mechanic at an airport affects the number of airplanes which will be based there permanently. Many aircraft owners will not base their aircraft at an airport lacking maintenance facilities. Conversely, the number of aircraft based at an airport will be the major determinant of whether or not that airport can support a full-time mechanic.

Estimates from several FBOs in Virginia indicate that costs of these annual inspections start at $200 for a small four-place, single-engine airplane and range upward depending on the complexity of the aircraft. About 50 such inspections are required each year in order to support the services of a full-time mechanic.

The availability of fuel and oil also contributes to the number of aircraft which will be based at an airport, and will definitely affect its amount of itinerant traffic.

In most cases, unless an aircraft is flown at least 240 hours per year it is more economical to rent an aircraft rather than own one.[64] Therefore, the rental of aircraft is a vital part of an airport operation. Rentals usually start at approximately $15 per flight hour for two-place, trainer-type aircraft and increase from there based on the size and complexity of the aircraft. Flying clubs are frequently established in order to reduce the cost of flying, but a person must fly approximately 100 hours per year in a flying club to justify his membership as more economical than renting an airplane.[65]

Closely associated with aircraft rental is flight instruction which requires the services of a licensed flight instructor and usually the rental of the aircraft in which he is instructing.

Additional revenue-producing services offered at an airport include the sale of parts and study materials, restaurant services, and ground transportation rental.

Because the dollar amount derived from the services discussed above is dependent upon the number of customers available in establishing an airport in a community, one should expect that a low scale initiation of services will be the most stable. This means that only limited services may be offered or that the personnel providing these services have a sufficiently broad background allowing them to perform a variety of duties.

Alternative Modes

Communities contemplating the acquisition of general aviation services should give serious thought to the modes of travel and communication which may be adequate substitutes for air services. Some services such as aerial photography cannot be obtained in any way other than flying; others, such as rapid transportation to a metropolitan area, can. Once the mix of services desired by the community has been determined, consideration should be given to possible substitutes for each service and to the necessity for the non-substitutable services. The decision as to whether or not another mode is an adequate sutstitute is dependent to a great degree on the characteristics of the local community

There is no need to repeat the discussion in Chapter II of rail, bus, truck, automobile, and telecommunications. It will be of some interest, however, to review the concepts used to evaluate the various modes and to relate those concepts to the local community.

The first concept is that of availability and accessibility. Aircraft almost always require that some mode of ground transportation be available. An airport must have an access road and a parking lot. Itinerant traffic will often require taxi or limousine service. Without scheduled service, the accessibility of the airways is limited to those having a pilot's license or to those who can afford to hire a plane and pilot. Highways are accessible to anyone with a

[64] Paul Garrison, T Taylor, V Fagan *Inside Private Aviation* (New York H&C Publishing Co , Inc , 1974), p 37

[65] *Ibid* , p 48

driver's license. But for that very reason they may not be accessible to the elderly, the young, the poor, or the handicapped who require some form of public transportation by air, rail, or highway.

A second concept of evaluation is reliability. All forms of transportation are generally mechanically reliable. Aircraft, however, are much more vulnerable to weather than the other modes. Localities with severe weather conditions may find a corresponding lack of reliability in air service. Under some conditions, however, air service may be more reliable than highway modes.

The third concept is adaptability to both load and terrain. General aviation is not as well adapted to bulk loads as are trucks or boxcars. Buses and cars suffer a similar limitation. Terrain, except the most rugged, poses little problem to aircraft, however.

Routing flexibility is the fourth concept. Except for rail (and water) transportation, most modes can reach most areas.

Fifth, the cost of using the various modes is also discussed in Chapter II. The importance of this factor depends on the socio-economic characteristics of the citizens of the community, some of whom could afford to use one mode but not another. Economics must also be considered in the light of the importance of time and comfort. Americans tend to consider the full-size automobile as a standard of comfort.

Developing The Plan

Introduction

So far this chapter has discussed the factors involved in deciding whether or not the community needs the services of general aviation and in formulating a plan to meet any such needs. That a plan is to be formulated implies that a preliminary decision has been made by the community that it needs the services being planned.

Such a preliminary decision is little more than an educated guess, especially since it is based on a subjective estimation of community goals which, typically are difficult to determine since they are rarely discussed. They exist more in behavior patterns and in basic assumptions than in words. A decision-maker is more likely to discover the goals which certain individuals or groups advocate for the community than those of the community as a whole.

The difficulty of discovering community goals is compounded by the lack of citizen response to less-than-concrete plans and to invitations to become involved in the early stages of the planning process. As plans become more concrete, citizens are more likely to respond, only to discover that their role is simply to applaud or oppose the developed plans but not to contribute to them. Consequently, community leaders must take steps to involve citizens in the formulation of plans as early as possible in the planning process. If done successfully, citizens will have an opportunity to articulate their goals and to incorporate them into the developing plans.

Such an effort runs contrary to an authoritarian leadership style in which a decision is made and then announced to the community. A democratic approach, seeking community input before the decision is reached is antithetical and seems to be slow, frustrating, and bogged down in endless discussion.

Leadership seeking community involvement enables the community to discover its goals during the process of planning; the "endless discussion" becomes a method of incorporating those goals. If, indeed, the discussion is endless, one could argue that the proposed public project is not consonant with community goals but stems, instead, from some special interest.

There are several benefits to community involvement. Once a plan is formulated, it is unlikely to be bogged down by unanticipated opposition, lawsuits, and action groups, because all interests have been consulted. The cooperation involved in formulating the plan will promote a sense of community pride and awareness. Furthermore, the goals discovered through such a process will provide guidelines for future planning efforts. One gains thoroughness of decision-making by sacrificing speed.

While the ideal of full citizen participation in planning may be unrealizable presently, it can be approximated by publicizing the planning process, soliciting comments, and holding well-announced public hearings before making decisions at crucial points in the planning process, as well as by conducting surveys to determine local preferences.

In addition to citizen participation, a second principle of planning is comprehensiveness. Satisfying the needs for general aviation services should be part of the overall community development effort.

Chapter I provides a useful outline of the many steps necessary in the planning process. The basic sequence in the planning development process will be discussed here. It consists of (1) describing alternative ways of satisfying estimated needs, (2) evaluating the alternatives