Chapter 1

THE AIRPORT SYSTEM

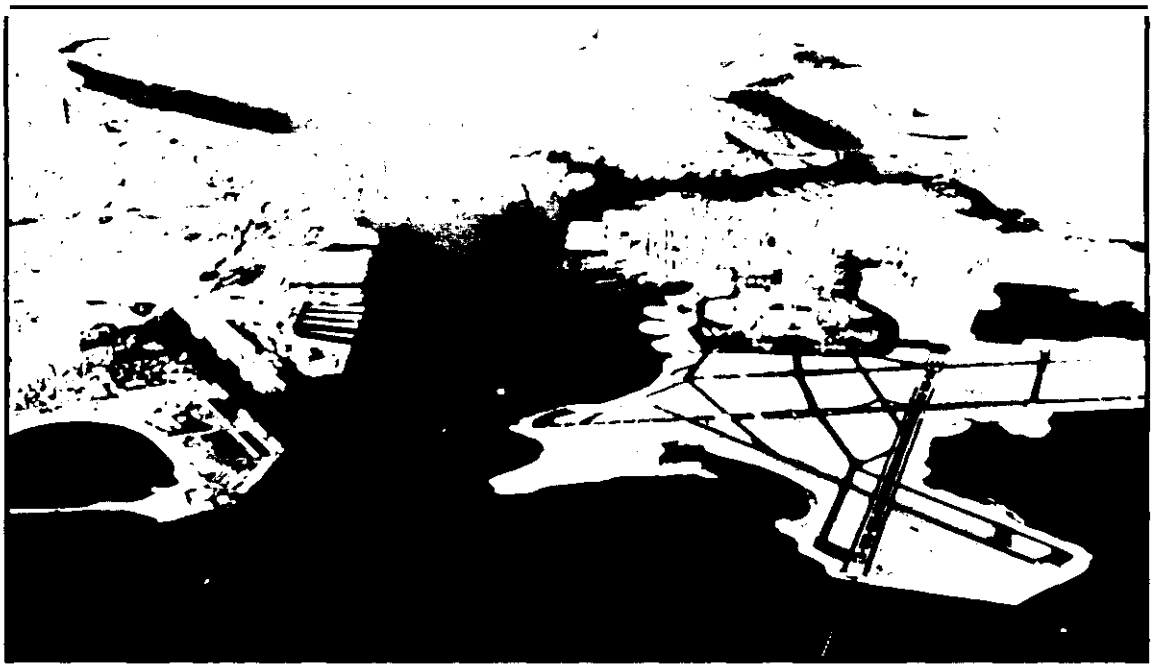

Photo credit: Dorn McGrath, Jr.

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THE AIRPORT SYSTEM

INTRODUCTION

The system of airports in the United States is the largest and most complex in the world. As of the end of 1982, there were 15,831 airports on record with the Federal Aviation Administration (FAA) -4,805 publicly owned airports, 1,970 privately owned fields open to public use, and 9,056 reserved for private use only. This constitutes almost half of the world's total. These airports range in size from small unpaved strips used by a handful of private flyers to gigantic air transportation hubs such as Chicago O'Hare and Atlanta Hartsfield, each handling more than 500,000 operations (takeoffs and landings) per year.

The number of airports alone, however, does not adequately reflect the extent and volume of aviation activity in this country in comparison with other parts of the world. The United States has half of the world's airports, but two-thirds of the world's 400 busiest airports (in terms of passenger enplanements). Collectively, U.S. airports handled over 309 million passenger enplanements (domestic and international) and 3.6 million tons of mail and cargo in 1982—over three-quarters of the world totals, outside the Soviet bloc. ' Table 1 presents additional data on the size of the U.S. airport and air transportation system.

Because of the sheer number of airports and the variety of size and function, the term "airport system" has little meaning when applied to all the airports and landing fields in the United States as a whole. Many—in fact, most—of these airports exist only for the convenience of a few aircraft owners and operators and play no substantial part in public air transportation. For this reason, FAA has identified a smaller group of airports that serve public air transportation either directly or indirectly and can be deemed of national importance and eligible for Federal aid.

Since *1970,* FAA has published a list of such airports, classified by size and function, in a planning document known as the National Airport System Plan (NASP). Under the Airport and Air-

Table 1 .—U.S. Airport and Air Transportation Activity, 1982

Aircraft facilities:[a]	
Airports	12,596
Heliports	2,712
STOLports	65
Seaplane bases	458
	15,831
Airport ownership and use:[a]	
Publicly owned	*4,805*
Private, open to public	1,970
Private	9,056
	15,831
Domestic passenger enplanements (millions):	
Air carrier:	
Domestic	272.8
International	19.7
Commuter	17.1
	309.6
Domestic revenue passenger miles (billions):	
Air carrier	*207.8*
Commuter	*2.3*
	210.1
Civil aircraft fleet:	
Air carrier[b]	4,074
General aviation	209,799
	213,873
Aircraft operations (millions):	
Air carrier	9.1
Commuter and air taxi	5.1
General aviation	34.1
Military	2.3
	50.6
Hours flown (millions):	
Air carrier	*6.7*
Commuter	1.7
General aviation	*36.4*
	44.8
Air cargo (million tons):[c]	
Mail	1.2
Freight	2.4
	3.6

[a] Excludes Puerto Rico, Virgin Islands, and Pacific Territories.
[b] Includes commuter, air taxi, air travel clubs, and all-cargo service.
[c] 1981 data.

SOURCE: Federal Aviation Administration and Civil Aeronautics Board data

'Airport Operators Council International, ***Worldwide Airport Traffic Report, Calendar Year*** **1982** (Washington, DC: AOC1, May 1983).

way Improvement Act of 1982 (Public Law 97-248), FAA was charged with preparing a new version of this plan, to be called the National Plan of Integrated Airport Systems (NPIAS), which is scheduled for issue in September 1984. As part of this planning effort, FAA has recently revised the method of classifying airports and now lists them in four major categories:[2]

1. Primary. -Public-use commercial service airports enplaning at least 0.01 percent of all passengers enplaned annually at U.S. airports.[3]
2. ***Commercial service.*** —Other public-use airports receiving scheduled passenger service and enplaning at least 2,500 passengers annually.
3. ***General aviation.*** —Those airports with fewer than 2,500 annual enplaned passengers and those used exclusively by private and business aircraft not providing common-carrier passenger service.
4. ***Reliever.—A*** subset of general aviation airports, which have the function of relieving congestion at primary commercial service airports and providing more access for general aviation to the overall community.

Table 2 lists the number of airports in each category as of the beginning of 1984 and those projected for inclusion in the NPIAS in 1994.[4]

Table 2.— Federal-Aid Airports by Service Level

Service level	Existing[a] (1984)	Projected[b] (1994)
Primary	281	284
Commercial service	279	346
General aviation	2,424	2,723
Reliever	219	286
Total	3,203	3,639

[a]As of February 1984.
[b]Very few of the projected additions will be new airports; most will be existing airports that qualify for Federal aid because of increased traffic volume.

SOURCE: Federal Aviation Administration.

Primary Airports

This category of airports, comprising 281 locations or less than 2 percent of all airports in the United States, handles virtually all of the airline passengers. Even within this small group, however, the range of airport size and activity level is very wide, and the distribution of passenger enplanements is highly skewed. About half of the primary airports (130) handle very little traffic, and collectively they account for only 3 percent of annual enplanements. At the larger primary airports, which handle the preponderance of passengers, there is a pattern of progressively higher concentration of traffic at fewer and fewer airports. For instance, the top 24 airports account for almost two-thirds of all enplanements, and the top 10 account for 40 percent. Perhaps the most telling fact is that one-quarter of all airline passengers board their flights at one of just five airports (Atlanta Hartsfield, Chicago O'Hare, New York Kennedy, Los Angeles, and Dallas-Fort Worth).[5]

Because several metropolitan areas are served by more than one primary airport, FAA measures aviation traffic by standard metropolitan statistical area (SMSA) as well as by individual airport. These metropolitan areas, called hubs by FAA, are divided into four classes according to percentage of total passenger enplanements: large, medium, small, and nonhub (table 3).

As with individual airports, the distribution of passenger enplanements is highly concentrated in a relatively few air traffic hubs. Figure 1 shows, for example, that 24 large hubs handle 70 percent of all traffic and, of these, the top 10 handle almost half.

Commercial Service Airports

Excluding primary airports, the remaining commercial service airports are typically small and located in communities with a population of under

[2]*First Annual Report of Accomplishments Under the Airport Improvement Plan, Fiscal Year 1982* (Washington, DC: Federal Aviation Administration, May 1983).

[3]In 1982, 0.01 percent was equivalent to about 31,000 enplaned passengers.

[4]Before 1983, FAA used a different classification scheme for larger airports, categorizing them according to the type of commercial service provided: air carriers and commuter airlines. The 1980 edition of the NASP listed 780 airports (635 air carrier and 145 commuter). The NPIAS classification reduces the total to 560 (281 primary and 279 commercial service), with the remaining very small commercial service airports (fewer than 2,500 annual enplanements) shifted to the general aviation category.

[5]Statistical ***Handbook of Aviation, Calendar Year 1982*** (Washington, DC: Federal Aviation Administration, December 1982).

Table 3.-FAA Classification of Air Traffic Hubs

Hub classification	Percent of total enplaned passengers	Number of hubs (1981)
Large	1,00 or more	24
Medium	0.25 to 0.99	39
Small	0.05 to 0.24	61
Nonhub	less than 0.05	425[a]

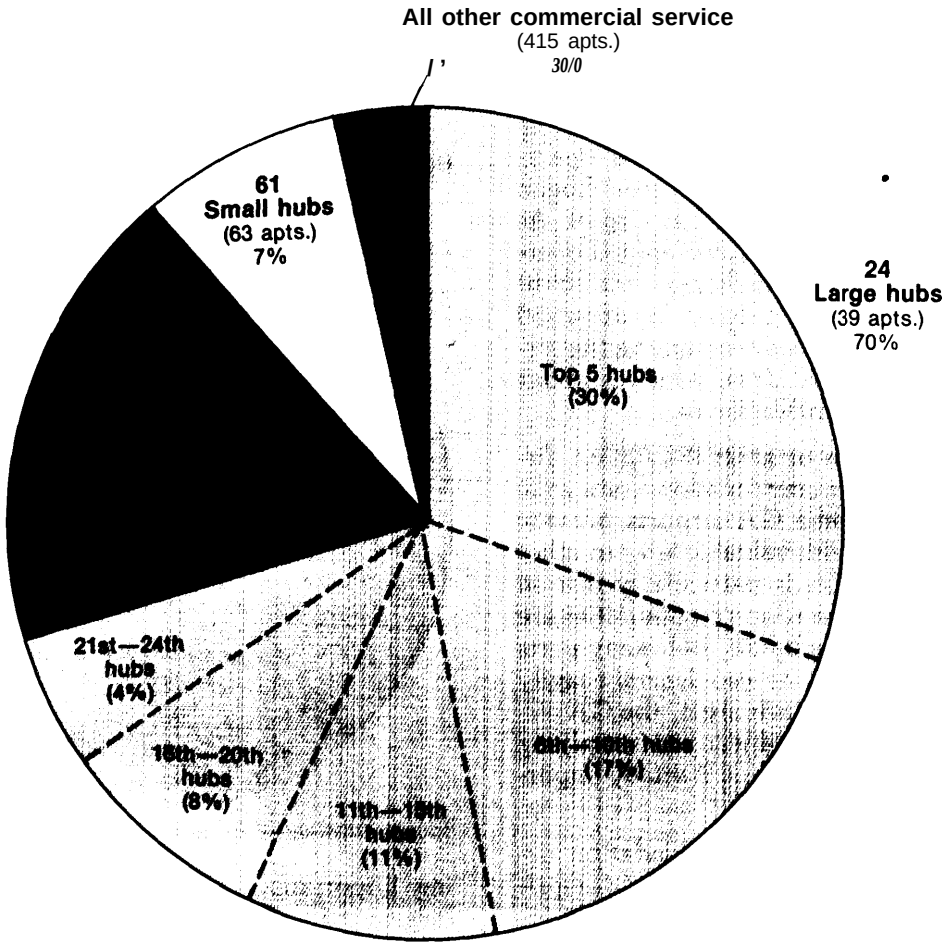
SOURCE: *Statistical Handbook of Aviation, Calendar Year 1982* (IVashington, DC Federal Aviation Administration, December 1982).

100,000. They handle a low volume of passenger traffic, 2,500 to 5,000 enplanements per year. Service is usually provided by commuter airlines, offering a few flights per day to nearby major hubs, and by air taxi operators. A large share of the activity at these airports is general aviation (GA), privately owned aircraft used for business and personal flying. The major concern of airports in this category is not adequate capacity but keeping the airport in operation so as to provide essential air service for the community and a base for general aviation.

General Aviation Airports

Over 90 percent of the airports available to the public are used exclusively by GA aircraft. General aviation is a broad and disparate category that includes aircraft used for business purposes, various types of aerial work, and flight instruc-

Figure I.—Distribution of Passenger Enplanements by Hub Size, 1982



SOURCE: *FAA Statistical Handbook of Aviation, Calendar Year 1982*

tion, as well as those used for purely personal and recreational purposes (see fig. 2). The types of aircraft operated cover a wide spectrum: small piston-engine aircraft, advanced turboprops and turbojets, rotorcraft, gliders, balloons, and dirigibles.

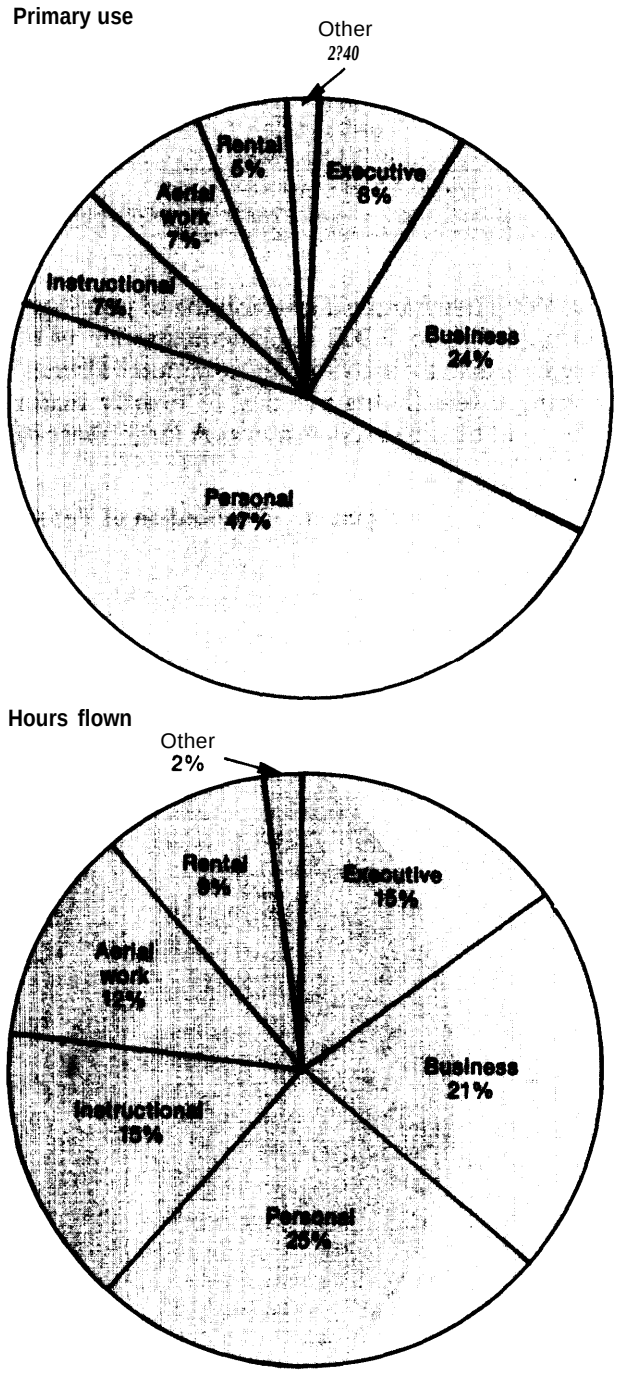
The airports serving general aviation are likewise varied. Typically, they are small, usually with a single runway and only minimal navigation aids. They serve primarily as a base for a few aircraft. There are notable exceptions, however. A few GA airports located in major metropolitan areas handle extremely high volumes of traffic (particularly business and executive aircraft) and are busier and more congested than all but the largest commercial airports. Table 4 lists the Nation's 10 busiest general aviation airports.

For comparison, the busiest GA airport, Van Nuys, CA, handled about 7 percent more operations in 1982 than Los Angeles International, the third-ranking air carrier airport in the United States (509,758 v. 478,892). Melbourne, FL, the 10th-ranking GA airport, had 229,138 operations—only slightly fewer than Boston Logan (244,748), the 10th-ranking air carrier airport. As additional perspective, the 301,363 annual operations at Tamiami Airport in Florida, the sixth-ranking GA airport, are equivalent to about so takeoffs or landings per hour (assuming the airport is open 16 hours per day), which is about the same as Washington National.

An important aspect of general aviation airports is that they serve many functions for a wide variety of aircraft. Some GA airports provide isolated communities with valuable links to other population centers. This is particularly true in areas of northern Alaska where communities are often unreachable except by air, but many parts of the Western United States also depend heavily on air transportation. In such areas, the GA airport is sometimes the only means of supplying communities with necessities and is vitally important in emergency situations.

The principal function of general aviation airports, however, is to provide facilities for privately owned aircraft used for business and personal activities. The role of GA airports in providing facilities for business aircraft is of growing importance. The business aircraft fleet is largely made up of twin-engine propeller or jet aircraft, typically equipped with sophisticated avionic devices comparable to those of commer-

Figure 2.- Profile of General Aviation Fleet, 1982



SOURCE: *FAA Statistical Handbook of Aviation, Calendar Year 1982.*

Table 4.—The 10 Most Active General Aviation Airports[a]

Airport	Annual operations
1. Van Nuys, CA	*590,758*
2. Long Beach, CA	*461,287*
3. Santa Ana, CA	*396,029*
4. Seattle-Boeing Field, WA.	*362,524*
5. Oakland, CA[b]	*334,557*
6. Tamiami, FL	*301,363*
7. Opa Locka, FL	*295,215*
8. San Jose, CA[b]	*264,936*
9. Pontiac, MI	*238,532*
10. Melbourne, FL[b]	*229,138*

[a]Ranked by number of operations (takeoffs and landings) by general aviation aircraft in 1982.
[b]Also receives commercial service; air carrier operations not included in total.

SOURCE: Airport Operators Council International, *Worldwide Airport Traffic Report, Calendar Year 1982* (Washington, DC: AOCI, May 1983).

cial airliners. General aviation airports serving business aviation play an important role by providing facilities comparable to those at major air carrier airports, thereby permitting diversion of some GA traffic from congested hubs.

Reliever Airports

Reliever airports are a special category of general aviation airports. They are located in the vicinity of major air carrier airports and are specifically designated by FAA as "general aviation type airports which provide relief to congested major airports. " To be classified by FAA as a reliever, an airport must handle 25,000 itinerant operations or 35,000 local operations annually, either at present or within the last 2 years. [b]The reliever airport must also be located in an SMSA with a population of at least 500,000 or where passenger enplanements reach at least 250,000 annually. As the name suggests, reliever airports are intended to draw traffic away from crowded air carrier airports by providing facilities of similar quality and convenience to those available at air carrier airports.

In recent years, FAA and Congress have encouraged development of reliever airports as a means of reducing delays at the larger hub airports. This is reflected in the Airport and Airway Improvement Act of 1982 (Public Law 97-248), which specifies that 10 percent of airport aid funds be used for development of reliever airports.

[b]Local operations are aircraft flights that originate and terminate at the same airport. An itinerant operation originates at one airport and terminates at another.

Photo credit" Federal Aviation Administration

Reliever airport for general aviation

THE AIRPORT CAPACITY PROBLEM

The term "capacity" refers to the overall ability of an airport to accommodate demand for service. Often, this is expressed as the number of aircraft operations (takeoffs and landings) that can be handled on an hourly, daily, or annual basis. In the broadest sense, however, aircraft operations are not the only aspect of demand that must be considered. This ability of the terminal building to handle passenger flow and the volume of vehicular traffic that can be accommodated on airport circulation and access roads are also important. For aircraft operations, this rate of service is determined by several factors—chiefly the layout of runways, taxiways, and aprons, the paths through the airspace leading to and from the airport, the rules and procedures for controlling air traffic, the conditions of wind and weather, and the mix of aircraft using the airport. Within the terminal building and on the landside approaches to the airport, the service rate (throughput) is similarly affected by the basic design of facilities and by the characteristics of passenger traffic (ratio of origin-destination passengers to transfers, mode of surface access, etc.). Restrictions of vehicle movement on access roads and at the curbside and bottlenecks at ticket counters, check-in points, baggage handling facilities, and gates all create passenger delay and impinge on the efficiency of airport operation. Since all of these factors vary over time at a given airport, capacity is not a single, fixed amount but an average figure that represents the typical rate at which demand can be accommodated.

Since demand for airport service is not uniform and constant but highly variable from time to time and place to place, the root of the airport capacity problem is how to handle fluctuations in demand without unacceptable delay. This is not a general systemwide problem, it occurs at only a few airports at periods of peak demand. Most airports, including many large and busy airports in major

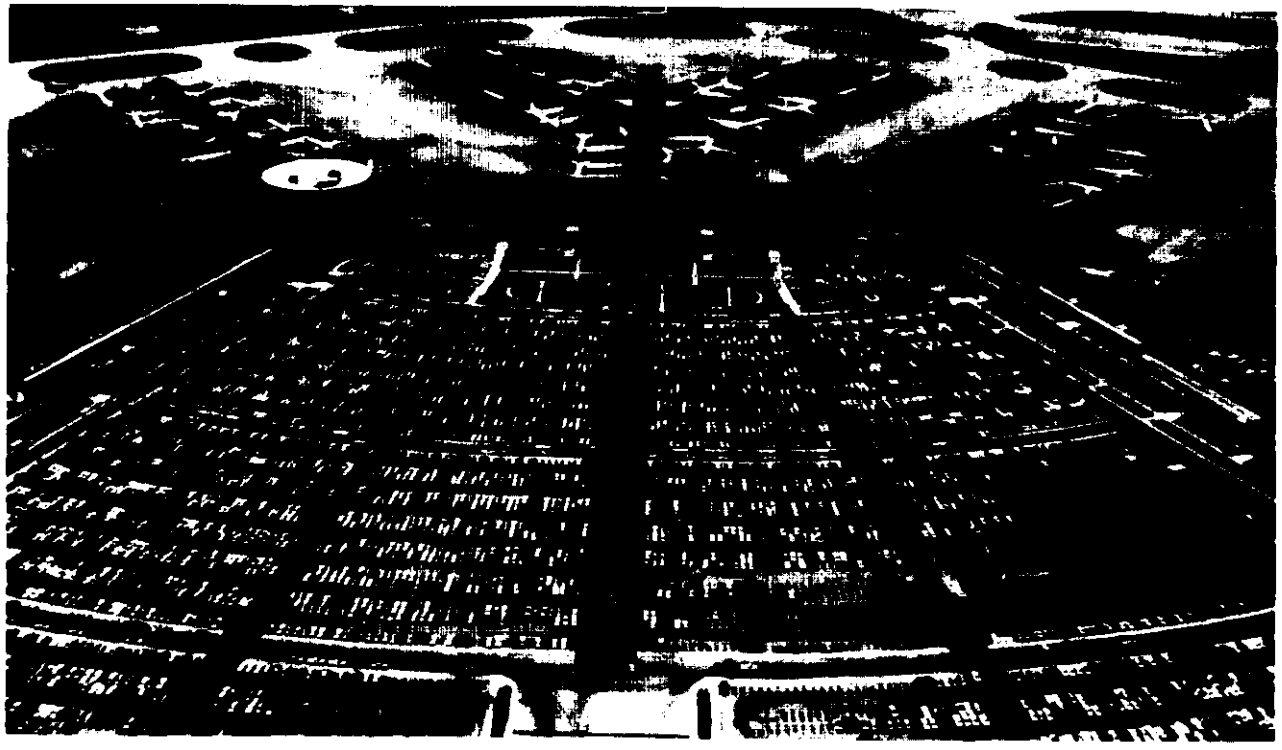


Photo credit' US. Department of Transportation

Airside and landside

metropolitan areas, have the capacity to handle present demand and projected growth for many years to come. Nor is the lack of capacity necessarily related to the size of the airport or the absolute volume of traffic. Some of the airports experiencing congestion and delay (or expected to in the future) are rather small, but they have high traffic density at certain times.

In general, however, delay tends to occur at those few airports serving the majority of airline passengers and so inconveniences a large number of travelers. Further, delay has a ripple effect throughout the system. Congestion at a few hub airports causes delay in connecting flights to and from other airports and, in the extreme, can affect the air traffic of a major region or the entire country.

FAA estimates that 14 airports (10 commercial and 4 general aviation) now experience significant problems of capacity and delay. If demand grows as FAA projects and if no remedial action is taken, the number of airports affected might reach 61 commercial airports—almost all large and many medium hubs—and 44 general aviation airports by the end of the century (see table 5).

The consequences of such congestion could be severe. Recent FAA estimates have placed the cost of delay for airlines in 1980 at $1.0 billion to $1.4 billion in extra crew time and wasted fuel, primarily the latter. This also represents an aggregate loss of 60 million hours of time for airline passengers.[7 8 9] If FAA's growth projections are realized, the delay costs to airlines could reach $2.7 billion by 1991 and perhaps twice that figure by 2000.

A number of alternatives have been suggested to alleviate airport capacity problems and to reduce delay. Very few of these solutions, however, are universally applicable, and none is a panacea. These alternatives can be divided into four categories. The first is to build new airports, although it is widely recognized that finding suitable large tracts of land and developing them as airport sites are becoming increasingly difficult. FAA has speculated that no more than one or two major air carrier airports will be built in the next decade. **10** A second alternative is to expand existing airport facilities. This has been done at several airports, but growing community resistance, particularly because of noise, may make expansion more difficult in the future. Application of new technology, however, has led to quieter aircraft that may make airport expansion less objectionable to those concerned about noise.

A third alternative is to make more efficient use of existing airport capacity. This includes improvements in technologies that would facilitate the movement of aircraft, both in the air and on the ground, and procedural changes such as reducing the longitudinal spacing between aircraft on final approach. A fourth alternative is to manage airport demand so that aircraft activity is more evenly distributed by time of day and among airports. The two most commonly mentioned demand-management techniques are economic measures, such as marginal-cost pricing, and regulatory actions, such as slot restrictions.

Because of the difficulties in building or expanding airports, there appears to be growing sentiment that other solutions should be explored. FAA has suggested that the "high capital costs and local resistance to large-scale airport construction in metropolitan areas-mandate that a critical need for additional capacity be evident before new major airport proposals are advanced.'"]

Table 5.—Airports Forecasted to Have Airside Congestion[a]

Commercial service	General aviation
1981	1981
Chicago O'Hare (IL)	Fort Worth Meachum (TX)
Denver Stapleton (CO)	Teterboro (NJ)
Detroit Metro (MI)	Van Nuys (CA)
Los Angeles International (CA)	By 1985
Philadelphia International (PA)	Baltimore Glenn L. Martin (MD)
San Francisco International (CA)	Farmingdale Republic (NY)
St. Louis Lambert (MO)	Kansas City Downtown (MO)
Washington National (DC)	Scottsdale Municipal (AZ)
By 1985	**By** 1990
Long Beach Dougherty (CA)	Anchorage Lake Hood (AK)
Santa Ana John Wayne (CA)	Everett Snohomish County (WA)
Palm Beach International (FL)	Houston Lakeside (TX)
By 1990	Killeen Municipal (TX)
Anchorage International (AK)	Manassas Municipal (VA)
Atlanta Hartsfield (GA)	Mesa Falon (AZ)
Baltimore-Washington International (MD)	Morristown Municipal (NJ)
Birmingham Municipal (AL)	Novato Gnoss (CA)
Boston Logan (MA)	Torrance Municipal (CA)
Dallas-Fort Worth (TX)	Vero Beach Municipal (FL)
Houston Hobby (TX)	**By** *2000*
Houston Intercontinental (TX)	Anchorage Merrill (AK)
Las Vegas McCarran (NV)	Aurora State (OR)
New York Kennedy (NY)	Beverly Municipal (MA)
New York La Guardia (NY)	Carlsbad Palomar (CA)
Prescott Municipal (AZ)	Chicago Palwaukee (IL)
Raleigh-Durham (NC)	Dallas Addison (TX)
By *2000*	Denver Arapahoe County (CO)
Burbank Glendale Pasadena (CA)	El Monte (CA)
Charlotte Douglas Municipal (NC)	Fort Lauderdale Executive (FL)
Eugene Mahlon-Sweet (OR)	Fullerton Municipal (CA)
Daytona Beach (FL)	Goodyear Phoenix-Litchfield (AZ)
Greensboro High Point-Winston-Salem (NC)	Greeley Weld County Municipal (CO)
Indianapolis International (IN)	Hayward Air Terminal (CA)
Lafayette Regional (LA)	Hartford Brainard (CT)
Memphis International (TN)	Hillsboro-Portland (OR)
Norfolk International (VA)	Houma Terrebonne (LA)
Oakland Metropolitan (CA)	Livermore Municipal (CA)
Orlando International (FL)	Miami New Tamiami (FL)
Oxnard (CA)	Minneapolis Crystal (MN)
Phoenix Sky Harbor (AZ)	New Orleans Lakefront (LA)
Providence T. F. Green (RI)	Norwood Memorial (MA)
Reno Cannon International (NV)	Palo Alto (CA)
San Antonio International (TX)	Philadelphia North (PA)
San Diego Lindbergh (CA)	Phoenix Deer Valley Municipal (AZ)
San Jose Municipal (CA)	Riverside Municipal (CA)
Sarasota Bradenton (FL)	San Carlos (CA)
Tucson International (AZ)	Santa Rosa Sonora County (CA)
White Plains Westchester County (NY)	Seattle King County (WA)
	Waukegan Memorial (IL)

[a]FAA considers an airport to be congested when traffic reaches 160 percent of Practical Annual Capacity or when significant constraints are expected because of physical limitations on airport use.

SOURCE: Federal Aviation Administration.

ORIGIN OF THE STUDY

Concern about the future adequacy of the airport system and possible strategies that might be adopted to deal with capacity and delay problems led the House Public Works and Transportation Committee to request that OTA assess future airport capacity and its implications in terms of public policy. The committee asked that four major subjects be examined in the study:

1. the present and future extent of airport capacity problems, their causes, and geographic distribution;
2. the extent to which these capacity problems will act as a critical constraint on aviation demand and the impact the capacity problems could have on the various aviation user groups, related industries, and local economies;
3. prospective technological solutions to airport capacity problems, including analysis of the extent to which future capacity problems are solvable by application of advanced technologies; and
4. past and current financing mechanisms (local or State funding, bonding, Federal grants, and various airport rents and user fees), the extent to which they have been relied on at various airport sizes and types, and the extent to which they can be depended on in the near future, including analysis of the extent to which future capacity problems are solvable by financial means.

This assessment addresses these questions by describing the existing state of the airport system and outlining technological and economic measures for dealing with airport capacity problems.

AREAS OF INTEREST

Various aviation organizations have called for increased Federal effort to provide technological improvements to increase capacity or to make more effective use of existing capacity. Chief among these are wake vortex detection and avoidance systems, improved air traffic control, and advanced landing systems. These groups have also advocated procedural changes to make more efficient use of airspace and runways, e.g., reduced longitudinal separation on final approach and closer lateral spacing for aircraft using parallel runways. Finally, they seek added facilities at some sites, notably separate runways for commuter and general aviation aircraft. The Industry Task Force on Airport Capacity Improvement and Delay Reduction, for instance, recently recommended accelerating the development and implementation of these and other technological and procedural changes aimed at reducing delay. '2 FAA has been studying developments along similar lines for several years and is proceeding with selective implementation in the National Airspace System Plan and the National Airspace Review. OTA has examined these technological measures, supplementing the Task Force Report and FAA studies with independent analysis. This ***is*** reported in chapter 4.

The question of funding is also crucial. Airport operators, while they seek technological improvements, also maintain that the major benefit will come from expansion of existing airports. The key issues are the amount of capital required, the sources of funds, and the financing mechanisms. The airport financing question is of particular interest because of the effects of airline deregulation. In cooperation with the Congressional Budget Office, OTA studied these questions, which are discussed in chapters 6 and 7.

The organizations and institutions concerned with airport planning and operation play an important role in how the system presently works and in the ability to plan, fund, and implement needed improvements. Roles and relationships are changing because of deregulation, long-term structural changes in the airline industry, Federal policy toward airport aid, and public concern about airport noise and land use. Of particular impor-

[12] *Report of the Industry Task Force on Airport Capacity Improvement and Delay Reduction,* September 1982.

tance is whether airports will be able to control operations and future development in a way that optimizes individual airports and yet assures compatibility with overall system needs. Chapters 2 and 5 address these matters.

Finally, there is the question of Federal policy. The Airport and Airway Improvement Act of 1982 calls for a new approach to airport system planning, called the "National Plan of Integrated Airport Systems." The NPIAS is to be issued in September 1984, and at present its scope and direction are not entirely clear. OTA has examined two aspects of the problem: 1) forecasting and its influence on determining airport needs, and 2) uncertainties that will affect the planning process. These subjects are treated in chapter 8. OTA has also considered features that could be incorporated in the NPIAS to make it an effective planning document. Planning issues are discussed in chapter 9.

ISSUES AND FACTORS IN AIRPORT SYSTEM DEVELOPMENT

Intertwined with these basic questions are issues where the interests of several parties have come into sharp conflict. One such group of issues relates to the strategic policy of the Federal Government in development of the airport system. Some have suggested that past Federal policy has placed too much emphasis on capital investment in new facilities and not enough on methods to make more effective use of existing facilities. A second set of issues involves funding. Some observers have suggested that the Federal role has become too large and pervasive and that responsibility for airport development should devolve either on the airports and their local sponsors or on State governments. Other issues arise from the legal and contractual arrangements traditionally concluded between airports and airlines. These arrangements have evolved over several decades, during a period of extensive Federal regulation of the airlines. There is some concern that these airport-airline agreements may be inappropriate in a deregulated era, either because they may be too rigid to allow airports and airlines to meet new challenges or because they may have anticompetitive features that do not allow the market to operate freely. Another issue is the problem of aircraft noise, which has been a growing environmental and political problem for many airports despite technological advances in reducing noise of jet aircraft. Finally, there are issues surrounding the planning of future airport development, particularly the timing and location of demand growth and the role that the Federal Government will play in defining and meeting airport needs.

Federal Policy and Strategy

Historically, Federal airport development policy has sought to promote the aviation industry and to accommodate growth of traffic demand. Where forecasts of future traffic demand have exceeded existing airport capacity, the solution has generally been to provide capital aid to build new facilities. The Airport Development Aid Program (ADAP), funded with user fees earmarked for the Airport and Airway Trust Fund, was established in 1970 as a response to the congestion and delay problems that plagued airports in the late 1960s. ADAP provided Federal matching grants to airports to pay for certain types of capital improvements, principally construction of new runways, taxiways, and aprons to relieve airside congestion. Federal assistance for capital improvements continues through the Airport Improvement Program (AIP), created by the Airport and Airway Improvement Act of 1982.

FAA projections of future traffic demand indicate that there could be severe airside congestion at a number of major airports over the next 20 years. Although some of the delays might be eased by improved air traffic control technology, the FAA view is that the primary constraint on the growth of the system will be "a lack of concrete" and that there is a need for more runways, taxiways, and ramps.

Thus, basic strategy has been challenged on the grounds that it biases the outcome toward capital-intensive solutions, Critics argue that Federal development grants have, in some cases, encouraged

airport operators to overbuild. In other cases, the facilities built with Federal support are substantially different in form and more expensive than needed to accomplish their intended function. But more fundamentally, the existence of a Federal program providing aid for only certain types of capital improvements at airports has distorted investment decisions and led airport operators to build not necessarily what they need but what the Government is willing to help pay for. By accommodating demand wherever and whenever it occurs through increasingly large and complex new capital facilities, more growth is encouraged at precisely those locations where it will be most difficult and expensive to absorb.

Other critics have suggested that projections of traffic growth are too high. Recent changes in the airline industry, such as deregulation, the growth of commuter air carriers, sharp rises in fuel costs, and escalating operating costs, may have caused permanent structural changes in the airline industry such that the great traffic growth of the 1960s and 1970s will not continue. Thus, policies aimed at accommodating high projected levels of growth may lead to overbuilding and excess capacity, and misallocation of resources within the system.

Congestion and delay in the airport system are not evenly distributed. They are concentrated at a few airports, while many others operate far below their design capacity. Thus, an alternative strategic response might be to manage or direct growth of air activity in ways that make more productive use of existing, uncrowded airport facilities.

Some observers believe that growth can be managed through administrative or economic means requiring only limited new capital investments. Administrative responses to growth include rules adopted by airport operators or various levels of government to divert traffic from congested airports to places or times where it can be handled more easily. Economic responses rely on market competition to determine access to airport services and facilities. To some extent, both administrative and economic measures for managing demand are already in use at a number of busy airports. However, there are legal, contractual, and even constitutional barriers that might preclude wider use of such techniques. Some of these barriers could be lowered through Federal Government action. A discussion of possible administrative and economic options is presented in chapter 5.

Funding Issues

Before World War II, the Federal Government was inclined to the view that airports, like ocean and river ports, were a local responsibility, and the Federal ***role*** was confined to maintaining the navigable airways and waterways connecting those ports. At the onset of World War II, the Federal Government began to develop airports on land leased from municipalities. Federal investment was justified on the grounds that a strong system of airports was vital to national defense. After the war, many of these improved airports were declared surplus and turned over to municipalities. Federal assistance to airports continued throughout the ***1950s*** and 1960s at a low level and was aimed primarily at improving surplus airports and adapting them to civil use. Major Federal support of airport development resumed in ***1970*** with the passage of the Airport and Airway Development Act, which was in large part a response to the congestion and delay then being experienced at major airports. This act established the user-supported Airport and Airway Trust Fund and ADAP.

Federal assistance to airports under ADAP was distributed as matching grants for capital improvement projects. There were several formulas for allocation—entitlement (calculated from the number of passengers enplaned at the airport), block grant (based on State area and population), and need (discretionary funds). Over the 10-year life of ADAP, outlays from the Trust Fund amounted to approximately $4 billion. ADAP expired in 1980, but a similar program of airport development assistance, AIP, was established in ***1982.*** Before AIP was enacted there was extensive debate about the future direction of Federal airport aid, sparked by proposals to withdraw assistance for ("to defederalize") major air carrier airports.

Supporters of defederalization advanced two arguments: that the Federal Government is overin-

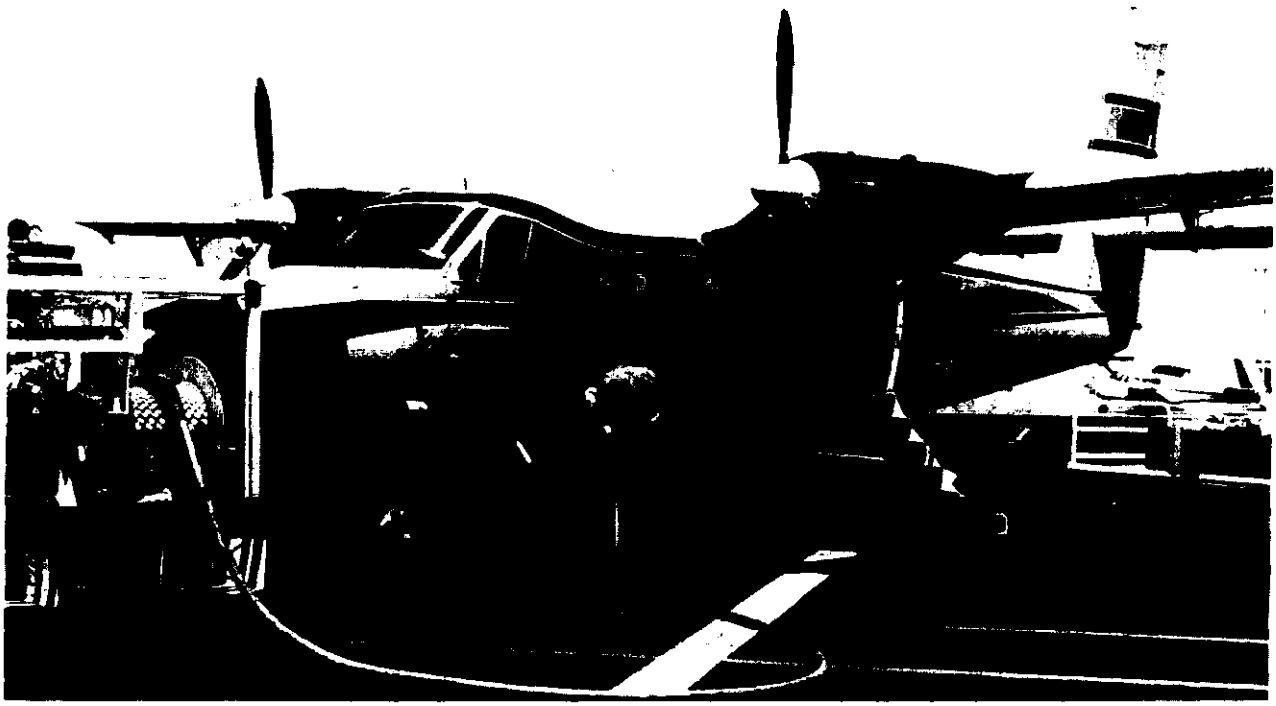


Photo credit' Golden West

Commuter air service, a link to small communities

volved in financing airport development and that Federal assistance is not necessary for large airports because they are capable of financing their own capital development. By excluding large airports from eligibility for Federal grants, the Government could reduce the overall cost of the aid program and at the same time provide more aid to small air carrier and general aviation airports. Under various proposals, the top 40 to 69 airports (in terms of enplaned passengers) would have lost eligibility for Federal aid. '3 The advantage to large airports, as pointed out by supporters of defederalization, would be freedom from many legal and administrative requirements involved in accepting Federal assistance.

Opponents of defederalization contended that the proposal was unwise for several reasons. First, it would eliminate Federal assistance for the very airports that provide the bulk of passenger service and have the greatest problems of congestion and delay. It is at these airports, the backbone of the national system, where a Federal presence can most easily be justified. Further, passengers using large airports pay about three-quarters of the taxes supporting the Airport and Airway Trust Fund. Thus, defederalization would lead to subsidy of smaller airports by larger ones. Some observers also questioned the ability of many airports to carry out necessary capital improvements without Federal participation. While agreeing that Federal grants form only a small percentage of total capital budgets at large airports, they argued that it was a needed revenue source for all but the very largest *5* or 10 airports.

Some proponents held that defederalized airports should be allowed to charge a "passenger facility charge" or "head tax" to make up for the loss of Federal funds. Federal law now prohibits

[13]S. 508, introduced by Senators Nancy Kassebaum and Howard Cannon, would have defederalized airports in two phases. The first year, airports enplaning more than 0.5 percent of all passengers (the top 40 airports) would have lost funding eligibility. In the second year, those enplaning more than 0.025 percent (69 airports at that time) would have been defederalized. The Administration proposal, as represented by H.R. 2930 would have defederalized only the top 40 airports over a 2-year period.

airports from taxing passengers. Others objected to the head tax while supporting the concept of defederalization, holding that airports could raise sufficient funds through retained earnings or through the private bond market to cover their capital needs. One major objection to the head tax was that passengers would have to bear a double tax when using a defederalized airport. They would have to pay both a ticket tax supporting the Airport and Airway Trust Fund and a head tax at the arrival or departure airport.

The major airlines, as represented by the Air Transport Association, were indifferent on the question of defederalization but opposed to the head tax. They held that the tax would impose unnecessary administrative burdens on them and would be unfair to passengers. Other observers noted that the underlying reason for the air carriers' objection was that head taxes would give airports an independent source of revenue and weaken the voice that airlines now have in airport investment decisions.

Airport operators were divided. Some very large airports, such as Chicago O'Hare, supported defederalization on the condition that it be accompanied by the freedom to impose a head tax. The Airport Operators Council International, an organization representing airports of all sizes, expressed qualified support of the concept of "optional defederalization" where airports could choose whether or not they wished to receive Federal aid, rather than having the decision made for them on the basis of size and passenger volume. Many airports opposed both defederalization and the head tax.

The question of defederalization is still open. Although the Airport and Airway Improvement Act of 1982 passed without a defederalization provision, it directed the Department of Transportation to study the effects of defederalization and to prepare a report to Congress.

Another approach to airport financing was also raised during the debate *over* AIP, although it was not introduced into legislation. Under the general concept of "new federalism," it was proposed to turn increased responsibility for decisions on airport funding and programming over to State aviation agencies and departments of transportation. Supporters contended that State agencies are in a better position to determine the needs of local airports and could distribute grants with less red tape than the Federal Government. They pointed out that some States already have active aviation agencies that evaluate airport improvement projects and approve all applications for Federal assistance. In these cases, the needs of the airports and the State might better be served by allowing State agencies more latitude in distributing airport grants.

A stronger role for State agencies could reduce the Federal role to basically that of a tax collector. Because of the interstate nature of air transportation, it would probably be more efficient to continue to collect ticket taxes, fuel taxes, or other aviation taxes at the national level. However, the funds could be passed through to the States on a formula basis, and the actual decisions on how funds were spent could be made at the State level.

There were several objections to the concept of new federalism. First, State agencies vary in strength. Many do not have the staff or the expertise to take on the responsibilities of evaluating airport development projects or administering grants. A period of transition would be necessary while these States prepared to accept new responsibilities. Others argued that setting up *50* separate agencies to do the work of FAA would add an additional layer of bureaucracy, since FAA involvement could not be completely eliminated. Still others saw interstate or multistate cooperation as a major stumbling block. For example, a State government, perhaps lacking perspective of the airport system as a whole, might find little incentive to aid development of an airport outside its borders or to enter into regional compacts to compensate citizens of adjacent States for airport noise impacts.

The policy implications of the questions of defederalization and State administration are examined further in chapter 10 of this report.

Airport Management Issues

Deregulation has led to changes in the relationship between airports and airlines. Airports traditionally maintained long-term use agreements (of 20 to 30 years) with the airlines that served them.

These agreements covered such arrangements as landing fees and the leasing of terminal space. As a result of these agreements, airlines have had a strong influence on the creditworthiness of airports in the revenue bond market since their financial stability and continued presence was a guarantee of the long-term economic viability of the airport. In some instances, airlines have been party to airport revenue bonds, agreeing to be jointly and severally liable for payment of debt and interest. In return for such guarantees, airlines have gained approval rights for capital improvement projects to be undertaken at the airport.

Since deregulation, however, air carriers' routes and service points are not as stable, and the airlines themselves have experienced financial difficulties. Long-term contracts written in the era of regulation may now inhibit the carriers' freedom to change routes. Conversely, they may also make it difficult for airports to accommodate new carriers. In some cases, carriers with long-term agreements whose service to the airport has declined may be occupying gate and counter space that a new entrant might be able to use more effectively.

Some observers have questioned whether long-term agreements, especially majority-in-interest clauses, may not have anticompetitive effects in the deregulated environment. They point out that incumbent carriers might make use of their agreements to deny new entrants access to the airport, or at least to place them at a competitive disadvantage with respect to terminal space and facilities. They also point out that carriers often negotiate with airport management as a group in a "negotiating committee" or "top committee" and question whether group negotiations involving competing firms are appropriate in a deregulated market.

It has also been pointed out that a capacity limit at a major airport has the effect of reducing free competition among carriers and works as a form of "reregulation" of the industry. Airport operators must be careful that actions taken to manage or control the growth of traffic at individual airports do not have anticompetitive effects. This issue was raised in connection with two recent events, the 1981 air traffic controllers' strike and the Braniff bankruptcy, which brought attention to the question of who owns airport operating "slots. "1[4]

During the strike, FAA imposed quotas on 22 airports, limiting the number of operations that could be performed each hour. Several methods of allocation were tried—administrative assignment, exchanges among incumbent carriers, and, briefly, auction. New entrant airlines complained that all of these methods were unfair.

When Braniff stopped operating, FAA redistributed its slots among other carriers, despite Braniff's claims that the slots were the airline's property for which it should be paid. Throughout this period there was controversy over whether or not a slot should be considered property, and whether the proceeds from a slot sale should go to the airline, the airport, or the Federal Government. This issue has arisen again in connection with proposed slot auctions at Washington National Airport.l[s]

This question may become particularly acute if problems of delay and congestion spread to more airports, and airport operators seek to employ traffic management techniques. If an airport imposes a quota, it must devise some method for allocating slots to present users and for accommodating new entrants. Until the question of slot ownership is resolved, any attempt to use sale or auction as an allocation method is likely to reignite this controversy.

Noise and Environmental Issues

Noise has been a major problem at airports since the introduction of the commercial jet aircraft. Recent technological advances in airframe and jet engine design have made new aircraft much quieter, but many industry experts believe that further large-scale reductions in aircraft noise will not be possible.

The public is very sensitive to noise, which has become an emotionally charged political issue.

14A slot is a block of time allocated to an airport user to Perform an aircraft operation (takeoff or landing).

Aviation Week and ***Space Technology,*** Aug. 15, 1983, pp. 32-33.

Photo credit" Los Angeles **Times**

Noise, an emotionally charged issue

Noise is probably the single most important constraint on the expansion of airports or the building of new ones. The problem is in large part one of land use, and land use decisions are usually beyond the control of FAA and the airport proprietor. Zoning and land use planning are the responsibility of local jurisdictions, and many jurisdictions have not applied land use controls to prevent residential communities from growing up near airports. Often, intergovernmental cooperation is needed because major airports may be surrounded by several municipalities, each with different zoning policies. The Federal Government has sometimes complicated the issue by financing and approving residential development projects in high-noise areas.

At present, citizens with complaints about airport noise have recourse only to the airport proprietor. While FAA and air carriers have some responsibility for abating aircraft noise, only the airport operator is legally liable. In many cases, airports have had to pay nuisance and damage claims for noise. To reduce their liability and to protect themselves, airports have instituted noise abatement programs that involve restricting air-

craft flight paths or hours of operation so as to reduce noise impact on residential areas. Noise abatement procedures can have a detrimental effect on airport capacity, and many airports with serious congestion and delay have found that the need to control noise restricts their freedom of action. In some cases, airports have had to purchase surrounding land or install noise-absorbing insulation in buildings under flight paths.

Some States and localities have enacted special regulations to limit aircraft noise at airports under their jurisdiction. There are several concerns about the proliferation of local noise standards. First, the standards vary from one location to another, adding confusion and complexity to the system. Second, the standards may act as a restraint on interstate commerce. Airlines may have to accelerate their purchases of quiet aircraft in order to serve many points with stringent noise standards. If they are not financially able to make these purchases, the only alternative may be to curtail operations at some locations.

Some argue that the Federal Government should set and enforce a uniform national standard for airport noise. However, FAA has been reluctant to embark on such a policy, in part because the Federal Government might then have to assume liability for violations of the standard.

Planning Issues

Many of the difficulties in planning a national airport system arise from its size and diversity. Each airport has unique problems, and each airport operator—although constrained by laws, regulations, and custom—is essentially an independent decisionmaker. While airports collectively form a "system," it is not a system that is comprehensively planned and centrally managed. FAA's role in planning the system has traditionally been one of gathering and reporting information on individual airport decisions and discouraging redundant development.

Since 1970, the National Airport System Plan has been prepared by FAA regional offices, working in conjunction with local airport authorities. The NASP presents an inventory of the projected capital needs of almost 3,200 airports "in which there is a potential Federal interest and on which Federal funds may be spent ."[16] Because the funds available from Federal and private local sources are sufficient to complete only a fraction of the eligible projects, many of the airport improvements included in the NASP are never undertaken.

The NASP has been criticized on three principal points. First, it is not really a plan, in the sense that it does not present time phasing or assign priorities to projects. FAA has attempted to meet this criticism in the latest edition by categorizing projects and needs according to three levels of program objectives: Level I—maintain the existing system, Level II—bring airports up to standards, and Level III—expand the system. Some, however, see this categorization as inadequate.

Second, the criteria for the selection of the airports and projects to be included in the plan have come under criticism. Some have argued that most of the 3,200 airports in the NASP are not truly of national interest and that criteria should be made more stringent to reduce the number to a more manageable set. On the other hand, there are those who contend that the plan cannot be of national scope unless it contains all publicly owned airports. It is argued that, since the NASP lists only development projects eligible for Federal aid and not those that would be financed solely by State, local, and private sources, the total airport development needs are understated by the plan.

A final criticism is that the NASP deals strictly with the development needs of individual airports, without regard to regional and intermodal coordination. This deficiency was addressed by Congress in the 1982 Airport and Airway Improvement Act, which directed FAA to develop a National Plan of Integrated Airport Systems. FAA has begun work on the plan, which is to be completed by September 1984. There is still uncertainty about the form that NPIAS will take and how many airports will be included. Some approaches to developing an integrated national airport system plan are discussed in chapter 9.

[16] *National Airport System Plan: **Revised Stutistlcs, 1980-1989*** (Washington, DC: Federal Aviation Administration, 1980), p. iii.