

CONFERENCE SUMMARY

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This summary of the conference proceedings attempts to reflect as objectively as possible what each workshop considered or decided. Included also are positions taken in the general papers and the workshop resource papers. The views presented, therefore, are not necessarily those of the author or those of any one of the conference participants. On no issue was there a unanimous opinion, and on several issues there were strong minority views.

The many points developed by the conference participants are here summarized and organized under 9 headings: definition of landside, capacity and the aviation system, capacity and level of service, peaking, multiple jurisdiction, balance, forecasting, financing, and federal aid. A final section comments on the conference research recommendations, which are included as the last chapter in this report.

DEFINITION OF AIRPORT LANDSIDE

Historically, airports have been modal interchange points for air travelers and service points for aircraft. The landside has come to be thought of as a distinct entity and can properly be defined as the area bounded by the point at which the passenger enters the airport proper, whether by transit modes, private automobile, or other means, to the point on the apron at which the passenger actually enters the aircraft. The landside, therefore, includes the access roads and ramps, parking facilities, terminal curbside, terminal facilities, and that part of the apron around the airplane used to service the passengers.

LANDSIDE CAPACITY AND THE AVIATION SYSTEM

The demand for air transportation has increased dramatically since World War II. To accommodate the rapidly rising numbers of intercity passengers and quantities of goods, new technologies and concentrated amounts of capital have been employed to provide airport facilities. However, both the level of the efforts expended and the resources used to satisfy user demand for air transport have been unevenly applied to airport development. In many cases, more attention and resources have been given to air-side facilities than to landside facilities.

The matching of facilities with requirements has progressed independently within each division to the extent that allocation of resources and forecasts of future activity are separate functions for the landside and the airside of an airport. Separation of the airside and the landside has permitted—and even promoted—different rates of growth in capacity in response to demand for air transportation. Because of the nature of its activities, airside capacity has developed in a unified, coordinated, and controlled manner. Landside capacity, however, has developed in a less coordinated manner. Individual expansion projects undertaken in response to actual or anticipated capacity demands have often resulted in landside facilities that are disjointed and do not permit the streamlined flow of passengers from one element to the next. Many participants felt that landside facilities, particularly the terminal buildings, have received low priority within the aviation system. Continuation of an approach that views aviation, airport, and airport access as distinct systems can seriously impede the future of air transportation within the United States.

CAPACITY AND LEVEL OF SERVICE

Landside capacity and level of service must be considered in terms of aircraft passengers, and all improvements should revolve around their needs for space and service. Passengers are concerned more with the level of service than with capacity, but because each is a function of the other they must be considered together.

Capacity may be defined as the physical facilities required to meet a given demand at a specified level of service. It is measured by the number of passengers that can be processed through the landside facilities of an airport under given conditions of time and service level.

Although capacity and level of service will have different dimensions (i.e., time, distance, space) depending on the elements under consideration, ratings for each should be assigned to each individual element within the airside complex. The sum of each of these individual ratings would then form a composite capacity and level-of-service rating for the airport. This single weighted rating can be used as a tool in comparing airports. Several participants disagreed with this view, feeling that some elements of the landside are more critical than others in terms of level of service and to aggregate ratings for each element would not be useful.

The agency that has the financial and administrative responsibility for implementing level-of-service standards should be given the responsibility for promulgating (or establishing), publishing, and enforcing them. Some participants thought that the standards should be used to highlight system deficiencies that could then be improved at the discretion of the airport manager. Others thought that they should be used to force mandatory improvements by the manager as a prerequisite to obtaining funding.

PEAKING

Landside capacity and level-of-service issues come into conflict most dramatically in the context of peaking—the periods of highest demand for airline trips. To an even greater extent during the peaking phenomenon than during the remainder of the operating day, the capacity of landside facilities constrains the ability of many metropolitan airports to meet air traffic demands. During peak periods, shifts might be made in

operations and procedures to maintain service level while keeping operating expenses and capital investment at reasonable levels. Any capacity change decision, however, must define the length of the peak period involved.

One way to adapt the level of service provided during periods of peaking is to change the pattern of aircraft parking. In off-peak periods, all aircraft are parked adjacent to the terminal building, and a loading bridge is used to move passengers between the aircraft and the terminal complex. Under peak demand conditions, additional service could be provided by employing remote aircraft parking and using a vehicle bridge to transport passengers and their luggage between remotely parked aircraft and the terminal complex. In this way, capacity could be increased and service level maintained without major capital investment.

More efficient use of terminal gates is another example. The cost of additional gates is high and the space for them is limited. An airport might more efficiently use existing gates by making them available to all carriers rather than by continuing the present practice of commitment or assignment of certain gates to each airline.

Additional operational and procedural shifts during periods of maximum demand include joint or preferential use or both of certain landside facilities including holding rooms, ground handling equipment, automation of baggage handling and distribution systems, and specialized facilities with appropriate level-of-service differentials for processing charter and nonscheduled flights. Remote off-airport and downtown processing terminals also hold potential for providing additional landside capacity at large airports to alleviate problems caused by peaking.

Airport landside operations are highly labor intensive, and raising the level of service intensifies the labor requirements. Automated handling equipment may, therefore, improve baggage handling and result in cost reductions since the cost of using the equipment over its life cycle may be significantly less than the cost of the labor it replaces. Automation of passport controls, public health check-in procedures, and immigration functions might contribute to the level of service desired at high-demand international terminals.

Because the airline travel peak demand usually coincides with the urban travel peak demand, inadequate airport access tends to adversely affect both urban transportation and airport operators. Roadway traffic management techniques can be applied to major thoroughfares and corridors surrounding or near an airport and to the links between the airport and major corridors. Ramp metering systems, incident clearing systems, stranded motorist clearing systems, and motorist information systems could have a positive influence on airport access.

Peak-load pricing was suggested as a way to shift air-carrier demand for airport services, influence air-carrier scheduling, and thus smooth peak demand for airport services. Because the cost of providing peak-load capacity exceeds that associated with providing service and capacity during off-peak periods, peak-load pricing will induce airport users, airlines, and others to reorient their demand for airport services to reduce the resources required.

However, the reasons air-carrier services peak in the first place is that people want to fly at certain times and the airlines are responsive to those desires. To ask carriers to dramatically change their patterns of supply is to ask them to ignore reality. This is particularly true in most city-pair markets, where the airlines are exceedingly competitive. No single carrier in such a market will jeopardize its market share by scheduling the bulk of its capacity at a time when the demand is less than in the peak periods. Therefore, short of the existence of capacity-limiting agreements and pooling arrangements between competitive air carriers, which are matters of federal policy, peak-load pricing will not likely result in much shifting or smoothing of the demand.

In addition, airlines already incur substantial cost penalties when they operate during periods of congestion. Aircraft ground times are greater, and fuel consumption is greater both on the ground and in the air. Labor costs are also higher because operating airport-related functions by airlines is geared to meet the peak demand, which means there is substantial excess capacity of both labor and capital during off-peak periods. Consequently, air carriers already have substantial inducements to try to spread their activities throughout the day.

MULTIPLE JURISDICTIONS

The influence of multiple jurisdictions over airports through control of ground access routes, land impacted by airport noise, taxing powers, police control, and other factors adds to and sometimes helps to create negative community attitudes toward the airport. Part of the solution will involve better coordination of multijurisdictional responsibilities for airports and their environs. The institutional procedures used by federal, state, and local governments involved in airport affairs should be examined to determine whether they can be streamlined to improve airport capacity.

The air carriers, airport authorities, and the federal government are primarily responsible for implementing programs to increase landside capacity through 3 basic categories of improvements.

1. Technological improvements in the physical facilities and equipment that are currently available or under research and development. Such innovations require capital-intensive investments for demonstration and subsequent implementation.
2. Operational and procedural improvements that consist of methods and sequences of operations, controls, or prescribed procedures that are currently in wide practice, under experimentation, or as yet to be implemented. These tend to be non-capital-intensive improvements.
3. Amendment of institutional, regulatory, and legal policies that affect procedures and operations or sources of funds for implementation of technological improvements. For example, jurisdiction of airport access is split between local and airport authorities, and questions arise as to who is responsible for providing improvements in these facilities and what basis should be used for sharing the cost.

BALANCE

The current criteria of the Federal Aviation Administration for airside level of service can lead to an imbalance with landside capacity and level of service. Its current Airport Development Aid Program (ADAP) favors funding airside over landside elements. The FAA should consider requiring a uniform accounting system so that it can evaluate the need and cost effectiveness of proposed programs eligible for ADAP funding. A policy permitting the FAA to withhold funds for airside projects to balance airside and landside capacity should be investigated. The financing of improvements in landside level of service to achieve balance by federal funding and without federal funds should be studied.

Attention must also be directed to balance among airports. Some airports are regionally unbalanced, others lack balance because of differences in demand for air travel, and others suffer from inadequate design. The federal government has a vital role to play in ensuring that appropriate balance exists between airside and landside capacity in the nationwide airport system.

Imbalance also occurs because the economic life of transport aircraft is less than the physical life of airport facilities. Thus, a mismatch results between technologically dynamic aircraft, which must interface with landside facilities, and the facilities themselves. The character of capacity demand is affected by aircraft technology because the technology has changed more rapidly than has been anticipated by airport landside planners. These mismatches must be reduced by ensuring flexibility in landside facilities.

FORECASTING

The airport manager's greatest need for effective decision-making in capacity problems is for reliable near- and long-term forecasts. FAA, airport, and airline participation is required to determine how reliable forecasting schedules can be derived. Valid activity indicators are also required in order to convert the schedule into demand

requirements for each component and subsystem of the landside complex (i.e., curbside, baggage, gates). Forecasts are recommended for activity indicators such as local point of passenger origin and destination, trip origin and destination, ratio of meeters and greeters, average bags per passenger, oversize bag mix and dimensions, group travel size, arrival times at airport prior to departure, modes of arrival and departure at airport, trip purpose, and behavior patterns.

Capacity demands emanate from a combination of time-related and aircraft-related factors that cannot be accurately predicted over the depreciation period and physical life of the asset. Therefore, the character of investment should be as flexible as possible, consistent with providing for expected peak demands. For instance, demand for landside capacity can decrease as the demand for air-carrier services becomes more dependent on discretionary travel than on business travel. Therefore, flexibility of the landside configuration to permit reductions in resource commitments must be included in the forecast design.

A forecast of the level and character of the demand for services in planning the establishment or expansion of airport landside capacity is also used in the financing of the facility. Information required includes changes in level and character of the demand for airport landside capacity, the effect that inflation of wages and prices will have, and the manner in which technological change will influence future landside requirements.

Forecasting techniques need to be improved both for short-range forecasting for 2- to 5-year periods and for long-range forecasting for 10- to 20-year periods. To improve forecasting accuracy, a 4-step approach is suggested: (a) Develop data series on factors at major airports; (b) undertake selected cause and effect research; (c) apply state-of-the-art econometric techniques; and (d) prepare multiple forecasts covering the 15- to 20-year period to permit design flexibility.

Many participants thought that the uncertainty of long-range forecasts mandated the building of flexibility into airport landside facilities. That is, the dangers caused by reliance on long-range forecasts can be minimized only by providing airport landside facilities that are functionally related to one another and to airport users in a manner that permits greater flexibility in their use.

FINANCING

Financing concerns those issues related to the raising of capital to support any given quantitative and qualitative changes in airport landside capacity. The choice of the financial instrument for raising expansion capital is made by airport management. Historically, airport landside capacity has been financed without the aid of the federal government. Debt instruments such as long-term bonds have been used to raise the required capital for new facilities or expansion of existing ones. One type of long-term bond, the revenue bond, specifies in detail how the funds are to be used and is eventually retired out of the income generated by operation of the specific facility being financed.

A dramatic change in airport financing will occur with the anticipated passage of the ADAP bill, which will for the first time make federal funds available for the creation and expansion of landside facilities and will thus relieve both airport operators and air carriers of some of the pressures of providing capital.

Growth and technological change have pronounced effects on airport landside facilities that have long service lives. The mix of aircraft serviced by an airport has changed radically every 8 to 12 years since World War II. In contrast, the primary investments in the landside are durable assets that have physical and depreciable lives of more than 25 years. However, because landside structures cannot accommodate successive generations of aircraft, economic and financial problems grow out of the mismatch between the useful and depreciable life of the airport landside facilities. A significant amount of landside capacity needs costly revision faster than the facilities being replaced are written off or become physically uneconomic or unsound. To prevent the financial burden of replacing facilities from becoming so great that increased

charges to lessees discourage the use of air transportation and airport services, facilities must be planned and developed with physical flexibility so as to minimize the probability that the life of the investment will be less than that of its financing. A consistent failure to match asset life with the length of its debt financing will cause airport costs to rise precipitously with unhappy consequences for all landside tenants and users, including the air carriers.

To reduce landside financing requirements, new institutional arrangements for acquiring services and materials should be explored. For example, determination of architectural fees based on the cost of the overall project should be reviewed. This practice has contributed in some instances to landside facilities that are more expensive than they need to be. Changing the method by which architects are compensated might well be an effective means of economizing on the resources required and of reducing the financing necessary to support landside development. Obviously the problem goes far beyond the architectural and engineering fee structure, which merely represents one dimension of the problem.

Institutions that supply capital for the creation and expansion of landside capacity are obligated to ensure that the capital provided is used efficiently and that the airport remains responsive to the needs of present and potential users so that financial obligations can be met. Influence exerted over the management of airport facilities by private-sector financiers provides assurance that payback schedules will be met. When financing is provided through the public sector, such as the proposed ADAP legislation, the federal government should ensure that the capital is used efficiently and proper accounting is kept. Some participants thought that all federal programs designed to provide capacity should set standards of economic performance that must be met before the facilities are eligible to receive funds.

Air carriers may also have an interest in seeing that the financial obligations are met. Airlines using the facility are jointly and severally liable for repayment of debt capital and interest on special-purpose revenue bonds. Partly because airlines have not been generally required to show these liabilities on their balance sheets, airline managements have often permitted extravagances in the landside facilities. In the future, however, air-carrier managements will be much more critical of facility costs because of the uncertain future of the airline industry itself, the contingent liability that is rapidly increasing as additional airport development is undertaken, and the deepening concern by accountants that potential liabilities arising from the debt guarantees are not recognized.

The method of financing and the size of the financial commitment associated with providing landside capacity have significant effects on airport users, including the airlines themselves. For instance, airlines are now subjected to increasing contingent liabilities when they most require financial strength to support their own operations. As the airline growth rate decreases, airlines will not be able to cope with situations in which the life of the landside assets being financed does not match or exceed the life of the debt associated with them.

If air carriers become less able to finance the growth of airport landside capacity, concessionaires must provide greater revenues. Concessionaires would then raise prices, and demand would decrease causing the concessions to become uneconomic. The burden of financing would then revert to other tenants and airport users such as airline passengers and visitors. For example, the proposed ADAP legislation permits airports to impose head taxes on passengers. Airline passengers represent a highly disaggregated market with relatively inelastic demand. To the extent that responsibility for providing or supporting the financing associated with airport capacity creation and expansion falls directly on the passenger, decisions associated with fee planning and creation of capacity will not be optimal. This method of financing will result in higher-than-necessary costs for any given level and quantity of landside throughput capacity.

FEDERAL AID

The proposed ADAP bill expands the way in which federal funds can be used to include terminal areas and delegates greater decision-making responsibility to airport operators in using the money. The proposed legislation contains transit development funding recommendations and permits use of trust funds for facilities within airport boundaries that connect with transit systems to the airport. This measure presents an opportunity to facilitate the flow of passengers through the airport with the least interruptions in their transition from ground-to-air or air-to-ground transportation.

Federal funds for airport landside development now come from various sources. The ADAP provides money for parking and terminal facilities. Federal highway funds are available for road projects within airport boundaries if the road is part of a federal highway system, fringe and corridor parking area, links connecting parking with modal or intermodal terminals, bus shelters or terminals, and exclusive truck lanes. The Urban Mass Transportation Administration capital grant program provides for the construction of bus, rapid, and other transit terminals and for the links connecting parking or other intermodal facilities with transit accommodations.

RESEARCH RECOMMENDATIONS

The research statements submitted by conference participants represent a synthesis of a wide range of attitudes and disciplines that were represented at the conference. The statements reflect the heavy emphasis that the participants placed on "soft" research, i.e., policy, planning, forecasting, management, economics, and regulation. This does not imply that "hard" research, i.e., improvements in technology, was overlooked. However, the consensus was that a great deal of technical knowledge already exists but that its application is impeded by constraints that are difficult to identify and to overcome. The constraints relate to planning, management, and policy and involve both public and private sectors, governmental jurisdictions at many levels, regulations and regulatory agencies, management and labor unions, air travelers, and the general public. Therefore, although many airport landside problems may appear to have simple solutions, the complexity that arises from the many interests involved requires careful research and well-managed, coordinated implementation.

In no way are these statements intended to be a comprehensive plan of action of research on airport landside capacity. They are intended to be a first step in a continual process of identifying research needs and requirements to improve airport landside capacity and communicating that information to all groups involved so that effective action can be taken. The statements clearly indicate the directions for an initial research program, one in which appropriate governmental agencies and private organizations can participate.

A comprehensive research and development program in airport landside capacity should build on the experience and knowledge gained in this initial effort and must involve all affected groups not only in the transfer of state-of-the-art information but also in the establishment of appropriate mechanisms for monitoring and evaluating on-going activities related to research and development. Many private and public organizations can assist in ensuring that such efforts are undertaken. For example, currently under discussion is the formation within the Transportation Research Board of a permanent standing committee on airport landside capacity. The functions of the new committee would be to (a) define research needs, (b) stimulate the sponsorship and conduct of research, and (c) serve as a focal point for discussion and transfer of information on current and proposed research and development. This and other efforts will be needed to carry out a long-term and integrated research program for improving landside capacity at airports.