U.S. Department
of Transportation

Federal Aviation Administration

Advisory Circular

The Airport System Planning Process

AC No: 150/5070-7

Date: November 10, 2004

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of Transportation

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Advisory Circular

Subject: THE AIRPORT SYSTEM PLANNING PROCESS	**Date:** November 10, 2004 **Initiated by:** APP-400	**AC No:** 150/5070-7 **Change:**

1. PURPOSE. This Advisory Circular (AC) provides guidance for use in accomplishing effective airport system planning.

2. CANCELLATION. This publication cancels two existing advisory circulars: *Planning the State Aviation System* (150/5050-3B), dated January 1989, and *Planning the Metropolitan Airport System* (150/5070-5), dated May 1970. It also incorporates guidance from a previously cancelled advisory circular, *The Continuous Airport System Planning Process* (150/5050-5), dated November 1975.

Dennis E. Roberts, Director
Office of Airport Planning and Programming

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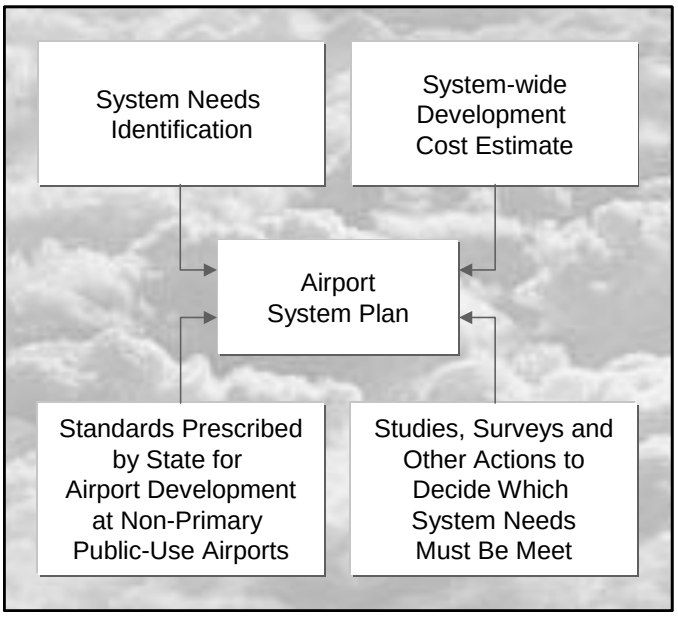
Chapter 1 Introduction

101. BACKGROUND

a. Federal law 49 USC 47102(8) defines "integrated airport system planning" as "developing for planning purposes, information, and guidance to decide the extent, kind, location, and timing of airport development needed in a specific area to establish a viable, balanced, and integrated system of public-use airports." This includes four main elements, which are illustrated in Figure 1: (1) system needs identification; (2) system-wide development cost estimate; (3) studies, surveys, and other planning actions to decide which aeronautical needs should be met by a system of airports; and (4) standards prescribed by a state, except standards for safety of approaches, for airport development at non-primary public-use airports.

Figure 1: Integrated Airport System Planning



b. The primary purpose of airport system planning is to study the performance and interaction of an entire aviation system to understand the interrelationship of the member airports. The system evaluated in the plan can be the airports of a metropolitan area, a state, or several bordering states. The effort involves examining the interaction of the airports with the aviation user requirements, economy, population, and surface transportation of a specific geographic area. The system of airports may include all airports, heliports, spaceports (operations involving horizontally-launched reusable vehicles), and seaplane bases in the study area that contribute to the national transportation system, as well as those that serve state and local aviation needs.

c. The airport system planning process should be consistent with state or regional goals for transportation, land use, and the environment. Overall, the planning process includes the

elements shown in Figure 2 and listed below. It is a dynamic process, which involves feedback from stakeholders throughout the effort.

1) Exploration of issues that impact aviation in the study area;

2) Inventory of the current system;

3) Identification of air transportation needs;

4) Forecast of system demand;

5) Consideration of alternative airport systems;

6) Definition of airport roles and policy strategies;

7) Recommendation of system changes, funding strategies, and airport development; and

8) Preparation of an implementation plan.

d. Although the process involves many varied elements, the final product should result in the identification, preservation, and enhancement of the aviation system to meet current and future demand. The ultimate result of the planning process should be the establishment of a viable, balanced, and integrated system of airports.

e. Airport system planning documents the public-use airports (including heliports, seaplane bases, and spaceports) and related facilities that are necessary to meet the current and future air transportation needs of a metropolitan, state, or multi-state area. It provides guidance on how to maximize the system benefits of airport investments and how to align Federal priorities with state and local objectives. The outcome of the process provides vital input into the aviation component of a comprehensive state or regional transportation plan.

102. APPLICATION

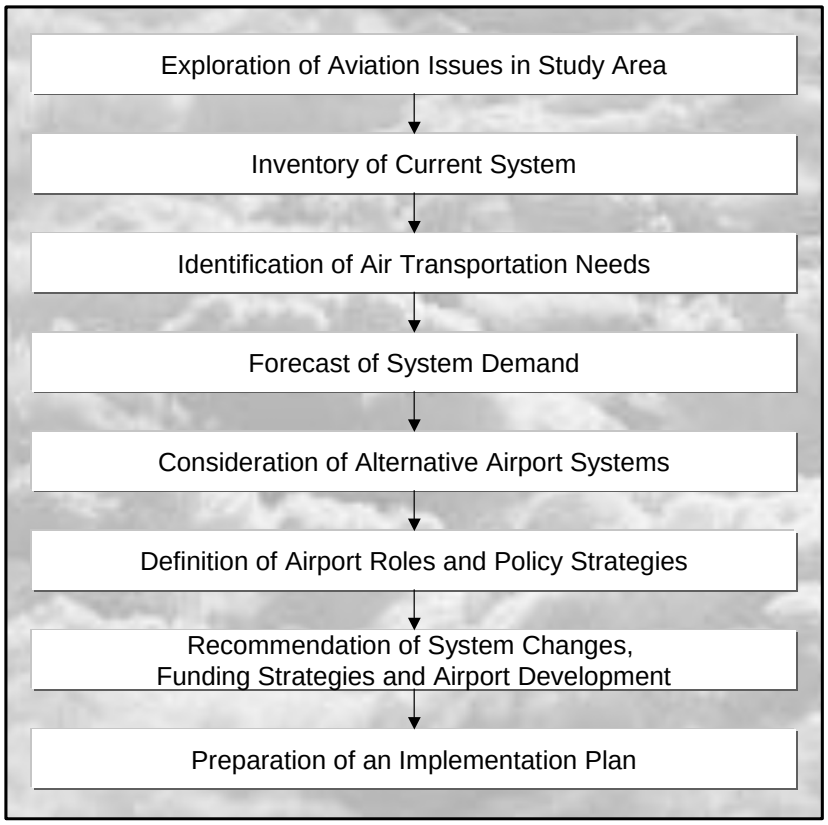
This advisory circular has the following applications in the system planning process:

a. Provides national guidance intended to improve the understanding and effectiveness of the state and metropolitan airport system planning process.

b. Defines a systematic approach to planning the nation's airport system, and identifies the organization and elements of the airport system planning process, in accordance with the eligibility criteria for the Airport Improvement Program (AIP).

c. Enables state aviation agencies, metropolitan and regional planning agencies, airports, consultants, and the Federal Aviation Administration (FAA), to flexibly define and develop products throughout the planning process, regardless of the variation in aviation programs. In order to maintain this flexibility, this advisory circular has not been written as a detailed "how to" guide to teach the basics of system planning.

Figure 2: Airport System Planning Process



d. Updates previous guidance in response to changes in aviation technology and market characteristics and incorporates advances in strategic planning, alternatives analysis, and information systems into the airport system planning process.

103. INTENDED AUDIENCE

The intended audience for this advisory circular includes the following:

a. State aviation agencies;

b. Metropolitan and regional planning organizations;

c. Consultants who perform system planning activities;

d. FAA Airports Offices: Headquarters, Regional, and Airports District Offices that review and coordinate these types of projects;

e. Individual airport proprietors who work with state and local planning agencies to help determine their role and development needs;

f. Members of the aviation industry who provide input into the study efforts, attend meetings during the process, are interested in the plan for a specific region or airport, or who will use the development identified in the plan;

g. Other Federal and state transportation and environmental agencies;

h. Municipal and county governments that need to be aware of the state or metropolitan aviation plans; and

i. Members of the general public who want to understand the state's or metropolitan planning organization's plans for the local aviation system.

104. ORGANIZATION OF ADVISORY CIRCULAR

This advisory circular is structured to guide the planner through the process and it:

a. Explains the philosophy behind the continuous airport system planning process. It describes the products that result from the planning process; defines the procedures to be used in the development of a multi-state, individual state, or metropolitan area system plan project; and explains the elements that should be included in the report.

b. Discusses the review/reappraisal of the current airport system plan, describes the steps involved in the determination of the need for and preparation of a special study, and evaluates the need for strategic planning to address future concerns in the state or metropolitan airport system.

c. Includes several appendices that provide a glossary (Appendix A), list of reference materials (Appendix B), and checklists to assist a planning agency during the project development and report preparation phases of the airport system plan (Appendices C and D).

105. USEFUL REFERENCE MATERIALS

A list of advisory circulars that include specialized guidance on aviation planning can be found on the National Planning Division's web site at http://www.faa.gov/arp/400home.cfm. A number of FAA Orders also provide guidance on the airport system planning process, and are found at http://www.faa.gov/arp/publications/orders/index.cfm?ARPnav=orders. Appendix B provides an inventory of applicable FAA Advisory Circulars and Orders, and lists some additional FAA, DOT, other government, and academic reference materials that can provide assistance during the airport system planning process.

Chapter 2 Airport Planning Process Philosophy

201. PURPOSE OF AIRPORT SYSTEM PLANNING PROCESS

a. The main purpose of the airport system planning process is to determine the type, extent, location, timing, and cost of the airport development needed in a state or metropolitan area to establish a viable system of airports. The aviation planning agency and the FAA should use the findings of the planning process to guide them in making informed decisions regarding which local airport development proposals to consider for future review and support.

b. Other purposes of the airport system planning process vary by state or metropolitan area and depend on a multitude of factors and the planning agency's commitment of resources to aeronautical activities and airport development. One key factor in the process is the nature of existing state or local laws related to aviation, because these define the planning agencies' responsibilities, authority, functions, and funding for airport activities. Other important factors include the state and regional goals and objectives regarding transportation, land use, and environmental matters.

c. The airport system planning process is an examination of system dynamics that leads to the effective use of federal, state, metropolitan, and local aviation resources in developing an efficient network of airports for current and projected needs. The product of the process is a cost-effective plan of action to develop airports consistent with established goals and objectives. The process also results in the establishment of perspectives on aviation priorities, such as airport roles, funding, policy strategies, and system trends in activity level. The process ensures that aviation plans remain responsive to the overall air transportation needs of the state or metropolitan area, while identifying the roles and characteristics of existing and recommended new airports, and describing the overall development required at each, including timeframes and estimated project costs. More detailed design, and capital and environmental planning are accomplished under an individual airport's master plan.

d. The FAA's *National Plan of Integrated Airport Systems (NPIAS)* supports the FAA's strategic goals for safety, system efficiency, and environmental compatibility. The NPIAS identifies specific airport improvements that will contribute to the achievement of those goals. Metropolitan, state, and multi-state aviation system planning fits between the FAA's national planning effort, as documented in the NPIAS, and the more comprehensive master plans prepared for individual airports. It feeds information "up" to be consolidated into the NPIAS and "down" to provide goals and development recommendations for individual airports. The airport system planning process also clarifies Federal, state, and local sponsor objectives, and helps make development of airports part of a regional transportation system.

e. Airport system plans should be consistent with the National Airspace System (NAS) Architecture, which details operational concepts, mandatory schedules, system requirements, human and physical resources, and regulatory policies essential for

maintaining the safety as well as capacity of the NAS. The NAS Architecture can be found at http://www.faa.gov/nasarchitecture.

202. GOALS OF PROCESS

a. The overall goal of any airport system planning process is to ensure that the air transportation needs of a state or metropolitan area are adequately served by its system of airports, both now and in the future.

b. Airport system planning processes should result in products that can be used by the planning organization or individual airport owner or the FAA in determining future airport development needs. Planning agencies, along with the FAA, should enter into the process committed to the goal of developing useable end products that will result in implementation of an aviation system that effectively meets user and community needs. The process should focus on the development of a thoughtful, well coordinated, and practical plan, including project scheduling, as well as on the interagency and public coordination needed to successfully put the plan into effect. An airport system plan should outline the organizational structure, authority, and responsibility for implementation and should provide a realistic assessment of needs and resources. The plan should also provide guidance and input for the preparation of airport master plans and airport capital improvement plans and serve as an important contribution to the National Plan of Integrated Airport Systems.

203. DISTINGUISHING CHARACTERISTICS OF AIRPORT SYSTEM PLANNING PROCESSES

Figure 3 below illustrates the characteristics that define a specific airport system planning study, as follows:

a. The most obvious distinguishing characteristic of an airport system planning process is its geographic scope. The scope of the plan can include several adjacent states in a region, one individual state, or a specific metropolitan area.

b. A key attribute of a system planning study is the implementation authority that a particular planning agency has been given. Most state aviation agencies can implement system recommendations using legislative and funding mechanisms.

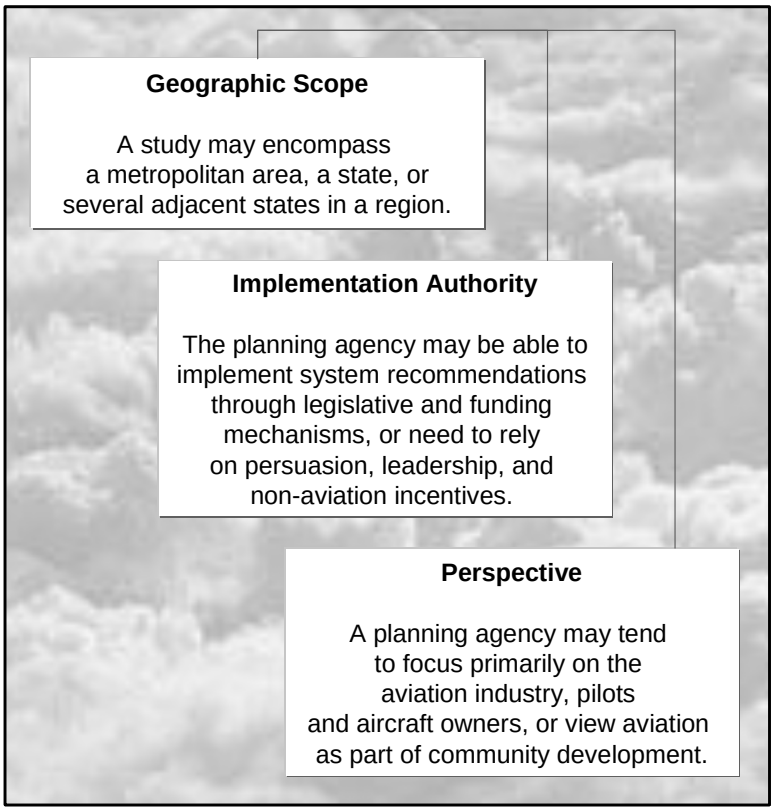
   A metropolitan planning agency may be able to influence airport development through persuasion, leadership, or non-aviation incentives such as surface transportation improvements. The agency may also influence development through regional planning approval processes. For a metropolitan planning organization in an air quality non-attainment area, air quality conformity (both transportation and general conformity) can be an important vehicle for implementing airport system plans, because airports undergoing major expansion using federal funds must demonstrate that their anticipated growth is reflected in air quality budgets in State Implementation Plans.

   Multi-state planning efforts may include participation by local airports that have the direct ability to implement study recommendations at their own facilities.

c. Different planning entities each have their own perspectives on the airport system planning process. The state aviation agency is typically (but not always) focused primarily on statewide aviation and the associated community of pilots, airports, airlines, and aviation system users. A metropolitan planning organization is more likely to be oriented to local aviation-related community development issues, surface access and transportation issues, as well as the role of air transportation in the larger multi-modal transportation system. Aviation is often a minor component of the agency's overall planning responsibilities. An airport sponsor concentrates directly on the user needs and community concerns that are specific to its facility.

d. These distinctions affect the focus and methodologies used during the airport system planning process. Understanding these distinctions and how they impact the scope of the system plan helps in deciding which studies should be conducted to meet the needs of each sponsor. Appreciating how state airport system planning relates to other airport planning activities at the metropolitan and local levels of government is important to the formulation of a productive continuous planning process. Planning for metropolitan areas should complement state and the local airport's planning for those locations.

Figure 3: Distinguishing Characteristics of Airport System Planning



204. ROLE OF THE FAA

a. The FAA's overall role in the airport system planning process is to provide technical advice, financial support, and expertise in Federal policy and legislative issues. The local FAA Airports Office participates in many of the process elements, including:

1) Development and approval of the scope of work;

2) Monitoring adherence to Federal requirements;

3) Providing technical guidance on planning, engineering, financing, and environmental matters;

4) Providing access to FAA expertise in other areas, such as ATO (air traffic) and flight standards;

5) Assisting in and encouraging plan coordination with Federal agencies, such as the Federal Highway Administration (FHWA) and Federal Transit Administration (FTA), as well as with state, regional and local planning agencies;

6) Approving forecasts and airport layout plans;

7) Incorporating plan recommendations into the NPIAS;

8) Developing a national Airports Capital Improvement Plan (ACIP); and

9) Coordinating funding recommendations among state agencies, metropolitan planning organizations, and airport sponsors.

The FAA can also be a valuable conduit in disseminating the results of airport system planning to state and local planning agencies, airport sponsors and surface access planners. The agency also provides financial and technical support for research studies of innovative planning concepts. The FAA also approves the system plan forecasts that justify the timing of Airport Improvement Program (AIP) projects. As defined in FAA Order 5100.38, *Airport Improvement Program Handbook*, if the system plan forecast exceeds the FAA's terminal area forecast (TAF) by more than ten percent in the first five years, the difference must be reconciled by either changing the TAF, the system plan forecast, or both. Further guidance on FAA's review and approval of aviation forecasts is described in Paragraph 506 of this advisory circular.

b. The FAA can provide financial assistance for eligible airport system planning projects through AIP. The local FAA Airports Office acts as the overall project administrator for the grant, ensuring that each task is successfully accomplished as specified in the scope of work. Planning projects that are eligible for AIP funding include integrated system plans for networks of airports within metropolitan areas and states, interim plan updates and reappraisals, and special and strategic planning studies. FAA Order 5100.38, *AIP Handbook*, and Chapter 4 of this advisory circular provide more details on project eligibility for AIP funds.

205. ROLE OF THE STATE AVIATION AGENCY

a. An aviation agency is typically authorized by state law to engage in airport system planning. It is normally under the state's aviation organization located within the Department of Transportation, an aeronautics commission, or another state planning agency. A planning agency means any agency designated by the FAA Administrator that is authorized by the laws of the state or states, or political subdivisions concerned, to engage in area wide planning for the areas in which FAA grant assistance is to be used. In addition, AIP funds may be awarded to American Samoa, District of Columbia, Guam, Northern Marianas Islands, Puerto Rico, and Virgin Islands. AIP funding may also be provided, at least through the end of fiscal year 2007, to the countries aligned with the United States in a Compact of Free Association, including Federated State of Micronesia, Republic of the Marshall Islands, and Republic of Palau. An agency's eligibility to receive AIP grants is defined in the FAA Order 5100.38, *AIP Handbook*, under sponsor eligibility. A legal opinion supplied by the state agency applying for the grant showing that state law permits the applicant to undertake the Federally assisted project is a sufficient basis for determining eligibility.

b. The state aviation agency's role in airport planning, development, and regulation often determines the scope of its system planning process. Depending on the involvement of the state agency, the airport system plan might include eligible elements that:

1) Inform the state budgetary process with assessments of resource requirements, including timing and priorities;

2) Provide the state with information to facilitate elected officials in making aviation planning and development decisions consistent with state goals and objectives, and with an airport's current Airport Layout Plan (ALP);

3) Provide individual airport sponsors with policy, technical direction, and American Society of Testing and Materials (ASTM) standards for master planning, along with budgetary guidelines;

4) Provide policy guidance and act as a management and coordination resource for metropolitan and multi-state planning efforts;

5) Assist in coordination with other state, regional, and local planning organizations having aviation-related interests.

6) Provide the FAA with recommendations for inclusion in the NPIAS;

7) Contain special studies that provide the aviation community and the general public with information on pertinent airport-related issues; and

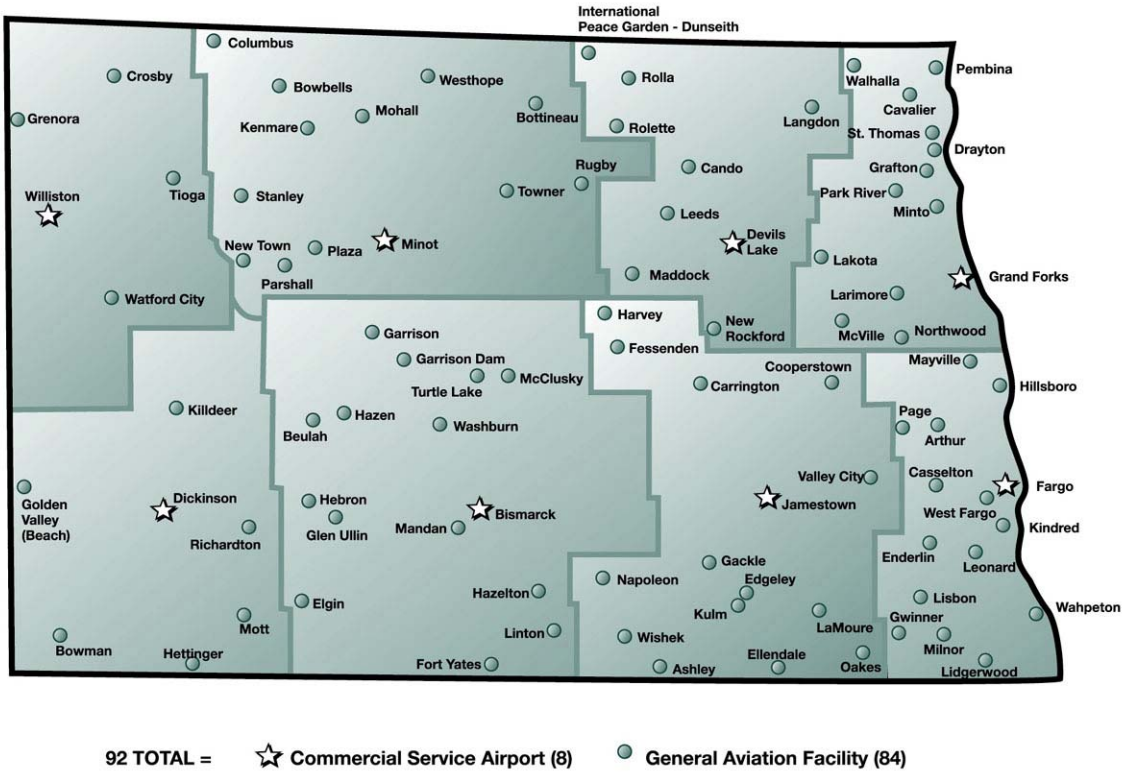
8) Support a continuing airport planning process, ensuring that aviation issues are continually and effectively evaluated.

Some, but not all, of the above elements are eligible for funding under AIP. For example, funding for developing legislation is normally ineligible.

c. The factors considered in determining the scope of system planning for a particular state include the aviation responsibilities vested in the agency by the state legislature; funding available to the state agency for administration and project development; staff size and capability; historical involvement of the agency in the continuous airport system planning process; aviation responsibilities of other state and local agencies; and the relationship of the state agency to the local FAA Airports Office and airport sponsors.

d. For states that play a larger role in airport issues and decisions, the system plan will be more extensive, including a detailed capital improvement plan, a number of special studies, and regular plan updates. The process elements will be more comprehensive, and will address aviation-oriented objectives regarding safety, efficiency, level of service, and economic self-sufficiency. In most states with active aviation programs, a continuous airport system planning process is already in place, which resulted from the preparation of state aviation plans over time. In this role, the state's process assesses the effects of changes on the variables and issues in the plan to maintain its responsiveness to current and forecast conditions, and allows for maintenance of accurate capital improvement plans for the state's airports. Figure 4 illustrates an example of an inventory map from an active state's airport system plan, which takes a wide-ranging look at its airport needs. This map depicts the categories of North Dakota's public airports.

Figure 4: Sample Map from a State Airport System Plan



Source: North Dakota Aeronautics Commission, 2003

e. For states with a lesser involvement in the development of their airport systems, the plan is likely to be basic, identifying only an airport system, airport roles, and broad recommendations of project development. The plan may be limited to determining airport development requirements for inclusion in the NPIAS. Its principal value to the state may be including critical portions of the state plan in the NPIAS, providing justification and priorities for state funding, and establishing eligibility for Federal financial assistance under the Airport Improvement Program.

f. Block grant states act as FAA's agent in AIP grant administration for their non-primary airports. They have responsibility for most financial, planning, environmental, engineering, compliance, and administration matters related to these grants. Airport system plans in these states often focus on issues that allow for the efficient planning and development of the airports included in the state block grant program.

g. All state aviation agencies, whether or not they are block grant states, can initiate studies under the airport system planning process. They provide leadership throughout the process in managing the airport system planning projects, selecting the consultants and administering their contracts, and acting as an advocate for the state's transportation objectives. For each system planning project, they ensure that time schedules are being met, work activities and coordination are accomplished satisfactorily, expenditures are reasonable and justified, and other performance goals are achieved. Many states also provide financial support for airport system planning projects, as well as for the airport development projects that result from the planning process.

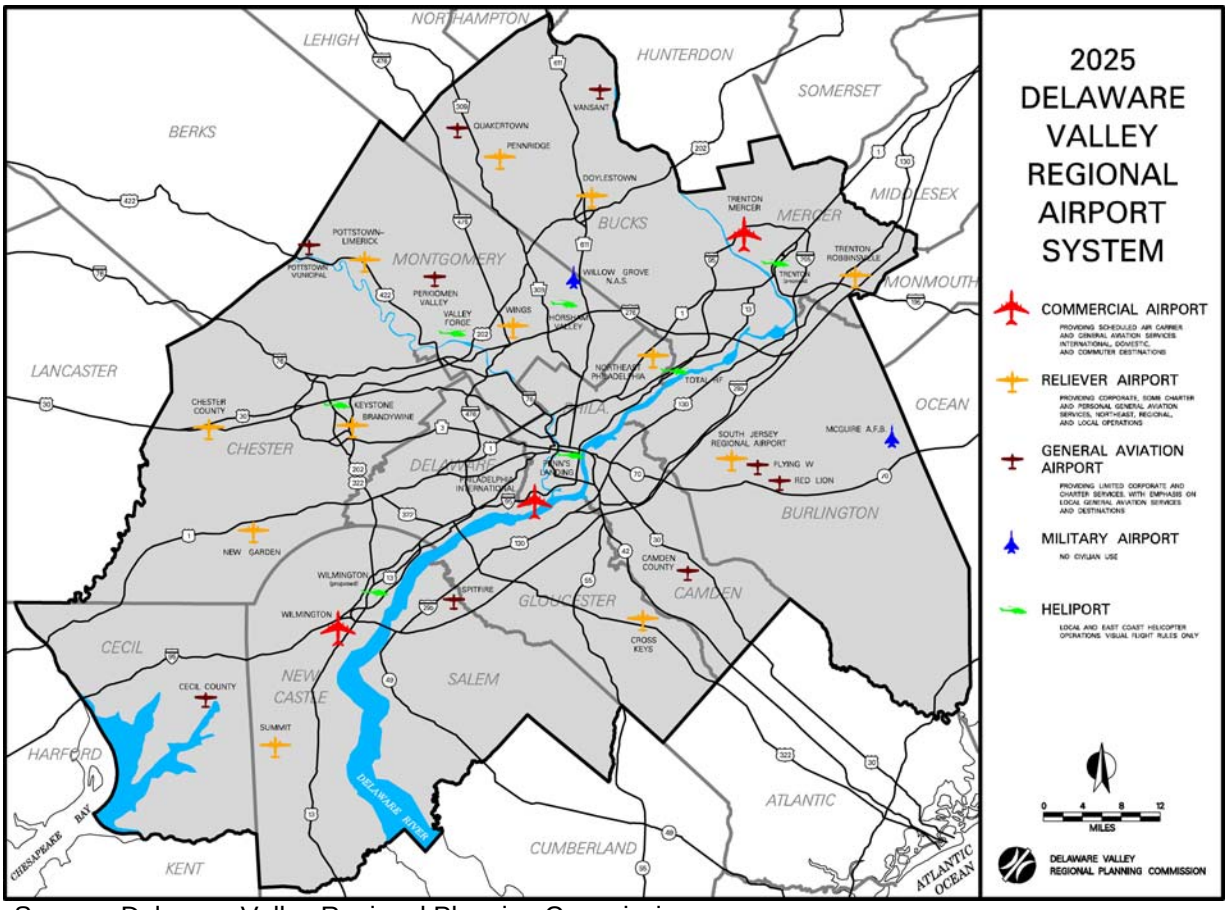
206. ROLE OF THE METROPOLITAN OR REGIONAL PLANNING AGENCY

a. The role of metropolitan and/or regional planning organizations in the airport system planning process is determined by their legislative authority and the aviation expertise they possess. Typical agencies authorized to conduct these studies are Metropolitan Planning Organizations (MPOs), Councils of Government (COGs), and Regional Planning Councils or Commissions (RPCs). These agencies are made up of representatives from local government and transportation authorities. The area included in a metropolitan planning organization's airport system study should be coincident with its jurisdictional boundaries. The variation in the roles of metropolitan planning organizations in airport system planning is even more pronounced than that of state agencies. Consultations between the local FAA Airports Office, the state aviation agency, and local airports are needed to determine what role, if any, the regional or metropolitan planning organization will have in airport system planning for its region. The discussion can also include a review of the work items that are eligible for AIP funding.

b. Nationwide, some of these agencies manage airport system planning studies for their area; are proponents for aviation enhancement and preservation in the region; identify critical regional aviation issues; and act as the contact point for regional surface access, air quality, and land use planning studies. Many work to increase the accessibility and mobility options available to travelers and shippers, including enhancing the integration of the entire regional transportation system. These agencies can act as a catalyst in implementing airport system components, resolving local conflicts, promoting airport

development funding priorities, and proposing the distribution of grants among eligible projects. They also may define a specific metropolitan area in a state that stands alone or a major metropolitan area that spans a multi-state region that would benefit from special aviation studies. These special studies are conducted in such areas as aviation-related environmental impacts (i.e. noise, air quality, and environmental justice), airport economic impacts, airport physical capacity, regional airspace analysis, and airport ground access. Figure 5 shows the complexity of airport categories considered in the Delaware Valley Regional Airport System, which includes parts of Delaware, New Jersey and Pennsylvania.

Figure 5: Sample Map of a Regional Airport System



Source: Delaware Valley Regional Planning Commission

c. Metropolitan planning should not be considered a separate effort, but should complement the ongoing state airport system planning process. Demand forecasts in the metropolitan airport system plan should be reviewed for incorporation in, or compatibility with, the state system plan. In some cases, where a state planning agency focuses on general aviation, they can defer to the regional planning organization to prepare forecasts for commercial airports in a metropolitan area. Regional and metropolitan planning organizations and state agencies should work closely together to assign responsibilities and roles, and to agree upon a process of sharing data and feeding recommendations to

the FAA for inclusion into the NPIAS. It is important that the local FAA Airports Office be an active participant in this coordination effort. To ensure that state and metropolitan aviation plans are adequately integrated, state agencies should participate in the technical advisory committee meeting of metropolitan system plans and vice versa. Through airport advisory committees, individual airports should also participate in the metropolitan airport system planning process. Representatives of individual airports can identify issues, constraints, and opportunities at their airports and provide updates on the status of development projects.

d. Where metropolitan areas span several states, the regional planning agency should also consider the relationships among the various state airport system plans. Multi-state metropolitan systems are not always identified in individual state airport system plans; metropolitan planning studies can exist separately and should complement each state planning document, assisting with regional priorities for the state's recommendations. Because metropolitan areas are often a center of aviation activity, their facility recommendations should be reflected in the state's plan. In some cases, metropolitan planning organizations may not make specific facility recommendations, but instead present a range of options.

e. The factors to be considered in determining the appropriate role of a particular metropolitan or regional planning organization in airport system planning include the aviation responsibilities vested in the agency by the state legislature, the funding available to the MPO for administration and project development, its staff size and capability, historical involvement of the agency in the continuous airport system planning process; aviation-related responsibilities of other state and local planning agencies, and the relationship of the MPO to the state aviation agency, the local FAA Airports Office, and airport sponsors. Surface transportation, airport access facilities, and land use impacts are important elements to consider in the metropolitan airport planning and project development process.

f. Airport system planning in areas that include large or medium hub airports (airports that have 0.25 percent or more of annual U.S. enplanements) can be conducted by a metropolitan or regional planning organization when that agency has the interest in and capability to conduct such planning. These metropolitan airport system plans may differ in the coverage of unique capacity and airspace issues that are present in a region with a large or medium hub airport. Metropolitan areas with a large or medium hub are routinely eligible for system planning grants, as defined in the *AIP Handbook*, which states: "Metropolitan agencies may request separate funding from FAA to supplement state planning if airport problems require a higher level of effort in the local area than would be provided as part of a state-wide analysis." FAA's National Planning Division considers exceptions to the hub airport criterion on a case-by-case basis.

g. When a metropolitan or regional planning agency acts as a sponsor for an AIP grant, it continuously monitors the system planning project, and selects a consultant, when applicable. Similar to a state aviation agency's responsibilities under an AIP project, the metropolitan or regional planning agency ensures that time schedules are being met, work activities and coordination are accomplished satisfactorily, deliverables are useable, expenditures are reasonable and justified, and other performance goals are achieved.

h. To gain a greater understanding of the role of metropolitan planning agencies in the overall transportation planning process for a region, planners should review a briefing book entitled *The Metropolitan Transportation Planning Process: Key Issues*, which was published jointly by FHWA and FTA. It can be accessed at http://www.planning.dot.gov/documents/briefingbook/bbook.htm.

207. MULTI-STATE AVIATION SYSTEM PLANNING

a. In certain large metropolitan areas, the air service market extends beyond state borders to include multiple airports in adjacent states. Some of the airports may be located outside the jurisdiction of a specific metropolitan planning agency, thereby requiring cooperation among multiple state and metropolitan areas to address regional demand. The techniques and elements found in metropolitan or state airport system planning also apply to a multi-state study, except that there may be a number of parties (state agencies, MPOs, local entities, individual airports, and others) more actively involved in the planning. The roles of each party should be determined prior to the start of the planning effort. For example, the multi-state airport system planning studies done for the New England Region are a collaborative effort of the six state aviation agencies, passenger jet service airports, FAA, and the New England Council. The sponsors for the AIP grant are Massport and the Massachusetts Aeronautics Commission.

b. One AIP grant can be issued to a lead planning agency to organize and conduct a multi-state airport system planning study, or separate AIP grants can be given to the various state and regional planning agencies. However, the work must be coordinated to ensure that the separate studies are completed concurrently, with consistent data and analysis.

c. A multi-state airport system planning study should inventory the regional airport system and facilities. It also should identify regional air transportation demand, assign demand to airports, prepare forecasts, determine the opportunity to recapture traffic leakage at a local airport, consider how air service and general/recreational aviation changes might impact the regional system, study interconnectivity with other transportation modes, and identify specific issues from a regional perspective. The total aviation demand should be distributed geographically, through a review of demographic data, passenger surveys, and various other data. Once the demand is distributed, it can be allocated to individual airports in the system, based on such factors as airport location, ease of access, level of services, and costs of air service.

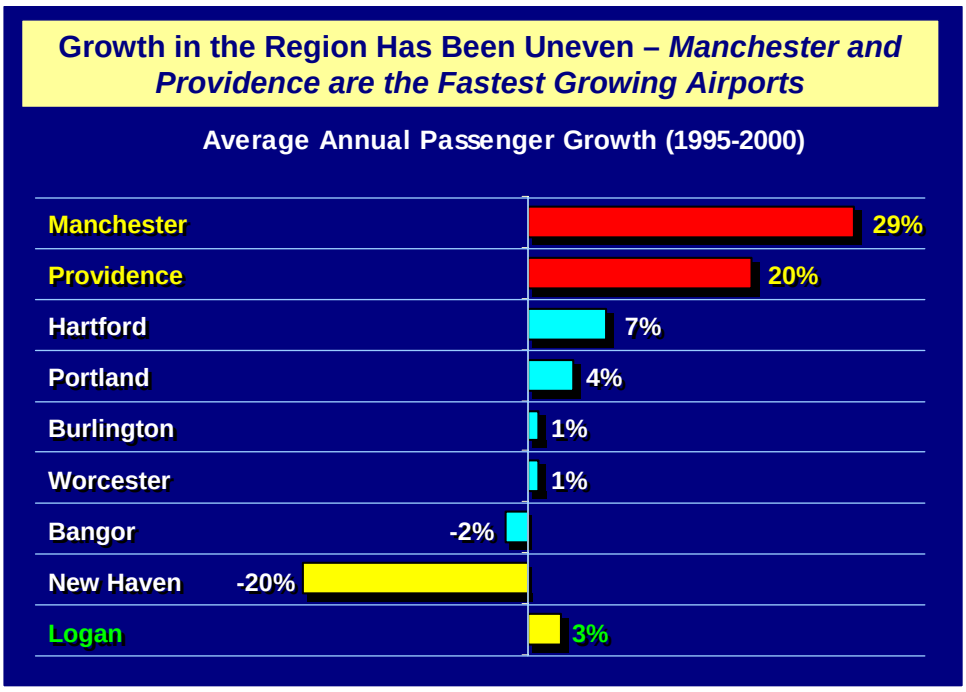
d. Airport sponsors in the study area should use the findings and recommendations from the study to agree on an implementation plan and airport roles, and to recommend a development plan that will serve as a guideline for the allocation of Federal, state, and local funds.

e. Since the airports in a multi-state system function together to meet regional air transportation demand, one airport may serve as a transcontinental and international airport while others support short-haul regional service. As an alternative to adding airfield or terminal capacity at a congested airport, a multi-state aviation system plan can look at the practicality of assigning present and future demand to underutilized airports that serve the regional air transportation market. However, before attempting such an

approach, the planners must evaluate the size and nature of regional passenger and cargo demand; the factors that would cause such demand to divert to other airports; and the institutional, economic, and political barriers that need to be overcome to permit development of a regional system of airports. Planners should also forecast the ability of an airport(s) to maintain a suitable airline schedule that would ensure passenger convenience, adequate levels of service, and competitive fares. As an example, Figure 6 shows the average annual passenger growth rates at the airports in the New England states surrounding Boston Logan Airport from 1995-2000.

f. The development of alternate airports should enhance airline profitability and be compatible with their route systems. Only after these market issues are understood would it be appropriate to assign demand to and plan development at an alternate airport. The introduction of new service at underutilized airports in a large metropolitan region often results in sudden shifts in activity. Reliable market information is important in such studies. These data can be obtained from travel agent surveys, travel offices of large local corporations, properly conducted passenger surveys, and the Department of Transportation's Bureau of Transportation Statistics household surveys. The study should also consider general aviation service and demand, particularly with regard to the development of reliever airports. Such a plan may require coordination with a number of state aviation planning and environmental offices when airports are in multiple states.

Figure 6: Sample Growth Chart from a Multi-State Airport System Plan



Source: *New England, At the Forefront of Building a Regional Aviation System*, sponsored by Massport and the Massachusetts Aeronautics Commission

208. SYSTEM PLANNING AND THE NATIONAL PLAN OF INTEGRATED AIRPORT SYSTEMS

a. Airport planning in the United States is performed at several levels of government. The FAA is responsible for the development and maintenance of a national system of airports, which is identified in the *National Plan of Integrated Airport Systems (NPIAS)*. The NPIAS Report to Congress includes a listing by state and role of those public-use airports important to the national air transportation system. The airports are publicly owned facilities, except those privately owned airports that are designated as relievers by the FAA. The report is updated and published by the FAA and provided to Congress on a biennial basis. An airport must be included in the NPIAS to be eligible for Federal financial assistance under the Airport Improvement Program. The NPIAS report also lists the cost of warranted development over a five-year period for each airport. Central to the NPIAS is a condition and performance report on the national airport system, which focuses on the availability of airports to the nation's citizens, surface access to airports, pavement condition, airport noise, airfield capacity, safety, and financial performance.

b. Most of the data and analysis in the NPIAS is based upon an individual airport's master plans and its capital improvement plans (CIP); state and metropolitan airport system plans; and national forecasts. The state system plan includes airport locations considered important to state air transportation objectives, as well as those that are of sufficient interest to be incorporated into the NPIAS. An important function of the state planning process is to identify airports that meet national interest criteria but which might not be identified as such by the FAA alone. To ensure that the NPIAS appropriately reflects airport system plans developed at the state and metropolitan level, aviation planners need to have a clear understanding of the criteria that define national interest, NPIAS entry, and development. These criteria are identified in FAA Order 5090.3, *Field Formulation of the National Plan of Integrated Airport Systems (NPIAS)*. Prior to the start of the state or metropolitan system planning process, the planning agency should reach agreement with the appropriate local FAA Airports Office on how the recommendations that are a result of the plan will be incorporated into the NPIAS and into the individual airport's CIP. This advocacy role is vital in the "feeding up" process, and how well this is achieved is an indication of the effectiveness of the airport system planning process. FAA financial support of and participation in these state and metropolitan planning studies is vital to the development of an accurate and up-to-date NPIAS.

c. System plans and special studies play a key part in the development of airport role, condition, and performance information for the NPIAS. However, airport system plan recommendations on capital development at individual airports or at a system of airports are usually secondary to master plan information.

d. The FAA maintains the NPIAS in a common database with its national Airports Capital Improvement Program (ACIP). The FAA's ACIP serves as its primary planning tool for systemically identifying, prioritizing, and assigning funds to critical airport development and associated capital needs for the National Airspace System (NAS). The ACIP data provides greater detail than the NPIAS, including the anticipated sources of funding for specific development expected to start within the next three to five years. The FAA, in cooperation with the state and regional aviation planning agencies, and individual airport

sponsors, formulates the national ACIP, which provides the basis for distribution of AIP grant funds. The FAA uses its National Priority System (NPS), a combination of quantitative and qualitative evaluation of airport development, to establish and justify AIP expenditures. The NPS categorizes airport development in accordance with agency goals and objectives. Further guidance on the development of the ACIP and use of the NPS can be found in FAA Order 5100.39, *Airports Capital Improvement Plan*.

Figure 7 shows the location of a new NPIAS reliever airport built in Virginia that was an outcome of the state airport system and master planning processes. The Stafford Regional Airport, a reliever to Reagan Washington National Airport, opened in December 2001.

Figure 7: A New Reliever Airport on Opening Day

Source: Photo of Stafford Regional Airport in Virginia provided by the FAA Washington Airports District Office

209. DEFINITION OF AIRPORT ROLES

a. In the NPIAS, airport types are defined as primary, commercial service, reliever, or general aviation. Commercial service airports are public airports receiving scheduled passenger service and having 2,500 or more enplaned passengers per year. Primary airports have more than 10,000 annual enplanements. A general aviation airport is defined as an airport that does not have scheduled commercial service. A high-capacity general aviation airport in a major metropolitan area can be designated as a reliever in the NPIAS by the FAA.

b. In the airport system planning process, some states or metropolitan planning organizations may use different definitions of airports from those found in the NPIAS in an effort to classify current and forecast local aviation needs. They may use terminology such as business class, recreational, local service, general utility, or basic utility to describe individual airport roles. For consistency, especially in determining airport funding categories, the NPIAS definition of airport roles should be adhered to in airport system planning documents. However, to better define the role of smaller airports in the system, some planning agencies may find it helpful to further classify general aviation airports into such categories as recreational or business. The agency can develop "standard" airport amenities associated with these local classifications, which would provide a given level of service for the airport class and an improved methodology for focusing funds on improvements to meet the "standards."

210. SYSTEM PLANNING FOR NON-NPIAS AIRPORTS

a. During the airport system planning process, many states and metropolitan organizations include non-NPIAS airports that are privately owned, public-use facilities. Publicly owned, public-use airports that have too little activity to qualify for inclusion in the NPIAS are also examined. However, during this process, most do not evaluate airports that are only for private use. While most privately owned, public-use airports are not eligible for Federal (and sometimes state) financial aid, they constitute an existing resource that should be protected and might eventually be converted to public ownership to meet aviation needs and/or to ensure their longevity. The planning agency should coordinate with the local FAA Airports Office to decide the criteria to be used in determining which airports will be included in the system plan.

b. Airports that are not included in the NPIAS should be included in system planning projects that are funded by an AIP grant only to the extent that they play an essential role in the state or metropolitan airport system. However, for AIP grant eligibility purposes, work on non-NPIAS airports is limited in cost to work activity that is nominal, such as general inventories, forecasting, or facility requirements. Other system planning projects involving more significant costs, such as pavement or obstruction surveys, are ineligible for AIP grants at airports that are not included in the NPIAS. The local FAA Airports Office can provide additional guidance on eligible AIP work at non-NPIAS airports.

211. RELATIONSHIP TO AIRPORT MASTER PLANS

a. An airport master plan is a detailed, long-term development plan for an individual airport. They are prepared to support the modernization or expansion of existing airports, or the creation of new airports. Typically, operators of individual airports prepare airport master plans, usually with the assistance of consultants. In some cases, depending on the complexity of an airport, state aviation agencies may prepare airport master plans for multiple general aviation facilities under one AIP system planning grant. Information from special analyses and studies at multiple airports developed by states or regional planning agencies can be useful in the master planning process and may decrease master planning resource requirements for individual airports. Conversely, state and metropolitan airport system plans should incorporate information from individual airport master plans to reduce duplication. In some instances, details provided in an individual

airport's new master plan might facilitate the need for a revision to its role in the current state system plan. Airport master planning efforts involve collecting data, forecasting demand, determining facility requirements, preparing environmental action plans, detailing long-range development plans and financial implementation schedules for a specific airport, and preparing Airport Layout Plans (ALP) drawings. The approved ALP is the most important product that results from the master planning process. It is required by the AIP grant assurances; and it serves as a record of aeronautical requirements, both current and future, and as a reference for local community deliberations on land use and zoning proposals, and budget issues.

b. State and regional airport system plans can provide information, direction, and policy guidance for airport master planning. The state or metropolitan plan identifies an airport's present and future role in the system, giving direction for improvements needed to meet the requirements of its aeronautical role. An airport system plan provides forecasts (at least for NPIAS airports) to be considered as a basis during the master planning process, describes the roles of various airports and the distribution of traffic among them, and provides an estimate of the future development warranted. Of importance to an individual airport operator is the extent and priority of financing capital improvements indicated in the state system plan's development program.

c. Often communities, airport sponsors, or other aviation interests propose development of a new airport to replace or supplement existing airports in a community. Sometimes airport system plans—state and metropolitan—are used to conduct general site selection, feasibility, or risk assessment studies for these new airport proposals. Preparation of the airport master plan is accomplished once the sponsor for the new facility has been determined.

212. RELATIONSHIP TO AIRPORT CAPITAL IMPROVEMENT PLANS

a. An airport Capital Improvement Plan (CIP) is the compilation of proposed projects for an individual airport for a three- to five-year period, and includes costs, priorities, AIP eligibility, and expected funding sources for each element.

b. The state or regional system planning document shows the timing for and estimated costs of proposed airport development. It provides a mechanism to assist in the preparation of an airport CIP for the facilities included in the plan, incorporating the objectives of the state, and concentrating on funding priorities that are consistent with its aviation goals and policies. The state should rely, when possible, on the development and schedules recommended in individual airport master plans, because they are more detailed than those prepared in a system planning process. The state can evaluate an individual airport CIP and put those development items into the system plan that are consistent with its definition of airport roles, address identified aviation needs, and support realistic funding scenarios. In cases where no airport master plan exists or the plan is outdated, the state should develop airport capital improvement requirements for the facility using current planning methodologies and standards, found in FAA's *Airport Master Plan Advisory Circular*.

213. CONSIDERATION FOR COMPATIBLE LAND USE/ZONING REGULATIONS

a. Land use control and zoning requirements are functions of state or local governments. Planners should recognize the vital need for compatible land use requirements around airports, and these should be considered throughout the state or metropolitan area during the airport system planning process. Local communities should be encouraged to implement land use and zoning regulations in an effort to preserve and protect their local airport facilities. Compatible land use in the vicinity of an airport is necessary to protect the public's health and welfare, while preserving the airport's capability to efficiently meet aviation transportation needs.

b. Communication among the state and metropolitan aviation organizations, local community planners, and the local FAA Airports Office concerning proposed airport development is vital in enacting compatible land use initiatives and zoning regulations. This can be accomplished by including representatives of these organizations in a technical group during the system planning study. Through this coordination, recommended airport development programs and policies can be verified for consistency with local economic, environmental, land use and zoning, and surface transportation plans.

c. The complexity of compatible land use issues varies by airport location. Often, the local community establishes regulations specific to its area, based on general guidance from the FAA, or with the strong support and detailed recommendations from the state aviation agency. Some state or metropolitan aviation agencies work directly with their local legislative bodies to implement limits on tall structures or zoning laws that increase aviation safety by protecting against both the construction of tall structures and development of incompatible land uses around airports.

d. General land use studies to consider the impact of airport development on the environment and the protection of airports from neighboring areas are eligible under AIP. These efforts are limited to area-wide applications or specific classes of airports.

214. SUPPORT FOR AIRPORT AND AIR SERVICE PRESERVATION

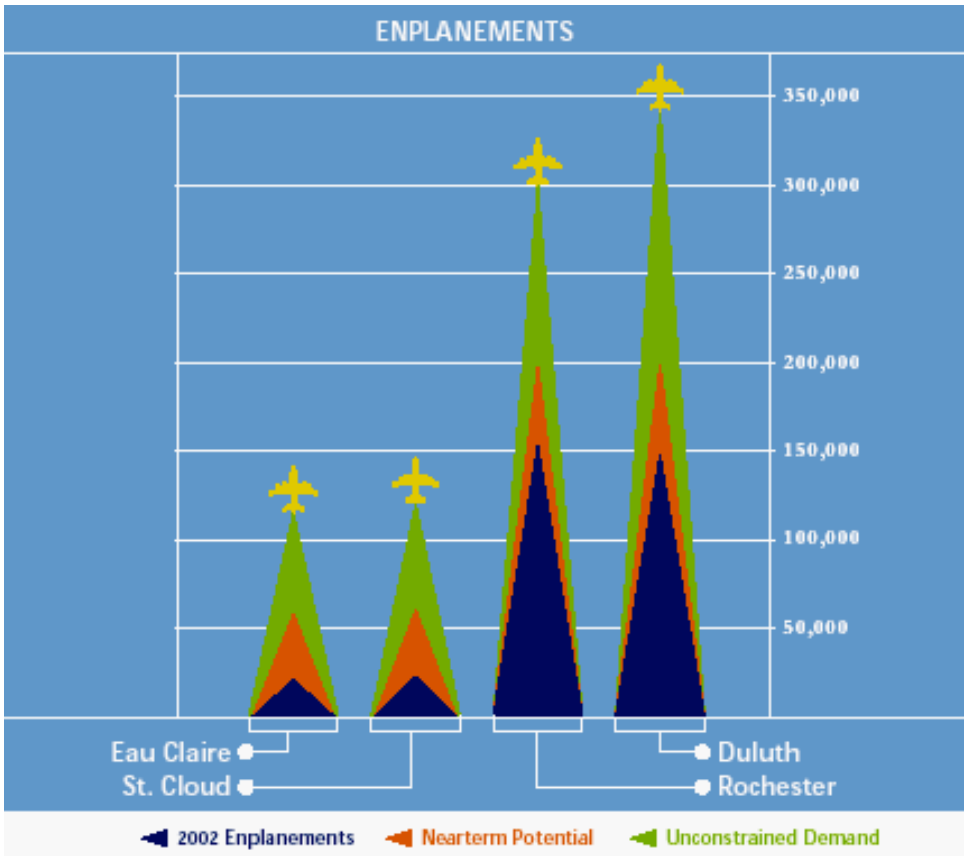
a. Gaining the support of the local community and legislative representatives to preserve or enhance a particular airport is critical in establishing a viable system of airports. Because airport system planning evaluates the performance of the state or metropolitan system by considering the interrelationship of its member airports, the resulting report defines the role of public-use airports in meeting current and future air transportation needs. When a justified need is shown in the most recent airport system plan, gaining the support of the local community to preserve and develop an airport is much easier.

b. State or metropolitan aviation agencies often prepare air service studies as an aid and inducement for airlines when they consider use of alternative airports and revisions to their flight schedules. However, AIP funding specifically for airline operating, or airport promotion or marketing studies are normally ineligible. An approved passenger forecast for a particular airport in a statewide or regional air service study can provide support for

a local community when it is working to encourage an airline to maintain current service or initiate vital new service into its airport.

Figure 8 is an illustration from an air service study conducted for the Minnesota Office of Aeronautics in partnership with the Wisconsin Bureau of Aeronautics. This air service study was initially intended to identify long-term capital improvement needs directly linked to an expanded role for perimeter airports located just outside the Minneapolis-St. Paul metropolitan area. As part of the effort, the Minnesota Office of Aeronautics established an Advisory Committee, which was made up of the parties listed in Figure 9 below.

Figure 8: Sample Air Service Analysis Chart



Source: *Tier 2 Air Service Study*, Minnesota Office of Aeronautics, June 2003

Figure 9: Sample Advisory Committee

- FAA
- Minnesota Office of Aeronautics
- Wisconsin Bureau of Aeronautics
- Metropolitan Council
- Metropolitan Airports Commission
- Chippewa Valley Regional Airport
- Duluth International Airport
- Rochester International Airport
- St. Cloud Regional Airport

Source: Minnesota Office of Aeronautics

The *Tier 2 Air Service Study* began as a detailed analysis. However, its most successful result was the regular meetings of the Advisory Committee, where the members sat together and discussed how to better cooperate, strengthen their respective business centers, and jointly market airport resources. Through this study, the state and metropolitan planning agencies, and the regional airports yielded a better inter-regional system of airports that meets the local communities' air service needs.

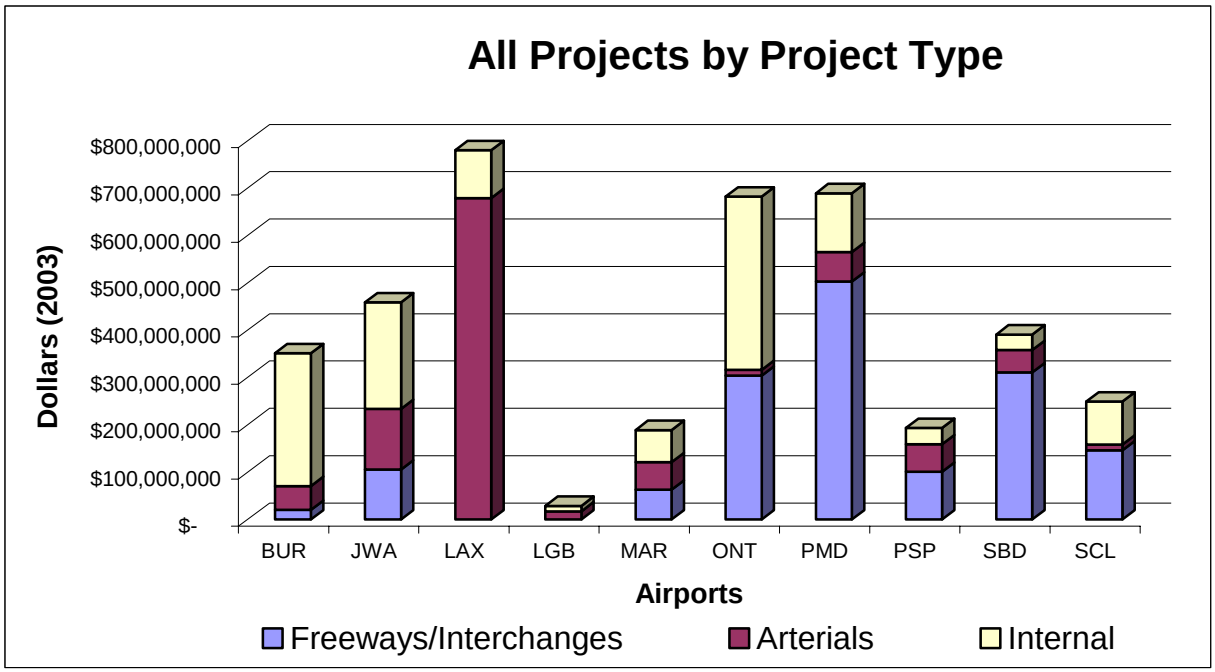
215. INPUT TO INTER-MODAL TRANSPORTATION PLANNING PROCESS

a. An airport should be viewed as an element of the larger transportation system that serves a community, metropolitan area, or state. Ground access to an airport is critical to its effective operation. Agencies responsible for the development of highways, railroads, and transit can be helpful in improving surface access to an airport for passengers, air cargo operations, and congestion reduction. An early dialogue between aviation interests and surface transportation agencies is vital to ensure that highway and transit improvements are coordinated with airport expansion plans. Similarly, significant airport development projects should be coordinated with the appropriate state and metropolitan transportation planning agencies, especially if the plans may affect surface access and movement of air cargo. State and regional system planners should be aware of the parties involved in surface transportation planning, their roles, and funding availability. These parties include the Federal Transit Administration, Federal Highway Administration, Federal Railroad Administration, state highway departments, local bus and rail transit agencies, private transportation providers, metropolitan planning organizations, and other city and county transportation agencies. Airport sponsors, working with state and metropolitan planning organizations, should also be active participants in development of statewide and metropolitan transportation plans and transportation improvement programs.

Figure 10 below, prepared by the Southern California Association of Governments (SCAG), identifies the projects and related funding needed for efficient access to the ten

commercial airports in the region from its 2030 Aviation Plan. Individual airport needs were determined by forecast growth in airport-related traffic added to forecast background and through traffic, capacity of existing ground access facilities, and related factors. SCAG included these airport ground access data in its Regional Transportation Plan.

Figure 10: Sample Airport Ground Access Data Chart



Source: 2004 Regional Transportation Plan Update – Airport Ground Access, Appendix D6 –Technical Approach, Southern California Association of Governments (SCAG).

b. In December 1996, the FAA and FHWA produced a report entitled "Inter-modal Ground Access to Airports: A Planning Guide," which presents a step-by-step process for ground access planning, discusses surveys and data collection, examines alternative ways of addressing ground access issues and describes access implementation plans.

c. Metropolitan planning organizations in air quality non-attainment or maintenance areas are required by Federal law to prepare regional transportation plans (RTPs) every three years, or every five years if they are not in those areas. The regulations require inclusion of access to airports in the RTP as a factor to be explicitly considered, analyzed as appropriate, and reflected in the planning process products. Some states, such as California, even have more specific requirements for addressing regional airport issues in an RTP that is prepared by an MPO.

216. PLANNING STRATEGICALLY

a. Planners need to look beyond the known, the familiar, and the foreseen to be prepared for challenges and opportunities that will occur as the result of changes in air transportation

demand and supply, technology, and legislative requirements. They need to think strategically and to establish a flexible, dynamic airport system planning process, recognizing that risk is a reality of planning. This strategic evaluation can be achieved during a system plan update or can be accomplished through a separate special study. A methodology for strategic planning during the airport system planning process includes looking ahead to consider potential problems or opportunities; and then determining data collection procedures, problem analysis, the stakeholders that may be involved, areas of impact, range of feasible alternatives, and an action plan. This strategy allows the planning agency to be more flexible in altering an airport's role; better able to assess strengths, weaknesses, and risks in the plan's assumptions; and more responsive in adapting their airport system development to future changes in the aviation industry and airline market conditions.

b. As part of strategic planning, a state or metropolitan aviation planning agency can develop its own strategy that defines and documents its role in the continuous airport system planning process. The strategy may involve establishing an overall airport system planning philosophy, setting goals and objectives for the process, and defining the scope of involvement that the agency will have in maintaining a successful continuous airport system plan. A final product can be a realistic three to five-year funding scenario for the agency's system planning projects, which should be coordinated with and supported by the local FAA Airports Office. The projects included in the agency's plan can then be included in the FAA's national ACIP and considered for future Federal funding.

Chapter 3 Airport System Planning Products

301. AIRPORT SYSTEM PLAN REPORT

a. An airport system plan report is a document that identifies the system of airports that meets the air transportation needs of a state, metropolitan area, or multi-state region. The state airport system plan report (or where applicable, a multi-state or metropolitan airport system plan report) is the guiding document for assigning a current and future role to each airport and in determining development needs, expressed in estimated costs and implementation schedules, based on priorities and likely funding sources. Figure 11 shows a general aviation aircraft operating at a small airport within a state's unique airport system.

Figure 11: General Aviation Airport

b. The functions of an airport system plan are to:

1) Explain the role of existing airports and their functions within the airport system, as well as to recommend the development of new airports, which should be classified according to NPIAS definitions.

2) Describe the airports, their physical and operational features, ownership status, surface access, and aviation services and use.

3) Identify issues, constraints, and opportunities for the system of airports.

4) Describe the five, ten, and 20-year capital development programs required to maintain and improve each system airport to meet future demand, including timing and estimated costs. Where applicable, information from metropolitan area airport system plans should be incorporated into the state plan.

5) Provide a framework and policy guidance for airport master planning. The state plan identifies each airport's present and future aeronautical role in the system. It incorporates the development programs of individual airport master plans to the extent they are consistent with the airport's state-defined role.

6) Provide state, regional, and FAA planners with a forecast to reference when reviewing individual airport master plan reports. Forecasting the air service and general aviation demand/activity is essential for determining system-wide needs using FAA design criteria.

7) Provide an analysis of airport development and financial information needed to keep the NPIAS database up-to-date, and identify airports that have not been previously identified by the FAA, but do in fact meet national interest criteria. Also, identify low activity airports (and duplicative facilities) that should be removed from the NPIAS or have their roles changed.

8) Provide input to surface access agencies during the comprehensive transportation process.

9) Provide the aviation industry and the general public with information on relevant aviation issues within the context of a system planning study.

10) Assist state and local policymakers in preparing recommendations on compatible land use and tall structures zoning regulations.

11) Prepare special initiatives to address aviation issues on an ongoing basis.

302. INTERIM UPDATES: REVIEW AND REAPPRAISAL OF AIRPORT SYSTEM

a. Interim updates are a critical element of the state or metropolitan area continuous airport system planning process. They initially involve a reevaluation of the basic airport system plan report in relation to existing conditions in the local airport system. A reevaluation will be necessary when planners identify changes or constraints that affect the validity of the existing plan. Specific examples of areas that may need frequent updates include pavement condition surveys, obstruction analysis, design standards review, and airport capital improvement plans. Other elements, such as inventory, forecasts for low activity airports, and NPIAS roles, may not require as regular reappraisals. Some rural airports may not experience significant facility or demand changes until well beyond five years. Therefore, the level of analysis of plan elements will depend on the specific factors that have prompted the reevaluation.

b. Depending on the complexity of the state or metropolitan airport system, and the changes in the national or local aviation environment, interim updates of the airport system plan may be necessary every two to five years.

303. ELECTRONIC DATA SYSTEMS

a. Geographic Information Systems

A Geographic Information System (GIS) effort is eligible for funding under the Airport Improvement Program if it is needed to establish airport roles or airport development needs. A GIS system includes planning, environmental, engineering, and financial information and analyses. Consistency among GIS systems used by different aviation planning agencies is a good idea and, in the future, when a standard is defined by the FAA, planners should strive to use systems that comply with it. Until an FAA standard is set, planning agencies should coordinate their GIS efforts with the local FAA Airports Office. Eligibility requirements for funding of electronic data systems are specifically defined in the *AIP Handbook* and include acquisition, licensing, and use of commercially available software that is necessary to complete eligible elements of a planning study.

b. Airport Surveying – GIS Program

The objective of the new Airport Surveying – GIS Program is to accurately collect and maintain airport information that will support the needs of the FAA and its customers while reducing duplication and maintenance of redundant or disparate data. In preparing advisory circular guidance for this program, the FAA will establish the required data to collect, how to submit the data, the required accuracy of the data to support the intended use, and how to have the information requiring validation by the National Geodetic Survey Aeronautical Survey Program approved. The new program will create a national aviation data standard for geographic information system development and implementation, establishing a single focused information resource for the program. Once the advisory circular is available, states, metropolitan planning agencies, airport sponsors, and consultants will be able to quickly obtain the information and guidance necessary to establish, contract, and complete a surveying project. This initiative will provide the FAA and its customers with geospatially referenced airport information for airport planning, construction, obstruction analysis, airspace and instrument procedure design, as well as for publication of government flight information publications.

c. Airport Capital Improvement Program

The electronic Airport Capital Improvement Program (ACIP) for airports in a state or metropolitan airport system plan should include a three- to five-year list of recommended priority development, describing the proposed project, funding requirements (Federal, state, local) and implementation years. The ACIP should be scheduled so that projects follow a logical sequence (e.g., review under the National Environmental Policy Act precedes design) and are properly constrained (e.g., funding request is reasonable).

d. Airport Layout Plan

When an electronic ALP is prepared, it should be developed in accordance with the criteria included in FAA Advisory Circular 150/5070-6, *Airport Master Plans*. Most local FAA Airports Offices have developed an ALP checklist for use when preparing these drawings. Under a state system plan, multiple airport layout plans may be developed for a group of general aviation airports. These may include the preparation of an Airport Facility Drawing, which meets the minimal requirements for an ALP, and is done for smaller non-primary airports that are only interested in maintenance of their facilities.

e. Airport Inventory

1) An airport inventory should determine the number and condition of an existing airport facility. The inventory phase of a study should provide enough time for planners to collect the data required to conduct the level of analysis needed to fulfill its ultimate goals.

2) An electronic summary of an airport's inventory should report current and historic aircraft activity, based aircraft, enplanements, the design aircraft using the airport (Airport Reference Code), and an Annual Service Volume for the existing airfield configuration, and should include a review of environmentally sensitive features.

f. Aviation Forecasts

A five, ten, and 20-year forecast of based aircraft, enplanements, and aircraft activity, along with current and expected design aircraft should be provided.

g. Financial Data

1) A system plan should only collect financial data needed to make broad recommendations about the airport system and its development. Such electronic data should include the identification of the portions of the development costs that could be covered by AIP grants, passenger facility charges, state grants, bonds, and airport revenues. Information on the potential for financing capital projects with general funds or debt financing instruments should also be noted. Quantifying items such as fee and rental structure to make an airport as self-sustaining as possible should be explored.

2) An airport system plan is not intended to audit each individual airport in order to determine its financial condition, but to describe the overall financial health of the airport system and to make recommendations to address problem areas.

h. Other

Various other electronic data systems are used to accomplish a variety of activities and elements during the system planning process, such as pavement maintenance and management data.

304. SPECIAL STUDIES

a. The examination of new issues relevant to airport systems analysis can be accomplished within the framework of a state or metropolitan planning organization's continuous airport planning process or as a separate special study. Such studies may be supplemental to the standard elements of a system plan.

b. The FAA, metropolitan or regional government, or state system planners may request a special study to obtain data or conduct an analysis more efficiently than through the production of multiple airport master plans.

c. Special studies may include, but are not limited to, air service, air cargo operations, standards reviews, safety area analyses, business jets access, satellite navigation and GPS, environmental or drainage inventories, surface access, economic impact, obstruction analysis or photogrammetry, general aviation security, multi-site acoustic aircraft counters, and pavement management. Additional examples and policy guidance for these types of studies can be found in Chapter 7 of this document.

d. Airport sponsors do not always have the authority to study new airports as a means to supplement or replace capacity-constrained airports. They may have little interest in carrying out a study of a new airport that they will not control, or even may consider as a potential competitor. However, special studies conducted as part of an airport system plan may be used in concert with master plans to evaluate airfield capacity alternatives for a metropolitan area. In these cases, the system plan can be used to examine the feasibility of building a new airport. In addition, system plans can be used to study transportation alternatives not within the jurisdiction of the airport sponsor, such as rail alternatives.

305. INNOVATIVE PLANNING TECHNIQUES

The FAA guidance on project eligibility in FAA Order 5100.38, *AIP Handbook*, and on airport planning contained in this document and in FAA Advisory Circular 150/5070-6, *Airport Master Plans*, is not intended to preclude the use of innovations in airport planning and development. However, before the FAA will approve the use of innovative planning and development techniques and methods in airport system planning, it needs to evaluate them to ensure that they will result in a useful product that neither degrades the safety and efficiency of an airport, nor has a negative impact on the community in which the airport is located. Such innovative techniques should also be reasonable in cost and relatively uncomplicated to use. To obtain FAA's consideration of the use of innovative planning and development techniques, the following items should be submitted to the FAA with a description of the proposed planning or development change:

a. An assessment of the impact of the change on the efficiency of planning and development decisions

b. Documentation that the change does not degrade the safety, efficiency, or utility of the airport operation, and

c. Documentation that the change does not increase the environmental impact of airport development.

d. The result of the innovative study should be incorporated into the existing state, regional, or multi-state system plan, when appropriate.

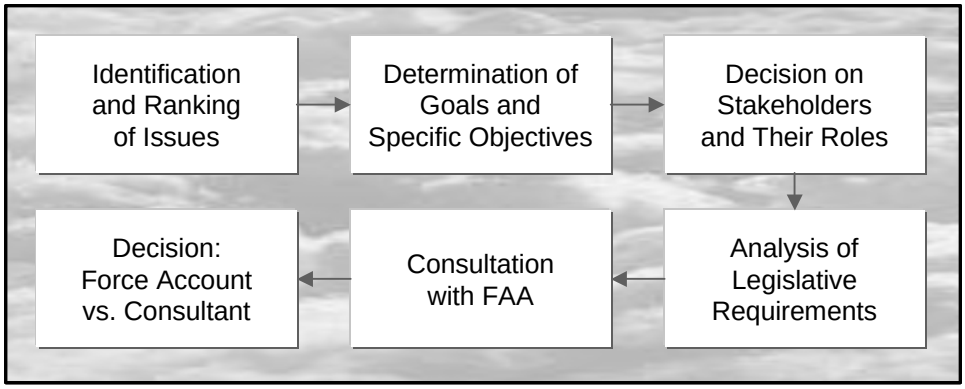
Airport system innovations and non-conventional technologies may require nation-wide changes in organizational structures, policies, standards, or plans. The system plan is a means of describing innovations for adoption as part of FAA's test and evaluation program for national airport systems. Such proposals might be provided as conceptual studies for discussion purposes until agreement is reached about further development of the concept.

Chapter 4 Airport System Plan Project Development

Airport system plan project development can be divided into three major components: approach; scoping; and implementation. Appendix C provides a Checklist for Project Development that may be used by the planning agency and the local FAA Airports Office to help ensure that each of the major steps is completed.

Figure 12 illustrates the key steps in the project approach component. The first steps, which include identification and ranking of issues, determination of broad goals and specific objectives, deciding on the stakeholders involved in the planning process, and analysis of legislative requirements, should be initially defined by the planning agency and then agreed to in consultation with the FAA. The FAA should also be consulted on the determination as to what work will be accomplished by the planning agency in-house (by force account) and what by a consultant.

Figure 12: Airport System Plan Project—Approach



401. ISSUES

Planners should identify and discuss major aviation-oriented problems, including issues that airports in the state or region face now and those issues that are expected to impact aviation in the future. Items to consider should include issues internal to aviation, such as airport ownership, project financing, revenues and expenses, the level and type of air service and general/recreational aviation activities, changes to approach procedures; as well as issues caused by outside influences, such as environmental and land use requirements, airspace considerations, surface access, or public controversy regarding airport development. Issues to consider may go beyond state boundaries, depending upon the location of relevant airports. Multi-state aviation planning studies will always consider issues that affect areas across state boundaries.

402. GOALS AND OBJECTIVES OF THE PLAN

a. The project evaluation should begin with a general statement of goals with respect to aviation and airports.

b. Although such a broad statement will often be applicable from state to state, more specific objectives and the performance criteria to be used to determine how well these objectives are met may vary significantly. The previous issues identified should then be ranked by order of importance relative to the goals and objectives of the study.

c. Some examples of broad statements of goals to be identified during the airport system plan project development are:

1) To provide for the timely development of airports that will meet the air transportation needs and economic goals of the system planning study area;

2) To develop a system of airports that provides a high degree of safety to the users, while at the same time providing adequate levels of service in terms of reliability and efficiency;

3) To maximize the economic benefits from the development of the airport system;

4) To develop an airport system whose attributes are consistent with, and integrated into, the state's or metropolitan area's long-range comprehensive planning policies and plans, particularly with respect to surface transportation and land use;

5) To minimize the airport system's environmental impact; and

6) To develop safe and efficient airports, which are built and maintained to appropriate design standards, and meet long-range aviation needs.

d. Some examples of more specific objectives, consistent with the goals, are:

1) Adequately assessing air service, general aviation, cargo, security, and surface access needs;

2) Maintenance, inventory, and update of aviation activity data and information about socioeconomic and environmental factors;

3) Review and validation of data affecting the airport system plan;

4) Reappraisal and modification of the airport system plan to account for the impact of changing aviation industry conditions;

5) Development of a mechanism for ensuring the successful interchange of information between system planning studies for a multi-state region, an individual state, a metropolitan area, airport master plans, the NPIAS, and airport capital improvement plans;

6) Development of improved aircraft approach procedures; and

7) Consideration of public comment to ensure awareness of the role the community believes that the airports play in the area's transportation system;

403. STAKEHOLDERS AND THEIR ROLES

a. When formulating the project, planners should decide which stakeholders will be involved and what roles they will play. Interested parties should include the state aviation agency, metropolitan and regional planning organizations, airport sponsors, FAA representatives, airlines and other aircraft operators, aviation industry groups, elected officials, other state transportation and environmental agencies, consultants, and local community groups.

b. The roles of the stakeholders in the process should include project formulation, project management, analysis and documentation, public coordination, information dissemination, and implementation.

404. LEGISLATIVE REQUIREMENTS

a. In developing the study, planners should identify existing and proposed state and local legislative requirements that might affect airports and their development. Such requirements might include compatible land use around airports, tall structures zoning, state aviation funding, and airport or pilot licensing.

b. Specific legislation may also define the role that the state or metropolitan agency will play in the system planning process and the authority that the agency has in implementing airport development, such as channeling. State channeling of Federal airport grants varies nationwide, and can include specific channeling of Federal funds and/or AIP grant approvals. It is based on enabling legislation rather than on Federal law.

405. CONSULTATION WITH THE FAA

a. State or metropolitan aviation agencies should hold a conference with local FAA Airports Office representatives to discuss a new project under its system planning process and how it fits in with previous planning work. The discussion should include specific goals and objectives, as well as the approach, stakeholders, estimated project costs and schedule, and expected final study products.

b. For first-time sponsors, the FAA should discuss grant assurances, project eligibility, and procedures for requesting Federal funding under AIP.

406. FORCE ACCOUNT VERSUS CONSULTANTS

a. Force Account

1) A force account arrangement is one in which a sponsor proposes to accomplish work under an AIP grant with its own personnel. A state, metropolitan, or regional planning agency may request permission to accomplish work under a force account in an effort to maintain an in-house aviation planning capability. The sponsor should recognize that under a force account, the FAA will fund only the work specifically associated with the accomplishment of an airport system planning or special study grant. The justification for performing the work under force account should provide

documentation that the in-house staff has the necessary experience, as well as the time and qualifications, to do the work in a timely, thorough, and competent manner, and that the costs are reasonable.

2) When the state, metropolitan, or regional planning agency is committed to maintaining a continuous airport system planning process, staff involvement is necessary in all activities.

b. Consultants

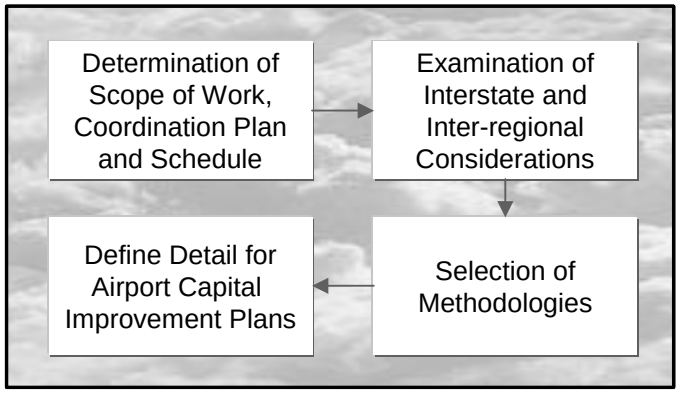
1) The initial airport system planning study, as well as updates to the plan, often require the assistance of consultants, who bring special expertise in the use of current aviation planning methodologies. Consultant services may also be necessary to help with reevaluations and reappraisals and in the performance of special studies. Local FAA Airports Office staff assist the sponsor in understanding the requirements for selection of a consultant and with the development of the scope of work, negotiations, type of contract, mandatory provisions of Federal grants, and determination of reasonableness of fees.

2) A firm fixed price contract is the preferred method for contracting with consultants for an airport system planning project. FAA Advisory Circular 150/5100-14, *Architectural, Engineering, and Planning Consultant Services for Airport Grant Projects*, provides guidance for the selection of a system planning consultant under the Federal grant process.

3) Title IX of the Brooks Act (Public Law 92-582) requires qualifications-based selection procedures be used for selection of firms to perform architectural and engineering services, pursuant to a fair and open selection process based on qualifications of the firm. Prior to evaluating consultants, the aviation agency should develop a list of criteria to rate potential consultants. The consultant should be selected by an unbiased and technically qualified panel that solicits and reviews technical qualifications of a number of firms. No FAA representatives may serve on this panel. The firm's qualifications should be based on its experience doing similar state and/or regional system planning work and professional credentials. Fees for services are established after the firm's selection through a negotiation process to determine a fair and reasonable price.

After hiring a consultant (or deciding to perform the work in-house), the next component in the airport system plan project development is to complete the scoping that provides the basis for the plan. These steps are illustrated in Figure 13 and include preparation of scope of work, coordination plan, and project schedule; examination of interstate or inter-regional considerations; selection of methodologies to be used; and defining the details for the preparation of airport capital improvement plans. Each of these steps is described in the paragraphs below, and occurs prior to the AIP grant application process.

Figure 13: Airport System Plan Project—Scoping



407. WORK SCOPE, COORDINATION PLAN, AND SCHEDULE

a. The scope of the planning process will be largely dependent on whether the planning agency is beginning the airport system planning process or is building on an existing plan. The structure and scope of work in the planning study should be designed according to the system of airports being examined and should identify specific issues and clear attainable goals, select appropriate work elements, and specify the level of effort needed for each activity. It should also define the planning approach to be used, techniques and methods, resources, work allocation, schedule, cost, financing, products, study area, public involvement, and implementation plans. Appendix D contains a Checklist for Elements of an Airport System Plan, which can be used by the planning agency and the FAA during the preparation of a project scope to determine which elements should be included in the plan.

b. During the scoping process for an airport system planning project, the planning agency, selected consultant, and the FAA should begin with a "brainstorming session," where they identify pertinent issues involved in the airport system's development. If issues are identified early in the process, planners can devise strategies for dealing with them, resulting in a plan that can be successfully implemented. The project scoping team should have broad representation so that all relevant issues will be identified. Some issues may be so comprehensive that they require a separate special study as part of the airport system planning process.

c. The planning agency and the selected consultant should agree on the scope of services to be provided, including identification of the areas and major components to be studied, a description of the job activities required to accomplish the work, and the anticipated format of the end product. A detailed work scope should show that cohesive, complete, and usable plans or other products will be produced. The scope should be sufficiently detailed so that the consultant can prepare a reasonable cost estimate. Where the scope of the project is too large or complex to be accomplished in a reasonable period of time under a single planning grant, the project may need to be conducted in several phases. Each phase should result in a useable product. The planners and the consultant should agree on schedules showing milestones for the completion of each technical product, as

well as coordination and review. Deadlines should be realistic, based on the effort involved in preparing the document and the planning agency's information requirements. The planning agency, consultant, and local FAA Airports Office should agree on target dates and should be aware of their responsibilities in meeting the project schedule. Decision points during the project should be clearly identified and all parties should recognize the importance of timely decision making.

d. A basic airport system plan scope of work may include a wide range of items. FAA Order 5100.38, *AIP Handbook*, more specifically defines airport system planning items that are eligible for AIP grant funds. However, airport system plan projects should include only those of the following elements or activities required to produce a plan that meets the needs of the planning agency (multi-state, state, region, or metropolitan area), and that will be beneficial in the development of a viable system of airports. Funding for airline operating studies, airport promotion or marketing, or legislation are normally ineligible under AIP. The local FAA Airports Office should be contacted for further information. The scope of work may include the following items:

1) Study designs that identify the framework, parties involved, organizational arrangements, major airport problems to be resolved, specific objectives, scope of work, time schedules, and cost breakdowns for projects;

2) General site inspections, inventories and surveys of airports, user preferences, and secondary socioeconomic data;

3) Forecasting to justify proposed airport development in terms of aviation activity levels and aircraft mix, limited to simple methods and assumptions that establish the demand for aircraft operations, based aircraft, passengers, cargo, and ground access;

4) Analysis of airfield, terminal area, and surface access to determine airport capacity values, identify causes of delay, analyze alternatives, or provide input to a capacity enhancement plan. Most system plans will not require a detailed capacity analysis, and should use the data from individual airport master plans, when possible. However, a simple determination of the overall capacity of the individual airports included in the system plan can be accomplished, using the concepts defined in FAA Advisory Circular 150/5060-5, *Airport Capacity and Delay*;

5) Analysis of airspace capacity, based on the availability of air navigation aids, communication facilities, and the presence of natural or man-made obstructions that affect the use of airspace; this analysis should be limited to that needed to support airport system development;

6) Facility requirements determination, including analysis of the suitability, possibilities for expansion, and safety deficiencies of existing airports; the general location and need for land bank programs or new airports; and the compatibility of airports with surface access plans and comprehensive planning;

7) Analysis of a reasonable number of alternative airport systems, including feasibility and sensitivity analysis, contingency plans and the evaluation of safety, efficiency, environmental impacts, energy considerations, and cost;

8) Preparation and adoption by the sponsor of the airport system plan (for specific forecast periods) of airport role assignment, design type, major facilities, and cost estimates;

9) General land use, noise, air quality, and other environmental studies to consider the impact of airport development on the environment and the protection of airports from incompatible uses in neighboring areas;

10) Development and implementation of land use compatibility plans and projects by state (or local unit of government) for large and medium hub airports that have not submitted a noise compatibility program within the past 10 years. The state must have the authority to plan and adopt land use control measures, including zoning, in and around the large or medium hub airport, and must have the airport owner agree to work cooperatively with it during the development of the plan.

11) Schedules of plan implementation, describing the staging of airport land acquisition and development based on aviation demand forecasts;

12) Estimates of funding from public agencies, as well as the financial community or other private sources, required to implement the plan, and estimates of revenue generated from improvements. A financial plan should contain estimates of funding from AIP, passenger facility charges, the Facilities and Equipment (F&E) and contract airport traffic control tower programs, and from other Federal, state, local, and private sector sources;

13) Capital improvement plans are normally a compilation of individual airport CIPs, screened for compliance with state or metropolitan goals, and airport role definitions, and should be provided in electronic form for downloading to the NPIAS in a prescribed format, if this is defined by the FAA;

14) Documentation of the eligibility of airports meeting the entry criteria for inclusion in the NPIAS;

15) Study coordination and reports, including public meetings and community involvement sessions;

16) Continuous planning activities that relate to elements of ongoing or existing airport system plans;

17) Airport surface access programs and plans that indicate proposed routes to central business districts or arterials. The work should be based on other airport access studies that take into account traffic demand, existing and potential access problems, surface transportation facilities, heliports, and remote terminals;

18) Preparation of state standards for development at non-primary airports;

19) Site selection and feasibility studies of the general area (excluding the specific airport area) for new, replacement, supplemental, or joint-use airports, where existing public airport sponsors agree to participate or an area-wide agency has been required or authorized by state or local law to do the planning;

20) Acquisition, licensing, and use of commercially available computer software including simulation models and other applications, when required for an approved planning purpose;

21) Economic studies to measure the benefit of interrelated developments in the network of airports and their impact on airport activity;

22) Identification of appropriate airport sponsorship arrangements (such as for a new airport), airports that have inappropriate ownership, and where interagency agreements are needed;

23) Policy analysis for specific airport development proposals, such as for state aviation taxes or land use policies;

24) Performance indicators or priority systems for pavement management and capital improvement plans; or

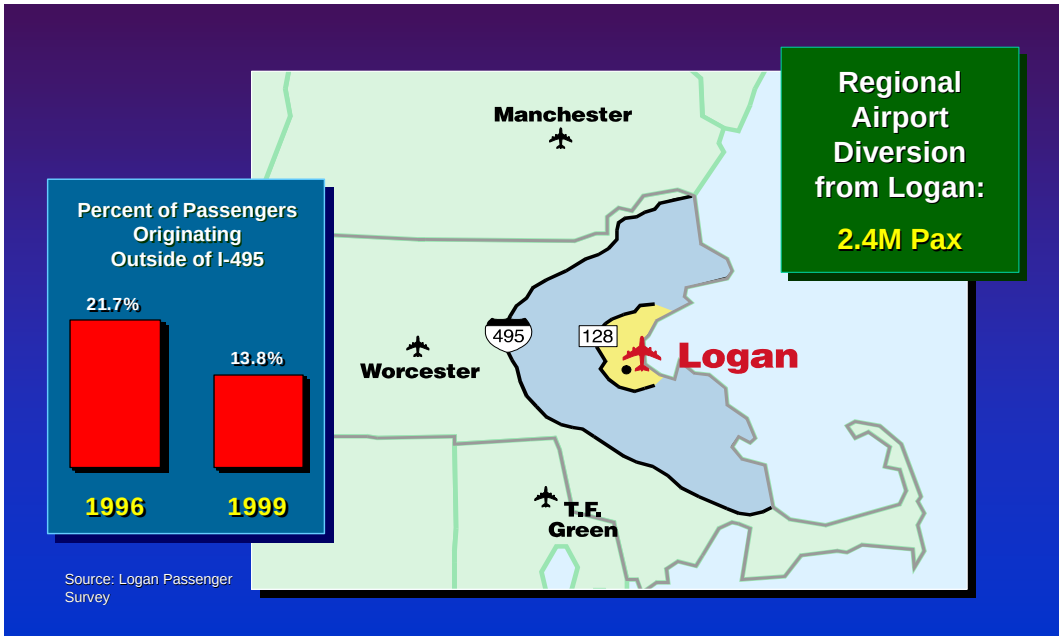
25) Involvement in master plan projects at one or more airports. In such cases, the affected individual airport sponsors should agree, in writing, to the scope of work.

408. INTERSTATE AND INTER-REGIONAL CONSIDERATIONS

a. When formulating the project scope of work, the sponsor should be aware that airports benefit and affect surrounding states or regions. Some of the aviation demand of the specific state or region under study, including residents' demand for commercial air service and general aviation facilities, as well as the business community's need for air cargo services, may be met by airports in adjacent states.

b. Multi-state aviation system planning studies generally include large metropolitan areas, where the air service demand extends across state borders to multiple airports. Since one or more of the airports are usually located outside the jurisdiction of a single metropolitan planning agency, multiple state and metropolitan areas must cooperate to address regional demand and implement the recommended airport development plans. Figure 14 shows the importance of regionalization in Boston Logan's market area.

Figure 14: Regional Demand Addressed in a Multi-State Airport System



Source: *New England, At the Forefront of Building a Regional Aviation System*, sponsored by Massport and the Massachusetts Aeronautics Commission

409. METHODOLOGIES TO BE USED

a. The airport system planning process should be thorough and analytical. There should be no ambiguity in its analysis and recommendations, since these may be used to justify project entry in the NPIAS or in prioritizing airport project development. Where possible, the use of established tools and methods, such as FAA's forecast or benefit/cost analysis (BCA) methodologies, is encouraged. Normally, development of a BCA to justify AIP discretionary dollars is not accomplished under a system plan, so the local FAA Airport Office should be consulted in this case. A discussion on forecast methodologies is included in Paragraph 506. The FAA Airport Benefit-Cost Analysis Guidance, prepared by the agency's Office of Aviation Policy and Plans in December 1999, can be found at http://api.hq.faa.gov/cost_ben/faabca.pdf. During the development of an appropriate approach, planners (and their consultants) should consider what data are available, what uncertainties must be accommodated, and what information they must get from the study.

b. During the scoping process, the planning agency should, in concert with the local FAA Airports Office, define its role in the development of forecasts. Forecasts for individual airports under a system plan are used to update the NPIAS, make adjustments to the FAA's terminal area forecasts (TAF), determine the timing of project development, and act as the basis for a benefit/cost analysis. In lieu of individual airport forecasts, in some cases it may be appropriate to develop based aircraft, activity, or enplanements forecasts for a metropolitan area within the state.

c. Methodologies used in analysis should be appropriate for the application and should be selected during project formulation. A system plan can evaluate demand and aviation activity for the state or region being studied, and then determine a methodology for allocating it among the airports serving that area. There are a number of forecasts available, so to the extent that they meet the requirements of the system planning project, they should be incorporated into the process. For towered airports, the system level aviation forecast can rely on airport-generated forecasts if they are current and approved by the FAA. For non-towered airports, the system level aviation forecast should use simple methods such as trend analysis, but may use the TAF. The accuracy of baseline master plan forecasts for non-towered airports may be improved through aircraft counting programs. However, these counts may not be cost beneficial for airports with less than 100,000 annual operations, where a more exact count would not affect the airport's development requirements.

d. Various airfield and airspace simulation models are available for analyzing airfield capacity and delay, including SIMMOD, ADSM, and RDSM from the FAA. When a daily schedule of aircraft operations is entered, these models provide estimates of airfield delay for various runway configurations and airfield improvements. Such modeling is time consuming and expensive and is normally done only as part of a master plan for a large hub airport with a capacity problem, but can be used in analyzing system-wide capacity issues. Advisory Circular 150/5060-5, *Airport Capacity and Delay*, provides simple methods for determining the annual capacity (Annual Service Volume) of an airfield.

e. The fundamental airport system planning process should include a methodology to address unforeseen events that could affect the analyses and conclusions of a system plan developed by the state or metropolitan planning agency. The methodology should identify changes or trends, identify affected airports, determine possible impacts, and develop alternative action plans and an implementation plan for future challenges and opportunities. The alternative action plans should account for changes in air carrier routes and alliances, airport competitors, the national and local economy, and technology. Various scenarios may consider the impact on small communities of the loss of access to airline hubs or the conversion of regional carrier fleets to regional jets, the impact of a reduced fare structure for hub-and-spoke airports on air service at those airports, the creation of a new ground transportation corridor through a region, the impact of local or state land use initiatives, the growth of air taxis as a means of providing communities with access to the national air transportation system, the increase in movements and efficiency of air cargo operations, introduction of new airlines, or the decline in available flights as the result of a weak national economy.

   For example, consider the introduction of service by a low-cost carrier at a secondary airport that previously had no significant air carrier service. This could attract a significant volume of traffic from the other air carrier airports in the region, and would require unanticipated airport development at the secondary airport in question, while also impacting the traffic growth and the development needs at the existing commercial service airports. Developing a response to this could change the state or regional system plan basic elements, recommended airport development, or airport roles.

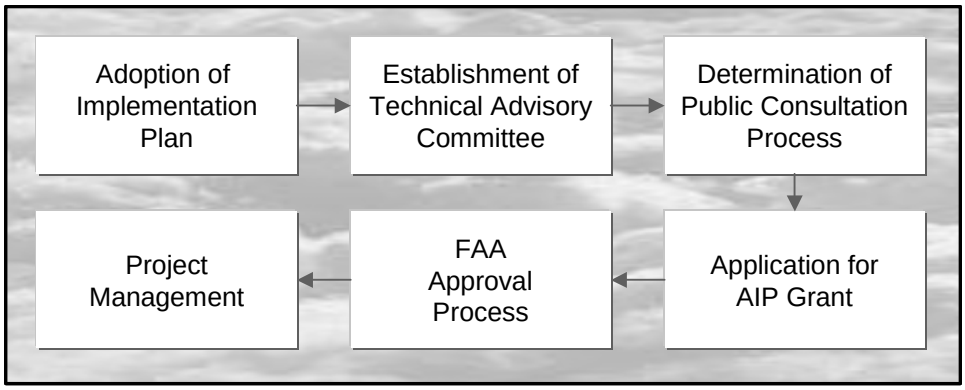
410. DEFINE DETAIL FOR AIRPORT CAPITAL IMPROVEMENT PLANS

a. An airport Capital Improvement Plan (CIP) is a compilation of projects planned for a particular airport for the next three-to-five years and includes the priority, costs, and expected funding sources for each project. Airport capital improvement planning may be accomplished as part of a state or metropolitan airport system plan or as part of an airport's master plan. During the scoping effort, representatives of the planning agencies, the local FAA Airports Office, and individual airports should discuss the degree of detail to include in the airport capital improvement plans that will be developed as part of a specific airport system plan. They should also decide how the CIPs will be used as the basis for input into the NPIAS and in the prioritization of projects to receive AIP funding. The ultimate decision on the distribution of Federal funds for airport development rests with the FAA, except where AIP funds are disbursed by block grant states.

b. The schedules for proposed airport development listed in a CIP that are directly related to forecast demand levels can be tied to such levels, rather than dates, if desired, since the dates when demand actually reaches forecast levels are often revised.

The final component in airport system plan project development is the series of steps that lead to implementation. These are shown in Figure 15 below.

Figure 15: Airport System Plan Project—Implementation



411. IMPLEMENTATION PLAN

a. The airport system plan should outline the organizational structure, authority, and responsibility for implementation of its recommendations, along with a realistic assessment of needs and available resources. The recommendations should reflect the technical and financial analyses in the report. Planners should give appropriate consideration to the desires of airport operators, users, and local communities. The plan should describe the processes to be followed to ensure the adoption of appropriate land use controls, ground transportation plans, and airport sponsorships.

b. The implementation plan should be formally adopted by the aviation planning agency. There should be reasonable assurance prior to the adoption of the plan that the state,

FAA, and airports will generally have the financial capability to undertake the proposed airport development.

c. The airport system planning process will be considered successful if its recommended actions are consistent with the local airports' master plans and are implemented. The plan should have a list of action items, and descriptions of each action item, responsible parties, schedule, financial requirements, special conditions, and approvals that must be obtained, and a means of determining the effectiveness of the recommendations. The plan may need to be coordinated with all affected parties. The planning agency is responsible for tracking progress and ensuring a successful implementation.

412. TECHNICAL ADVISORY COMMITTEE

a. Meaningful dialogue with the various stakeholders helps identify the challenges and opportunities that should be examined during the course of the study. For system planning projects, a Technical Advisory Committee (TAC) may be appropriate to ensure that the plan analysis is thorough and that the results are adequately documented and disseminated. The committee should have a representative of each party that is likely to be affected by study recommendations, and should reflect the complexity of the project scope. It should include representatives of the state aviation agency, metropolitan or regional planning organization, FAA, air carrier and general aviation airports, airlines and other aircraft operators, and, depending on the scope of the project, state or local transportation agencies, municipalities, state economic development offices, as well as Federal and state environmental resource agencies.

b. Members of the TAC should be identified in the initial development of the scope of work, and their names and affiliations listed in reports prepared during the planning project. A list of key individuals and organizations expected to work on the project, along with their responsibilities, should also be included in those documents.

c. Depending on the timing of the establishment of the Technical Advisory Committee, the members should review the project scope, applicability of the work, and project feasibility at the start of the study. If the committee is set up after the study has been initiated, it should review all interim reports, as well as drafts of the final products, and provide the project sponsor with comments and recommendations. These comments should focus on reasonableness and project implementation. Members of the TAC should also provide information and insights in their areas of expertise.

413. PUBLIC CONSULTATION

a. The airport system planning process should provide suitable opportunities for participation by the public. The public includes a broad spectrum of people with interests, such as airport operators, users, and aviation industry groups, as well as neighbors of existing and potential airports, environmentalists, local government and metropolitan or regional planning agencies, business and industry, environmental resource agencies, and elected officials. Particularly for a controversial project, planners will find it helpful to seek community input to ensure that they have addressed obvious community concerns and identified major environmental issues.

b. The planning agency should determine the extent of public consultation needed in the airport system planning process and develop a plan commensurate with the scope of work. The earlier any public concerns are identified, the more easily the issues can be addressed.

c. Technical advisory committee meetings can be open to the public and the press to keep the general public informed. Such efforts can be supplemented with the distribution of publications to libraries or local government, and by posting on the planning agency's web site.

414. AIP GRANT APPLICATION PROCESS

a. FAA staff will review the grant application to determine if the project is adequately structured, the elements are eligible, the schedule is realistic, and the scope of work is commensurate with its costs. The local FAA Airports Office is responsible for approving a system planning grant application. The planning project application process is thoroughly described in FAA Order 5100.38, *AIP Handbook*.

b. The grant application should contain a project scope of work consistent with the requirements defined in this advisory circular and those in the *AIP Handbook*. For contracting work, the project scope and cost resulting from the consultant selection process should be the basis for the requested AIP grant. Requests for FAA's approval of force account should also be consistent with guidance in the *AIP Handbook*.

c. In state and metropolitan planning studies, an AIP grant is issued to the eligible planning agency that will be responsible for managing the project. In multi-state planning, one AIP grant can be issued to a lead planning agency to organize and conduct the study, or separate AIP grants can be made to the various state and regional planning agencies. It is important in these cases that the work is appropriately coordinated to be sure that the separate studies are completed concurrently and that data and analysis are consistent.

415. FAA APPROVAL PROCESS

a. The responsibility for the approval or disapproval of a system planning grant application rests with the local FAA Airports Office. That FAA office will also review and approve a consultant contract or an aviation agency's use of a force account.

b. The FAA, with the assistance of a block grant state where appropriate, will decide which recommendations from a system plan are incorporated in the NPIAS or an ACIP.

c. For system planning grants that include the preparation of multiple airport layout plans (ALPs), the local FAA Airports Office approves each ALP with a signature. When administering AIP for the FAA, block grant states have the authority to approve ALPs for the non-primary airports in their states. Individual airport sponsors also sign their ALPs.

416. PROJECT MANAGEMENT

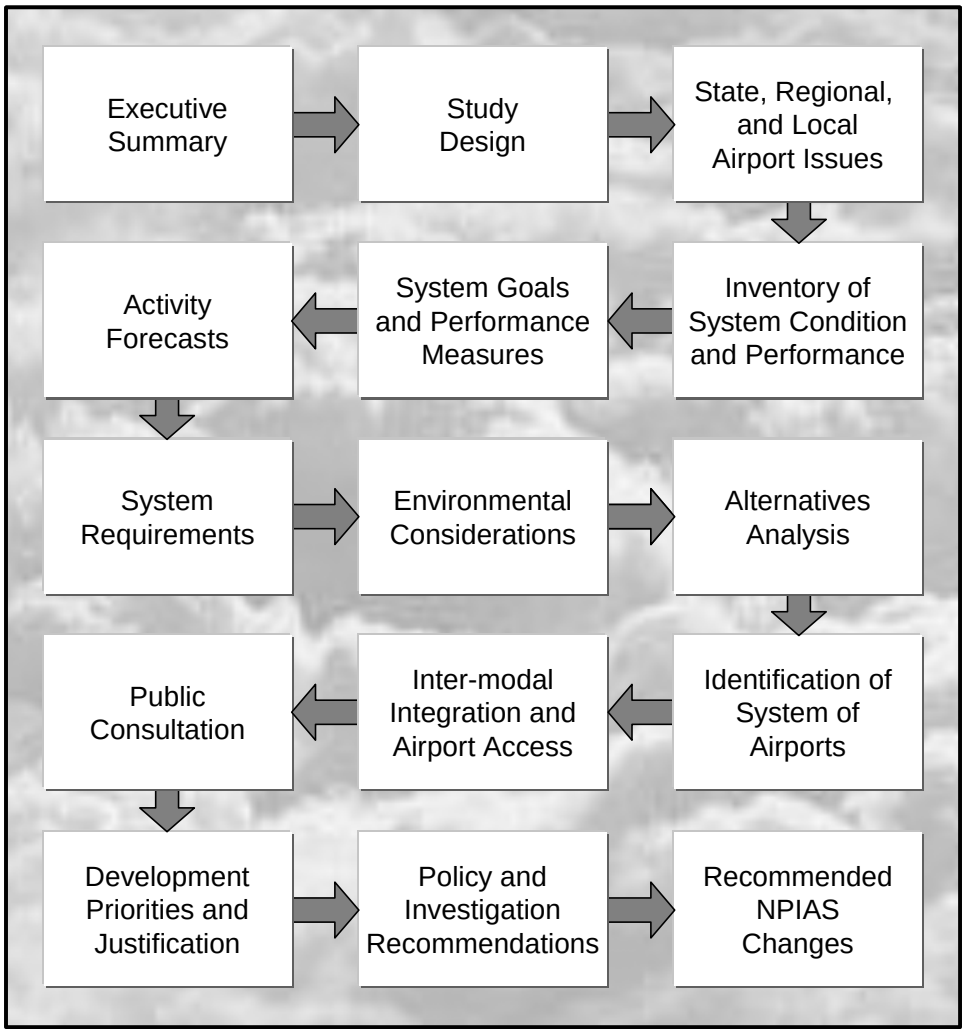
a. The airport sponsor is responsible for the continuous monitoring of the airport system planning project. The sponsor ensures that time schedules are met, work activities and coordination are accomplished satisfactorily, expenditures are reasonable and justified, and other performance conditions are met, including grant requirements. The sponsor provides the FAA with all reports that are required for grant approval, as well as for grant closeout.

b. The local FAA Airports Office is responsible for reviewing the performance of the sponsor and its consultant, and the project reports, to ensure that the activities and work elements are completed in accordance with the AIP grant agreement. The FAA representatives should attend key planning meetings, and participate on the Technical Advisory Committee and in the public consultation process when managing the project. The local FAA Airports Office also ensures that the sponsor and its consultant coordinate the study based on the requirements contained in the scope of work, all previous comments are adequately addressed, the project schedule stays on track so that critical tasks are completed on time, and the sponsor is held accountable for each final product identified in the project scope.

Chapter 5 Elements of an Airport System Plan Report

An airport system plan report can contain many elements, which are illustrated in Figure 16 and described in the paragraphs below. It is a good idea to use a checklist to determine which elements should be included in the report. Appendix D, Checklist for Elements of an Airport System Plan, is an example of a checklist that may be used during the preparation of the plan to ensure that each of the applicable elements is provided satisfactorily.

Figure 16: Elements of an Airport System Plan Report



501. EXECUTIVE SUMMARY

An executive summary, which highlights the main elements and final recommendations of the planning study, should be provided as part of the report. Interested parties, especially those outside the aviation industry, can use an executive summary to quickly review the scope and findings of the system planning study.

502. STUDY DESIGN

The first element of a complex airport system planning effort should be a study design. It is a comprehensive outline of what data will be collected, the methodologies to be used in the analysis, and the output that is required. The study design should include a detailed description of how, what, and when each element of the report will be completed. Organizing the work with a study design is crucial to successful completion of the plan and usually will result in reduced costs and time savings for all parties involved.

503. STATE, REGIONAL, AND LOCAL AIRPORT ISSUES

Sound judgment and common sense should be used in developing the scope of work for the airport system plan. Preparing a list of major aviation issues, problems, questions, and opportunities is a vital part in developing the plan. Because of the uniqueness of the system planning process, the report may include issues of a national nature, as well as concerns specific to an individual state, metropolitan region, a local community, or even a multi-state area. The items in this list should be ranked in order of importance and strategies to address each should be presented.

504. INVENTORY OF SYSTEM CONDITION AND PERFORMANCE

a. The inventory of system conditions and performance contains a number of items listed in Figure 17 and defined in the following paragraphs.

Figure 17: Inventory of System Condition and Performance

- Airport physical characteristics
- Airport activity levels
- Environmental and land use considerations, and applicable laws
- Navigational aids
- Local socioeconomic data
- Airport financial data
- Historical weather data
- Surface transportation characteristics
- Terminal, airspace, and airfield capacity

b. The adequacy of a system of airports can be determined from the condition and performance of certain important characteristics of individual airports. Planners should initially conduct an inventory to identify existing conditions that may have an effect on the service level or role of the airports. Relevant features of an airport include such

elements as runway length, width, and strength; design aircraft; distance from population centers; aircraft approach procedures; compliance with current airport design standards; ground access; airport ownership; aviation sectors that utilize the airport; apron capacity; based aircraft; enplanements; operational activity; airport services; and master plan, ALP, and Exhibit A Property Map status (showing ownership and interest in each tract within airport boundaries).

c. As part of the inventory, the information described below should be gathered from a variety of sources. Not all of these data need to be collected for each plan:

1) An inventory of the condition and activity of individual airports in the state or system plan areas. An airport safety data inspection report (FAA Form 5010) is one source of the data. Some planning agencies choose to collect these data during airport visits by the project team.

2) Summary of environmental features and conditions, and land use considerations, and an inventory of Federal, state, and local laws and ordinances that may affect the development and use of the aviation facilities. Broader data may be gathered for state plans and more detailed data for metropolitan plans.

3) Information on navigational aids; individual airport visual and electronic landing aids; and approach minima and procedures.

4) Statewide or regional socioeconomic data and airport financial information.

5) Historical data on weather conditions on a system-wide or regional basis.

6) Surface transportation, including the existing and planned highway and transit system, should be inventoried to the extent that it may have an effect on the access and development planned at existing or new airports.

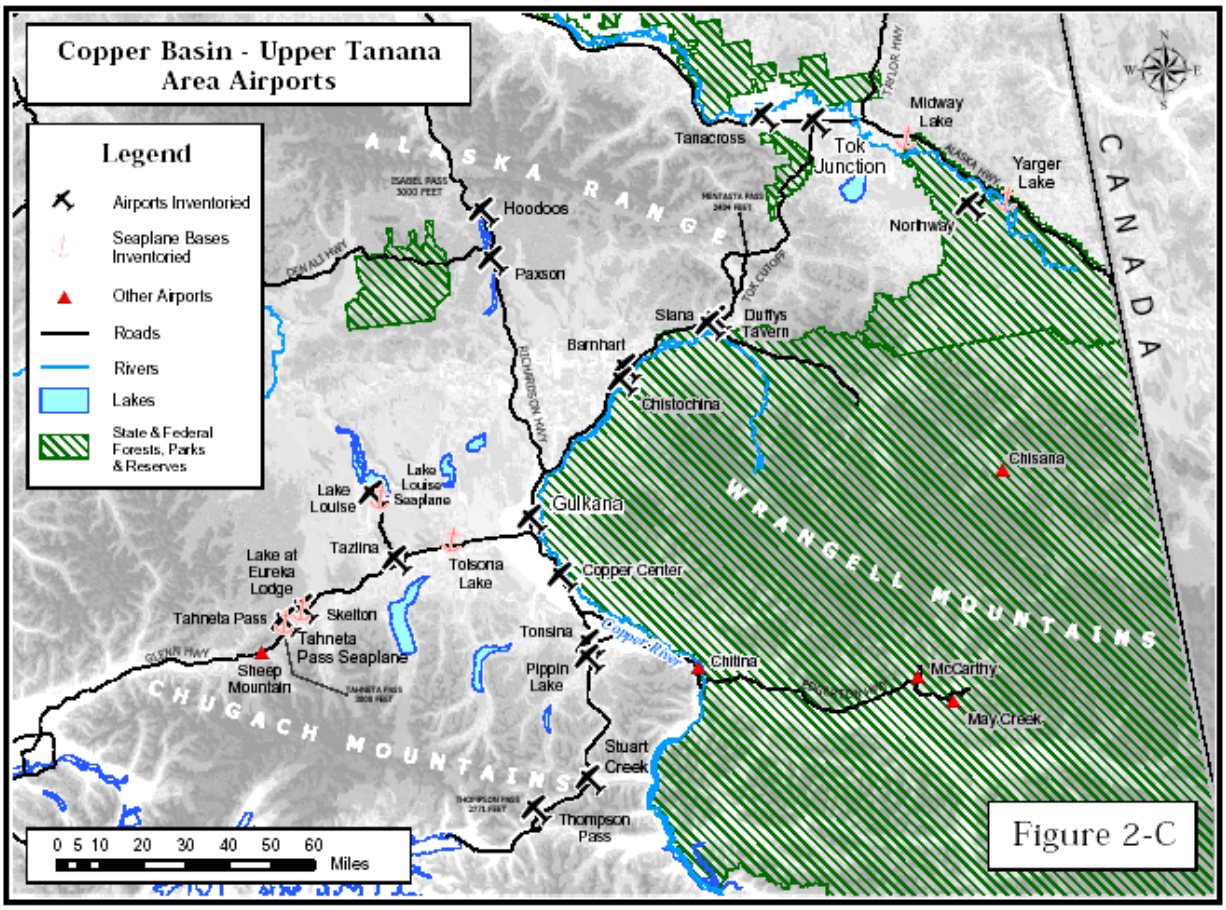
7) Terminal, airfield, and airspace capacity.

Figure 18 illustrates the airports included in the inventory completed under a regional airport system plan for the Copper Basin and Upper Tanana Valley area in Alaska.

505. SYSTEM GOALS AND PERFORMANCE MEASURES

a. Broad system goals and performance measures are established at the outset of the planning process, resulting in products that can be effectively used by the region, state, and the FAA in determining annual airport development needs. The system plan sponsor, along with the FAA, should use these measures as a control to ensure the implementation of a successful aviation system that meets user and community needs.

Figure 18: Sample Inventory Map from a Regional Airport System Plan



Source: *Copper Basin and Upper Tanana Valley Regional Airport Plan*, prepared for the Alaska Department of Transportation and Public Facilities

b. More specific goals that are defined for a system plan report will vary depending on the characteristics of the planning area. Examples of goals include having a system of airports readily accessible to the population of the region or state(s); providing for emergency medical access to the greatest possible percentage of the population; providing a system of airports that is safe and efficient; and preserving the existing airport system with a high degree of stable ownership.

c. Performance measures, which are tied to the goals, should be developed to determine the level of service of the system of airports, based on the performance of individual airports. The measures should reflect the users' needs, while providing guidance for system-wide policy and investment strategies. Because of their different roles, separate performance measures may be proposed for the commercial service and general aviation airports in the system. They can be tied to such indicators as safety, security, capacity, delay, system flexibility, design standards, cost effectiveness, financial support, environmental quality, or accessibility to airport or desired destination. The system plan sponsor can decide to measure the number of airports that meet certain development criteria, the percentage of

communities within a certain travel time of a category of airports, various aspects of the condition of the airports in a state or region, or the number of aircraft accidents by aircraft type. Specific examples of performance measures may include having 90 percent of the state population within 60 minutes drive time of an air carrier airport; 95 percent of the state population within 30 minutes of a NPIAS airport; 95 percent of the highest level of airports with precision instrument approaches; 95 percent of pavements in fair condition; 90 percent of system airports by category where automobile parking facilities are matched to demand, or length of the waiting list for aircraft tie down space does not exceed two percent of the aircraft based in a region. In some cases, the development of the measures may be an on-going process because the initial work may not supply useful information, or they may end up being too difficult to measure.

506. ACTIVITY FORECASTS

a. Airport system plans provide forecasts to define an airport's role within the system, prioritize airport development, and determine airport reference codes (ARC). An ARC relates airport design criteria to the operational and physical characteristics of the aircraft types that operate at the airport. System plan forecasts should focus on requirements for system planning, including project justification and timing of development. However, if the scope of a state system planning project involves preparation of master plans or airport layout plans for multiple airports, the individual airport forecasts should follow the guidance provided in FAA Advisory Circular 150/5070-6, *Airport Master Plans*.

b. A number of forecasts are readily available. To the extent that these forecasts meet the requirements of the system planning effort, they should be incorporated into the process. The report prepared by the FAA's Office of Aviation Policy and Plans (APO), entitled *Forecasting Aviation Activity by Airport*, dated July 2001, should be consulted to determine what approach to use in the forecasting effort of the plan. The report can be accessed at http://api.hq.faa.gov/pubs.asp?Lev2+1. The APO data systems web site at http://www.apo.data.faa.gov/index.html provides access to historical traffic counts, forecasts of aviation activity, and delay statistics.

c. Steps in the preparation of aviation forecasts include collection and review of previous forecasts, determination of data needs, identification of data sources, collection of the data, evaluation of historic forecasts, selection of forecast methods, preparation of forecasts, and evaluation and documentation of results. Several factors can be considered in forecasting demand and updating or refining existing forecasts, including socioeconomic data, demographics, disposable income, geographic attributes, and external factors such as fuel costs and local attitudes towards aviation.

d. Planners should obtain a reliable baseline, select an appropriate forecast methodology, develop a forecast, compare it to other forecasts (e.g., FAA's Terminal Area Forecast) for reasonableness, and submit the forecasts to the FAA for approval. The forecasts should be based on a methodology that is logical and appropriate for the airport system in question. The planning agency should use appropriate statistical techniques to estimate activity where primary data based on activity counts are not available. The level of detail of the forecast should be based upon the activity in the airport system, the planning issues

to be addressed, and the future use of the forecasts. Forecast methods can use regression analysis, trend analysis, share analysis, and a variety of aviation industry surveys.

e. Regional planning agencies may use a forecasting model that considers interaction between airports in a complex, metropolitan, multi-airport system. Forecasts developed on a regional basis for individual airports with overlapping service areas may in some instances be more appropriate, from a regional perspective, than summing up forecasts developed at a local level, since airports can claim the same passengers, resulting in double counting of estimated demand.

f. The FAA has found that it is difficult to prepare forecasts for non-towered airports when baseline activity data are questionable. Under system planning, activity counts may be conducted at individual airports to establish baseline operations data and estimates of the number of based aircraft. The results of these counts can be used to improve the baseline forecasts in individual airport master plans. APO has published a report entitled *Model for Estimating General Aviation Operations at Non-Towered Airports Using Towered and Non-Towered Airport Data*, dated July 2001, which presents a regression model for estimating general aviation operations at non-towered airports. Independent variables in the model include airport characteristics, demographics, and geographic features. The report applies the model to estimate activity at 2,789 general aviation airports in the TAF, and can be found at http://api.hq.faa.gov/pubs.asp?Lev2=1.

g. The system plan forecast should be prepared for five, ten, and 20-year periods and should specify the existing and future design aircraft. Forecasts can be developed for aircraft operations (landings and takeoffs; local and itinerant; and air carrier, commuter/air taxi, general aviation, and military), enplanements (air carrier and commuter), number of pilots, hours flown, fuel use, air cargo tonnage, peak hour operations, design aircraft, fleet mix, aircraft size, military activity, and general aviation operations. As a general rule, forecasts for general aviation airports are limited to aircraft operations, based aircraft, and design aircraft. Figure 19 illustrates the types of aircraft normally based at a general aviation airport.

h. FAA approval is required for forecasts that are used to support the justification and timing for an AIP project. If the system plan forecast exceeds that of the FAA's TAF by more than ten percent in the first five years, the difference must be reconciled by either changing the TAF, the system plan forecast, or both. Inconsistencies with the forecasts should be worked out at the local FAA Airports Office before seeking FAA Headquarters involvement. The TAF is at http://www.api.faa.gov/taf97/taftoc.htm and is updated in December of each year.

Figure 19: General Aviation Based Aircraft

i. Further guidance on the FAA review and approval of aviation forecasts is defined in a memorandum dated May 2002 found at http://www.faa.gov/arp/planning/02forcst.pdf. For general aviation and reliever airports where the five-year forecast exceeds 100,000 total annual operations or 100 based aircraft, locally developed forecasts for operations, based aircraft, and enplanements are considered to be consistent with the TAF if they meet any of the following criteria:

1) Forecasts differs by less than 10 percent in the first five years, or

2) Forecast activity levels do not affect the timing or scale of an airport project, or

3) Forecast activity levels do not affect the role of the airport.

For general aviation and reliever airports where the five-year forecast is less than 100,000 total annual operations or 100 based aircraft, the forecast does not need FAA Headquarters review, and the data should be provided for use in the annual update of the TAF. APO-110 may require additional information if the forecast varies significantly from historical trends without adequate justification.

507. SYSTEM REQUIREMENTS

a. Development Standards

1) The FAA has developed a system of dimensional standards for the design of airports. The application of these standards to airports supports the development and maintenance of a national system of safe, useful, and efficient airports. FAA Advisory Circular 150/5300-13, *Airport Design*, provides detailed design standards. The use of these standards is mandatory for airports receiving AIP grants and strongly recommended for other airports.

2) Dimensional standards are based on the design aircraft expected to use the airport on a regular basis (500 or more annual itinerant operations or scheduled service). The airport reference code (ARC) is used to relate airport design standards to the operational and physical characteristics of the airport's design aircraft. An ARC has two components: the aircraft approach speed (A-E) and the aircraft wing span (I-VI). A typical business class turboprop is a B-II, and a narrow body jet aircraft (B-737) is a C-III. A more detailed description of ARC is contained in Appendix B of FAA Advisory Circular 150/5300-13.

b. Capacity Analysis—Airfield and Airspace

1) Airfield capacity analysis is not normally required in system planning. An airfield with fewer than 100,000 existing or forecast annual operations is not likely to have an airfield capacity problem and does not need capacity analysis. Depending upon the level of operations and the configuration of the airfield (number and orientation of runways and taxiways), airports with more than 100,000 operations also may not have an airfield capacity problem. However, a simple determination of the overall capacity of the individual airports in the system plan can be made. The annual service volume for general aviation airports can be calculated, while existing capacity analysis data from larger commercial service airports should be taken from current airport master plan documents, when available. When necessary, an airfield capacity analysis is normally conducted by the sponsor's selected consultant as part of an individual airport's master plan. In some instances, the FAA may take on the responsibility for a capacity study, but those usually involve a group of airports that have been identified as having significant congestion issues. Guidance on how to calculate airport capacity and aircraft delay can be found in FAA Advisory Circular 150/5060-5, *Airport Capacity and Delay*.

2) Airspace capacity analysis is primarily an FAA function because of the agency's responsibility to ensure the safe and efficient movement of aircraft. Capacity analysis of airspace can consider navigational aids, communication facilities, and obstructions that affect the use of the airspace; however, it is limited to assessing what is needed to support state or metropolitan airport system development. This analysis may prove useful to the planning agency and the FAA in examining airfield configuration alternatives, finding potential operational limitations, and highlighting the need for a more detailed TERPS study.

c. Fundamental airport development, the basic configuration recommended for an airport in the national system, is defined in Table 3-1 in FAA Order 5090.3, *Field Formulation of the National Plan of Integrated Airport Systems (NPIAS)*. The fundamental development for an airport should be in accordance with the standards and criteria contained in the appropriate FAA planning and design advisory circulars and orders, as listed in the reference materials included in Appendix B.

d. An analysis of possible new airport development should consider the potential of underutilized airports in the region that could provide additional regional capacity, obviating the need for new investments. Consideration should be given to the reasons why the airports are currently underutilized in the first place, and what might cause a shift in the distribution of future aviation activity to those locations.

508. ENVIRONMENTAL CONSIDERATIONS

a. Preparation of an environmental document is not normally a Federal requirement under a multi-state, state, or metropolitan area system plan. It should be noted, though, that state laws may vary and, as an example, under California law, environmental impact reports are required for state and Federally mandated regional transportation plans (RTP). Since the Southern California Association of Governments (SCAG) incorporates aviation system planning work into its RTP, system-level environmental documentation for this work is required.

b. Environmental issues, though, should be considered in the evaluation process and development of airport system planning recommendations. This ensures the early evaluation of potential problems, with the objective of identifying alternatives, and may identify the need for additional environmental analysis for projects at a particular airport. FAA Order 5050.4, *Airport Environmental Handbook*, can assist airport sponsors and/or their consultants in the preparation of necessary environmental documentation.

c. The airport system plan provides an opportunity to inform the public of future aviation needs and the potential environmental effects. Such an evaluation may alter decisions to pursue airport development projects that involve Federal, state, and local expenditures.

d. In most cases, the airport system plan will not inventory environmental features to the degree necessary to make decisions on viable master planning alternatives or to scope an environmental document. However, the plan should consider obvious and known environmental features, such as the presence of significant residential development, parklands, wildlife preserves, non-attainment areas, or known historic resources. Environmentally sensitive features on and around an airport could be included in the larger inventory that describes the airport's physical characteristics and facilities. Based on this preliminary environmental inventory, planners will be able to identify environmental factors that would be important in defining viable airport roles and reasonable development alternatives for further consideration during the airport's master planning process.

e. The consideration of environmental features during the system planning process provides an opportunity to take early action to minimize potential environmental impacts, such as limiting incompatible land uses. More detailed land use compatibility planning may be accomplished under a state or regional system plan around large and medium hubs, depending on previous noise compatibility efforts by that airport owner. The planning agency must have land use control authority and an agreement by the airport owner to work cooperatively in this effort. Specific eligibility details are in FAA Order 5100.38, *AIP Handbook*.

509. ALTERNATIVES ANALYSIS

a. Alternative plans should be developed once the extent of the projected system demand and the timing and nature of aviation system development are determined. If the assessment of airport system capacity shows that expansion of facilities is necessary to accommodate projected demand, an investigation of alternatives should be conducted. Generally, these should examine a broad set of functional alternatives for the airports in the system, rather than detailed design considerations for each individual airport. Critical objectives during this analysis are to make the best use of existing airport facilities and to support any expansion based on aeronautical, financial, and environmental factors. Alternatives may focus on financing (constrained vs. unconstrained), the airport system (expanded vs. reduced), airport roles (private vs. public), and environmental impacts (mitigation vs. no build).

b. Criteria to compare alternatives can include capital costs, aviation safety, airspace utilization, ability to address need, environmental impacts, delay and other operational costs, consistency with local area comprehensive and transportation plans, and land use availability and compatibility.

c. Alternatives analysis should include a “do nothing” option, the transfer of some or all of the operations to another facility, or the construction of a new airport to replace or supplement an existing one. Having regional airports replace more than one airport may also be an option to consider. Under the FAA’s Military Airport Program, a designated number of current or former military airfields receive AIP grant funds for projects necessary to convert them to civilian use to reduce congestion. Consideration should be given to the use of these airfields during the alternatives analysis.

d. The evaluation of system alternatives is usually a more complex activity for large metropolitan or regional areas than it is for the remainder of the state. In high activity areas, airspace and land are scarce; ground transportation options may be limited due to congestion, which affects airport accessibility; and potential environmental impacts can be substantial. Therefore, the analysis of practicable alternatives should attempt to balance the need for airfield capacity and use of airspace with the need to minimize environmental impacts.

510. IDENTIFICATION OF SYSTEM OF AIRPORTS

a. The final system of airports, including existing and new airports, can be identified following the determination of system requirements, the investigation of alternatives, and the application of evaluation criteria. The existing role of each airport also should be identified.

b. Each airport that the airport system plan recommends for inclusion in the NPIAS should have a service level and role based on the definitions defined by the FAA in that document. The NPIAS defines airport roles as primary commercial service (large, medium, small, and non-hubs), non-primary commercial service, relievers, general aviation, and non-NPIAS. The role of the airport influences the type of aircraft that it can accommodate, or in the case of commercial service, the routes and markets they can serve. The role assignment assumes that appropriate facility requirements will be met.

c. If the state or metropolitan agency is using role definitions for an airport that are different from those defined in the NPIAS (e.g., primary, reliever, general aviation), then the current NPIAS role should also be provided in the inventory and implementation elements of the plan. This will establish a standard for uniformity in airport role definition that will help maximize the system benefits of airport investments, as well as ensure the rationalization of Federal priorities across airport categories.

511. INTER-MODAL INTEGRATION AND AIRPORT ACCESS

a. An evaluation of aviation needs within the context of multi-modal planning should be undertaken. Plans should be developed in coordination with other transportation planning efforts, including comprehensive long-range plans. Consideration should be given to the area's social, economic, and environmental conditions, and to overall transportation system performance issues. Airport access and land use impacts should be treated explicitly in appropriate state and metropolitan plans. Surface transportation plans should consider the issues of highway access to airports, highway congestion, parking supply and fees, public transit access by city bus or passenger rail, access for taxicabs and other private surface transportation providers, and rail or truck access for air cargo. The aviation planning agency should consult with highway and transit planners, MPOs, and airport sponsors. Airport sponsors should be encouraged to become familiar with the current, long-range (20-year) transportation plan, updated every three to five years by the MPO (depending on air quality designation status), as well as to work with the MPO to prioritize surface transportation improvements that are important for access to the airport as part of the transportation improvement program, which is developed and adopted by the MPO at least every two years.

Figure 20 shows a BART (Bay Area Rapid Transit) train at San Francisco International Airport. BART airport connectors integrate transit access to the airport, providing an economical and convenient way to travel to and from Bay Area airports.

Figure 20: Inter-modal Access to an Air Carrier Airport

Photo of BART station at San Francisco International Airport courtesy of BART.

b. Planners should focus on airports as an element of the larger transportation system that takes people and cargo from where they are to where they want to be. The system plan needs to be coordinated with surface transportation planners to ensure that all airports in the system can be readily accessed by the population and businesses that they serve; that surface access to larger primary airports is efficient, convenient, and cost effective; that customers have a wide range of access choices; that travelers' special needs are met; and that additional truck traffic due to air cargo operations and its separation from passenger traffic is considered.

c. DOT/FFF/AP 96-3 *Inter-modal Ground Access to Airports: A Planning Guide* should be used as a reference during the evaluation of this issue. The division office of the FHWA in each state, and/or the state department of transportation, are valuable sources for information about highway planning and financing. Information on transit planning and financing can be obtained from local transit agencies or from the regional offices of the FTA listed at http://www.fta.dot.gov/about/offices/4978_ENG_HTML.htm.

d. The aviation planning agency should have a working knowledge of highway and transit financing prior to coordinating airport development projects with surface transportation agencies. Knowledge of the financing, planning, management and coordination of highway, railroad, and transit projects will allow the airport planner to be more effective in securing access improvements that the airport needs. Highway and transit projects are financed by Federal, state and local funds, much as airports are. However, unlike FAA's

role with airport projects, FHWA and FTA do not directly prioritize, select, or develop individual surface transportation projects. Instead, MPOs and state DOTs cooperatively plan, prioritize, and select individual surface transportation projects for implementation.

e. Understanding the databases and analytical tools of the various planning disciplines can be useful in planning for airport access issues. The many GIS systems employed by other transportation and land use planners can help in airport system analysis, especially for airport access studies, where common surface transportation terms and metrics may be introduced. Other analytical issues might be:

1) How many additional air passengers per year would cause a decrease in the highway level of service or intersection performance along a major access road to the airport?

2) How do the peaking characteristics of airport traffic compare with the peaks of surface traffic during the day?

3) How do the travel patterns of airport employees and other daily commuters affect the analysis of surface access by airport passengers?

4) How do cargo and trucking operations impact air terminal access?

5) How can quality access be provided by different transportation modes in order to successfully meet the needs of the community?

512. PUBLIC CONSULTATION

a. As described in the system plan project development chapter, the airport system planning process should provide an opportunity for public participation, the extent of which should be commensurate with the scope of work. Appropriate coordination of study drafts with the aviation public, community organizations, airport sponsors and users, and other interested parties is critical to the successful adoption and implementation of the final planning report. It is important that all affected or potentially affected parties perceive that the process is open, that the opportunity for participation exists, and that the study is designed to consider input from all of them.

b. The degree of participation by various groups will differ. Some groups will want to provide direct input to the planning process. Others will be satisfied with the opportunity to review and comment on interim products, and some will be content to be kept informed during the process and to comment on the final product. Public participation should be a part of the overall study design, including the provision of the funding necessary to accomplish it. The public consultation process should be documented in the report, with a summary of dates, parties involved, significant points of discussion, and action items. Establishment of a web site for the project is an interactive opportunity to release the study documents to the general public. The technical advisory committee, which receives periodic oral and written reports throughout the process and provides comments and reactions, can also be an effective vehicle for receiving public input.

c. The FAA's *Community Involvement Manual*, FAA-EE-90-03, is helpful to planning professionals and others dealing with airport development and the concerns of airport communities. The manual, which can be found at http://www.aee.faa.gov/noise/aee100_files/LUPItoolkit/VI.A.pdf, provides practical guidelines for involving the community in a variety of aviation planning situations. Since this involvement will vary with different states, airports, communities, issues, and at different points in the planning process, the manual outlines a process for identifying community involvement needs, evaluating techniques to meet these needs and designing a workable program.

513. DEVELOPMENT PRIORITIES AND JUSTIFICATION

a. This phase of the report involves the translation of the justified development needs into costs and schedules, based on priorities and likely financial sources.

b. The state aviation agency's role in identifying priorities for future airport development is crucial, because it is in a position to sort out the priorities among competing airports. The state's responsibility in assigning project priorities is essential to the successful development of the NPIAS and to the facilitation of FAA's grant funds through the ACIP. Similarly, the MPO provides specific recommendations prioritizing the needed airport development projects within its region. For example, when several airports in a metropolitan area desire major runway development, but it can only be justified for one of those airports, the state planners should consider the metropolitan or regional planning organization's recommendations in determining what development level is needed to meet the forecast demand in that part of the state.

c. Some states and regional planning organizations define priority indices with relative weightings, establishing their own priority rankings for proposed airport development projects. In general, these rankings should be consistent with FAA's AIP priorities, if Federal fund are sought. However, the application of state and local goals, objectives, and policies may require some adjustments to the FAA's National Priority System (NPS). Also, the states' (and regional planning agencies') evaluation of a project's importance may be based on specific factors and cost effective measures not inherent in the application of FAA's NPS. Phasing of individual project elements should be logical.

d. A cost-effective plan of action should be prepared for five, ten, and 20-year planning horizons. The highest priority projects will be designated as five-year or short-term airport capital improvements, which can include an immediate action plan. The FAA, state, and local aviation funding limitations should be kept in mind when the plan is prepared. For the five- to ten-year period, proposed development should be geared to realistic financial capabilities, with the justification based on the state's and region's goals, objectives, policy strategies, and system trends in activity levels. The ten- to 20-year timeframe should focus on a more general assessment of airport development needs. The long-term period provides a less precise estimate of costs than near-term development and is conducted primarily for fiscal planning purposes. All airport development needs should be reported in a consistent manner. All development needs should be included (for an accurate reflection of overall system requirements), even though the airport may be funding development with non-AIP sources. Development that

is eligible for AIP funding should be identified so it can be easily incorporated into the FAA's ACIP and the NPIAS, as well as into the airport sponsor's master plan and ALP.

514. POLICY AND INVESTIGATION RECOMMENDATIONS

a. The airport system plan report may contain recommendations on state, regional, or local policy changes to address the needs of aviation, including new funding mechanisms, land use and zoning guidance, or regulatory changes. It may also give insight to organizational changes that may be necessary to more effectively carry out state or regional planning and development activities.

b. The airport system plan should also recommend additional studies, when appropriate, to collect inventory data on runway safety areas, pavement condition, or approach procedures, or to investigate specific problems such as poor air service or inefficient inter-modal connections.

515. RECOMMENDED NPIAS CHANGES

a. Although all commercial service airports must be included in the NPIAS, only about fifty percent of the nation's public-use airports are included in the report.

b. The FAA Regional Airports Division Managers are responsible, within national program policy parameters and program guidance, for making all decisions with respect to entry and development inputs and revisions to the NPIAS, except for recommendations for proposed commercial service airports. The director of the FAA's Office of Airport Planning and Programming (APP-1) must approve recommendations for proposed commercial service airports before they can be included in the NPIAS.

c. Recommending the addition or deletion of an airport in the NPIAS is a significant action that must be carefully evaluated. After completion of a system planning effort, a state aviation agency can recommend inclusion of a new, or removal of an existing, airport to the FAA. Five factors that should be considered by the state aviation agency prior to making any written recommendations on whether to recommend deletion of an airport from the NPIAS: (1) reasons for deletion; (2) funding status, such as multi-year grant or unexpired non-primary entitlement; (3) inclusion in a state or regional plan; (4) local reaction; and (5) Federal grant obligations. Further guidance to assist in this determination is available from the local FAA Airports Office. The state should consult with the local FAA Airports Office before finalizing any written recommendations concerning changes to the NPIAS. When evaluating whether to recommend that a general aviation or reliever airport be added to the NPIAS, the state should consider the airport use, as well as the NPIAS entry criteria defined in FAA Order 5090.3, *Field Formulation of the National Plan of Integrated Airport Systems (NPIAS)*.

Figure 21 is an example of the typical entries included in the NPIAS for a particular state. Rhode Island's data are shown here.

Figure 21: Typical NPIAS Entry

Rhode Island

Primary and Commercial Service Airports

City	Airport	LocID	Role		Year 5		2005-2009
			Current	Year 5	Enplaned	Bsd Aft	Dev Cost
Block Island	Block Island State	BID	CM	CM	9,273	7	$3,000,001
Providence	Theodore F Green State	PVD	PR	PR	3,291,854	65	$204,240,880
Westerly	Westerly State	WST	CM	CM	9,592	68	$5,388,889

Reliever and General Aviation Airports

City	Airport	LocID	Role		Year 5	2005-2009
			Current	Year 5	Based Aircraft	Dev Cost
Newport	Newport State	UUU	GA	GA	26	$6,405,556
North Kingstown	Quonset State	OQU	RL	RL	58	$1,611,111
Pawtucket	North Central State	SFZ	RL	RL	115	$4,111,112

Chapter 6 Review and Reevaluation of Airport System Plans

601. ADEQUACY OF CURRENT SYSTEM PLAN

a. An initial or basic airport system plan document should be adequate for up to five years, depending on the significance of the changes that occur in the state or metropolitan aviation system. However, the adequacy of the document can be evaluated no sooner than every two years. This review should be a coordinated effort among the state aviation agency, metropolitan/regional planning organizations, and the local FAA Airports Office. For states with active aviation organizations, a dynamic process should be established subsequent to the completion of the basic plan. This dynamic process will provide a means to monitor the effectiveness of the plan and its implementation and to provide the planning agency with the ability to prepare major updates as needed.

b. The review should identify changes in issues important to aviation, including constraints to the effective operation of the jurisdiction's airports. The planning agency should be alert to technological changes that provide opportunities to enhance the airport system, such as improvements in approach procedures, aircraft, avionics, and surface access systems.

c. If major changes occur in airport roles, implementation of development, or issues that would affect the operation and development of system airports, an updated system plan may be needed. If the changes are relatively minor, an interim update (or addendum) to the existing document, addressing the changes that have taken place and updating the airport database, is sufficient. If the changes are significant, a total update of the plan may be in order, resulting in the publication of a new airport system planning report. To determine if revisions are needed, a critical review process should be formalized, keeping several questions in mind:

   1) Where has the current plan failed to meet the region's needs?

   2) Where has it been successful?

   3) Are there more efficient ways to achieve the same benefits?

   4) What assumptions have changed?

d. Certain issues may require preparation of special studies to address a complex or unique problem, to assist in the collection of data, to determine their impact on the aviation system and to develop an action plan that addresses those issues. Consideration of the impacts of the growth of business jet use, like those pictured in Figure 22, on airports across a state or metropolitan area can be the topic of a special study.

Figure 22: Business Jets

Photo of two Learjets in the forefront with two King Airs and one Beech Baron in the background courtesy of Jet Network, LLC.

e. All decisions should be based on an evaluation of current data. A review of aviation activity, airport characteristics, socioeconomic factors, land use patterns, and surface access should determine the extent to which this information needs to be updated. Surface transportation planning and land use planning initiatives should also be considered, since changes in their status may influence airport planning decisions.

602. REVIEW WITH STAKEHOLDERS

a. The planning agency should maintain contact with stakeholders involved in or affected by the recommendations made in the current system plan report. These may include representatives of the FAA, adjacent states, metropolitan and regional planning organizations, airport sponsors, local government, aviation interest groups, and the general public.

b. Coordination with airport sponsors permits the exchange of information between system and master planners, including sharing of information on aviation forecasts, airport roles, and anticipated facility needs. Coordination with local governments regarding airport ground access planning, land use, and funding support will help avoid conflicts in decision making and planning. Such contacts also ensure the integration of airport planning into comprehensive transportation and land use planning.

603. DESIGNATE ELEMENTS NEEDING REEVALUATION

Once the changes in important issues have been identified and their impact on the aviation system assessed, the planners should designate elements that need reevaluation. The degree of analysis of these elements depends on the factors that have precipitated the reevaluation.

604. ASSESS SUCCESS OF SYSTEM PLANNING PROCESS

As part of the reevaluation process, the planning agency should evaluate each element of the system plan to determine the effectiveness of that section in supporting planning and development decisions. Weak or ineffective sections should be redesigned, strengthened, or even deleted, and useful sections emphasized. Questions to ask include:

1) Is the inventory thorough, yet concise?

2) Did we use force account effort where appropriate?

3) Did we use consultants where appropriate?

4) Was the consultation process valuable?

5) Has there been effective leadership?

6) Has the planning agency's staff been active and dedicated to the process?

7) Did we use the plan in making planning and development decisions? Did the FAA, other planning organizations, and local airports do so?

8) Does the general public understand the plan?

9) Have other state and local planning agencies used the report?

10) Did we develop a plan that can be easily reevaluated and updated?

11) Did we pursue special studies that addressed important issues?

12) Did we use our recommended development plan in consultation with the FAA in making funding decisions?

605. INTERIM UPDATES

a. Because of changes in many variables affecting the plan, interim updates may be necessary after the development of the basic multi-state, state, or regional aviation system plan. The timing of these updates will depend on the nature of the aviation system trends, but may be needed every two to five years.

b. Planners should expect to conduct interim updates to the airport system plan in the areas of airport role, activity forecasts, airport inventory, and airport development plans and CIPs. The system plan should be updated to reflect changes in airport roles. Forecasts

and inventories should be revised at least every five years. To ensure that accurate data are input to the NPIAS, the recommended development plan should be evaluated about every year.

606. DETERMINE NEED FOR FORMAL UPDATE

The airport system plan report is the product of a complete update cycle and replaces the existing plan as the source document for all related aviation system planning and development decisions. The update should incorporate the information included in any interim reports and special studies that have been published since the original system plan was completed. The extent of the plan revision will depend on the degree of change since the development of the existing plan. Depending on the sponsor's requirements, a formal update to the report should be prepared at least every five years.

Chapter 7 Special Studies

701. DETERMINE SPECIAL STUDIES NEEDED

a. The examination of new issues relevant to the aviation system can be accomplished within the framework of a system plan, or through a separate supplemental study. Such special studies should be undertaken to analyze new issues or to further address unique situations or problems that were identified during the basic airport system planning process. These studies can be used to gather additional data required for successful continuous system planning and to develop productive new techniques for acquiring and managing the new information so that they can be used on a statewide or regional basis, such as pavement maintenance/management studies. Special studies are important to system planning because the new data and analysis that they provide can support decisions on airport role and result in sound recommendations for developing a system of airports within a specific jurisdiction. In many cases, special studies may be exploratory or involve a new approach to an old problem, and may be useful to planners in other states and regions across the country.

b. Special studies may be necessary to complete the components of a state or metropolitan study to address significant changes in the system and to evaluate navigational aids, security, airspace, ground access, pavement condition, zoning implementation, and multi-jurisdictional issues. Such studies may also be necessary to integrate aviation projects with other transportation mode plans, with the NPIAS and airport master plans, and can serve to keep elected and appointed officials, media, consultants, and the general public informed of local airport system activities, such as an increase or decrease in the area's available airline service, number of enplaned passengers, or amount of air cargo.

c. At small airports receiving non-primary entitlements, multiple Airport Layout Plans can be accomplished under the state system planning process and be eligible for AIP funding. When considering this type of special study, the state should develop recommendations on how to undertake this work, taking into account the level of effort required for development needs at these smaller facilities.

d. States and, in some cases, the FAA provide funding to airport sponsors to assist in the maintenance of airfield pavements. Pavement management programs are an example of a special study and qualify as system planning projects as described in paragraph 306 of FAA Order 5100.38, *AIP Handbook*. A network level pavement condition survey provides a broad systematic approach to inventory, evaluates data, identifies cost-effective maintenance and rehabilitation needs, and examines general alternatives and timeframes for maximizing benefits. Advisory Circular 150/5380-7, *Pavement Management System*, discusses essential components of such a system and outlines how to use it to make cost-effective decisions regarding pavement maintenance and rehabilitation. Through an AIP system planning grant, the Oklahoma Aeronautics Commission developed a web-based airport pavement management product, which can be accessed for an individual airport or for the overall state system of airports at http://cec-b30.ecn.ou.edu/. Information for each Oklahoma airport includes an aerial photo, directory information, construction history, geotechnical data, visual distress

surveys, condition forecast, pavement health, and pavement capacity. Figure 23 shows a pavement condition and repair alternatives exhibit taken from the Georgia Airport Pavement Management Study completed in May 2003.

Figure 23: Sample from Pavement Management Study

Typical Pavement Surface	Repair Alternative
	Can be kept operational using cost-effective preventive maintenance actions, such as crack sealing and surface treatments.
	Preventative maintenance may still be advisable and will typically require rehabilitation.
	Pavement allowed to deteriorate requiring costly reconstruction to restore it to operational condition.

Source: Georgia Airport Pavement Management Study, Condition Assessment and Preservation Plan, Georgia Aviation System Plan, May 2003.

e. Air cargo is an important and growing activity at many airports. Air cargo demand may require special facilities for truck access and for security that need to be considered in the planning and project development process. Where appropriate, special studies should be prepared to address a variety of air cargo issues on a statewide basis.

f. Other special studies might include these aviation-related topics, among others:

1) Identification of airports (and priorities) that should be improved to accommodate business jets on a regional basis;

2) Identification of airports that need improved instrument approaches and the facility improvements required to support those approaches;

3) Identification of airport improvements needed at smaller commercial service airports to accommodate regional jets, statewide navigational aids, or automated weather observing system (AWOS) studies;

4) Studies to develop statewide guidance or standards on noise, zoning, or land use compatibility;

5) Statewide economic impact studies;

6) Emergency services and security planning;

7) Evaluation of market routes;

8) General aviation airport security; and

9) Strategic planning.

Figure 24 shows a graphic from an economic impact study conducted for Texas' airports, which summarizes the total aviation service activity in the state.

Figure 24: Economic Impact of Aviation Summary

Source: Economic Impact of General Aviation in Texas, prepared for Texas Department of Transportation, June 2003.

g. Specific recommendations for additional studies can include aircraft traffic counts, obstruction studies, and capital improvement plans (similar to metropolitan and/or statewide Transportation Improvement Programs).

702. FOLLOW PROJECT DEVELOPMENT STEPS

The work scope for special studies should be developed in a manner similar to a work scope for other airport system planning efforts. The steps in that process are described in Chapter 4 of this advisory circular, including the identification of issues, goals and objectives; the designation of stakeholders and their roles; consultation with the FAA, affected airports, and the public; consultant selection; work scope development; preparation of an implementation plan and grant application; and establishment of a project management process.

Figure 25 below highlights the specific objectives identified in a special study, The RNAV and WX System Plan, completed by the Colorado Division of Aeronautics in 2001. Data from the RNAV (GPS) portion of the study are used by the state to recommend modifications to FAA's procedures production schedule, as input to master plans, and during the preparation of five-year airport capital improvement programs that are updated annually.

Figure 25: Sample Specific Objectives for an RNAV (GPS) Approach Procedures System Plan

The RNAV (GPS) objectives of the study included:

1. List current approaches and minimums for each airport.
2. Determine the target approach minimums appropriate for each airport. For instance, all intermediate airports with a weighted performance measure score >54.8 should have an RNAV (GPS) procedure with LNAV/VNAV minimums of 300-¾.
3. Determine potential best minimums at each airport using RNAV (GPS) TERPS procedure design guidance for the intended type of minimums. Consider planned or programmed changes to the runways when warranted.
4. List capital improvements needed and associated costs at each airport to achieve the potential approach minimums.
5. Establish priorities for implementing new RNAV (GPS) approaches and airport improvements based on benefit/cost analyses and other appropriate considerations.

Source: *Colorado RNAV and WX System Plan*, prepared for the Colorado Division of Aeronautics, September 2001.

703. IMPLEMENT RECOMMENDATIONS

The real value of any airport system planning effort is realized with the implementation of the plan recommendations. Therefore, most special studies should include a realistic implementation plan for the system of airports included in the effort and identify recommended actions, responsibilities of various parties, and a feasible implementation schedule. In some cases, the document may just define a planning strategy that identifies alternatives and advises the policy makers what happens as a result of a particular policy decision. In other cases, the result of the study may just be a collection of data, such as aircraft activity counts. Any pertinent results should be provided to the airports within the state or metropolitan area so that they can consider incorporating the recommendations onto their ALP or into their capital improvement plans. If the results of the study have application beyond an individual state or metropolitan area for which the study was conducted, the implementation plan should include recommendations for the dissemination of the study results.

704. INCORPORATE INTO EXISTING AVIATION SYSTEM PLAN

Once the special study has been completed, it is critical that appropriate results be incorporated into the funding and implementation plans of the existing airport system plan. This allows for the consideration of special issues in conjunction with ongoing aviation system planning efforts, ensuring a greater degree of continuity than if the special study was accomplished in isolation.

Appendix A Glossary

AC	Advisory Circular
ACIP	Airports Capital Improvement Plan
AIP	Airport Improvement Program
ALP	Airport Layout Plan
APO	FAA Office of Aviation Policy and Plans
APP	FAA Office of Airport Planning and Programming
ARC	Airport Reference Code
ASTM	American Society of Testing and Materials
AWOS	Automated Weather Observing System
CIP	Capital Improvement Plan
COG	Councils of Government
DOT	Department of Transportation
FAA	Federal Aviation Administration
F&E	Facilities and Equipment
FHWA	Federal Highway Administration
FTA	Federal Transit Administration
GIS	Geographic Information System
GPS	Global Positioning System
MPO	Metropolitan Planning Organization
NAS	National Airspace System
NEPA	National Environmental Policy Act
NPIAS	National Plan of Integrated Airport Systems
NPS	National Priority System
RNAV	Radio Navigation
RPC	Regional Planning Council or Commission
RTP	Regional Transportation Plan
SCAG	Southern California Association of Governments
TAC	Technical Advisory Committee
TAF	Terminal Area Forecast
TERPS	United States Standard for Terminal Instrument Procedures
WX	Weather

Appendix B Useful Reference Materials

1. FAA ADVISORY CIRCULARS

A list of advisory circulars that include specialized guidance on airport planning can be found on the National Planning Division's web site at www.faa.gov/arp/400home.cfm. These include, among others, the following:

FAA Advisory Circular 150/5060-5, *Airport Capacity and Delay*, explains how to compute airport capacity and aircraft delay for airport planning and design.

FAA Advisory Circular 150/5070-6, *Airport Master Plans*, details national guidance for the airport community to use in preparing airport master plans.

FAA Advisory Circular 150/5100-14, *Architectural, Engineering, and Planning Consultant Services for Airport Grant Projects*, contains guidance for sponsors in selecting and employing consultants under FAA's airport grant programs.

FAA Advisory Circular 150/5300-13, *Airport Design*, provides guidance that defines airport design and clarifies the rationale used in airport, statewide, and metropolitan planning.

FAA Advisory Circular 150/5380-7, *Pavement Management System*, discusses essential components of such a system and outlines how to use it to make cost-effective decisions regarding pavement maintenance and rehabilitation.

2. FAA ORDERS

A number of FAA Orders also provide guidance on the airport system planning process, and are found at http://www.faa.gov/arp/publications/orders/index.cfm?ARPnav=orders. They include the following:

FAA Order 5050.4, *Airport Environmental Handbook*, provides guidance for preparing environmental assessments, findings of no significant impact, and environmental impact statements for airport development proposals and other airport actions as required by various laws and regulations.

FAA Order 5090.3, *Field Formulation of the National Plan of Integrated Airport Systems (NPIAS)*, contains guidance on long-range airport planning and instructions for the continuous formulation and maintenance of the NPIAS computer database and the biennial report to Congress.

FAA Order 5100.38, *Airport Improvement Program Handbook*, provides specific guidance on the funding eligibility of planning elements.

FAA Order 5100.39, *Airports Capital Improvement Plan*, details the development and process through which FAA formulates the national Airports Capital Improvement Plan (ACIP).

3. ADDITIONAL GUIDANCE

Additional FAA, DOT, other government, and academic reference materials may provide assistance to planners. These include the following:

Airport Systems Planning, Design and Management, by Richard de Neufville and Amedo R. Odoni, M.I.T., Cambridge, MA, published by McGraw-Hill in 2003.

Aviation System Performance Measures for State Transportation Planning, by Geoffrey D. Gosling, Transportation Research Record, No. 1703, Transportation Research Board, September 2000.

Community Involvement Manual, FAA-EE-90-03, is helpful to planning professionals and others dealing with airport development and the concerns of airport communities. The manual, which can be found at http://www.aee.faa.gov/noise/aee100_files/LUPItoolkit/VI.A.pdf, provides practical guidelines for involving the community in a variety of aviation planning situations.

Forecasting Aviation Activity by Airport, July 2001, by FAA's Office of Airport Policy and Plans (APO-110) provides guidance on the preparation of airport activity forecasts. A variety of current forecast data can be found at the FAA's Policy and Plans Office website at http://www.api.faa.gov/pubs.asp?Lev2=1.

Improving Public Transportation Access to Large Airports, January 2001, TRB's Transit Cooperative Research Program (TCRP) Report 62, prepared by Leigh Fisher Associates in association with Matthew A. Coogan and MarketSense, which presents data on the use of public transportation at large U.S. airports and selected international airports; provides examples of successful airport access systems from around the world; identifies key factors affecting the use of public transportation by airline passengers and employees; and describes the institutional environment and factors that affect public transportation at large U.S. airports, including airport structure, funding for ground access, and airport agreements with airlines. The report is available at http://www.nationalacademies.org/trb/bookstore.

Inter-modal Ground Access to Airports – A Planning Guide, December 1996, is an FHWA and FAA report used by airport, state, local, and metropolitan planners to manage and plan for inter-modal ground access for all types of airports, which can be purchased from the National Technical Information Service, Springfield, VA 22161.

Model for Estimating General Aviation Operations at Non-Towered Airports Using Towered and Non-Towered Airport Data, July 2001, by FAA's Office of Airport Policy and Plans (APO-110) presents a regression model for estimating general aviation operations at non-towered airports, and can be accessed at http://api.hq.faa.gov/pubs.asp?Lev2=1.

National Plan of Integrated Airport Systems (NPIAS), 2005-2009, Report to Congress, Federation Aviation Administration. The NPIAS report is updated and published by the FAA and provided to Congress on a biennial basis. It includes a listing by state and role

of those public-use airports important to the national air transportation system. The airports are publicly owned facilities, except those privately owned airports that are designated as relievers by the FAA.

Standard Specification for Recreational Airpark Design, by the American Society for Testing and Materials (ASTM) Technical Committee F37 on Light Sport Aircraft, provides details on what can affect the future makeup of general/recreational airports. The specification can be accessed at http://www.astm.org/cgi-bin/SoftCart.exe/COMMIT/COMMITTEE/F37.htm?L+mystore+admc2845+1085618671.

Strategies for Improving Public Transportation to Large Airports, December 2002, TCRP Report 83, prepared by Leigh Fisher Associates in association with Matthew A. Coogan and MarketSense, which describes the advantages of rubber-tire transit as compared to rail transit and emphasizes market-based approaches to maximizing airport ground access and alleviating ground side congestion. The report is available at http://www.nationalacademies.org/trb/bookstore.

The Metropolitan Transportation Planning Process: Key Issues, a briefing notebook for transportation decision makers, officials and staff, is published by the Transportation Planning Capacity Building Program of the FHWA and FTA and can be accessed at http://www.planning.dot.gov/documents/briefingbook/bbook.htm.

23CFR Part 470, Highway Systems, and 23CFR Part 450, Planning Assistance and Standards, are regulations that may be useful to state, metropolitan and regional agencies for system planning activities, including some guidance for airports. These requirements can be accessed at http://www.fhwa.dot.gov/hep/legreg.htm#I.

Appendix C Checklist for Project Development

✓	Date		Add comments below
		1	Issues identified and ranked
		2	Goals and specific objectives determined
		3	Stakeholders and their roles identified
		4	Legislative requirements analyzed
		5	FAA consulted
		6	Work to be done in-house (force account) and by consultant defined
		7	Work scope identified with schedule and description of products to be delivered
		8	Interstate airport relationships considered
		9	Methodologies selected
		10	Detail for Airport Capital Improvement Plans (ACIP) defined
		11	Technical advisory committee established
		12	Implementation plan outlined
		13	Public consultation process determined
		14	AIP grant application submitted

Appendix D Checklist for Elements of an Airport System Plan Report

✓	Date		Add comments below
		1	Executive Summary
		2	Study design
		3	State and local airport issues
		4	Inventory of system condition and performance
		5	System goals and performance measures
		6	Activity forecasts
		7	System requirements
		8	Environmental considerations
		9	Analysis of system alternatives
		10	Identification of system of airports
		11	Inter-modal integration and airport access
		12	Public consultation
		13	Airport development priorities and justification
		14	Policy and investigation recommendations
		15	Recommended NPIAS changes