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Introduction

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1.1 OVERVIEW

The San Francisco International Airport (SFO, or the Airport) Master Plan, adopted by the City and County of San Francisco (CCSF) Airport Commission in 1992, provided a long-term plan for Airport facility relocation, expansion, and development to accommodate 51.3 million annual passengers (MAP) forecast for 2006. In 1997, SFO accommodated 40 MAP and traffic continued to grow until the U.S. economy slowed in early 2000. SFO experienced a steady decline in passenger activity in the following years as a result of the recession. Since then, passenger activity at SFO has recovered and the Airport served a record 50 MAP in 2015. Implementation of projects under the Master Plan has continued. The sustained increase in passenger activity coupled with the execution of the Master Plan projects prompted the need to develop a new plan to accommodate future growth at SFO. From late 2014 through early 2016, a draft Airport Development Plan (ADP) was prepared for SFO by Airport management, supported by their consultant team.

The ADP sets forth a long-term plan to guide the development of the Airport as the premier long-haul and international gateway of choice, providing the highest level of international and domestic guest service, and facilitating the economic growth of the San Francisco Bay Area. Building upon Ongoing Projects at SFO, the ADP defines recommended facility development that would accommodate long-term demand at the Airport, forecast to reach 71.1 MAP.

Based on growth trends and aviation demand forecasts for the Airport, aviation activity demand at SFO is expected to grow to the maximum practical capacity of its airfield. While the ADP does not propose enhancements to airfield capacity, it does provide a plan for terminal, landside, and support facilities development to accommodate the passenger and vehicular traffic and other demands up to an ultimate growth level constrained by runway capacity.

Industry evolution and the challenges associated with predicting the future must be considered in any planning effort. A successful plan establishes flexible development concepts based on historical events, considerations for change, and industry familiarity to guide Airport management toward a recommended outcome. The SFO ADP was prepared using this approach and accounts for the dynamic aviation industry by forecasting demand over time to establish a plan for incremental facility expansion.

Since improvement needs at SFO are fluid, the ADP assessment incorporates (1) the Master Plan and other projects currently being implemented, (2) projects under consideration to meet current and near-term requirements, and (3) projects to meet long-term needs. The basis of ADP planning analyses was developed with the flexibility to adapt to aviation activity demand materializing sooner or later than forecast. The timing of some projects may change; however, the recommendations for future projects remain relevant.

Practical decisions concerning service levels, market competition, feasibility, and finances must be made before a project evolves from analysis to a construction commitment. The ADP implementation and feasibility analyses identify critical decision points into the execution timeline to help determine when to advance or defer facility implementation. This flexibility enables the ADP to serve as a roadmap to the future, assisting Airport stakeholders, management, and governing organizations to respond pragmatically as air service grows and Airport facilities must expand to accommodate that growth.

This chapter provides an overview of the history of SFO; the current planning context; ADP methodology, process, and structure; and the goals, objectives, and planning principles.

1.2 AIRPORT HISTORY

Mills Field to the Jet Age

In 1927, the Airport began as Mills Field on land leased by CCSF from the estate of Ogden Mills. The land was soon purchased by CCSF, which sought to attract new commercial airline service to the Airport. The period of rapid growth and technological development that followed led CCSF to undertake several major Airport construction projects throughout the 1930s. Within 10 years, the main runway had been lengthened to 3,000 feet, the runway and taxiway areas were repaved extensively, lighting and electrical infrastructure were installed, and a new Airport Administration Building was constructed, which included a passenger terminal with a restaurant, a newsstand, ticketing counters, and a waiting area.

By the mid-1940s, San Francisco Airport was serving more than one million passengers a year with an increasing number of passengers traveling to and from destinations overseas. Voters approved a \$20 million bond issue in 1945 for investment in airport infrastructure, followed by another \$10 million bond issue in 1949, as passenger activity continued growing rapidly. Several trans-Pacific routes were established between San Francisco and the Philippines, Hong Kong, Macau, and Australia, leading SFO to become known as “San Francisco International Airport.” The additional bond funds allowed for completion of a new Central Terminal Building (later called Terminal 2) in 1954.

The dawn of the jet age, ushered in by the launch of the Boeing 707, demanded additional improvements to accommodate the new aircraft. In 1959, the Airport installed the first jet bridges in the United States, allowing passengers to board aircraft directly from the terminal. When the new South Terminal (later called Terminal 1) opened in 1963, SFO was one of the five busiest airports in the United States, and had become a net revenue generator for CCSF.

In the mid-1960s, a large maintenance base and a new airmail facility as well as parking garage space, were developed for Pan American World Airways. A 1973 comprehensive master plan laid out a strategy for continued growth at the Airport. The North Terminal (later called Terminal 3) was built in 1979, with Boarding Area (B/A) E added in 1981. Terminal 2 was significantly renovated in 1983, and Terminal 1 and other Airport areas were further modernized in 1988. With significant increases in passenger traffic expected, the Airport Commission adopted a new Master Plan in 1992.

1992 Master Plan to Present Day

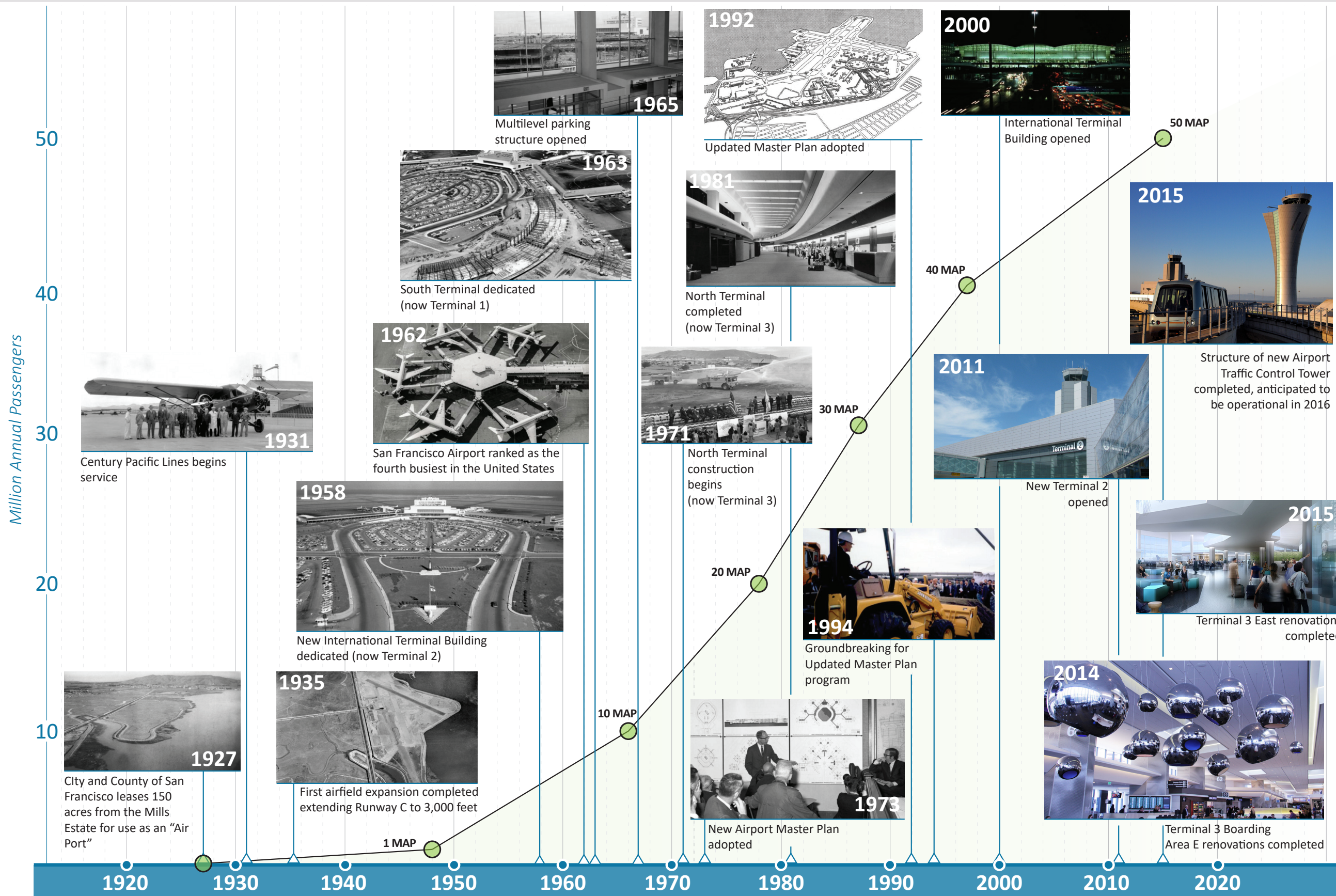
The Master Plan was designed to address some of the capacity constraints that consistent growth at the Airport had tested and to accommodate expected future growth. International traffic in particular had grown so quickly that a new International Terminal Building (ITB) was included as the centerpiece of the Master Plan projects. Before the new terminal could be constructed, international traffic at the Airport more than doubled between 1987 and 1997. By 2000, the Airport’s historic peak year, more than 41 million passengers were being processed at SFO annually. Delays had grown precipitously, and Airport facilities were stressed to the maximum. The new ITB was completed and opened at the end of that year.

Soon after the ITB opened, however, a sudden downturn in the Bay Area’s vital technology sector and worldwide declines in air travel in the aftermath of the September 11, 2001, terrorist attacks resulted in a steep decline in traffic at SFO. Terminal 2, the old international terminal vacated with the opening of the ITB, remained closed as additional gate capacity was not needed.

In 2007, Virgin America was launched, and the airline chose SFO as its primary hub, with headquarters in nearby Burlingame. That same year, JetBlue Airways introduced new service and Southwest Airlines returned to the Airport. These new domestic services, as well as steady increases in international traffic, enabled SFO to maintain steady growth through the Great Recession of 2007–2009. This new traffic also served as the impetus for the renovation of Terminal 2. The project was completed and Terminal 2 reopened in April 2011.

In recent years, SFO has continued to attract service from new and incumbent airlines. This trend signals a strong future for the Airport as it continues to enhance service and adapt to the needs of commercial aviation.

Airport History



1.3 CURRENT PLANNING CONTEXT

SFO is a large hub airport located in San Mateo County, California, 13 miles south of downtown San Francisco. The Airport, owned by CCSF, is managed and operated by the San Francisco Airport Commission (Airport Commission). SFO is bordered by the San Francisco Bay to the east and U.S. Highway 101 (U.S. 101) to the west. The Airport is surrounded by the cities of Millbrae and Burlingame to the south, San Bruno to the west, and South San Francisco to the north. SFO is the seventh busiest airport in the United States¹ and a prominent air service link between North American cities as well as a major gateway to Europe and Asia.

Since the adoption of the Master Plan in 1992, SFO has added more than 5 million square feet of terminal and landside improvements, most notably the ITB, two international boarding areas, the AirTrain automated people mover (APM) system, and a consolidated rental car facility. In 2011, the renovation of Terminal 2 set a new standard in passenger terminal design and environmental sustainability. The Airport completed construction of Boarding Area E in 2014 and the eastern frontage area of Terminal 3 in 2015. Additionally, operational adjustments have been made to accommodate new, larger aircraft types, such as the Airbus A380. As of early 2016, design is underway for the redevelopment of Terminal 1 and planning is under way for redevelopment of the western frontage area of Terminal 3. Now that the 1992 Master Plan recommendations have been almost fully implemented, it is time to plan for the next 20-year period of growth and expansion.

SFO operates under a number of significant constraints that must be considered under the long-term planning effort. First and foremost among these constraints is the lack of available vacant land for new development or expansion of Airport facilities.

¹ FAA Passenger Boarding (Enplanement) and All-Cargo Data for U.S. Airports, 2014

The existing runway system constrains the number of aircraft operations that the Airport can ultimately accommodate. SFO's runway capacity is based on the runway geometry established after completion of the Runway Safety Area Improvement Program in 2014. The ADP is designed with the assumption that SFO's runway geometry will remain unchanged through the planning horizon, and therefore does not propose runway expansion or reconfiguration. However, new airspace procedures and control methods related to the Federal Aviation Administration (FAA) next-generation (NextGen) program and other technologies will influence airfield capacity and were considered in the forecasts of aviation demand.

The commitment by Airport management to maintain a stable cost per enplaned passenger necessitates a measured approach to the issuance of new bond debt. Furthermore, many aging facilities are expected to reach the end of their lifecycles during the current planning period.

The ADP gives primary consideration to: (1) understanding the existing Airport and its ongoing expansion efforts, (2) long-term growth potential within a constrained environment, (3) meeting the demands of sustained aviation activity growth, and (4) achieving the strategic goals established by Airport management.

SFO Regional Context



Sources: San Mateo County, U.S. Census Bureau, SFO Bureau of Planning and Environmental Affairs, 2016.

1.4 ADP METHODOLOGY AND PROCESS

1.4.1 Methodology

Development of the ADP consisted of a study process including a forecast of future activity, inventory of existing conditions, analyses of facility requirements, development and evaluation of alternatives, and integration of selected plans into a recommended implementation strategy.

The ADP study team inventoried existing facilities and evaluated ongoing planning and design studies. Recognition and detailed investigation of ongoing construction activities at the Airport, including the SFO Capital Plan,² established a view of near-term development at the Airport, providing a baseline condition and allowing the ADP to maintain continuity with Ongoing Projects. The evaluation of ADP alternatives in concert with Airport goals and objectives strengthened that continuity by ensuring that ADP recommendations reflect the vision for SFO.

In addition to the previously prepared and ongoing studies of various Airport facilities, in 2014 the ADP study team initiated new studies focused on taxiway system improvements, ITB redevelopment, baggage handling system (BHS) upgrades, ground access and parking projects, support facilities expansion, and utility system upgrades necessary to accommodate long-term Airport growth. Planning activities were coordinated to ensure continuity between elements at each phase of the ADP study. The results of facility-specific planning efforts were synthesized and refined to fit within the Airport-wide context.

² The Fiscal Year 15/16 SFO Capital Plan provides a summary of programmed project costs, project justification, alternatives to implementation, and fiscal impact to revenue for the near-term (1-5 years) and mid-term (6-10 years), as applicable.

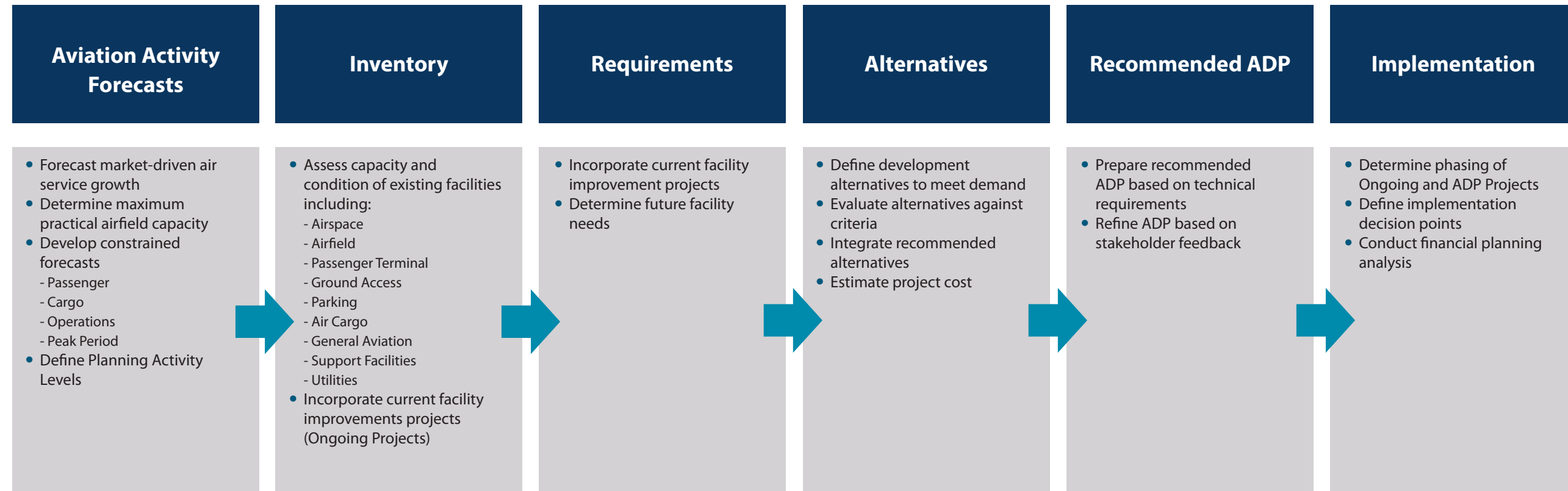
Coordination between Airport staff and stakeholders was essential to the development of the ADP. Working groups consisting of SFO management, airport planners, technical staff, and stakeholders were organized and consulted regularly during each phase of analysis. These working groups facilitated the exchange of ideas, established planning principles, identified priorities, and engaged stakeholders in working toward a broad agreement on the need, scope, nature, and timing of planning solutions. Participation of the working groups strengthened the planning process by capitalizing on the expertise available to Airport management and shaping alternatives pragmatically to suit facility, operational, service, and business needs. Most important, planning solutions were evaluated against Airport goals to ensure that the Airport vision is reflected in the ADP recommendations.

Recognizing that actual demand often does not materialize as forecast, having plan flexibility is critical. The componentized, phased nature of the ADP will enable SFO leadership to adjust project timelines accordingly. Decision points along the implementation path for each project allow for reevaluation of the need for or timing of a project based on demand and other factors. Some projects feature a tiered approach in which later phases of the project may be deferred or accelerated in response to developing demand. Other projects may be deferred, accelerated, or cancelled entirely. This flexibility allows Airport management to operate prudently without compromising operational performance, the guest experience, or financing capabilities. These decision points enable Airport management to respond with appropriate adjustments instead of continuing with previous plans that may no longer be justified.

The ADP is intended to be a living document that will guide future Airport development projects as needs evolve. To reflect the most current vision and demand for Airport facilities, subsequent studies will examine elements of the ADP in greater detail.

A number of projects are currently in the environmental review, programming, design, or construction phase at the Airport. These projects were incorporated into the ADP to provide a complete picture of future development opportunities and constraints. The ADP document identifies these as Ongoing Projects. New projects that meet the Airport's long-term needs have been identified as ADP Projects and will require program-level environmental review prior to Airport Commission consideration and implementation.

1.4.2 Study Process



1.4.3 Document Structure

The ADP is organized into seven chapters:

1. Introduction
2. Aviation Activity Forecasts
3. Inventory
4. Requirements
5. Alternatives Development and Evaluation
6. Recommended Airport Development Plan
7. Implementation

Appendices include supplemental technical, procedural, and reference information:

- A. Acronyms and Glossary of Terms
- B. Ultimate Airport Capacity and Delay Simulation Modeling Analysis
- C. Airport Development Plan Forecast Factors
- D. Airfield Ongoing Projects Alternatives
- E. International Terminal Building Arrivals Level Study
- F. International Terminal Building Main Terminal Departures Level and Boarding Areas A and G – Alternatives Analysis
- G. Baggage Handling System Study
- H. Support Facilities Preliminary and Intermediate Alternatives Analysis
- I. Acknowledgments

1.5 GOALS, OBJECTIVES, AND PLANNING PRINCIPLES

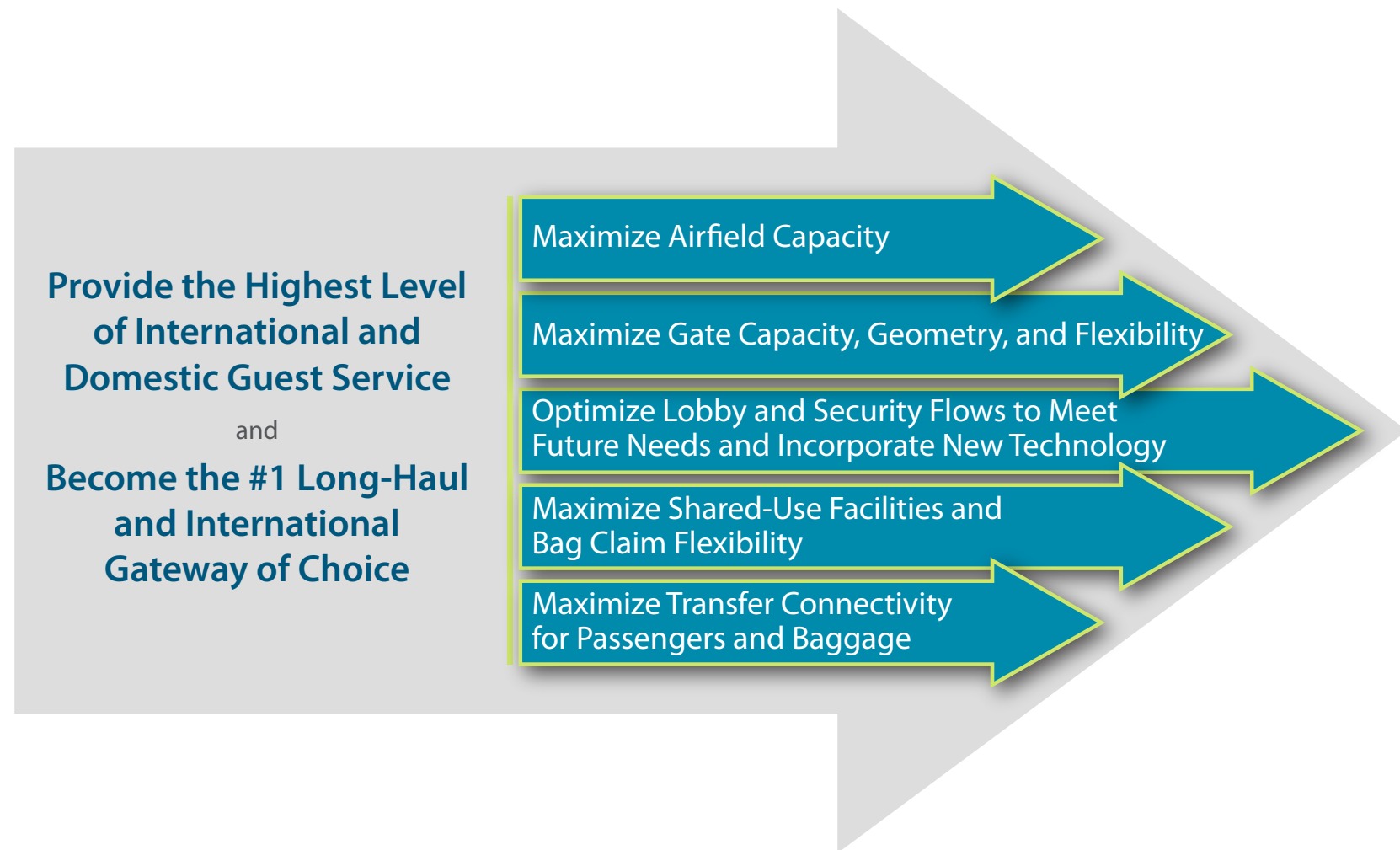
Goals and Objectives

Airport management has identified overarching goals to improve and enhance safety, the guest experience, the use of public transit, sustainability, technology, operational and organizational capacity, and economic stability at SFO. These goals led to the tangible objectives that shape the specific ADP development alternatives. The potential development solutions were evaluated to determine how they correlate to the overarching goals for SFO.

The ADP will guide long-term facility development, policy decisions, and operational changes at the Airport by providing a framework for decision-making while considering overarching goals. The ADP recommendations provide a strategy for accommodating forecast aviation activity in a safe, cost-effective, operationally efficient, environmentally conscious, and flexible manner.

A new planning cycle has begun with the ADP. Development of the recommended projects will accommodate demand over approximately the next 20 years while supporting SFO strategic goals that are tailored to ensure long-term success.

Long-Term Airport Development Goals



Planning Principles

The primary planning principle at any commercial service airport is to permit the efficient flow of aircraft, passengers, and goods through the facility. When considering development projects, planners must prioritize competing demands for limited available space. At SFO, land available for development is constrained by geography and surrounding development; therefore, it is crucial that vital land resources are reserved for aviation-related needs.

Land at the Airport can be classified into categories based on its operational purpose and value:

1. The Airport Operations Area (AOA), commonly referred to as the “airfield,” is the highest-order land use category at any airport. For a land use or project to be planned or designated within the AOA, it should have a function that is directly aviation-related. Examples of such aviation-related functions include, but are not limited to, runways, taxiways, cargo loading, passenger loading, aircraft fueling and maintenance, airfield security, and fire and rescue services.
2. A number of aviation support functions are required to be adjacent to the AOA and may include, but are not limited to, terminal areas, ground service equipment storage and maintenance, cargo warehousing, and parts storage.
3. Functions that are relevant to airport activities but do not require direct adjacency to the AOA include parking, ground transportation, catering, construction staging areas, and utilities. If space on Airport property is limited, some of these functions may be located off-Airport.

These land use designations are not always clearly defined, and exceptions are common. Strategic decisions may alter the priority of certain functions because of revenue generation or other benefits to Airport users. However, in planning future development at the Airport, it is important to keep these priorities in mind and ensure that the long-term vision for SFO is consistent with its mission to provide for aircraft transporting passengers and cargo to and from local ground transportation or other aircraft.

Typical Airport Land Use Priorities

