Leigh | Fisher

FINAL TECHNICAL MEMORANDUM

AVIATION ACTIVITY FORECAST UPDATE

San Diego International Airport

Prepared for

San Diego County Regional Airport Authority
San Diego, California

April 2019

SAN DIEGO
INTERNATIONAL AIRPORT
LET'S GO.

CONTENTS

Page

1.0 INTRODUCTION 1

2.0 REVIEW OF RECENT AVIATION TRENDS 2
2.1 Enplaned Passengers 2
2.2 Air Cargo 3
2.3 Aircraft Operations 4
2.4 Factors Contributing to Faster than Forecast Aviation Activity Growth 5

3.0 KEY DRIVERS OF AVIATION ACTIVITY 11

4.0 UPDATED unconstrained AVIATION ACTIVITY FORECASTS 12
4.1 Enplaned Passengers 12
4.2 Air Cargo 14
4.3 Aircraft Operations 17
4.4 Aircraft Fleet 22
4.5 Critical Aircraft 22

5.0 CONSTRAINED DEMAND SCENARIO 28
5.1 Approach 28
5.2 Enplaned Passengers 31
5.3 Air Cargo 31
5.4 Total Aircraft Operations 31
5.5 Aircraft Fleet 34
5.6 Critical Aircraft 34

6.0 COMPARISON WITH THE FAA 2018 TAF 40

Appendix A Updated Regression Analysis

Appendix B Alternative Forecast Scenarios

Appendix C FAA Approval Letter for the Forecasts

Appendix D Constrained Demand Scenario Technical Appendix

Appendix E 2012 ADP Forecast Report

1.0 INTRODUCTION

The Airport Development Plan (ADP) forecasts for San Diego International Airport (SDIA or the Airport) were prepared in 2012 using 2011 as the base year. Since then, actual passenger traffic at SDIA has exceeded the 2012 ADP forecasts, reflecting strong economic growth, decreases in domestic airfares, the use of larger capacity aircraft (in terms of the number of seats), higher load factors, and strong growth in both origin-destination (O&D) and connecting passengers. Given faster than forecast economic and passenger traffic growth, the San Diego County Regional Airport Authority (the Authority) asked LeighFisher to review the key industry issues and trends that drive aviation activity at SDIA and prepare updated aviation activity forecasts using 2018 as the base year.

The objective of this technical memorandum is to:

- Review recent aviation trends at SDIA for the period since the ADP forecasts were prepared (between 2011 and 2018) and the factors contributing to faster than forecast growth
- Refresh the methodology used in the 2012 ADP forecasts and update the key drivers of SDIA aviation demand*
- Prepare updated unconstrained forecasts of enplaned passengers, air cargo, and aircraft operations through 2050**
- Prepare a constrained demand scenario based on SDIA's single runway capacity
- Compare the updated unconstrained forecasts with the 2012 ADP forecasts, the FAA's published 2018 Terminal Area Forecast (TAF), the constrained demand scenario, and as required by the FAA, prepare forecast comparisons for FAA review and approval

The unconstrained forecasts presented in this memorandum do not include specific assumptions about physical, regulatory, environmental or other impediments to aviation activity growth. The constrained demand scenario was prepared based on the unconstrained forecasts and reflects the real-world limitations of SDIA's single runway on unconstrained forecast growth. This well-known and substantial limitation on the operational and passenger capacity of the airport must be considered in planning airport improvements and analyzing their reasonably foreseeable impacts. The constrained demand scenario presented in this memorandum analyses and anticipates these limitations and therefore the constrained demand scenario represents the "preferred" forecasts recommended for FAA approval and for airport planning.

Forecasts and demand scenarios are presented for enplaned passengers, air cargo, and aircraft operations, including operations for passenger and all-cargo airlines and general aviation and military aircraft. Using calendar year 2018 as the base year, annual forecasts and demand scenarios were prepared for four future demand years—2023, 2028, 2033, and 2050. In addition, high and low forecast scenarios were developed and are summarized in Appendix B. For reference, Appendix C includes the FAA Approval Letter of the draft Unconstrained Forecasts and the 2012 ADP forecast report.

* San Diego International Airport, Airport Development Plan, Aviation Activity Forecasts, November 2012. Approved by the FAA in a letter dated May 7, 2013.

** The draft unconstrained forecasts were reviewed and approved by the FAA in a letter dated December 20, 2018. See Appendix C. The draft unconstrained forecasts reviewed by the FAA were based on the 10 months of actual 2018 activity statistics available at that time. This memorandum was updated to include the full year of actual 2018 activity statistics and the addition of the Constrained Demand Scenario for consideration by the FAA.

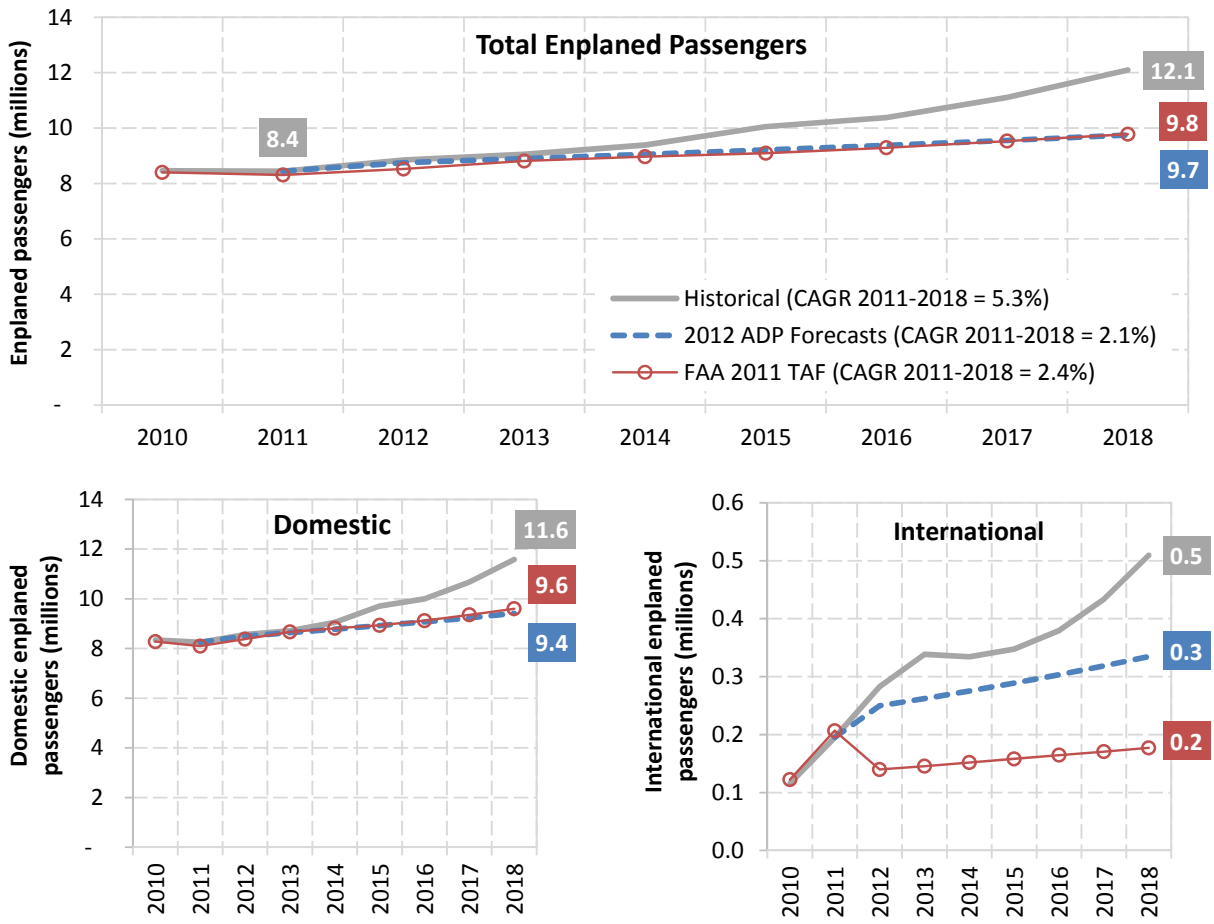
2.0 REVIEW OF RECENT AVIATION TRENDS

This section presents a review of actual and forecast aviation activity between 2011 and 2018 using the 2012 ADP forecasts and the FAA 2011 TAF as a basis for comparison. A summary of the factors contributing to faster than forecast growth since 2011 is also presented.

2.1 Enplaned Passengers

In 2018, the number of enplaned passengers totaled 12.1 million, approximately 2.4 million greater than the 2012 ADP forecast of 9.7 million (a difference of 24%), as shown on Figure 2-1. Domestic passengers at SDIA accounted for most of the increase between 2011 and 2018, although international passenger traffic more than doubled during this period.

Figure 2-1
HISTORICAL AND FORECAST ENPLANED PASSENGERS: 2010-2018
San Diego International Airport



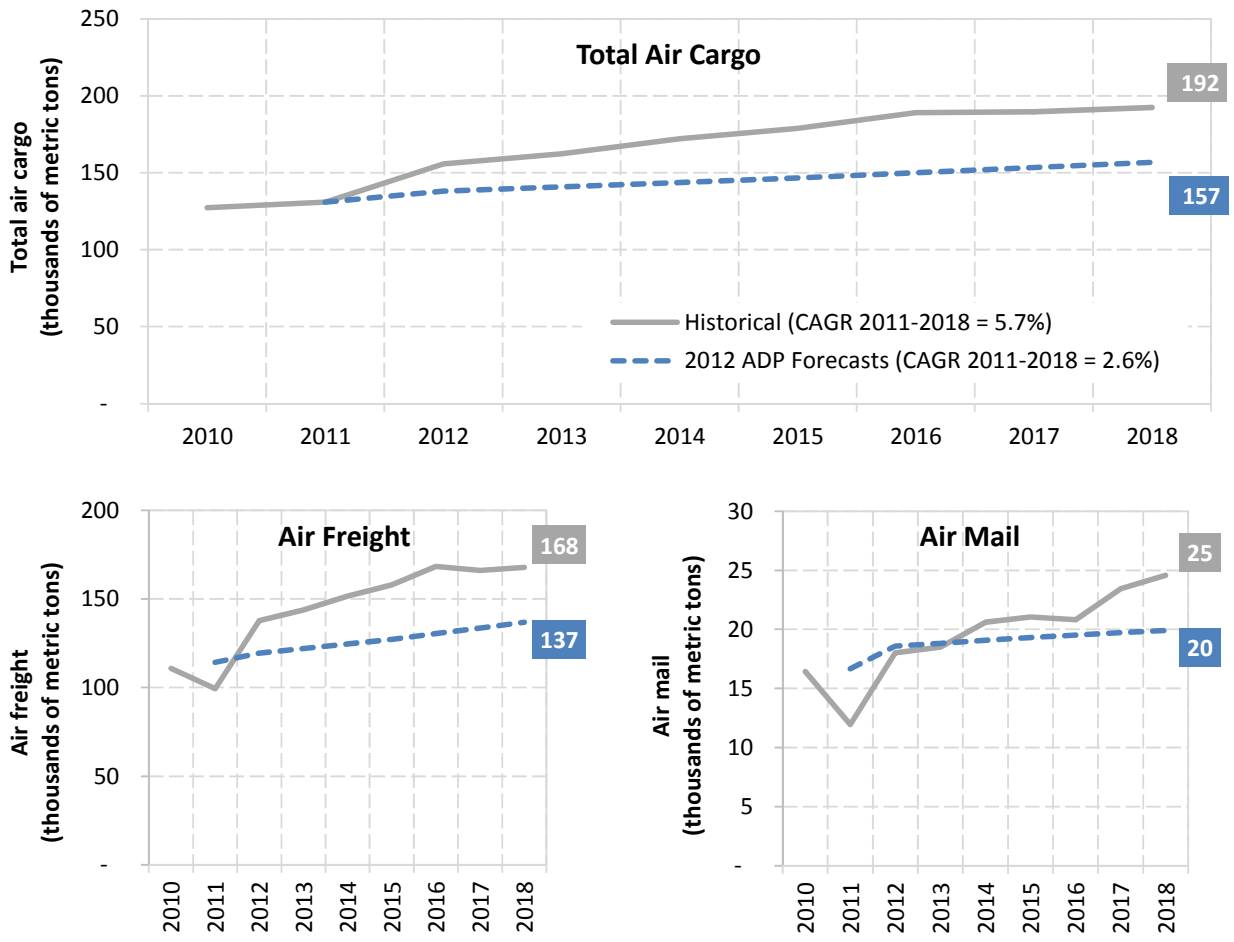
Note: Data are for domestic and international enplaned passengers.
Totals may not sum due to rounding.
The SDIA planning forecasts were prepared on a calendar year basis and the FAA 2011 TAF was prepared on a U.S. government fiscal year basis (October through September) and exclude nonrevenue passengers.

Sources: *Historical*— San Diego County Regional Airport Authority records. *Forecast*: LeighFisher, San Diego International Airport, Airport Development Plan, Aviation Activity Forecasts, November 2012. FAA 2011 Terminal Area Forecast, Federal Aviation Administration, www.faa.gov, accessed February 2012.

2.2 Air Cargo

In 2018, total air cargo (freight and mail) totaled 192,351 metric tons, approximately 35,000 metric tons greater than the 2012 ADP forecast of 157,000 (a difference of 23%), as shown on Figure 2-2. Air freight at SDIA accounted for most of the increase between 2011 and 2018, although air mail tonnage experienced strong growth (an average increase of 10.8% per year).

Figure 2-2
HISTORICAL AND FORECAST TOTAL AIR CARGO: 2010-2018
San Diego International Airport



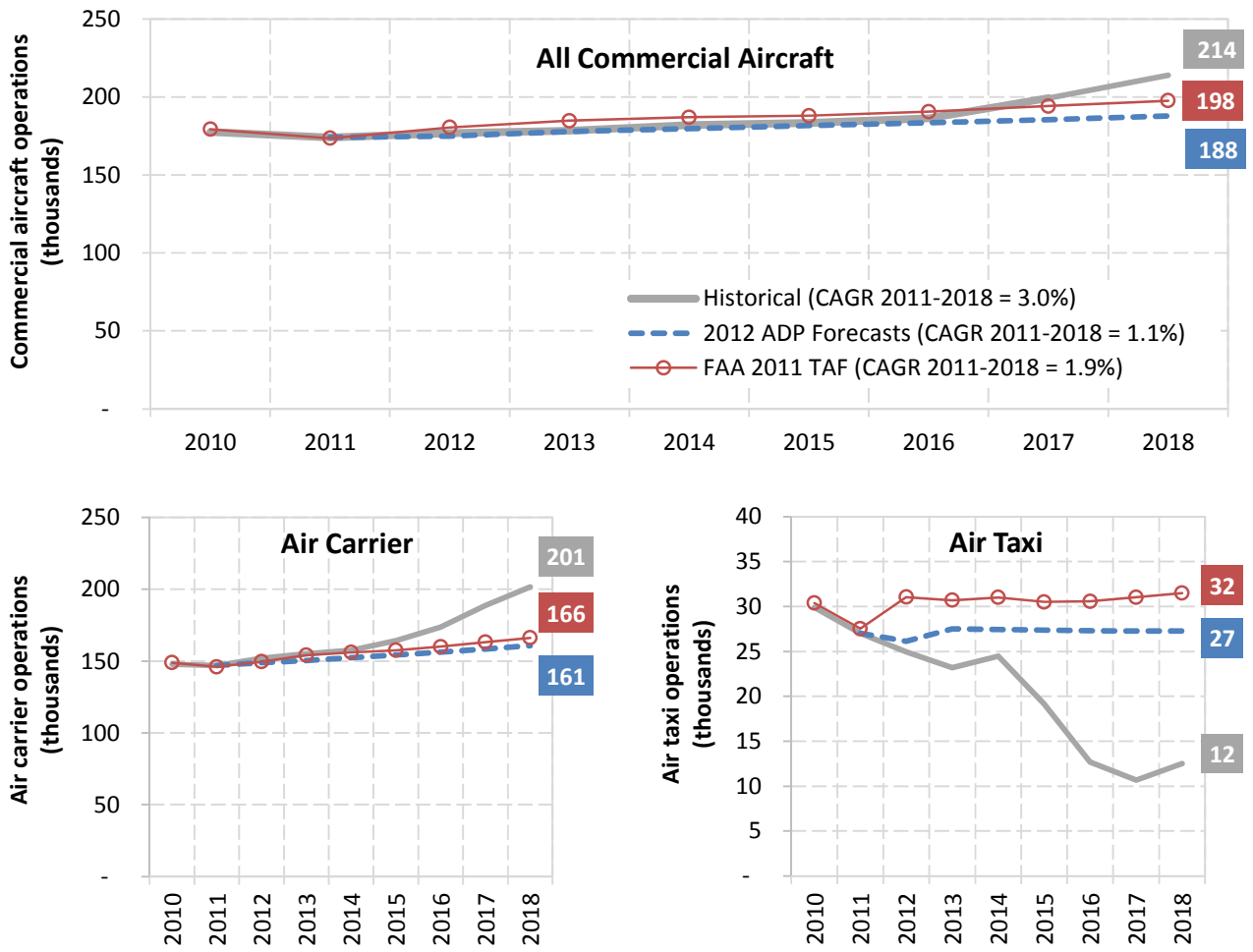
Note: Data include domestic and international enplaned and deplaned air cargo.
Totals may not sum due to rounding.

Sources: *Historical*— San Diego County Regional Airport Authority records. *Forecast*: LeighFisher, San Diego International Airport, Airport Development Plan, Aviation Activity Forecasts, November 2012.

2.3 Aircraft Operations

In 2018, the number of commercial aircraft operations totaled 213,963, approximately 26,000 operations greater than the 2012 ADP forecast of 188,000 (a difference of 14%), as shown on Figure 2-3. Air carrier operations at SDIA accounted for all of the increase between 2011 and 2018 and also offset the decrease in air taxi operations during this period.

Figure 2-3
HISTORICAL AND FORECAST COMMERCIAL AIRCRAFT OPERATIONS: 2010-2018
San Diego International Airport



Note: Data for commercial airline operations include air carrier and air taxi and commuters, including passenger and all-cargo airlines and unscheduled air taxis.
Totals may not sum due to rounding.

Sources: *Historical*— San Diego County Regional Airport Authority records. *Forecast*: LeighFisher, San Diego International Airport, Airport Development Plan, Aviation Activity Forecasts, November 2012. FAA 2011 Terminal Area Forecast, Federal Aviation Administration, www.faa.gov, accessed February 2012.

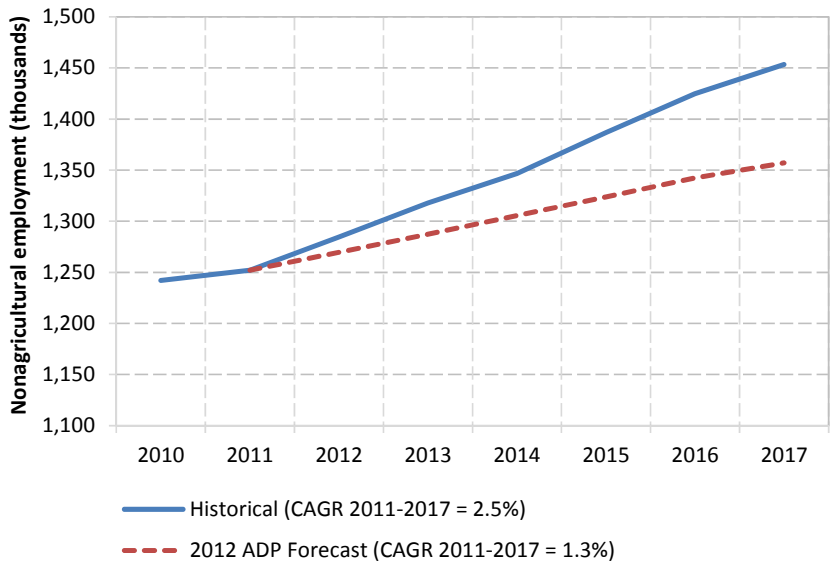
2.4 Factors Contributing to Faster than Forecast Aviation Activity Growth

A number of factors contributed to faster than forecast growth between 2011 and 2018, including strong economic growth, decreases in domestic airfares, the use of larger capacity aircraft (in terms of the number of seats), higher load factors, and strong growth in both origin-destination (O&D) and connecting passengers.

2.4.1 Economic Growth

Strong economic growth in San Diego County between 2011 and 2017 (the latest year available) is reflected in the data for nonagricultural employment and per capita personal income. As shown on Figure 2-4, nonagricultural employment in San Diego County increased an average of 2.5% per year between 2011 and 2017, faster than the 1.3% per year growth forecast by the San Diego Association of Governments (SANDAG) in its 2010 report used as a basis for the 2012 ADP forecasts. In comparison, nonagricultural employment in California and the United States increased an average increase of 2.6% and 1.8% per year, respectively, between 2011 and 2017.

Figure 2-4
HISTORICAL AND FORECAST NONAGRICULTURAL EMPLOYMENT
San Diego County



CAGR = Compound annual growth rate

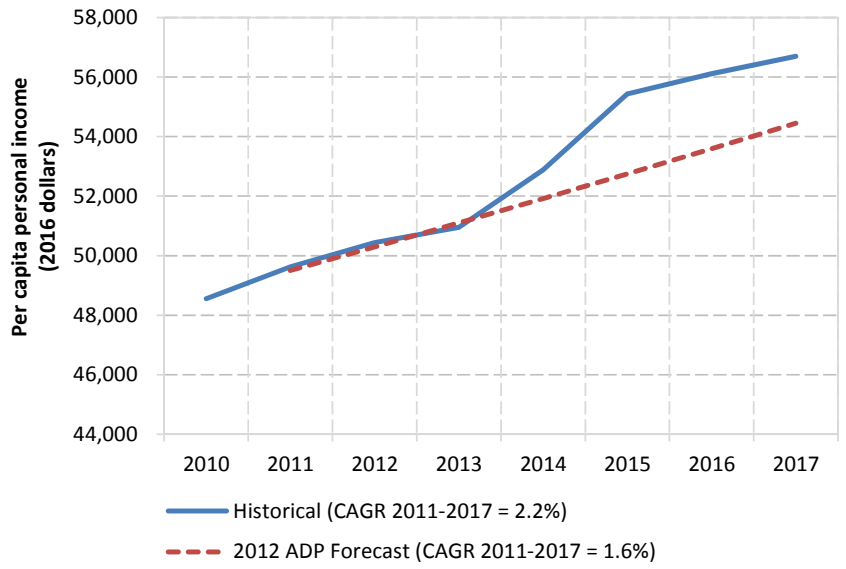
Sources: *Historical*—U.S. Department of Labor, Bureau of Labor Statistics, www.bls.gov, accessed November 2018. *Forecast*— San Diego Association of Governments (SANDAG), 2050 Regional Growth Forecast, published February 26, 2010; accessed May 2012.

Unemployment rates* in San Diego County also reflect strong economic growth since 2011, decreasing from 10.3% in 2011 to 4.0% in 2017. Unemployment rates in California and the United States also decreased considerably between 2011 and 2017—from 11.7% to 4.8% in California and from 8.9% to 4.4% in the nation as a whole.

*U.S. Department of Labor, Bureau of La Labor Statistics, www.bls.gov, accessed November 2018. Unemployment rates are not seasonally adjusted.

Per capita personal income in San Diego County, in 2016 dollars, increased an average of 2.2% per year between 2011 and 2017, faster than the 1.6% per year growth forecast by SANDAG in its 2010 report, as shown on Figure 2-5. Per capita personal income was one of the two variables used in the econometric analysis of domestic O&D passengers used as a basis for the 2012 ADP forecasts and is typically a key driver of passenger traffic at airports. In comparison, per capita personal income in California and the United States increased an average increase of 2.6% and 1.7% per year, respectively, between 2011 and 2017.

Figure 2-5
HISTORICAL AND FORECAST PER CAPITA PERSONAL INCOME
San Diego County



CAGR = Compound annual growth rate

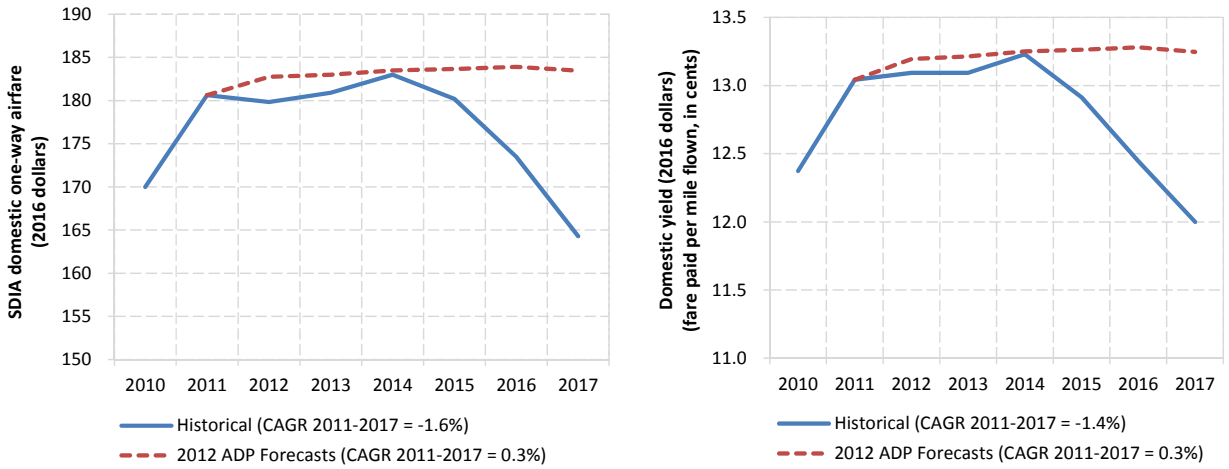
Sources: *Historical*— U.S. Department of Commerce, Bureau of Economic Analysis, Regional Accounts Data, www.bea.gov, accessed May 2012. Expressed in 2016 dollars using the consumer price index. *Forecast*— San Diego Association of Governments (SANDAG),, 2050 Regional Growth Forecast, published February 26, 2010; accessed May 2012.

2.4.2 Airfares and Airline Yield

The cost of travel for a passenger is typically represented by airfare and airline yield data published by the U.S. Department of Transportation from its Origin-Destination Survey of Airline Passenger Traffic.* The cost of travel at SDIA is represented by domestic one-way airfares and domestic airline yield, in 2016 dollars, for the Airport. As shown on Figure 2-6, SDIA domestic airfares and airline yield, in 2016 dollars, decreased an average of 1.6% and 1.4% per year, respectively, between 2011 and 2017, compared with a forecast increase of 0.3% per year based on the FAA's forecast increase in airline yield in its 2012 National Aerospace report. Passenger traffic and the cost of travel are inversely related; that is, passenger traffic typically decreases in response to an increase in airfares. The assumption that SDIA domestic airfares and yield would increase slightly between 2011 and 2017 dampened the growth in passengers forecast for the 2012 ADP.

*Represents a 10% sample of all tickets issued by U.S. airlines.

Figure 2-6
HISTORICAL AND FORECAST DOMESTIC AIRFARES AND AIRLINE YIELD
San Diego International Airport
In 2016 dollars



CAGR = Compound annual growth rate

Sources: *Historical*— U.S. Department of Transportation, Origin-Destination Survey of Airline Passenger Traffic, Domestic, online database, accessed November 2018. *Forecast*—Federal Aviation Administration, FAA Aerospace Forecasts, Federal Fiscal Years 2012-2032, March 2012, www.faa.gov.

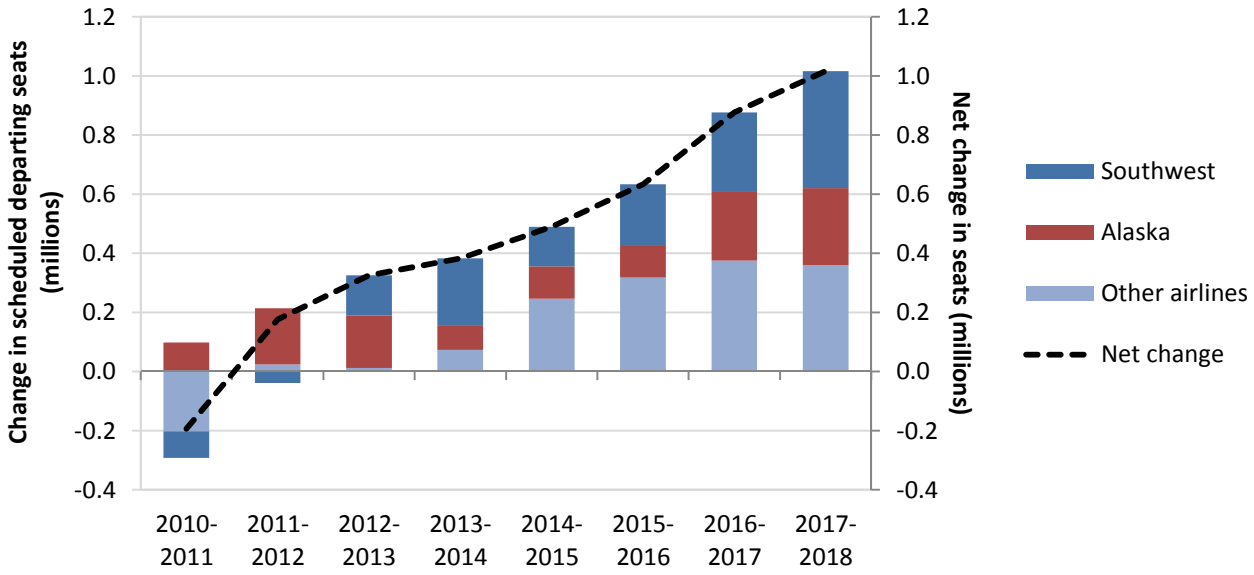
2.4.3 Seat Capacity

Between 2011 and 2018, total scheduled departing seats at the Airport increased an average of 4.7% per year, reflecting the development of SDIA as a focus city in Alaska Airlines' network and the competitive response by Southwest and the other existing airlines. As shown on Figure 2-7, the net change in seats at SDIA has increased steadily since 2011, with more than 1 million seats added in 2018. Between 2011 and 2018, Alaska's scheduled departing seats at the Airport increased an average of 13.8% per year, compared with an average increase of 3.8% per year in Southwest's seats. Strong growth in seat capacity at SDIA since 2011 contributed to faster than forecast growth in passenger traffic.

2.4.4 Aircraft Gauge

The average aircraft gauge at SDIA, the size of an aircraft in terms of the number of seats, increased an average of 1.7% per year between 2011 and 2018, compared with the 2012 ADP forecast growth of 0.5% per year, as shown on Figure 2-8. The increase in aircraft gauge since 2011 reflects the retirement of 50-seat regional jets, the densification of aircraft, and the delivery of new higher capacity fuel efficient aircraft.

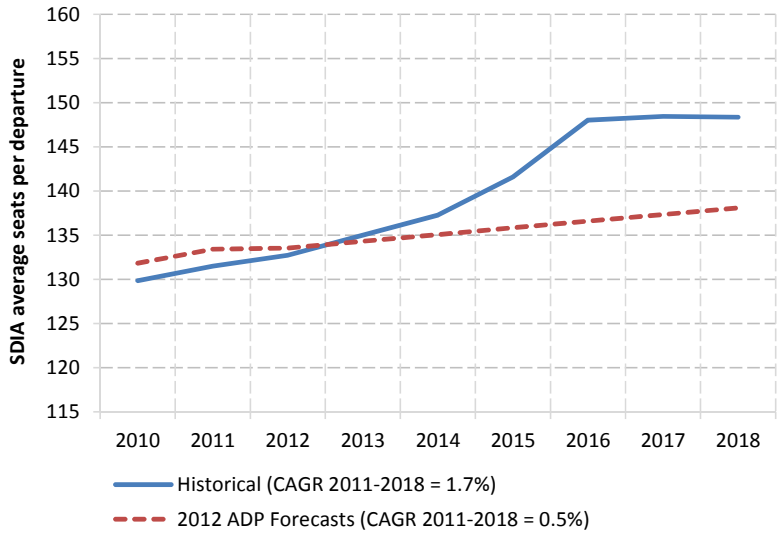
Figure 2-7
NET CHANGE IN SCHEDULED DEPARTING SEATS
San Diego International Airport



CAGR = Compound annual growth rate

Source: OAG Worldwide Aviation Ltd, Schedules Analyser, online database, accessed November 2018.

Figure 2-8
HISTORICAL AND FORECAST AVERAGE SEATS PER DEPARTURE
San Diego International Airport



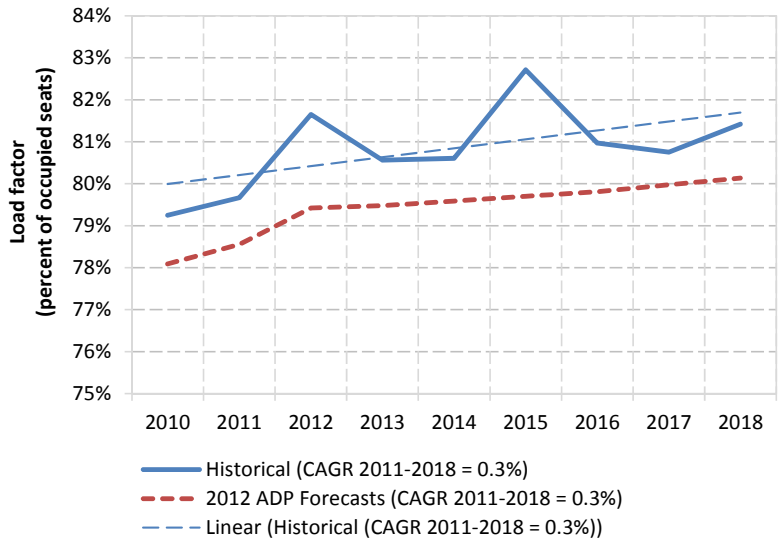
CAGR = Compound annual growth rate

Sources: *Historical*—OAG Worldwide Aviation Ltd, Schedules Analyser, online database, accessed November 2018. *Forecast*: LeighFisher, San Diego International Airport, Airport Development Plan, Aviation Activity Forecasts, November 2012.

2.4.5 Load Factor

Enplaned passenger load factors at SDIA, the percent of occupied seats on an aircraft, increased an average of 0.4% per year between 2011 and 2018, nearly equal to the 2012 ADP forecast growth rate of 0.3%, as shown on Figure 2-9. Differences in historical and 2012 ADP forecast load factors in 2010 and 2011 reflect revisions to published seat data for 2010 and 2011. Load factors at SDIA increased considerably in 2012 and 2015, preceding the addition of more seat capacity which resulted in decreased load factors in 2013 and 2016 compared with a linear trend line.

Figure 2-9
HISTORICAL AND FORECAST ENPLANED PASSENGER LOAD FACTOR
San Diego International Airport



CAGR = Compound annual growth rate

Note: Differences in historical and 2012 ADP forecast load factors in 2010 and 2011 reflect revisions to published seat data in 2010 and 2011.

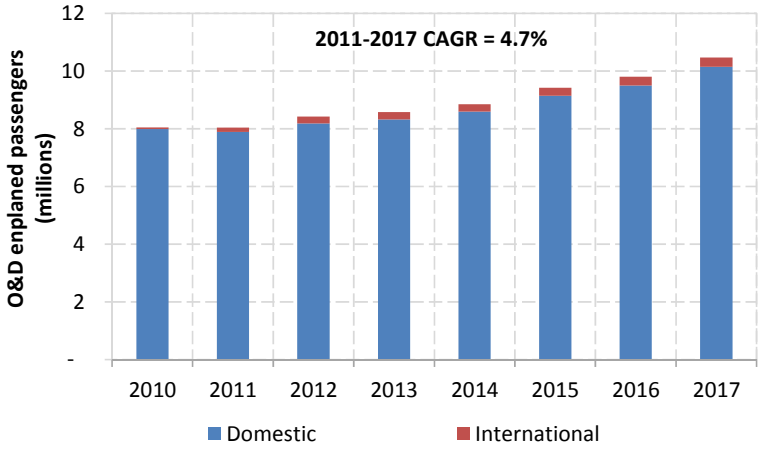
Sources: *Historical*— San Diego County Regional Airport Authority records. OAG Worldwide Aviation Ltd, Schedules Analyser, online database, accessed November 2018. *Forecast*: LeighFisher, San Diego International Airport, Airport Development Plan, Aviation Activity Forecasts, November 2012.

2.4.6 O&D and Connecting Passengers

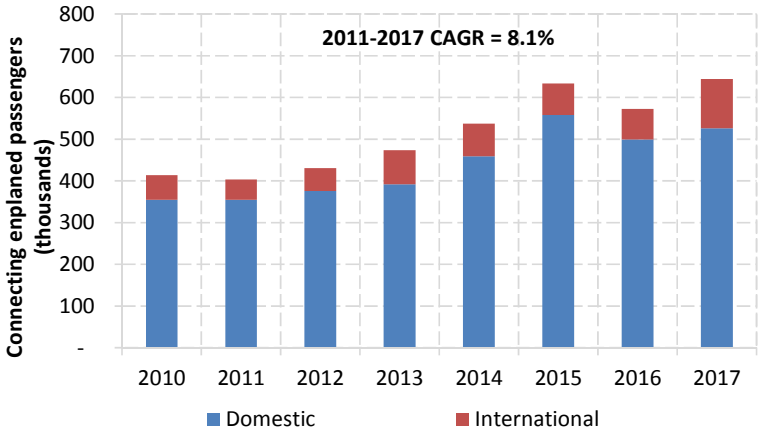
SDIA is primarily an O&D airport with nearly 95% of its passengers originating from or destined for San Diego. O&D passenger demand is affected by the demographics and economy of the region served by the airport as well as airline service and airfares. From 2011 to 2017, the number of domestic O&D passengers at SDIA increased an average of 4.7% per year, more than double the long-term historical rate of 2.2% per year between 1990 and 2011, as shown on Figure 2-10. Although connecting passengers at SDIA account for about 5% of total passengers, connecting passenger experience strong growth between 2011 and 2017—an average increase of 8.1% per year.

Figure 2-10
O&D AND CONNECTING PASSENGERS
San Diego International Airport

Origin-Destination Enplaned Passengers



Connecting Enplaned Passengers



CAGR = Compound annual growth rate

Source: U.S. Department of Transportation, Origin-Destination Survey of Airline Passenger Traffic, Domestic, online database, accessed November 2018

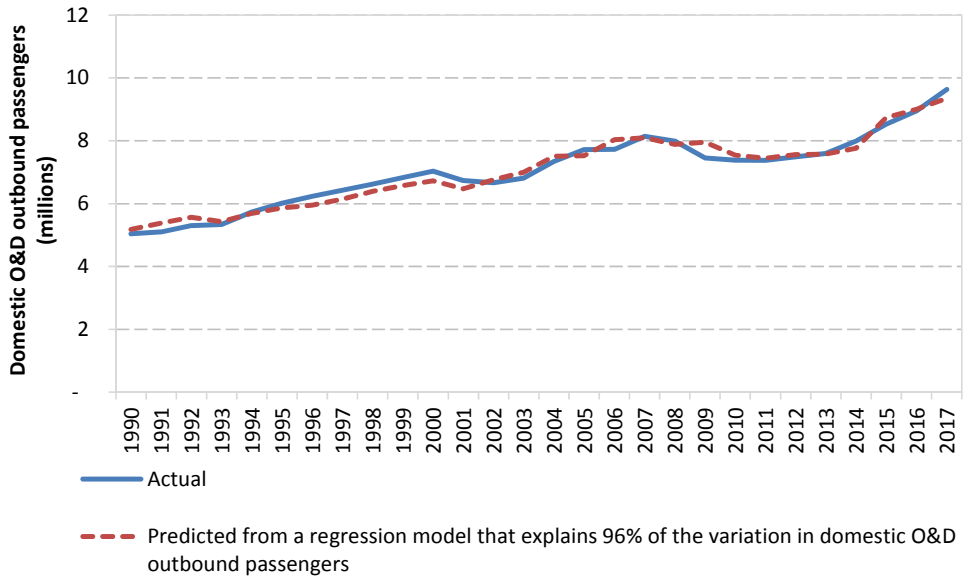
3.0 KEY DRIVERS OF AVIATION ACTIVITY

The 2012 ADP unconstrained forecasts were developed based on an analysis of the key drivers of aviation activity at SDIA. An updated analysis of the key drivers of aviation activity shows that:

- The historical trend in domestic O&D passengers at SDIA continues to be strongly related to per capita personal income in San Diego County, adjusted for inflation, and the cost of travel, represented by domestic airfares, adjusted for inflation, consistent with the 2012 ADP forecast analysis.
- As shown in Figure 3-1, a regression model including San Diego County per capita personal income and domestic airfares explained 96% of the historical variation in domestic originating passengers between 1990 and 2017. See Appendix A for regression statistics.

The forecasts of per capita personal income and domestic airfares were based on the analysis of historical trends discussed in Section 2 and available independent forecasts prepared by the California Department of Transportation, Woods & Poole, a national economic forecasting firm, and the Federal Aviation Administration.* SANDAG's most recent economic forecasts were prepared in 2013 and do not reflect the recent trends in economic growth. SANDAG expects to publish an updated economic forecast in 2019.

Figure 3-1
REPRESENTATIVE MODEL
HISTORICAL AND PREDICTED DOMESTIC O&D PASSENGERS
San Diego International Airport



Sources: *Actual*—U.S. Department of Transportation, Origin-Destination Survey of Airline Passenger Traffic, Domestic, online database, accessed December 2011. *Predicted*—LeighFisher, November 2018.

*California Department of Transportation, *California County-Level Economic Forecast 2018-2050, The California Economic Forecast,* September 2018. Woods & Poole Economics Inc., 2018 MSA Profile, Metropolitan Area Projections to 2050, 2018. Federal Aviation Administration, *FAA Aerospace Forecasts, Fiscal Years 2018–2038*, March 2018, www.faa.gov.

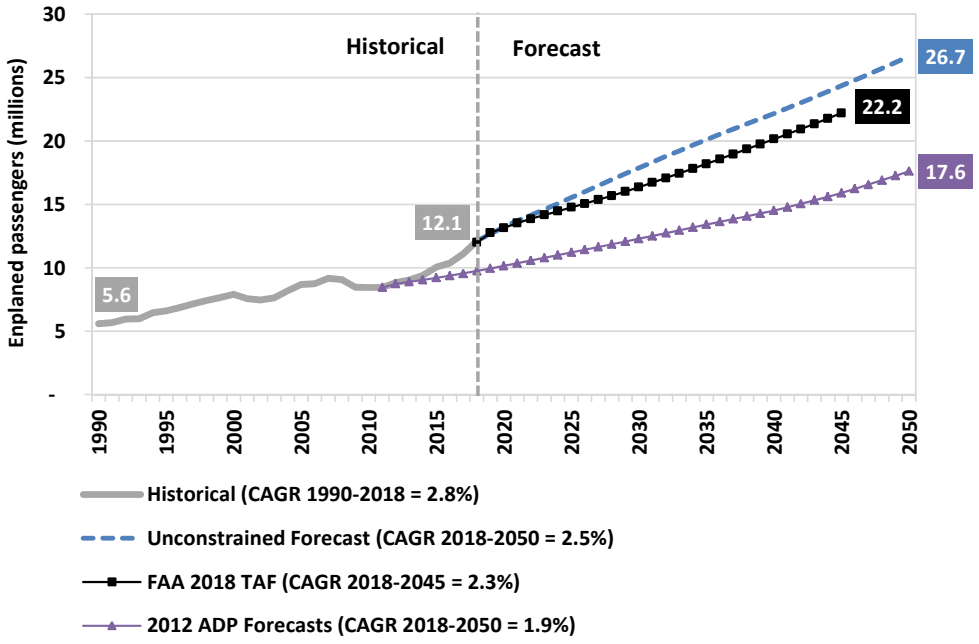
4.0 UPDATED UNCONSTRAINED AVIATION ACTIVITY FORECASTS

This section presents updated unconstrained forecasts of aviation activity at SDIA for 2023, 2028, 2033, 2038, 2043, and 2050, including enplaned passengers, air cargo, and aircraft operations and a summary of the underlying forecast assumptions. As discussed earlier, the unconstrained forecasts presented in this memorandum do not include specific assumptions about physical, regulatory, environmental, or other impediments to aviation activity growth. The constrained demand scenario in Section 5 of this memorandum addresses the real-world limitations of SDIA's runway on unconstrained forecast growth. This well-known and substantial limitation on the operational and passenger capacity of the airport must be considered in planning airport improvements and analyzing their reasonably foreseeable impacts. The constrained demand scenario presented in this memorandum analyses and anticipates these limitations and therefore the constrained demand scenario represents the "preferred" forecasts recommended for FAA approval and for airport planning.

4.1 Enplaned Passengers

As shown on Figure 4-1 and in Table 4-1, the number of passengers at the Airport is forecast to increase from 12.1 million passengers in 2018 to 26.7 million in 2050 in the unconstrained forecast, an average increase of 2.5% per year. The number of domestic passengers at the Airport is forecast to increase an average of 2.3% per year between 2018 and 2050, compared with an average increase of 5.5% per year in international passenger traffic.

Figure 4-1
UNCONSTRAINED FORECAST OF ENPLANED PASSENGERS
San Diego International Airport



CAGR = Compound annual growth rate
Note: The forecasts presented in this figure were prepared using the information and assumptions given in the accompanying text. Inevitably, some of the assumptions used to develop the forecasts will not be realized and unanticipated events and circumstances may occur. Therefore, there are likely to be differences between the forecast and actual results, and those differences may be material.

Sources: *Historical*—San Diego County Regional Airport Authority records. *Forecast*—LeighFisher, November 2018.

Table 4-1
UNCONSTRAINED FORECAST OF ENPLANED PASSENGERS
San Diego International Airport

	Historical		Unconstrained Forecast					
	2017	2018	2023	2028	2033	2038	2043	2050
Domestic								
Mainline airline	4,752,261	5,244,306	6,255,600	7,174,800	8,030,800	8,771,400	9,472,600	10,505,900
Regional airline	712,939	853,232	1,074,700	1,293,800	1,520,300	1,743,700	1,977,700	2,349,300
Low cost carrier	5,208,403	5,515,739	6,541,600	7,502,900	8,398,000	9,172,500	9,905,800	10,986,300
Domestic total	10,673,603	11,613,277	13,871,900	15,971,500	17,949,100	19,687,600	21,356,100	23,841,500
International	433,475	512,661	733,900	979,600	1,288,100	1,662,100	2,104,200	2,834,900
Total Airport	11,107,078	12,125,938	14,605,800	16,951,100	19,237,200	21,349,700	23,460,300	26,676,400
O&D and connecting enplaned passengers								
O&D	10,462,985	11,422,762	13,758,800	15,968,000	18,121,800	20,111,700	22,099,800	25,129,300
Connecting	644,093	703,176	847,000	983,100	1,115,400	1,238,000	1,360,500	1,547,100
Total Airport	11,107,078	12,125,938	14,605,800	16,951,100	19,237,200	21,349,700	23,460,300	26,676,400
Percent of total Airport								
O&D	94.2%	94.2%	94.2%	94.2%	94.2%	94.2%	94.2%	94.2%
Connecting	5.8%	5.8%	5.8%	5.8%	5.8%	5.8%	5.8%	5.8%

	Percent change	Compound annual percent increase (decrease)					
	2017-2018	2018-2023	2023-2028	2028-2033	2033-2038	2038-2043	2043-2050
Domestic							
Mainline airline	10.4%	4.5%	2.8%	2.3%	1.8%	1.6%	1.5%
Regional airline	19.7	5.9	3.8	3.3	2.8	2.6	2.5
Low cost carrier	5.9	4.4	2.8	2.3	1.8	1.6	1.5
Domestic total	8.8	4.5	2.9	2.4	1.9	1.6	1.6
International	18.3	9.4	5.9	5.6	5.2	4.8	4.4
Total Airport	9.2	4.8	3.0	2.6	2.1	1.9	1.9

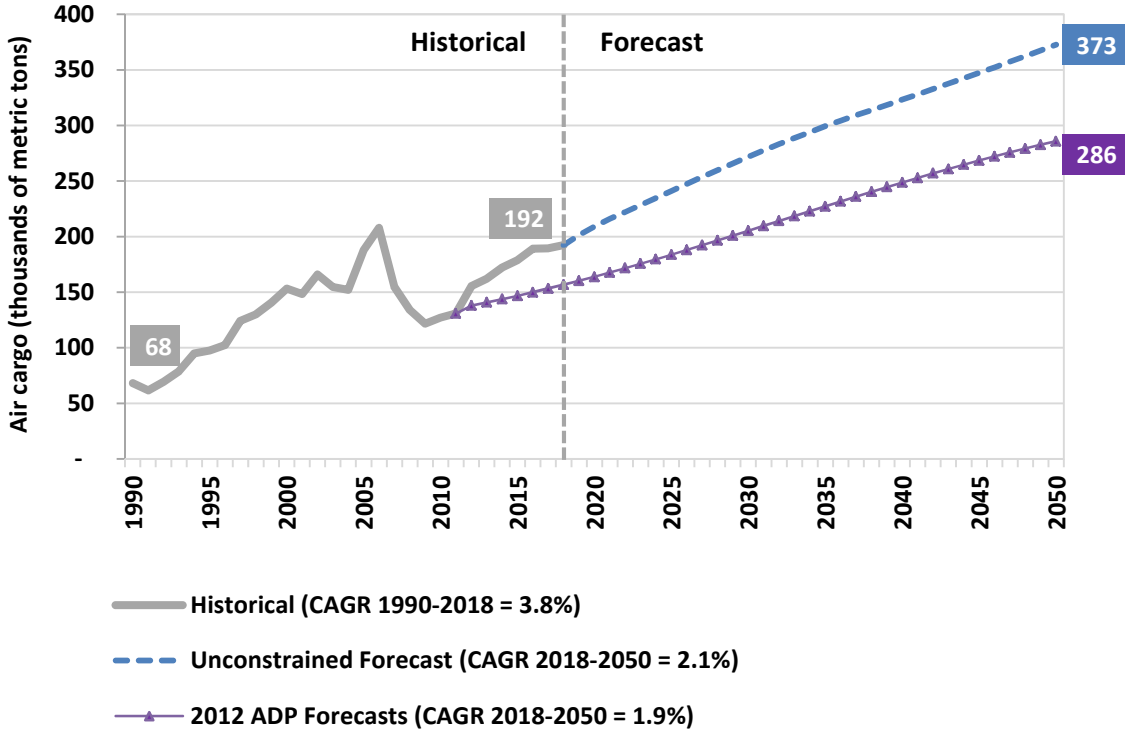
Note: The forecasts presented in this table were prepared using the information and assumptions given in the accompanying text. Inevitably, some of the assumptions used to develop the forecasts will not be realized and unanticipated events and circumstances may occur. Therefore, there are likely to be differences between the forecast and actual results, and those differences may be material.

Sources: *Historical*—San Diego County Regional Airport Authority records. *Forecast*—LeighFisher, November 2018.

4.2 Air Cargo

As shown on Figure 4-2 and in Table 4-2, total air cargo at the Airport is forecast to increase from 192,351 metric tons in 2018 to 372,700 metric tons in 2050 in the unconstrained forecast, an average increase of 2.1% per year. Air freight and air mail at the Airport are forecast to increase an average of 2.1% per year between 2018 and 2050.

Figure 4-2
UNCONSTRAINED FORECAST OF AIR CARGO
San Diego International Airport



CAGR = Compound annual growth rate
Note: The forecasts presented in this figure were prepared using the information and assumptions given in the accompanying text. Inevitably, some of the assumptions used to develop the forecasts will not be realized and unanticipated events and circumstances may occur. Therefore, there are likely to be differences between the forecast and actual results, and those differences may be material.

Sources: *Historical*—San Diego County Regional Airport Authority records. *Forecast*—LeighFisher, November 2018.

Table 4-2
UNCONSTRAINED FORECAST OF AIR CARGO
San Diego International Airport
In metric tons

	Historical		Unconstrained Forecast					
	2017	2018	2023	2028	2033	2038	2043	2050
Air freight								
Enplaned	75,097	72,960	86,030	97,800	108,690	118,070	126,980	140,090
Deplaned	91,038	94,826	113,040	128,530	142,880	155,270	167,050	184,400
Air freight total	166,135	167,786	199,070	226,330	251,570	273,340	294,030	324,490
Mail								
Enplaned	17,691	17,987	21,330	24,280	27,020	29,410	31,680	35,050
Deplaned	5,741	6,578	8,070	9,180	10,200	11,080	11,930	13,160
Mail total	23,432	24,566	29,400	33,460	37,220	40,490	43,610	48,210
Air cargo								
Enplaned	92,788	90,947	107,360	122,080	135,710	147,480	158,660	175,140
Deplaned	96,779	101,404	121,110	137,710	153,080	166,350	178,980	197,560
Total air cargo	189,567	192,351	228,470	259,790	288,790	313,830	337,640	372,700
Percent of total								
Enplaned	48.9%	47.3%	47.0%	47.0%	47.0%	47.0%	47.0%	47.0%
Deplaned	51.1%	52.7%	53.0%	53.0%	53.0%	53.0%	53.0%	53.0%
Enplaned air freight								
Domestic								
Cargo airline	67,240	64,446	75,880	85,680	94,420	101,550	108,010	117,290
Passenger airline	5,738	5,763	6,480	7,310	8,060	8,670	9,220	10,010
Domestic total	72,979	70,209	82,360	92,990	102,480	110,220	117,230	127,300
International	2,118	2,751	3,670	4,810	6,200	7,850	9,750	12,790
Air freight total	75,097	72,960	86,030	97,800	108,680	118,070	126,980	140,090
Enplaned mail								
Cargo airline	15,115	15,027	17,770	20,220	22,510	24,490	26,390	29,190
Passenger airline	2,575	2,961	3,560	4,050	4,510	4,910	5,290	5,850
Mail total	17,691	17,987	21,330	24,270	27,020	29,400	31,680	35,040
Total enplaned air cargo	92,788	90,947	107,360	122,070	135,700	147,470	158,660	175,130

Table 4-2 (page 2 of 2)
UNCONSTRAINED FORECAST OF AIR CARGO
San Diego International Airport
In metric tons

	Percent change 2017-2018	Compound annual percent increase (decrease) Unconstrained Forecast 2018-2023	2023-2028	2028-2033	2033-2038	2038-2043	2043-2050
Total air cargo (enplaned and deplaned)							
Air freight	1.0%	4.4%	2.6%	2.1%	1.7%	1.5%	1.4%
Mail	4.8	4.6	2.6	2.2	1.7	1.5	1.4
Total	1.5	4.4	2.6	2.1	1.7	1.5	1.4
Enplaned air freight							
Domestic	(3.8)	4.1	2.5	2.0	1.5	1.2	1.2
International	29.9	7.5	5.6	5.2	4.8	4.4	4.0

Note: The forecasts presented in this table were prepared using the information and assumptions given in the accompanying text. Inevitably, some of the assumptions used to develop the forecasts will not be realized and unanticipated events and circumstances may occur. Therefore, there are likely to be differences between the forecast and actual results, and those differences may be material.

Sources: *Historical*—San Diego County Regional Airport Authority records. *Forecast*—LeighFisher, November 2018.

4.3 Aircraft Operations

This section summarizes the forecasts of total aircraft operations, including passenger airline, all-cargo airline, general aviation, and military operations.

4.3.1 Unconstrained Forecast Approach and Methodology

The forecasts of total aircraft operations are derived from the forecasts of passenger and cargo demand described previously and an evaluation of general aviation and military operations. In particular:

- The forecasts of passenger airline aircraft departures are based on the enplaned passenger forecasts and assumptions regarding average aircraft size and enplaned passenger load factor.
- The forecasts of all-cargo airline aircraft departures are based on the air cargo forecasts and assumptions regarding average cargo tonnage per operation and type of all-cargo service (integrated carrier or regional feeder).
- The forecasts of general aviation aircraft operations are based on historical trends, the number of aircraft based at the Airport, the average daily utilization of those aircraft, assumptions regarding aircraft utilization in the future, and industry forecasts of general aviation activity such as those prepared by the FAA.
- The forecasts of military aircraft operations are based on data for the base year of the forecasts and carried forward through the forecast period. Military operations typically increase and decrease with geopolitical trends and therefore this activity may vary in a given year.

4.3.2 Unconstrained Forecast Assumptions

Table 4-3 presents the forecast assumptions for passenger and cargo airline aircraft operations, including assumptions for the average enplaned passenger load factor, the average number of seats per departure, and average cargo tonnage per cargo airline operation.

4.3.3 Passenger Airline Aircraft Operations Forecasts

Passenger aircraft operations include total departures and arrivals performed by mainline and regional affiliate aircraft in the service of transporting passengers, as shown in Table 4-4. Passenger airline aircraft operations were calculated by dividing the enplaned passenger forecasts by sector (e.g., domestic and International) and category (e.g., mainline and regional affiliate carrier) by the estimated number of passengers enplaned per departure. In 2018, the average number of passengers enplaned per departure for the Airport as a whole was 121.1, derived by multiplying the load factor by the average seats per departure (e.g., 81.6% x 148.3 = 121.1). This number is expected to increase slowly over the forecast period based on an estimated increase in the average number of seats per aircraft and an estimated load factor, or percent of available seats filled with passengers. The average number of passengers enplaned per departure is expected to reach approximately 125.9 in 2050 in the unconstrained forecast. Dividing the enplaned passenger forecasts by the forecast number of passengers enplaned per departure yields passenger airline aircraft departures. The forecast departures were then multiplied by two to yield passenger airline aircraft operations for each category of activity.

Passenger airline air carrier aircraft operations at SDIA are forecast to increase from 197,244 in 2018 to 423,670 operations in 2050 in the unconstrained forecast, an average increase of 2.4% per year, as shown in Table 4-4.

Table 4-3
ASSUMPTIONS FOR AIRCRAFT OPERATIONS UNCONSTRAINED FORECAST
San Diego International Airport

	Historical		Unconstrained Forecast					
	2017	2018	2023	2028	2033	2038	2043	2050
Enplaned passengers per departure								
Domestic								
Mainline airline	146.8	145.5	146.4	146.4	146.4	146.4	146.4	146.4
Regional airline	55.7	56.9	58.5	59.9	61.2	62.6	64.0	66.0
Low cost carrier	118.1	122.2	122.8	124.2	125.6	127.0	128.5	130.5
Domestic total	119.5	120.7	121.3	121.9	122.5	123.1	123.7	124.5
International	128.7	130.2	131.4	132.9	134.4	135.9	137.4	139.6
Total Airport	119.9	121.1	121.8	122.5	123.2	124.0	124.8	125.9
Enplaned passenger load factor								
Domestic								
Mainline airline	85.8%	85.7%	86.0%	86.0%	86.0%	86.0%	86.0%	86.0%
Regional airline	74.5%	76.7%	78.2%	79.2%	80.2%	81.2%	82.2%	83.6%
Low cost carrier	77.8%	79.0%	79.0%	79.5%	80.0%	80.5%	81.0%	81.7%
Domestic total	80.9%	81.7%	82.0%	82.3%	82.6%	83.0%	83.3%	83.8%
International	77.2%	79.7%	79.7%	80.2%	80.7%	81.2%	81.7%	82.4%
Total Airport	80.8%	81.6%	81.8%	82.2%	82.5%	82.8%	83.1%	83.6%
Average seats per departure								
Domestic								
Mainline airline	171.1	169.7	170.2	170.2	170.2	170.2	170.2	170.2
Regional airline	74.8	74.1	74.9	75.6	76.4	77.2	77.9	79.0
Low cost carrier	151.8	154.6	155.4	156.1	156.9	157.7	158.5	159.6
Domestic total	147.8	147.7	148.0	148.1	148.3	148.4	148.5	148.6
International	166.6	163.4	164.9	165.8	166.6	167.4	168.3	169.5
Total Airport	148.4	148.3	148.8	149.1	149.4	149.7	150.1	150.6
Enplaned freight per operation (tons)								
All-cargo airlines	19.8	20.2	19.9	20.0	20.1	20.2	20.3	20.3

Note: The forecasts presented in this table were prepared using the information and assumptions given in the accompanying text. Inevitably, some of the assumptions used to develop the forecasts will not be realized and unanticipated events and circumstances may occur. Therefore, there are likely to be differences between the forecast and actual results, and those differences may be material.

Sources: *Historical*—San Diego County Regional Airport Authority records. *Forecast*—LeighFisher, November 2018.

4.3.4 All-Cargo Airline Aircraft Operations Forecasts

Cargo airline operations at SDIA include the flight activity by airlines dedicated exclusively to the transportation of freight such as FedEx and by commuter/regional size aircraft. Air carrier size aircraft that perform all-cargo operations at the airport include widebody (e.g., Airbus A-300, Boeing 767, and MD-11) and narrowbody (e.g., Boeing 757) aircraft. Commuter or regional aircraft that perform all-cargo operations at the airport include small piston and turboprop aircraft such as the Beechcraft 99 and Swearingen Metroliner aircraft. In 2018, there were 6,380 cargo airline operations performed at the Airport.

The forecast of all-cargo operations was developed by first estimating the share of future cargo tonnage expected to be carried by air carrier and commuter aircraft. The cargo tonnage expected to be carried by all-cargo carriers was then divided by an estimated cargo tons per departure ratio to yield total air carrier cargo operations. The ratio of tons per operation is expected to average 20,000 pounds over the forecast period.*

Cargo airline aircraft operations at SDIA (air carrier and commuter) are forecast to increase an average of 1.9% per year from 6,380 in 2018 to 11,540 in 2050, as shown in Table 4-4.

4.3.5 General Aviation Aircraft Operations Forecasts

General aviation (GA) activity includes all flight operations by aircraft other than scheduled or charter passenger and cargo aircraft and military aircraft. GA includes not only pilot training and recreational flights on small single engine or multi-engine propeller driven aircraft, but also operations on large business jet aircraft.

On a nationwide basis, the number of general aviation aircraft operations has been in slow decline due to factors such as increases in aircraft, fuel, and insurance costs, as well as increased avionic instrument requirements. The 2008-2009 economic recession and the financial credit crisis further reduced general aviation activity nationwide. In the future, the FAA expects general aviation traffic to recover slowly.

The flight operations of GA aircraft are categorized as local or itinerant operations. Local operations are flights that operate within visual range or close proximity of the airport. Itinerant operations typically include those flights that leave the airport destined for another airport and require the filing of flight plans with the local air traffic control authorities. Historically, itinerant operations have accounted for nearly all GA operations at the Airport. In 2018, a total of 10,337 itinerant GA operations were performed at the Airport (100% of GA operations), as shown in Table 4-4.

GA operations in the future are forecast to continue to be comprised of itinerant operations only. The total number of general aviation operations is forecast to increase an average of 0.5% per year from 2018 through 2050, compared with a forecast growth rate of 0.3% per between 2018 and 2038 for the nation as a whole.**

In 2018, a total of 9 jet aircraft were based at the Airport. The total number of based aircraft at the Airport is forecast to increase to 11 in 2050.

4.3.6 Military Aircraft Operations Forecasts

The number of military operations at the Airport averaged approximately 700 operations per year between 2010 and 2018. In 2018, military operations totaled 758, slightly above the 9-year average. Military

*Includes air carrier and commuter operations. Air cargo data are not reported separately for commuters.

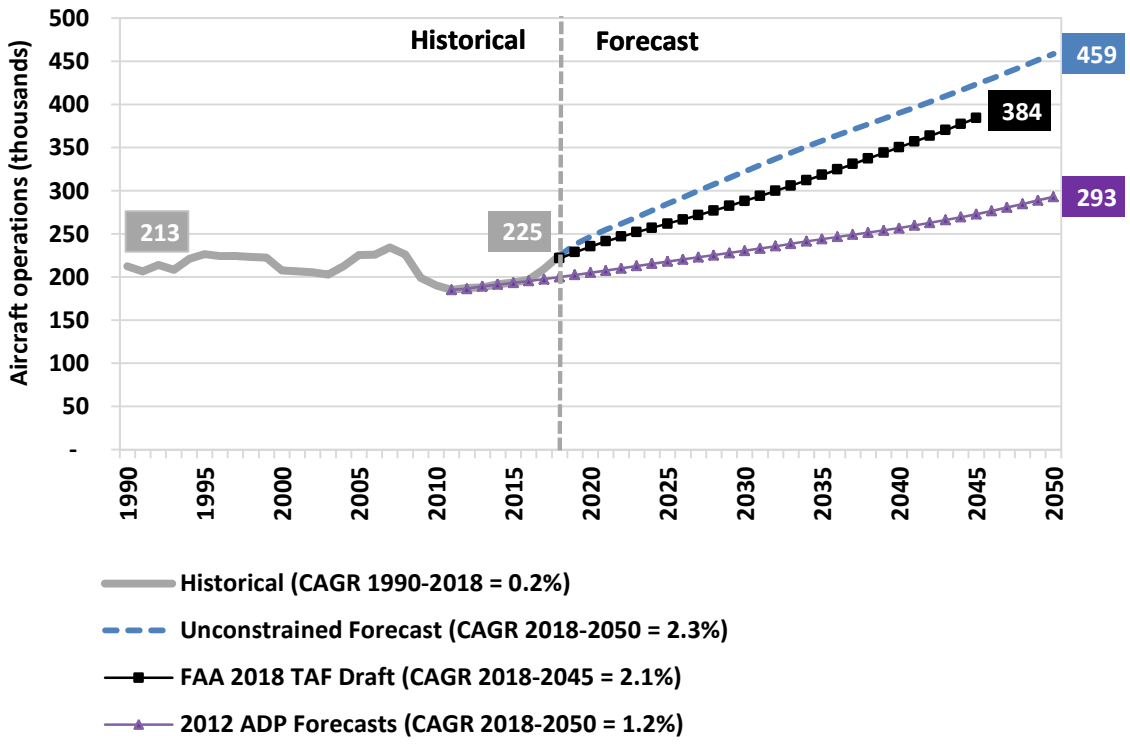
**U.S. Department of Transportation, Federal Aviation Administration, FAA National Aerospace Forecasts, Fiscal Years 2018-2038, www.faa.gov.

operations are expected remain at a level of about 700 operations from 2018 through 2050, as shown in Table 4-4.

4.3.7 Total Aircraft Operations Forecasts

As shown on Figure 4-3 and in Table 4-4, total aircraft operations at the Airport are forecast to increase from 225,058 in 2018 to 458,700 in 2050 in the unconstrained forecast, an average increase of 2.3% per year. Commercial aircraft operations at the Airport are forecast to increase an average of 2.3% per year between 2018 and 2050, while general aviation operations are forecast to increase an average of 0.5% per year and military operations are forecast to remain relatively unchanged.

Figure 4-3
UNCONSTRAINED FORECAST OF TOTAL AIRCRAFT OPERATIONS
San Diego International Airport



CAGR = Compound annual growth rate
Note: The forecasts presented in this figure were prepared using the information and assumptions given in the accompanying text. Inevitably, some of the assumptions used to develop the forecasts will not be realized and unanticipated events and circumstances may occur. Therefore, there are likely to be differences between the forecast and actual results, and those differences may be material.

Sources: *Historical*—San Diego County Regional Airport Authority records. *Forecast*—LeighFisher, November 2018.

Table 4-4

UNCONSTRAINED FORECAST OF TOTAL AIRCRAFT OPERATIONS

San Diego International Airport

	Historical		Unconstrained Forecast					
	2017	2018	2023	2028	2033	2038	2043	2050
Air Carrier								
Passenger airlines	182,712	197,244	239,870	276,770	312,230	344,370	376,010	423,670
Cargo airlines	4,082	3,850	4,640	5,220	5,720	6,130	6,490	7,020
Other	1,787	372	800	800	810	810	820	820
Air Carrier total	188,581	201,466	245,310	282,790	318,760	351,310	383,320	431,510
Air Taxi								
Cargo airlines	2,716	2,530	2,980	3,360	3,680	3,940	4,170	4,520
Other	7,946	9,967	10,000	10,000	10,000	10,000	10,000	10,000
Air Taxi total	10,662	12,497	12,980	13,360	13,680	13,940	14,170	14,520
General Aviation								
Itinerant	9,613	10,337	10,470	10,730	11,000	11,280	11,560	11,970
Local	--	--	--	--	--	--	--	--
General Aviation total	9,613	10,337	10,470	10,730	11,000	11,280	11,560	11,970
Military	707	758	700	700	700	700	700	700
Total Airport	209,563	225,058	269,460	307,580	344,140	377,230	409,750	458,700

	Percent change 2017-2018	Compound annual percent increase (decrease)					
		2018-2023	2023-2028	2028-2033	2033-2038	2038-2043	2043-2050
Air Carrier							
Passenger airlines	8.1%	5.0%	2.9%	2.4%	2.0%	1.8%	1.7%
Cargo airlines	(5.7)	4.8	2.4	1.8	1.4	1.1	1.1
Other	(82.1)	21.1	0.0	0.2	0.0	0.2	0.0
Air Carrier total	6.8	5.0	2.9	2.4	2.0	1.8	1.7
Air Taxi							
Cargo airlines	(6.8)	4.2	2.4	1.8	1.4	1.1	1.2
Other	25.4	0.1	0.0	0.0	0.0	0.0	0.0
Air Taxi total	17.2	1.0	0.6	0.5	0.4	0.3	0.3
General Aviation	7.5	0.3	0.5	0.5	0.5	0.5	0.5
Military	7.2	(2.0)	0.0	0.0	0.0	0.0	0.0
Total Airport	7.4	4.6	2.7	2.3	1.9	1.7	1.6

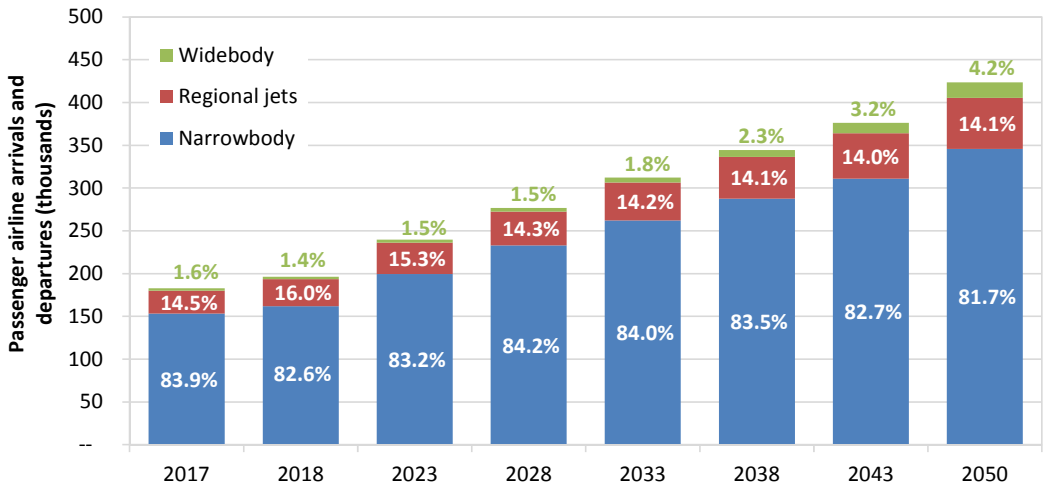
Note: The forecasts presented in this table were prepared using the information and assumptions given in the accompanying text. Inevitably, some of the assumptions used to develop the forecasts will not be realized and unanticipated events and circumstances may occur. Therefore, there are likely to be differences between the forecast and actual results, and those differences may be material.

Sources: *Historical*—San Diego County Regional Airport Authority records. *Forecast*—LeighFisher, November 2018.

4.4 Aircraft Fleet

Figure 4-4 and Table 4-5 present the passenger airline fleet mix at SDIA for 2017, 2018, and for the forecast years (2023, 2028, 2033, 2038, 2043, and 2050) in terms of the number and percentage of annual passenger airline aircraft operations.

Figure 4-4
UNCONSTRAINED FORECAST OF PASSENGER AIRLINE AIRCRAFT OPERATIONS BY EQUIPMENT GROUP
San Diego International Airport



Note: The forecasts presented in this figure were prepared using the information and assumptions given in the accompanying text. Inevitably, some of the assumptions used to develop the forecasts will not be realized and unanticipated events and circumstances may occur. Therefore, there are likely to be differences between the forecast and actual results, and those differences may be material.

Sources: *Historical*—San Diego County Regional Airport Authority records. OAG Worldwide Aviation Ltd, Schedules Analyser, online database, accessed November 2018. *Forecast*—LeighFisher, November 2018.

4.5 Critical Aircraft

In SDIA's Airport Development Plan, the B777 (D-V) was designated as the critical (or design) aircraft for activity levels of approximately 12 million enplaned passengers reached in 2018 and the B787-9 was designated as the future critical aircraft for activity levels of more than 12 million enplaned passengers.

Table 4-5 identifies the forecast fleet mix for the 2018 unconstrained forecast. Of the aircraft identified in the future fleet mix, the B787-9 is the most demanding (i.e., the aircraft with the largest tail heights, wingspans, approach speeds, and runway length requirements) and continues to be the critical aircraft used for airport planning based on the following:

- The choice of the B787-9 as the critical aircraft is consistent with FAA guidance for the 2012 ADP forecast as it continues to be the largest aircraft with more than 500 operations
- Table 4-5 presents a summary of annual operations by aircraft type for the 2018 unconstrained forecast and shows that the B787-9 remains the largest aircraft with 500 or more operations. (Although the A330-200 also has more than 500 operations and a slightly larger wingspan, the B787-9 has larger length, tail height, and Maximum Takeoff Weight or MTOW.)

Table 4-5

UNCONSTRAINED FORECAST OF PASSENGER AIRLINE AIRCRAFT OPERATIONS BY AIRCRAFT TYPE

San Diego International Airport

	Arrivals and departures							
	Historical		Unconstrained Forecast					
Aircraft type	2017	2018	2023	2028	2033	2038	2043	2050
Domestic								
Narrowbody								
A318	499	3,020	--	--	--	--	--	--
A319	6,328	4,801	4,879	4,522	3,852	--	--	--
A320	15,161	14,132	18,145	22,321	26,742	31,216	34,084	37,981
A320neo	--	--	2,399	4,152	6,245	9,298	16,920	30,081
A321	12,354	17,699	22,484	27,326	32,389	38,133	43,517	51,151
B717-200	406	1,531	--	--	--	--	--	--
B737-300/400/500/600	312	--	--	--	--	--	--	--
B737-700	57,680	57,471	65,094	65,420	62,250	53,161	39,245	23,035
B737-800	33,660	37,950	50,948	64,321	75,685	86,919	87,385	89,987
B737-900	17,799	16,996	21,868	26,616	31,588	36,561	43,680	44,980
B737 MAX	329	1,493	3,015	4,863	7,047	10,527	18,263	31,593
B757-200/300	3,733	3,680	2,796	1,842	--	--	--	--
CS100	--	--	1,919	3,598	5,620	7,921	10,528	13,981
MD-80	381	24	--	--	--	--	--	--
MD-90	1,053	260	316	--	--	--	--	--
Subtotal-- narrowbody	149,695	159,056	193,863	224,982	251,416	273,736	293,622	322,790
Regional jets								
CRJ-100/200	523	1,351	--	--	--	--	--	--
CRJ-700	2,355	3,146	3,346	2,754	2,482	2,049	1,485	826
CRJ-900	1,175	388	1,192	1,652	2,175	2,744	3,372	4,223
ERJ-175	19,408	23,975	29,157	32,258	36,391	40,137	43,825	49,380
Subtotal--regional jets	23,461	28,861	33,694	36,663	41,048	44,930	48,682	54,428
Turboprop								
Q400	1,769	699	371	--	--	--	--	--
Widebody								
A330-200	720	713	867	1,001	1,129	1,245	1,359	1,532
B767-200/300	532	146	--	--	--	--	--	--
B787-8	--	--	240	277	937	2,755	5,264	8,473
Subtotal--widebody	1,252	859	1,107	1,277	2,065	4,000	6,624	10,005
Subtotal-- Domestic	**176,176**	**189,475**	**229,035**	**262,923**	**294,530**	**322,666**	**348,927**	**387,223**

Table 4-5 (page 2 of 4)

UNCONSTRAINED FORECAST OF PASSENGER AIRLINE AIRCRAFT OPERATIONS BY AIRCRAFT TYPE

San Diego International Airport

	Arrivals and departures							
	Historical		Unconstrained Forecast					
Aircraft type	2017	2018	2023	2028	2033	2038	2043	2050
International								
Narrowbody								
A319	122	49	--	--	--	--	--	--
A320neo	--	--	240	830	1,561	2,411	3,384	5,084
A320	185	223	271	312	352	389	424	478
A321	619	662	1,285	1,759	2,609	3,566	4,646	6,082
B737-700	889	1,095	1,332	1,537	1,734	1,912	2,088	2,353
B737-800	566	812	987	1,139	1,285	1,417	1,547	1,743
B737-900	1,232	859	1,044	1,205	1,360	1,500	1,637	1,845
B737 MAX	--	--	480	1,107	1,873	2,755	3,760	5,508
Subtotal-- narrowbody	3,615	3,699	5,638	7,890	10,774	13,949	17,487	23,093
Regional jets								
CRJ-700	1,229	118	--	--	--	--	--	--
CRJ-900	--	1,694	2,060	1,824	1,433	892	221	--
ERJ-175	110	274	573	1,215	1,995	2,889	3,906	5,249
Subtotal--regional jets	1,339	2,086	2,633	3,038	3,427	3,780	4,127	5,249
Widebody								
A340-300	59	487	592	683	770	--	--	--
B747-400	282	286	--	--	--	--	--	--
B767-200/300	112	--	--	--	--	--	--	--
B777	426	431	525	329	58	64	70	79
B787-8	720	719	1,354	1,562	2,075	2,633	3,251	4,086
B787-9	--	--	--	277	624	1,377	2,256	3,813
Subtotal-- widebody	1,599	1,923	2,470	2,851	3,528	4,075	5,577	7,979
Subtotal-- International	**6,553**	**7,708**	**10,742**	**13,778**	**17,729**	**21,804**	**27,191**	**36,320**
Total--Passenger Airlines	**182,712**	**197,244**	**239,870**	**276,770**	**312,230**	**344,370**	**376,010**	**423,670**

Note: The forecasts presented in this table were prepared using the information and assumptions given in the accompanying text. Inevitably, some of the assumptions used to develop the forecasts will not be realized and unanticipated events and circumstances may occur. Therefore, there are likely to be differences between the forecast and actual results, and those differences may be material.
Totals may not add due to rounding.

Sources: *Historical*—San Diego County Regional Airport Authority records. *Forecast*—LeighFisher, November 2018.

Table 4-5 (page 3 of 4)
UNCONSTRAINED FORECAST OF PASSENGER AIRLINE AIRCRAFT OPERATIONS BY AIRCRAFT TYPE
San Diego International Airport

	Percent of total							
	Historical		Unconstrained Forecast					
Aircraft type	2017	2018	2023	2028	2033	2038	2043	2050
Domestic								
Narrowbody								
A318	0.3%	1.5%	--%	--%	--%	--%	--%	--%
A319	3.5	2.4%	2.0	1.6	1.2	--	--	--
A320	8.3	7.2%	7.6	8.1	8.6	9.1	9.1	9.0
A320neo	0.0	0.0%	1.0	1.5	2.0	2.7	4.5	7.1
A321	6.8	9.0%	9.4	9.9	10.4	11.1	11.6	12.1
B717-200	0.2	0.8%	--	--	--	--	--	--
B737-300/400/500/600	0.2	0.0%	--	--	--	--	--	--
B737-700	31.6	29.1%	27.1	23.6	19.9	15.4	10.4	5.4
B737-800	18.4	19.2%	21.2	23.2	24.2	25.2	23.2	21.2
B737-900	9.7	8.6%	9.1	9.6	10.1	10.6	11.6	10.6
B737 MAX	0.2	0.8%	1.3	1.8	2.3	3.1	4.9	7.5
B757-200/300	2.0	1.9%	1.2	0.7	--	--	--	--
CS100	--	0.0%	0.8	1.3	1.8	2.3	2.8	3.3
MD-80	0.2	0.0%	--	--	--	--	--	--
MD-90	0.6	0.1%	0.1	--	--	--	--	--
Subtotal-- narrowbody	81.9%	80.6%	80.8%	81.3%	80.5%	79.5%	78.1%	76.2%
Regional jets								
CRJ-100/200	0.3%	0.7%	--%	--%	--%	--%	--%	--%
CRJ-700	1.3	1.6%	1.4	1.0	0.8	0.6	0.4	0.2
CRJ-900	0.6	0.2%	0.5	0.6	0.7	0.8	0.9	1.0
ERJ-175	10.6	12.2%	12.2	11.7	11.7	11.7	11.7	11.7
Subtotal--regional jets	12.8%	14.7%	14.0%	13.2%	13.1%	13.0%	12.9%	12.8%
Turboprop								
Q400	1.0%	0.4%	0.2%	--%	--%	--%	--%	--%
Widebody								
A330-200	0.4%	0.4%	0.4%	0.4%	0.4%	0.4%	0.4%	0.4%
B767-200/300	0.3	0.1	--	--	--	--	--	--
B787-8	0.0	0.0	0.1	0.1	0.3	0.8	1.4	2.0
Subtotal--widebody	0.7	0.4	0.5	0.5	0.7	1.2	1.8	2.4
Subtotal-- Domestic	**96.4%**	**96.1%**	**95.5%**	**95.0%**	**94.3%**	**93.7%**	**92.8%**	**91.4%**

Table 4-5 (page 4 of 4)

UNCONSTRAINED FORECAST OF PASSENGER AIRLINE AIRCRAFT OPERATIONS BY AIRCRAFT TYPE

San Diego International Airport

	Percent of total							
	Historical		Unconstrained Forecast					
Aircraft type	2017	2018	2023	2028	2033	2038	2043	2050
International								
Narrowbody								
A319	0.1%	--%	--%	--%	--%	--%	--%	--%
A320neo	0.0	0.0	0.1	0.3	0.5	0.7	0.9	1.2
A320	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1
A321	0.3	0.3	0.5	0.6	0.8	1.0	1.2	1.4
B737-700	0.5	0.6	0.6	0.6	0.6	0.6	0.6	0.6
B737-800	0.3	0.4	0.4	0.4	0.4	0.4	0.4	0.4
B737-900	0.7	0.4	0.4	0.4	0.4	0.4	0.4	0.4
B737 MAX	--	--	0.2	0.4	0.6	0.8	1.0	1.3
Subtotal-- narrowbody	2.0%	1.9%	2.4%	2.9%	3.5%	4.1%	4.7%	5.5%
Regional jets								
CRJ-700	0.7%	0.1%	--%	--%	--%	--%	--%	--%
CRJ-900	--	0.9	0.9	0.7	0.5	0.3	0.1	0.0
ERJ-175	0.1	0.1	0.2	0.4	0.6	0.8	1.0	1.2
Subtotal--regional jets	0.7%	1.1%	1.1%	1.1%	1.1%	1.1%	1.1%	1.2%
Widebody								
A340-300	--%	0.2%	0.2%	0.2%	0.2%	--%	--%	--%
B747-400	0.2	0.1	--	--	--	--	--	--
B767-200/300	0.1	0.0	--	--	--	--	--	--
B777	0.2	0.2	0.2	0.1	--	--	--	--
B787-8	0.4	0.4	0.6	0.6	0.7	0.8	0.9	1.0
B787-9	--	--	--	0.1	0.2	0.4	0.6	0.9
Subtotal-- widebody	0.9	0.9	1.0	1.0%	1.1%	1.2%	1.5%	1.9%
Subtotal-- International	**3.6%**	**3.9%**	**4.5%**	**5.0%**	**5.7%**	**6.3%**	**7.2%**	**8.6%**
Total--Passenger Airlines	**100.0%**	**100.0%**	**100.0%**	**100.0%**	**100.0%**	**100.0%**	**100.0%**	**100.0%**

Note: The forecasts presented in this table were prepared using the information and assumptions given in the accompanying text. Inevitably, some of the assumptions used to develop the forecasts will not be realized and unanticipated events and circumstances may occur. Therefore, there are likely to be differences between the forecast and actual results, and those differences may be material.
Totals may not add due to rounding.

Sources: *Historical*—San Diego County Regional Airport Authority records. *Forecast*—LeighFisher, November 2018.

Table 4-6 summarizes the number of forecast operations for the B787-9, B777, and B747-400 aircraft in the 2018 unconstrained forecast.

Table 4-6
UNCONSTRAINED FORECAST OF CRITICAL AIRCRAFT OPERATIONS
San Diego International Airport

	Historical		Unconstrained Forecast					
Parameter	2017	2018	2023	2028	2033	2038	2043	2050
Enplaned passengers (millions)	11.1	12.1	14.6	17.0	19.2	21.3	23.5	26.7
B747 operations	282	286	--	--	--	--	--	--
B777 operations	426	431	525	329	58	64	70	79
B787-9 operations	--	--	--	277	624	1,377	2,256	3,813
Aircraft Approach Category (AAC)	D	D	D	D	D	D	D	D
Airplane Design Group (ADG)	V	V	V	V	V	V	V	V

For the determination of the existing critical aircraft, it is noteworthy that the volume of B777 (D-V) operations alone do not surpass the 500 operations threshold. B777 aircraft are used by British Airways during the summer months and are replaced with B747-400 during the winter months. As the B747-400 and B777 have similar demands on airport infrastructure (wingspan, length, tail height, and MTOW), they may be viewed as a group for the purposes of defining the existing design aircraft. Together, the operations of this group exceed the 500 operations threshold. Therefore, the 2018 unconstrained forecast is consistent with defining the current critical aircraft as a group defined by the B777 (D-V) and B747-400.

5.0 CONSTRAINED DEMAND SCENARIO

This section presents a constrained demand scenario of SDIA aviation activity that was developed to evaluate the potential for a single runway to meet unconstrained forecast demand. In contrast to the unconstrained forecast presented in Section 4.0, the constrained demand scenario is defined by specific assumptions about the hourly capacity of a single runway and the ability of the airlines serving SDIA to operate efficiently in a constrained environment. The constrained demand scenario addresses the real-world limitations of SDIA's single runway on unconstrained forecast growth. This well-known and substantial limitation on the operational and passenger capacity of the airport must be considered in planning airport improvements and analyzing their reasonably foreseeable impacts. The constrained demand scenario presented in this memorandum analyses and anticipates these limitations and therefore the constrained demand scenario and represents the "preferred" forecasts recommended for FAA approval and for airport planning.

5.1 Approach

The constrained demand scenario was developed using a bottom-up approach based on the Design Day Flight Schedules (DDFSs) developed for the unconstrained forecast, as shown on Figure 5-1. The DDFSs include detailed data for an average day in the peak month (ADPM), including:

- Arrivals and departures
- Origin and destination
- Published carrier and operator
- Time of day
- Equipment type
- Seat configuration
- Scheduled arrival and departure date
- Stand time
- Estimated passenger load factors by origin and destination

5.1.1 Operation Constraints

To develop DDFSs for the constrained demand scenario, the unconstrained forecast DDFSs were evaluated in relation to operation constraints at SDIA, including:

- **Hourly Limit of 50 Operations.** The hourly profiles of the unconstrained forecast DDFS were evaluated in relation to a limit of 50 operations per hour, which was exceeded in certain hours starting in 2024, as shown on Figure 5-2. For the constrained demand scenario DDFS, selected flights in hours which exceeded the limit were shifted to other hours with fewer than 50 operations, provided that shifting the flight didn't duplicate a flight to the same market by the same airline. Appendix D presents information on the establishment of the limit.

- **Departure Hour Restrictions.** SDIA's Airport Use Regulation restricts departures by any aircraft between the hours of 11:30 pm and 6:30 am and gate departures between the hours of 11:15 pm and 6:15 am. There is no restriction on arrivals.* For the constrained demand scenario DDFS, the departure hour restrictions limit the ability of airlines to reschedule flights during a 16.5 hour period per day.

- **Annual Limit.** SDIA's annual limit on total aircraft operations (including passenger and cargo airlines, general aviation, military, and other unscheduled) is defined by an upper bound of 292,000

* San Diego County Regional Airport Codes, Section 9.40, Airport Use Regulation at San Diego International Airport, www.san.org.

operations and a lower bound of 262,000 operations and reflects the potential Annual Service Volume (ASV) for the Airport.

Figure 5-1
CONSTRAINED DEMAND SCENARIO APPROACH AND ASSUMPTIONS
San Diego International Airport

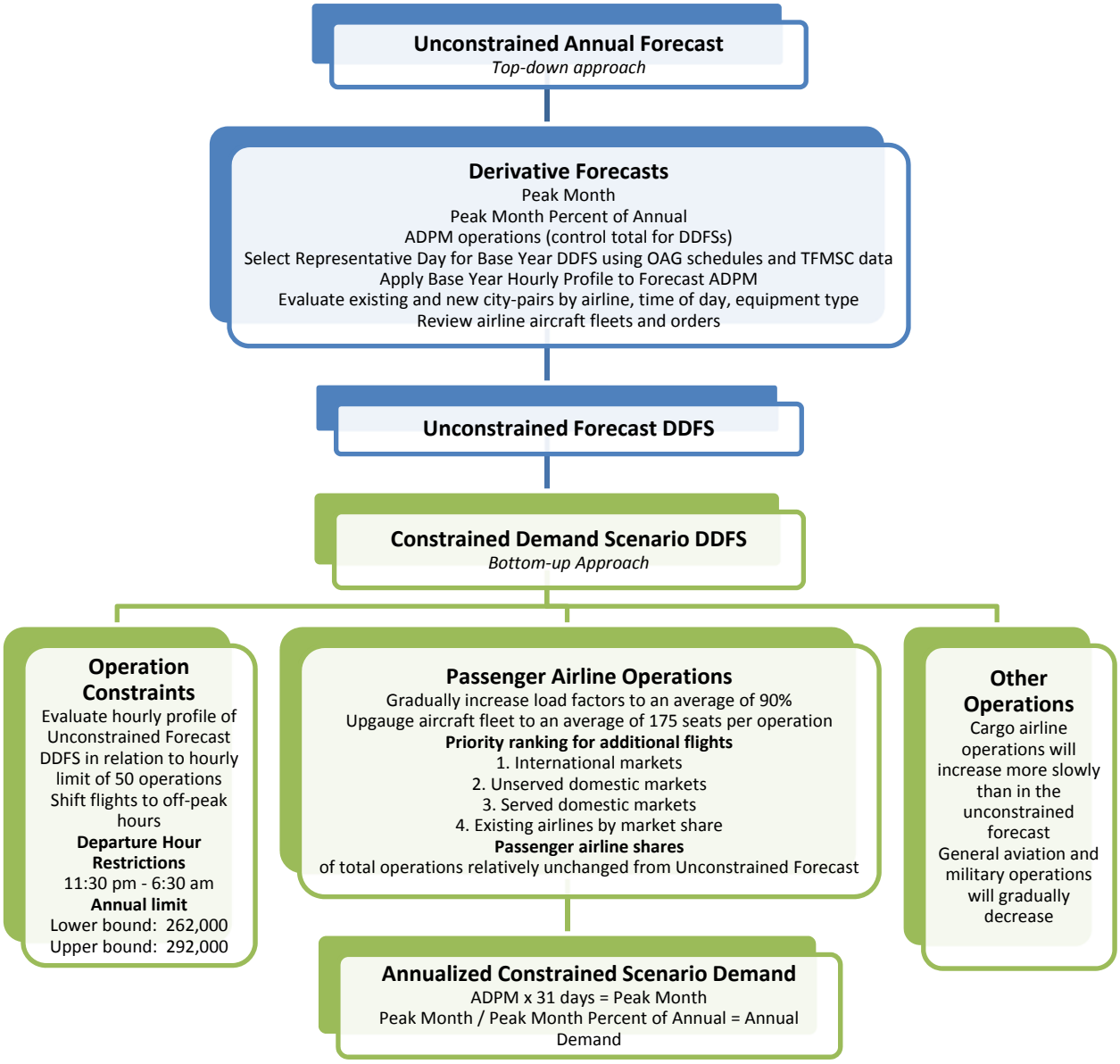
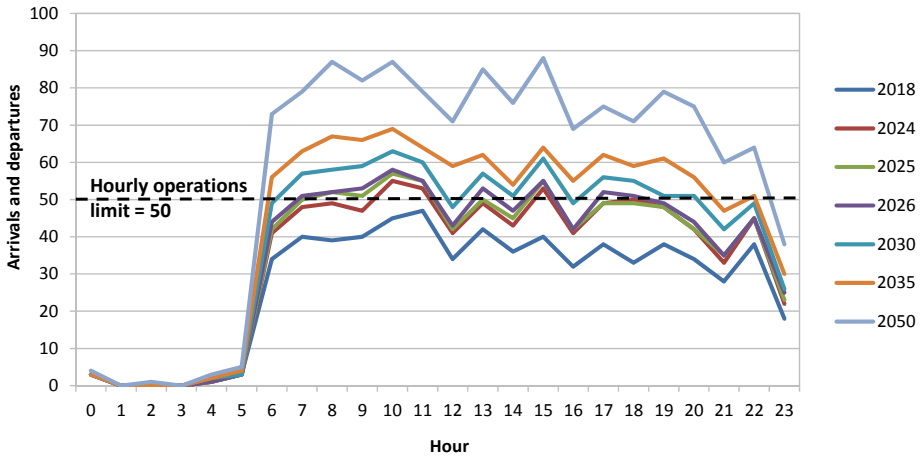


Figure 5-2
ADPM TOTAL AIRCRAFT OPERATIONS BY HOUR
FOR THE UNCONSTRAINED FORECAST DDFS
San Diego International Airport



Note: Data include operations for passenger and cargo airlines, general aviation, and military.

Sources: *2018*—OAG Worldwide Aviation Ltd, online database and Federal Aviation Administration, Traffic Flow Management System Counts (TFMSC), www.aspm.faa.gov, both accessed January 2019. *Forecast*—LeighFisher, January 2019.

5.1.2 Passenger Airline Operations

In addition to the operation constraints, the constrained demand scenario DDFS was developed based on assumptions regarding the ability of the airlines serving SDIA to operate efficiently in a constrained environment. These assumptions included:

- **Load Factor.** In a constrained environment, it was assumed that passenger airlines would increase load factors (i.e., the percent of occupied seats on flights) to accommodate as much of the unconstrained forecast demand as possible. For the constrained demand scenario DDFSs, an average load factor of 90% was assumed, compared with an average of 86% in the unconstrained forecast.

- **Aircraft Gauge.** SDIA's aircraft gauge, or the average number of seats per operation, was assumed to reach an average of 175 seats per operation in the constrained demand scenario, compared with an average of 155 in the unconstrained forecast. It was assumed that passenger airlines would increase the average gauge of the primarily narrowbody fleet serving the Airport and that the gauge would be limited by the airlines' existing aircraft fleets and orders.

- **Priority Ranking for Additional Flights.** In the development of DDFSs, flights were added to the base year schedule in order to accommodate the unconstrained forecast demand. For the constrained demand scenario DDFSs, a priority ranking for the addition of flights was developed with guidance from SDIA's Airline Service Department. As shown in Figure 5-1, international markets were given first priority when deciding between flights to remain in the constrained demand scenario DDFS, followed by unserved domestic markets and served domestic markets. Existing airlines were given preference depending on their share of a certain market.

- **Passenger Airline Shares.** In the constrained demand scenario, it was assumed that the passenger airline shares of total operations would remain relatively unchanged from Unconstrained Forecast (subject to the priority ranking outlined above).

5.1.3 Other Operations

In the constrained demand scenario, the operations of cargo airlines are assumed to increase more slowly than in the unconstrained forecast, reflecting an increase in the average tonnage per operation. In 2018, general aviation and military operations accounted for 5% of total aircraft operations at the Airport, down from 8% in 2000. It was assumed that the number of operations by general aviation and military aircraft at the Airport would gradually decrease to 3% of total operations in a constrained environment.

5.1.4 Annualized Constrained Scenario Demand

ADPM operations and passengers represented in the constrained demand scenario DDFS were annualized based on derived values for the peak month (i.e., ADPM operations multiplied by 31 days = peak month operations) and the assumed peak month percent of annual operations (i.e., peak month operations divided by the peak month percent of annual = annual operations). It was assumed that the peak month percent of annual operations would continue to account for 9.1% of total aircraft operations through 2050. Similarly, it was assumed that the peak month percent of annual passengers would continue to account for 9.6% of total passengers through 2050. For example, in 2033:

- ADPM total aircraft operations from the constrained scenario DDFS totaled 816 which translates into 25,310 peak month operations (816 ADPM operations multiplied by 31 days = 25,310 peak month operations)
- The 25,310 peak month operations translates into 277,200 annual operations (25,310 peak month operations divided by 9.1% = annual operations)

5.2 Enplaned Passengers

As shown in Table 5-1 and on Figure 5-3, the number of enplaned passengers at the Airport is forecast to increase from 12.1 million enplaned passengers in 2018 to 20.3 million in 2050 in the constrained demand scenario, an average increase of 1.6% per year. The number of air carrier enplaned passengers at the Airport is forecast to increase an average of 1.8% per year between 2018 and 2050, compared with an average decrease of 3.4% per year in commuter passenger traffic.

5.3 Air Cargo

As shown in Table 5-1 and on Figure 5-4, total air cargo at the Airport is forecast to increase from 192,351 metric tons in 2018 to 335,400 metric tons in 2050 in the constrained demand scenario, an average increase of 1.8% per year.

5.4 Total Aircraft Operations

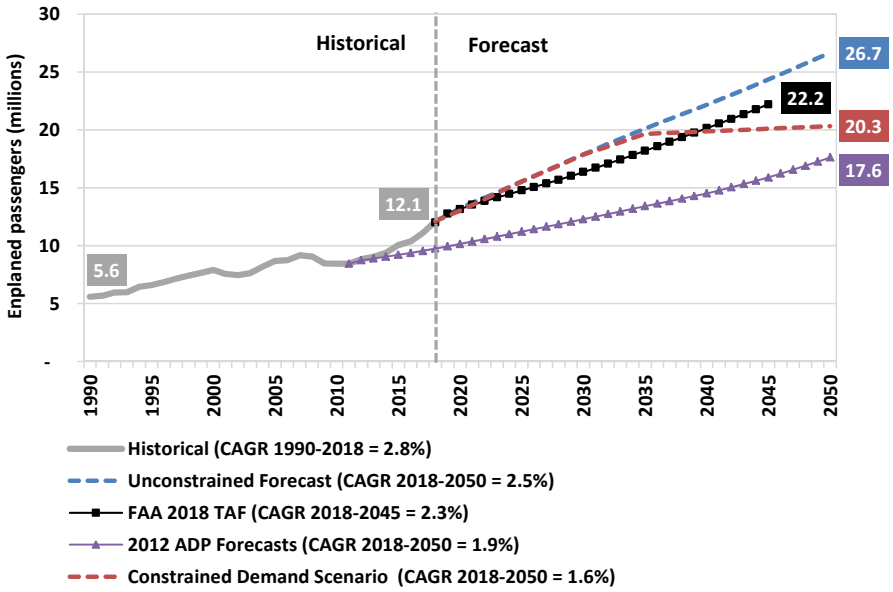
As shown in Table 5-1 and on Figure 5-5, total aircraft operations at the Airport are forecast to increase from 225,058 in 2018 to 290,100 in 2050 in the constrained demand scenario, an average increase of 0.8% per year. Commercial aircraft operations at the Airport are forecast to increase an average of 0.9% per year between 2018 and 2050, while general aviation and military operations are forecast to decrease an average of 2.1% and 1.7% per year, respectively.

Table 5-1
CONSTRAINED DEMAND SCENARIO OF AVIATION ACTIVITY
San Diego International Airport

	Historical	Constrained Demand Scenario			
	2018	2023	2028	2033	2050
Enplaned passengers					
Air carrier	11,272,706	13,798,000	16,576,000	18,618,000	20,036,232
Commuter	853,232	738,000	343,000	309,000	284,768
Total enplaned passengers	12,125,938	14,536,000	16,919,000	18,927,000	20,321,000
Total air cargo	192,351	230,000	257,400	279,800	335,400
Total aircraft operations					
Commercial aircraft operations					
Air carrier					
Passenger airlines	197,244	227,800	244,500	257,700	271,800
Cargo airlines	3,850	4,440	5,100	5,700	7,610
Other	372	--	510	670	380
Total air carrier	201,466	232,240	250,110	264,070	279,790
Air taxi					
Passenger airlines	--	--	--	--	--
Cargo airlines	2,530	2,760	3,000	3,100	3,290
Other	9,967	10,210	3,850	1,650	1,400
Total air taxi	12,497	12,970	6,850	4,750	4,690
Total commercial aircraft operations	**213,963**	**245,210**	**256,960**	**268,820**	**284,480**
General aviation	10,337	9,020	8,390	7,750	5,180
Military	758	630	650	660	440
Total aircraft operations	**225,058**	**254,860**	**266,000**	**277,230**	**290,100**
Forecast assumptions					
Load factor	85.4%	87.0%	89.1%	89.9%	90.0%
Average seats per operation	151.0	153.3	163.6	172.2	175

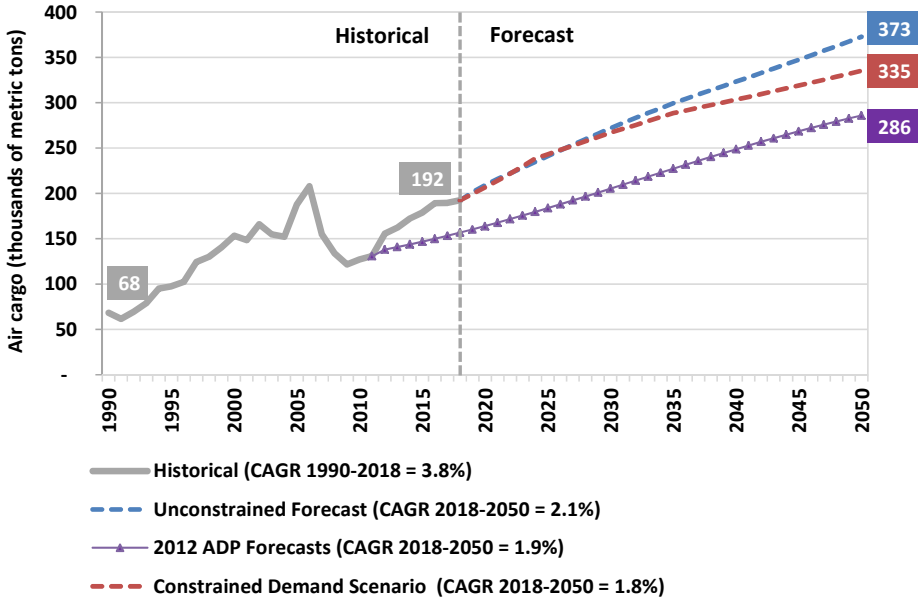
Sources: *Historical*—San Diego County Regional Airport Authority records. *Forecast*—LeighFisher, April 2019.

Figure 5-3
CONSTRAINED DEMAND SCENARIO OF ENPLANED PASSENGERS
San Diego International Airport



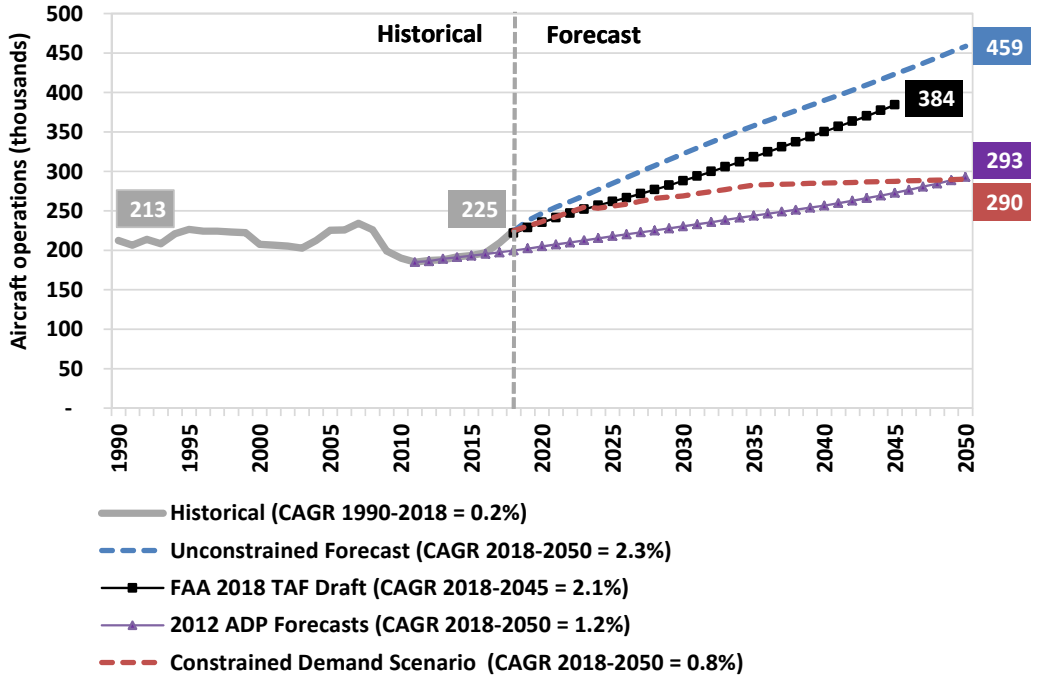
CAGR = Compound annual growth rate
Sources: *Historical*—San Diego County Regional Airport Authority records. *Forecast*—LeighFisher, April 2019.

Figure 5-4
CONSTRAINED DEMAND SCENARIO OF AIR CARGO
San Diego International Airport



CAGR = Compound annual growth rate
Sources: *Historical*—San Diego County Regional Airport Authority records. *Forecast*—LeighFisher, April 2019.

Figure 5-5
CONSTRAINED DEMAND SCENARIO OF TOTAL AIRCRAFT OPERATIONS
San Diego International Airport



CAGR = Compound annual growth rate
Sources: *Historical*—San Diego County Regional Airport Authority records. *Forecast*—LeighFisher, April 2019.

5.5 Aircraft Fleet

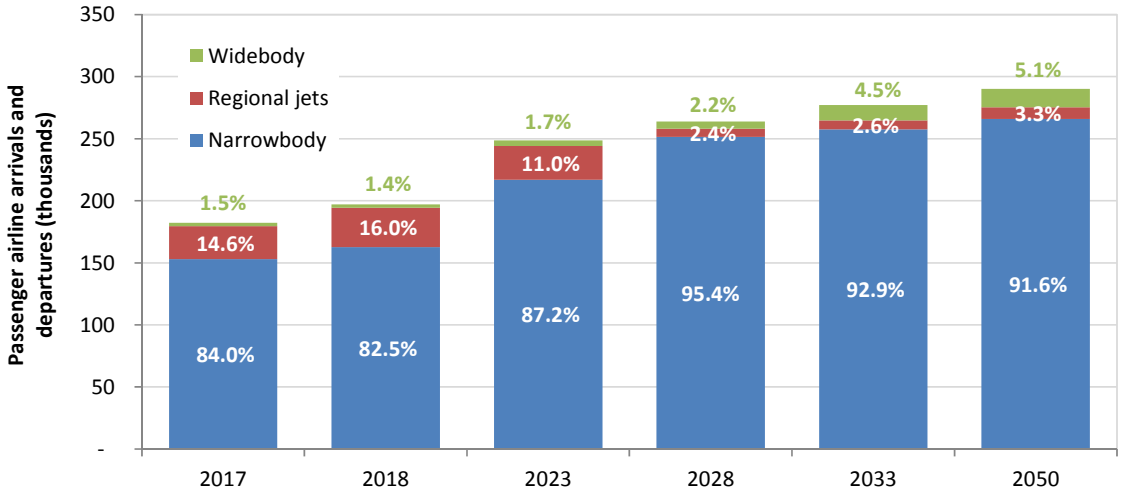
Table 5-2 and Figure 5-6 present the passenger airline fleet mix at SDIA for 2017, 2018, and for the constrained demand scenario years (2023, 2028, 2033, and 2050) in terms of the number and percentage of annual passenger airline aircraft operations.

5.6 Critical Aircraft

As discussed in Section 4.5, of the aircraft identified in the future fleet mix, the B787-9 is the most demanding (i.e., the aircraft with the largest tail heights, wingspans, approach speeds, and runway length requirements) and continues to be the critical aircraft used for airport planning based on the following:

- The choice of the B787-9 as the critical aircraft is consistent with FAA guidance for the 2012 ADP forecast as it continues to be the largest aircraft with more than 500 operations
- Table 5-2 presents a summary of annual operations by aircraft type for the constrained demand scenario and shows that the B787-9 remains the largest aircraft with 500 or more operations. (Although the A330-200 also has more than 500 operations and a slightly larger wingspan, the B787-9 has larger length, tail height, and MTOW.)

Figure 5-6
CONSTRAINED DEMAND SCENARIO OF PASSENGER AIRLINE AIRCRAFT OPERATIONS BY EQUIPMENT GROUP
San Diego International Airport



Sources: *Historical*—San Diego County Regional Airport Authority records. OAG Worldwide Aviation Ltd, Schedules Analyser, online database, accessed November 2018. *Forecast*—LeighFisher, April 2019.

Table 5-3 summarizes the number of critical aircraft forecast operations for the B787-9, B777, and B747-400 aircraft in the constrained demand scenario.

Table 5-3
CONSTRAINED DEMAND SCENARIO OF CRITICAL AIRCRAFT OPERATIONS
San Diego International Airport

	Historical		Constrained Demand Scenario			
Parameter	2017	2018	2023	2028	2033	2050
Enplaned passengers (millions)	11.1	12.1	14.5	16.9	18.9	20.3
B747 operations	282	286	--	--	--	--
B777 operations	426	431	720	717	716	725
B787-9 operations	--	--	720	1,434	1,433	2,176
Aircraft Approach Category (AAC)	D	D	D	D	D	D
Airplane Design Group (ADG)	V	V	V	V	V	V

Table 5-2

CONSTRAINED DEMAND SCENARIO OF PASSENGER AIRLINE AIRCRAFT OPERATIONS BY AIRCRAFT TYPE

San Diego International Airport

	Arrivals and departures					
	Historical		Constrained Demand Scenario			
Aircraft type	2017	2018	2023	2028	2033	2050
Domestic						
Narrowbody						
A318	499	3,020	--	--	--	--
A319	6,328	4,801	1,441	6,452	1,433	1,451
A320	15,161	14,132	2,161	2,867	7,879	7,253
A320neo	--	--	3,601	--	--	--
A321	12,354	17,699	18,728	16,488	12,177	12,329
B717-200	406	1,531	3,601	4,301	4,298	4,352
B737-300/400/500/600	312	--	19,448	31,541	31,874	31,548
B737-700	57,680	57,471	11,525	18,996	29,726	30,823
B737-800	33,660	37,950	1,441	--	--	--
B737-900	17,799	16,996	70,228	48,029	12,535	11,967
B737 MAX	329	1,493	47,539	54,480	80,940	83,404
B757-200/300	3,733	3,680	22,689	45,520	46,558	47,867
CS100	--	--	--	7,168	12,177	15,230
MD-80	381	24	1,441	4,301	7,163	7,978
MD-90	1,053	260	5,042	,434	--	--
Subtotal-- narrowbody	149,695	159,056	208,884	241,578	246,758	254,200
Regional jets						
CRJ-100/200	523	1,351	--	--	--	--
CRJ-700	2,355	3,146	720	--	--	--
CRJ-900	1,175	388	--	--	--	--
ERJ-175	19,408	23,975	23,770	3,584	3,581	5,802
Subtotal--regional jets	23,461	28,861	24,490	3,584	3,581	5,802
Turboprop						
Q400	1,769	699	--	--	--	--
Widebody						
A330-200	720	713	720	717	716	725
B767-200/300	532	146	--	--	--	--
B787-8	--	--	--	717	7,521	8,340
Subtotal--widebody	1,252	859	720	1,434	8,237	9,066
Subtotal-- Domestic	**176,176**	**189,475**	**234,094**	**246,596**	**258,577**	**269,068**

Table 5-2 (page 2 of 4)

CONSTRAINED DEMAND SCENARIO OF PASSENGER AIRLINE AIRCRAFT OPERATIONS BY AIRCRAFT TYPE

San Diego International Airport

	Arrivals and departures					
	Historical		Constrained Demand Scenario			
Aircraft type	2017	2018	2023	2028	2033	2050
International						
Narrowbody						
A319	122	49	720	717	716	725
A320neo	--	--	--	--	--	--
A320	185	223	720	717	716	725
B737-800	566	812	1,441	1,075	716	725
B737-900	1,232	859	2,521	3,226	2,865	2,901
B737 MAX	--	--	--	717	1,433	1,451
Subtotal-- narrowbody	3,615	3,699	7,923	10,036	10,744	11,604
Regional jets						
CRJ-700	1,229	118	--	--	--	--
CRJ-900	--	1,694	2,161	717	--	--
ERJ-175	110	274	720	2,151	3,581	3,626
Subtotal--regional jets	1,339	2,086	2,881	2,867	3,581	3,626
Widebody						
A340-300	59	487	720	717	716	2,176
B747-400	282	286	--	--	--	--
B767-200/300	112	--	--	--	--	--
B777	426	431	1,441	1,434	1,433	1,451
B787-8	720	719	1,441	2,151	2,149	2,176
B787-9	--	--	--	--	--	--
Subtotal-- widebody	1,599	1,923	3,601	4,301	4,298	5,802
Subtotal-- International	**6,553**	**7,708**	**14,406**	**17,204**	**18,623**	**21,032**
Total--Passenger Airlines	**182,712**	**197,244**	**248,500**	**263,800**	**277,200**	**290,100**

Table 5-2 (page 3 of 4)
CONSTRAINED DEMAND SCENARIO OF PASSENGER AIRLINE AIRCRAFT OPERATIONS BY AIRCRAFT TYPE
San Diego International Airport

	Arrivals and departures					
	Historical		Constrained Demand Scenario			
Aircraft type	2017	2018	2023	2028	2033	2050
Domestic						
Narrowbody						
A318	0.3%	1.5%	--%	--%	--%	--%
A319	3.5	2.4	0.6	2.4	0.5	0.5
A320	8.3	7.2	0.9	1.1	2.8	2.5
A320neo	0.0	0.0	1.4	--	--	--
A321	6.8	9.0	7.5	6.3	4.4	4.3
B717-200	0.2	0.8	1.4	1.6	1.6	1.5
B737-300/400/500/600	0.2	0.0	7.8	12.0	11.5	10.9
B737-700	31.6	29.1	4.6	7.2	10.7	10.6
B737-800	18.4	19.2	0.6	--	--	--
B737-900	9.7	8.6	28.3	18.2	4.5	4.1
B737 MAX	0.2	0.8	19.1	20.7	29.2	28.8
B757-200/300	2.0	1.9	9.1	17.3	16.8	16.5
CS100	--	0.0	--	2.7	4.4	5.3
MD-80	0.2	0.0	0.6	1.6	2.6	2.8
MD-90	0.6	0.1	2.0	0.5	--	--
Subtotal-- narrowbody	81.9%	80.6%	84.1%	91.6%	89.0%	87.6%
Regional jets						
CRJ-100/200	0.3%	0.7%	--%	--%	--%	--%
CRJ-700	1.3	1.6	0.3	--	--	--
CRJ-900	0.6	0.2	--	--	--	--
ERJ-175	10.6	12.2	9.6	1.4	1.3	2.0
Subtotal--regional jets	12.8%	14.7%	9.9%	1.4%	1.3%	2.0%
Turboprop						
Q400	1.0%	0.4%	--%	--%	--%	--%
Widebody						
A330-200	0.4%	0.4%	0.3%	0.3%	0.3%	0.3%
B767-200/300	0.3	0.1	--	--	--	--
B787-8	0.0	0.0	--	0.3	2.7	2.9
Subtotal--widebody	0.7	0.4	0.3	0.5	3.0	3.1
Subtotal-- Domestic	**96.4%**	**96.1%**	**94.2%**	**93.5%**	**93.3%**	**92.8%**

Table 5-2 (page 4 of 4)

CONSTRAINED DEMAND SCENARIO OF PASSENGER AIRLINE AIRCRAFT OPERATIONS BY AIRCRAFT TYPE

San Diego International Airport

	Arrivals and departures					
	Historical		Constrained Demand Scenario			
Aircraft type	2017	2018	2023	2028	2033	2050
International						
Narrowbody						
A319	0.1%	--%	0.3%	0.3%	0.3%	0.3%
A320neo	0.0	0.0	--	--	--	--
A320	0.1	0.1	0.3	0.3	0.3	0.3
A321	0.3	0.3	0.6	0.4	0.3	0.3
B737-700	0.5	0.6	1.0	1.2	1.0	1.0
B737-800	0.3	0.4	1.0	1.4	1.6	1.8
B737-900	0.7	0.4	--	--	0.3	0.3
B737 MAX	--	--	0.3	0.3	0.6	0.6
Subtotal-- narrowbody	2.0%	1.9%	3.2%	3.8%	3.9%	4.0%
Regional jets						
CRJ-700	0.7%	0.1%	--%	--%	--%	--%
CRJ-900	--	0.9	0.9	0.3	--	--
ERJ-175	0.1	0.1	0.3	0.8	1.3	1.3
Subtotal--regional jets	0.7%	1.1%	1.2%	1.1%	1.3%	1.3%
Widebody						
A340-300	--%	0.2%	0.3%	0.3%	0.3%	0.8%
B747-400	0.2	0.1	--	--	--	--
B767-200/300	0.1	0.0	--	--	--	--
B777	0.2	0.2	0.6	0.5	0.5	0.5
B787-8	0.4	0.4	0.6	0.8	0.8	0.8
B787-9	--	--	--	--	--	--
Subtotal-- widebody	0.9	0.9	1.4%	1.6%	1.6%	2.0%
Subtotal-- International	**3.6%**	**3.9%**	**5.8%**	**6.5%**	**6.7%**	**7.3%**
Total--Passenger Airlines	**100.0%**	**100.0%**	**100.0%**	**100.0%**	**100.0%**	**100.0%**

Sources: *Historical*—San Diego County Regional Airport Authority records. *Forecast*—LeighFisher, April 2019.

6.0 COMPARISON WITH THE FAA 2018 TAF

Table 6-1 presents a comparison of the unconstrained aviation demand forecasts and the constrained demand scenario prepared for San Diego International Airport with the FAA 2018 TAF for the Airport. The constrained demand scenario is the "preferred" forecasts recommended for FAA approval and is compared for the components of total enplaned passengers, commercial aircraft operations, and total aircraft operations.

The format of Table 6-1 is based on the template provided by the FAA for the comparison of airport planning forecasts and the FAA TAF.* As required, the results are presented for the base year of 2018 and forecast horizons years, which are equal to the base year plus 1, 5, 10, and 15 years (2019, 2023, 2028, and 2033). The SDIA unconstrained forecasts and constrained aviation demand scenario have been compared graphically with the FAA 2018 TAF in the figures presented in Sections 4 and 5 of this report.

The key findings of the comparison of the SDIA updated unconstrained aviation demand forecasts and the constrained demand scenario with the FAA 2018 TAF are summarized below:

- The unconstrained forecast and constrained demand scenario for enplaned passengers at SDIA are higher than the 2018 TAF in 2023 and 2028, as shown in Table 6-1.
  - In 2023, the unconstrained forecast variance is 3.0%, compared with 2.5% for the constrained demand scenario
  - In 2028, the unconstrained forecast variance is 8.0%, compared with 7.8% for the constrained demand scenario

- The unconstrained forecast of commercial operations for SDIA is greater than the 2018 TAF in 2023 and 2028, while commercial operations in the constrained demand scenario are less than the TAF:
  - The unconstrained forecast variance is 5.3% in 2023, compared with -2.7% for the constrained demand scenario
  - The unconstrained forecast variance is 9.5% in 2028, compared with -5.8% for the constrained demand scenario

- The unconstrained forecast of total aircraft operations for SDIA is greater than the 2018 TAF in 2023 and 2028, while total operations in the constrained demand scenario are less than the TAF:
  - The unconstrained forecast variance is 4.9% in 2023, compared with -3.2% for the constrained demand scenario
  - The unconstrained forecast variance is 9.0% in 2028, compared with -6.5% for the constrained demand scenario

- Overall, both the SDIA updated unconstrained forecasts and the constrained demand scenario are similar to the FAA 2018 TAF for the Airport and "differ by less than 10 percent in the 5-year forecast period, and 15 percent in the 10-year forecast period," as stipulated in the FAA forecast guidance.

Tables 6-2 and 6-3 present summaries of the SDIA updated unconstrained forecasts and constrained demand scenario using a second template provided by the FAA.

*U.S. Department of Transportation, Federal Aviation Administration, *Forecasting Aviation Activity by Airport*, July 2001, and *Review and Approval of Aviation Forecasts*, June 2008, http://www.faa.gov.

Table 6-1
FAA TAF FORECAST COMPARISON *(2018 – 2033)*
San Diego International Airport

	Year *(a)*	SDIA Unconstrained Forecast	Constrained Demand Scenario	FAA 2018 TAF	Percent variance from 2018 TAF: SDIA Unconstrained Forecast	Percent variance from 2018 TAF: Constrained Demand Scenario
Passenger enplanements						
Base yr.	2018	12,125,938	12,125,938	12,001,009	1.0%	1.0%
Base yr. + 5yrs.	2023	14,605,800	14,536,000	14,176,358	3.0%	2.5%
Base yr. + 10yrs.	2028	16,951,100	16,919,000	15,689,066	8.0%	7.8%
Base yr. + 15yrs.	2033	19,237,200	18,927,000	17,443,744	10.3%	8.5%
Commercial operations *(b)*						
Base yr.	2018	213,963	213,963	210,982	1.4%	1.4%
Base yr. + 5yrs.	2023	258,290	238,850	245,371	5.3%	-2.7%
Base yr. + 10yrs.	2028	296,150	254,760	270,516	9.5%	-5.8%
Base yr. + 15yrs.	2033	332,440	268,790	299,649	10.9%	-10.3%
Total operations *(c)*						
Base yr.	2018	225,058	225,058	221,821	1.5%	1.5%
Base yr. + 5yrs.	2023	269,460	248,500	256,771	4.9%	-3.2%
Base yr. + 10yrs.	2028	307,580	263,800	282,076	9.0%	-6.5%
Base yr. + 15yrs.	2033	344,140	277,200	311,370	10.5%	-11.0%

(a) The SDIA Unconstrained Forecast and Constrained Demand Scenario were prepared on a calendar year basis; the FAA 2018 TAF were prepared on a U.S. government fiscal year basis (October through September).
(b) Commercial operations include operations by passenger airlines, all-cargo airlines, and air taxi operators.
(c) Total operations include commercial operations plus operations by general aviation and military.

Sources: Base year 2018 (actual)—San Diego County Regional Airport Authority records.
SDIA Unconstrained Forecast—LeighFisher, November 2018.
SDIA Constrained Demand Scenario—LeighFisher, April 2019.
FAA 2018 TAF for SDIA—U.S. Department of Transportation, Federal Aviation Administration, www.faa.gov, accessed March 2019.

Table 6-2

SUMMARY OF SDIA UNCONSTRAINED FORECAST USING FAA TEMPLATE

San Diego International Airport

		Unconstrained Forecast				Average annual compound growth rates			
	Base year 2018	Base year + 1 year 2019	Base year + 5 years 2023	Base year + 10 years 2028	Base year + 15 years 2033	Base year to +1 year 2018 - 2019	Base year to +5 years 2018 - 2023	Base year to +10 years 2018 - 2028	Base year to +15 years 2018 - 2033
Passenger enplanements									
Air carrier *(a)*	11,272,706	11,767,500	13,531,100	15,657,300	17,716,900	4.7%	3.8%	3.4%	3.1%
Commuter *(b)*	853,232	905,700	1,074,700	1,293,800	1,520,300	5.5%	4.6%	4.2%	3.9%
Total	12,125,938	12,673,200	14,605,800	16,951,100	19,237,200	4.8%	3.8%	3.4%	3.1%
Aircraft operations									
Itinerant									
Air carrier	201,466	214,360	245,310	282,790	318,760	6.7%	4.1%	3.5%	3.1%
Commuter/air taxi	12,497	12,660	12,980	13,360	13,680	1.8%	0.9%	0.7%	0.6%
Total commercial operations	213,963	227,020	258,290	296,150	332,440	6.4%	3.9%	3.3%	3.0%
General aviation	10,337	10,260	10,470	10,730	11,000	0.5%	0.5%	0.5%	0.5%
Military	758	700	700	700	700	0.0%	0.0%	0.0%	0.0%
Local									
General aviation	--	--	--	--	--	--	--	--	--
Military	--	--	--	--	--	--	--	--	--
Total operations	225,058	237,980	269,460	307,580	344,140	6.1%	3.7%	3.2%	2.9%
Cargo/mail (enplaned + deplaned tons)	192,351	201,480	228,470	259,790	288,790	4.4%	3.4%	3.0%	2.7%
Based Aircraft									
Single-engine (nonjet)	--	--	--	--	--	--	--	--	--
Multiengine (nonjet)	--	--	--	--	--	--	--	--	--
Jet engine	9	9	9	11	11	--	--	--	--
Helicopter	--	--	--	--	--	--	--	--	--
Other	--	--	--	--	--	--	--	--	--
Total	9	9	9	11	11	--	--	--	--
Operational factors									
Average aircraft size (seats)									
Air Carrier *(a)*	161.4	161.6	162.1	162.7	163.2				
Commuter *(b)*	74.1	74.3	74.9	75.6	76.4				
Average enplaning load factor									
Air Carrier *(a)*	81.8%	81.9%	82.2%	82.4%	82.7%				
Commuter *(b)*	77.2%	77.4%	78.2%	79.2%	80.2%				
GA operations per based aircraft	1,149	1,140	1,163	975	1,000				

Note: The SDIA Unconstrained Forecast was prepared on a calendar year basis; the FAA 2018 TAF were prepared on a U.S. government fiscal year basis (October through September).

(a) Includes mainline and charter airline activity as summarized in the previous tables in this report.

(b) Includes regional affiliate airline activity, which includes flights using regional aircraft with more than 60 seats.

Sources: Base year 2018 (actual)—San Diego County Regional Airport Authority records. SDIA Unconstrained Forecast—LeighFisher, November 2018. FAA 2018 TAF for SDIA—U.S. Department of Transportation, Federal Aviation Administration, www.faa.gov, accessed March 2019.

Table 6-3

SUMMARY OF SDIA CONSTRAINED DEMAND SCENARIO USING FAA TEMPLATE

San Diego International Airport

		Constrained Demand Scenario				Average annual compound growth rates			
	Base year 2018	Base year + 1 year 2019	Base year + 5 years 2023	Base year + 10 years 2028	Base year + 15 years 2033	Base year to +1 year 2018 - 2019	Base year to +5 years 2018 - 2023	Base year to +10 years 2018 - 2028	Base year to +15 years 2018 - 2033
Passenger enplanements									
Air carrier *(a)*	11,272,706	11,738,000	13,798,000	16,670,000	18,753,000	4.1%	4.1%	4.0%	3.5%
Commuter *(b)*	853,232	836,000	738,000	249,000	174,000	-2.0%	-2.9%	-11.6%	-10.1%
Total	12,125,938	12,574,000	14,536,000	16,919,000	18,927,000	3.7%	3.7%	3.4%	3.0%
Aircraft operations									
Itinerant									
Air carrier	201,466	206,870	232,240	250,110	264,070	2.7%	2.9%	2.2%	1.8%
Commuter/air taxi	12,497	12,880	6,610	4,650	4,720	3.1%	-12.0%	-9.4%	-6.3%
Total commercial operations	213,963	219,750	238,850	254,760	268,790	2.7%	2.2%	1.8%	1.5%
General aviation	10,337	9,270	9,020	8,390	7,750	-10.3%	-2.7%	-2.1%	-1.9%
Military	758	580	630	650	660	-23.5%	-3.6%	-1.5%	-0.9%
Local									
General aviation	--	--	--	--	--	--	--	--	--
Military	--	--	--	--	--	--	--	--	--
Total operations	225,058	229,600	248,500	263,800	277,200	2.0%	2.0%	1.6%	1.4%
Cargo/mail (enplaned + deplaned tons)	192,351	201,480	228,470	259,790	288,790	4.7%	3.5%	3.1%	2.7%
Based Aircraft									
Single-engine (nonjet)	--	--	--	--	--	--	--	--	--
Multiengine (nonjet)	--	--	--	--	--	--	--	--	--
Jet engine	9	9	9	11	11	--	--	--	--
Helicopter	--	--	--	--	--	--	--	--	--
Other	--	--	--	--	--	--	--	--	--
Total	9	9	9	11	11	--	--	--	--
Operational factors									
Average aircraft size (seats)									
Air Carrier *(a)*	161.4	161.6	162.1	162.7	163.2				
Commuter *(b)*	74.1	74.3	74.9	75.6	76.4				
Average enplaning load factor									
Air Carrier *(a)*	81.8%	81.9%	82.2%	82.4%	82.7%				
Commuter *(b)*	77.2%	77.4%	78.2%	79.2%	80.2%				
GA operations per based aircraft	1,149	1,030	1,002	763	705				

Note: The SDIA Constrained Demand Scenario was prepared on a calendar year basis; the FAA 2018 TAF were prepared on a U.S. government fiscal year basis (October through September).

(a) Includes mainline and charter airline activity as summarized in the previous tables in this report.

(b) Includes regional affiliate airline activity, which includes flights using regional aircraft with more than 60 seats.

Sources: Base year 2018 (actual)—San Diego County Regional Airport Authority records. SDIA Constrained Demand Scenario—LeighFisher, April 2019. FAA 2018 TAF for SDIA—U.S. Department of Transportation, Federal Aviation Administration, www.faa.gov, accessed March 2019.

Appendix A

UPDATED REGRESSION ANALYSIS

Regression analysis compares the historical relationship between a dependent variable, in this case, enplaned passengers, and an independent or "predictor" variable. The predictor variable is eventually used to project future levels of the dependent variable. In aviation demand forecasts, the predictor variable is typically represented by an economic or demographic metric such as population, employment, or personal income. Regression analyses produce a mathematical equation that identifies the strength or reliability of the historical correlation between the dependent variable (enplaned passengers) and predictor variables. The statistical reliability of this equation is typically measured by a regression statistic known as "R-squared." An R-squared of 1.0 would represent a perfect historical correlation between the dependent and predictor variable and suggest that the measurement of this historical relationship will be a reliable predictor of future results.

Table A-1 presents the key statistics for the updated domestic O&D passenger regression model based on data for 1990 through 2017.

Table A-1
UPDATED REGRESSION MODEL FOR THE UNCONSTRAINED FORECAST
San Diego International Airport

	Coefficient	t-statistic	P-value
Domestic originating passengers			
Dependent variable = ln(SDIA domestic originating passengers)			
Independent variables			
ln(San Diego County per capita personal income, 2016 dollars)	0.93	12.03	0.0000
ln(SDIA domestic airfares, 2016 dollars)	-0.54	-4.81	0.0001
Dummy variable (2001-2005 downturn)	-0.08	-4.16	0.0004
Dummy variable (2015-2017 service expansion)	0.07	2.62	0.0155
Constant	8.60	6.72	0.0000
Observations	27		
Adjusted R-squared	0.96		

Source: LeighFisher, November 2018.

Appendix B

ALTERNATIVE FORECAST SCENARIOS

This appendix summarizes alternative forecasts of enplaned passengers, air cargo, and total aircraft operations for SDIA. In addition to the unconstrained forecasts of aviation activity presented in Section 4 (referred to in this Appendix as "baseline"), "Updated Aviation Activity Forecasts", two alternative scenarios are prepared for planning purposes and to use as tools to manage uncertainty and anticipate the facility requirements associated with alternative levels of aviation activity compared with the baseline forecast.

Scenario Assumptions

Two alternative forecast scenarios were developed based on the analysis of passenger and cargo activity presented in Section 4.

- The High Forecast Scenario is a fast growth scenario reflecting faster regional economic growth than the baseline forecasts, as measured by San Diego County per capita personal income, and continued gradual decreases in domestic airfares.
- The Low Scenario Forecast is a slow growth scenario reflecting slower regional economic growth than the baseline forecasts, as measured by San Diego County per capita personal income, and gradual increases in domestic airfares.

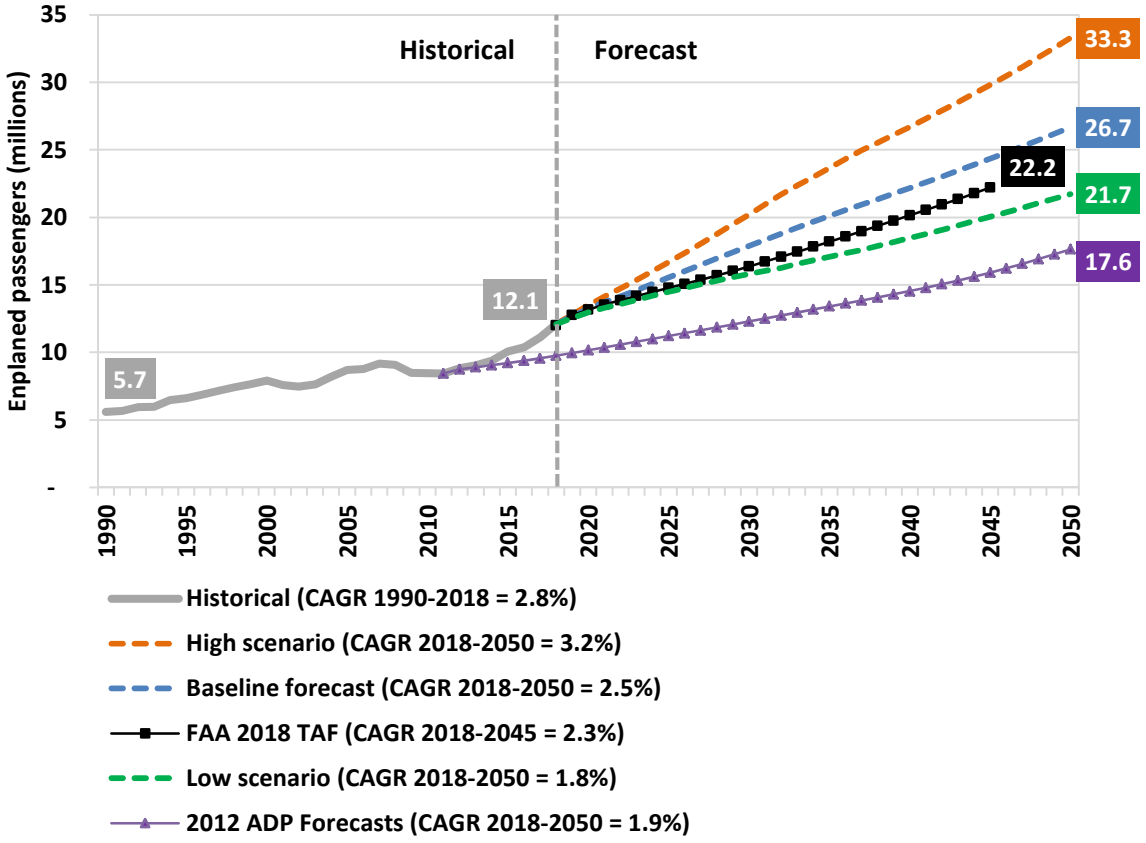
All other assumptions used in the alternative forecast scenarios are unchanged from the baseline forecast, including average load factors, average seats per departure, and cargo carried per operation.

Enplaned Passengers

Figure B-1 presents a comparison of the baseline forecast of enplaned passengers with the alternative forecast scenarios, the FAA 2018 TAF, and the 2012 ADP forecasts. Table B-1 (at the end of this section) presents the detailed alternative scenario forecasts of enplaned passengers.

- In the High Forecast Scenario, the number of passengers at the Airport is forecast to increase from 12.1 million passengers in 2018 to 33.3 million in 2050, an average increase of 3.2% per year. The number of domestic passengers at the Airport is forecast to increase an average of 2.8% per year between 2018 and 2050, compared with an average increase of 7.5% per year in international passenger traffic.
- In the Low Forecast Scenario, the number of passengers at the Airport is forecast to increase from 12.1 million passengers in 2018 to 21.7 million in 2050, an average increase of 1.8% per year. The number of domestic passengers at the Airport is forecast to increase an average of 1.7% per year between 2018 and 2050, compared with an average increase of 3.5% per year in international passenger traffic.

Figure B-1
HISTORICAL AND FORECAST ENPLANED PASSENGERS
San Diego International Airport



CAGR = Compound annual growth rate
Note: The forecasts presented in this figure were prepared using the information and assumptions given in the accompanying text. Inevitably, some of the assumptions used to develop the forecasts will not be realized and unanticipated events and circumstances may occur. Therefore, there are likely to be differences between the forecast and actual results, and those differences may be material.

Sources: *Historical*—San Diego County Regional Airport Authority records. *Forecast*—LeighFisher, November 2018.

Air Cargo

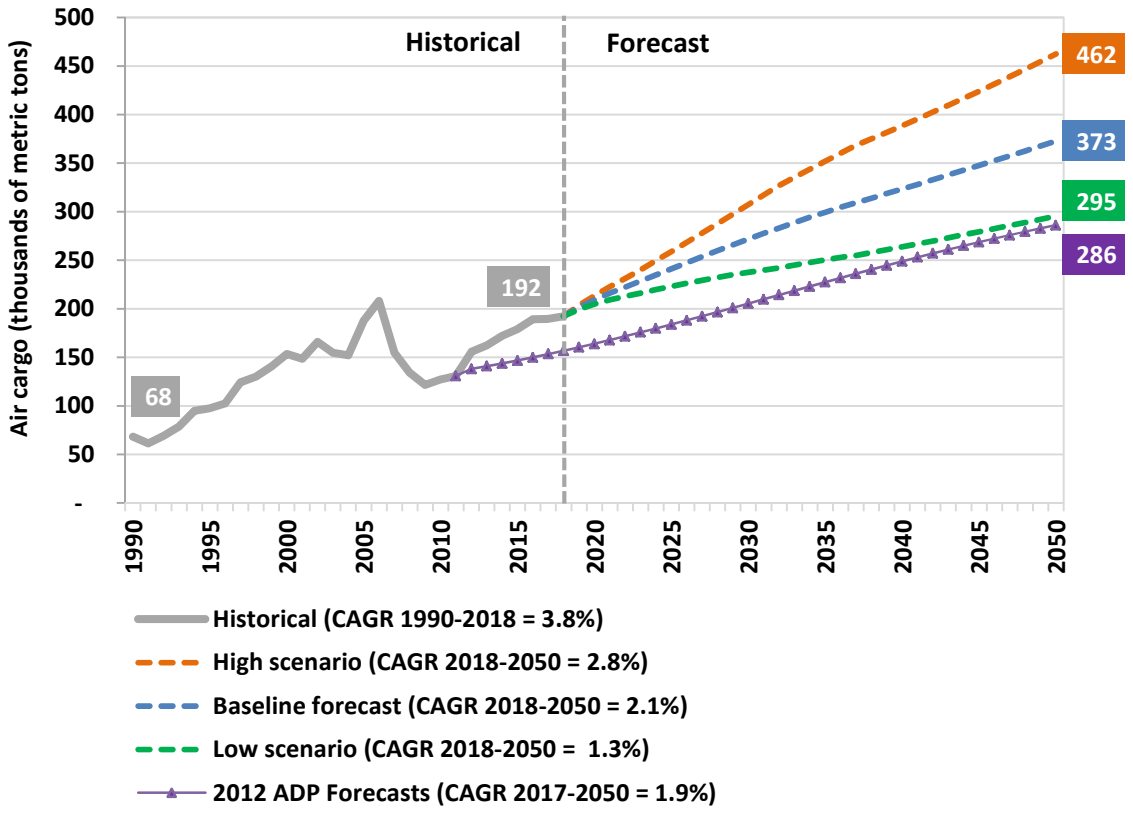
Figure B-2 presents a comparison of the baseline forecast of total air cargo with the alternative forecast scenarios and the 2012 ADP forecasts. (The FAA does not prepare air cargo forecasts.) Table B-2 (at the end of this section) presents the detailed alternative scenario forecasts of total air cargo.

- In the High Forecast Scenario, total air cargo at the Airport is forecast to increase from 192,351 metric tons in 2018 to 462,480 metric tons in 2050, an average increase of 2.8% per year. Air freight and air mail at the Airport are forecast to increase an average of 2.8% per year between 2018 and 2050.

- In the Low Forecast Scenario, total air cargo at the Airport is forecast to increase from 192,351 metric tons in 2018 to 295,250 metric tons in 2050, an average increase of 1.3% per year. Air freight

and air mail at the Airport is forecast to increase an average of 1.3% per year between 2018 and 2050,

Figure B-2
HISTORICAL AND FORECAST AIR CARGO
San Diego International Airport



CAGR = Compound annual growth rate
Note: The forecasts presented in this figure were prepared using the information and assumptions given in the accompanying text. Inevitably, some of the assumptions used to develop the forecasts will not be realized and unanticipated events and circumstances may occur. Therefore, there are likely to be differences between the forecast and actual results, and those differences may be material.

Sources: *Historical*—San Diego County Regional Airport Authority records. *Forecast*—LeighFisher, November 2018.

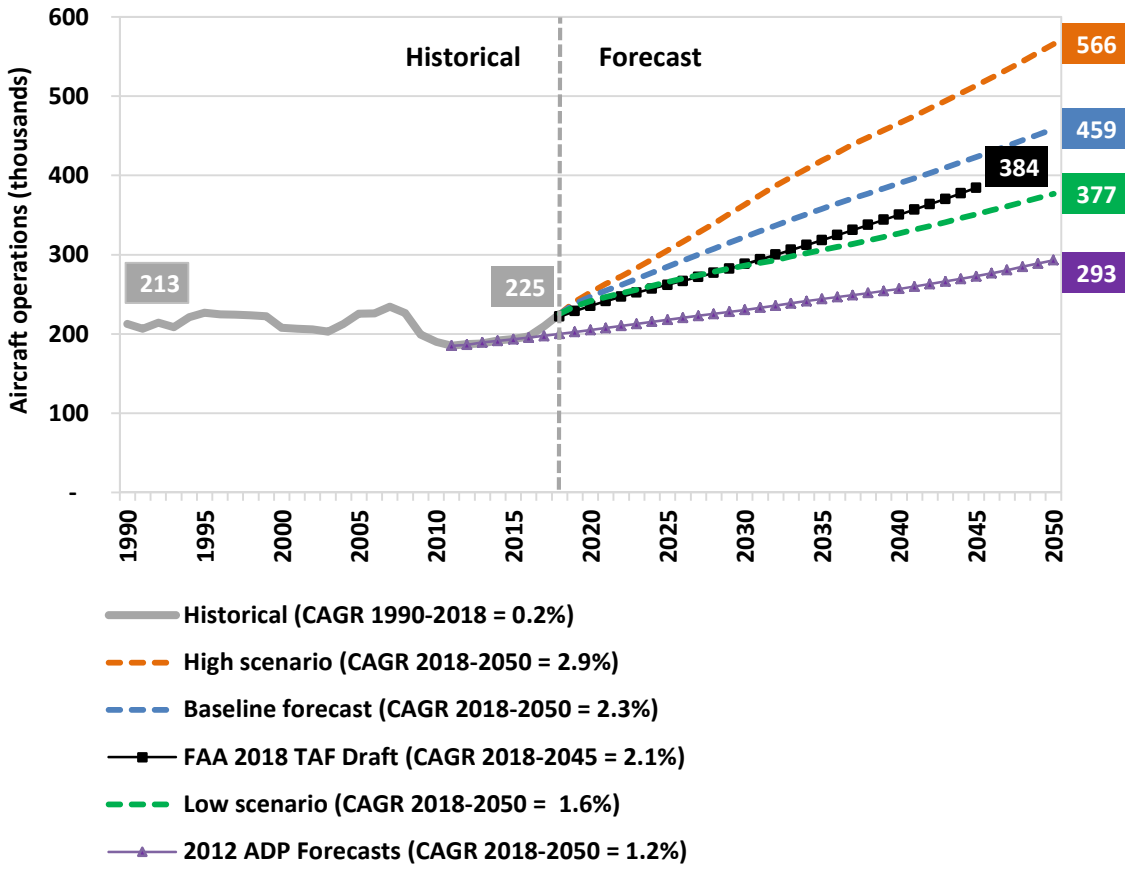
Total Aircraft Operations

Figure B-3 presents a comparison of the baseline forecast of total aircraft operations with the alternative forecast scenarios, the FAA 2018 TAF, and the 2012 ADP forecasts. Table B-3 (at the end of this section) presents the detailed alternative scenario forecasts of total aircraft operations.

- In the High Forecast Scenario, total aircraft operations at the Airport are forecast to increase from 225,058 in 2018 to 565,820 in 2050, an average increase of 2.9% per year. Commercial aircraft operations at the Airport are forecast to increase an average of 3.0% per year between 2018 and 2050, while general aviation are forecast to increase an average of 1.0% per year and military operations are forecast to remain relatively unchanged.

- In the Low Forecast Scenario, total aircraft operations at the Airport are forecast to increase from 225,058 in 2018 to 376,680 in 2050, an average increase of 1.6% per year. Commercial aircraft operations at the Airport are forecast to increase an average of 1.7% per year between 2018 and 2050, while general aviation and military operations are forecast to remain relatively unchanged.

Figure B-3
HISTORICAL AND FORECAST AIRCRAFT OPERATIONS
San Diego International Airport



CAGR = Compound annual growth rate
Note: The forecasts presented in this figure were prepared using the information and assumptions given in the accompanying text. Inevitably, some of the assumptions used to develop the forecasts will not be realized and unanticipated events and circumstances may occur. Therefore, there are likely to be differences between the forecast and actual results, and those differences may be material.

Sources: *Historical*—San Diego County Regional Airport Authority records. *Forecast*—LeighFisher, November 2018.

Table B-1
ENPLANED PASSENGER FORECASTS—ALTERNATIVE SCENARIOS
San Diego International Airport

	Historical		High Forecast Scenario					
	2017	2018	2023	2028	2033	2038	2043	2050
Domestic								
Mainline airline	4,752,261	5,244,306	6,563,400	7,901,200	9,239,800	10,301,700	11,169,200	12,388,400
Regional airline	712,939	853,232	1,127,100	1,423,500	1,746,900	2,044,800	2,328,200	2,765,800
Low cost carrier	5,208,403	5,515,739	6,863,500	8,262,500	9,662,300	10,772,700	11,679,900	12,954,900
Domestic total	10,673,603	11,613,277	14,554,000	17,587,200	20,649,000	23,119,200	25,177,300	28,109,100
International	433,475	512,661	804,700	1,179,300	1,703,400	2,414,800	3,360,100	5,170,300
Total Airport	11,107,078	12,125,938	15,358,700	18,766,500	22,352,400	25,534,000	28,537,400	33,279,400
O&D and connecting enplaned passengers								
O&D	10,462,985	11,422,762	14,468,000	17,678,300	21,056,100	24,053,400	26,882,600	31,349,500
Connecting	644,093	703,176	890,700	1,088,200	1,296,300	1,480,600	1,654,800	1,929,900
Total Airport	11,107,078	12,125,938	15,358,700	18,766,500	22,352,400	25,534,000	28,537,400	33,279,400
Percent of total Airport								
O&D	94.2%	94.2%	94.2%	94.2%	94.2%	94.2%	94.2%	94.2%
Connecting	5.8%	5.8%	5.8%	5.8%	5.8%	5.8%	5.8%	5.8%

	Percent change	Compound annual percent increase (decrease)					
	2017-2018	2018-2023	2023-2028	2028-2033	2033-2038	2038-2043	2043-2050
Domestic							
Mainline airline	10.4%	5.8%	3.8%	3.2%	2.2%	1.6%	1.5%
Regional airline	19.7%	7.2%	4.8	4.2	3.2	2.6	2.5
Low cost carrier	5.9%	5.6%	3.8	3.2	2.2	1.6	1.5
Domestic total	8.8%	5.8%	3.9	3.3	2.3	1.7	1.6
International	18.3%	11.9%	7.9	7.6	7.2	6.8	6.4
Total Airport	9.2%	6.1%	4.1	3.6	2.7	2.2	2.2

Note: The forecasts presented in this table were prepared using the information and assumptions given in the accompanying text. Inevitably, some of the assumptions used to develop the forecasts will not be realized and unanticipated events and circumstances may occur. Therefore, there are likely to be differences between the forecast and actual results, and those differences may be material.

Sources: *Historical*—San Diego County Regional Airport Authority records. *Forecast*—LeighFisher, November 2018.

Table B-1 (page 2 of 2)
ENPLANED PASSENGER FORECASTS—ALTERNATIVE SCENARIOS
San Diego International Airport

	Historical		Low Forecast Scenario					
	2017	2018	2023	2028	2033	2038	2043	2050
Domestic								
Mainline airline	4,752,261	5,244,306	5,959,400	6,509,000	6,970,700	7,457,700	8,022,100	8,896,600
Regional airline	712,939	853,232	1,024,300	1,174,800	1,321,400	1,484,900	1,677,600	1,992,600
Low cost carrier	5,208,403	5,515,739	6,231,900	6,806,600	7,289,400	7,798,700	8,388,900	9,303,400
Domestic total	10,673,603	11,613,277	13,215,600	14,490,400	15,581,500	16,741,300	18,088,600	20,192,600
International	433,475	512,661	668,100	810,800	969,000	1,135,900	1,306,000	1,536,600
Total Airport	11,107,078	12,125,938	13,883,700	15,301,200	16,550,500	17,877,200	19,394,600	21,729,200
O&D and connecting enplaned passengers								
O&D	10,462,985	11,422,762	13,078,700	14,413,900	15,590,800	16,840,600	18,270,000	20,469,100
Connecting	644,093	703,176	805,000	887,300	959,700	1,036,600	1,124,600	1,260,100
Total Airport	11,107,078	12,125,938	13,883,700	15,301,200	16,550,500	17,877,200	19,394,600	21,729,200
Percent of total Airport								
O&D	94.2%	94.2%	94.2%	94.2%	94.2%	94.2%	94.2%	94.2%
Connecting	5.8%	5.8%	5.8%	5.8%	5.8%	5.8%	5.8%	5.8%

	Percent change	Compound annual percent increase (decrease)					
	2017-2018	2018-2023	2023-2028	2028-2033	2033-2038	2038-2043	2043-2050
Domestic							
Mainline airline	10.4%	3.2%	1.8%	1.4%	1.4%	1.5%	1.5%
Regional airline	19.7%	4.7%	2.8	2.4	2.4	2.5	2.5
Low cost carrier	5.9%	3.1%	1.8	1.4	1.4	1.5	1.5
Domestic total	8.8%	3.3%	1.9	1.5	1.4	1.6	1.6
International	18.3%	6.8%	3.9	3.6	3.2	2.8	2.4
Total Airport	9.2%	3.4%	2.0	1.6	1.6	1.6	1.6

Note: The forecasts presented in this table were prepared using the information and assumptions given in the accompanying text. Inevitably, some of the assumptions used to develop the forecasts will not be realized and unanticipated events and circumstances may occur. Therefore, there are likely to be differences between the forecast and actual results, and those differences may be material.

Sources: *Historical*—San Diego County Regional Airport Authority records. *Forecast*—LeighFisher, November 2018.

Table B-2
AIR CARGO FORECASTS—ALTERNATIVE SCENARIOS
San Diego International Airport
In metric tons

	Historical		High Forecast Scenario					
	2017	2018	2023	2028	2033	2038	2043	2050
Total air cargo								
Air freight								
Enplaned	75,097	72,960	90,450	108,230	126,170	140,940	153,890	173,570
Deplaned	91,038	94,826	118,850	142,270	165,920	185,440	202,640	228,820
Air freight total	166,135	167,786	209,300	250,500	292,090	326,380	356,530	402,390
Mail								
Enplaned	17,691	17,987	22,440	26,890	31,410	35,190	38,570	43,760
Deplaned	5,741	6,578	8,480	10,160	11,840	13,240	14,470	16,330
Mail total	23,432	24,566	30,920	37,050	43,250	48,430	53,040	60,090
Total air cargo								
Enplaned	92,788	90,947	112,890	135,120	157,580	176,130	192,460	217,330
Deplaned	96,779	101,404	127,330	152,430	177,760	198,680	217,110	245,150
Total air cargo	189,567	192,351	240,220	287,550	335,340	374,810	409,570	462,480
Percent of total								
Enplaned	48.9%	47.3%	47.0%	47.0%	47.0%	47.0%	47.0%	47.0%
Deplaned	51.1%	52.7%	53.0%	53.0%	53.0%	53.0%	53.0%	53.0%
Enplaned air freight								
Domestic								
Cargo airline	67,240	64,446	79,630	94,380	108,690	119,330	127,420	138,380
Passenger airline	5,738	5,763	6,790	8,050	9,270	10,180	10,870	11,810
Domestic total	72,979	70,209	86,420	102,430	117,960	129,510	138,290	150,190
International	2,118	2,751	4,030	5,790	8,210	11,430	15,600	23,380
Air freight total	75,097	72,960	90,450	108,220	126,170	140,940	153,890	173,570
Enplaned mail								
Cargo airline	15,115	15,027	18,690	22,400	26,170	29,320	32,130	36,450
Passenger airline	2,575	2,961	3,750	4,490	5,250	5,880	6,440	7,310
Mail total	17,691	17,987	22,440	26,890	31,420	35,200	38,570	43,760
Total enplaned air cargo	92,788	90,947	112,890	135,110	157,590	176,140	192,460	217,330

Table B-2 (page 2 of 4)
AIR CARGO FORECASTS—ALTERNATIVE SCENARIOS
San Diego International Airport
In metric tons

	Percent increase (decrease) 2017-2018	High Forecast Scenario					
		Compound annual percent increase (decrease)					
		2018-2023	2023-2028	2028-2033	2033-2038	2038-2043	2043-2050
Total air cargo (enplaned and deplaned)							
Air freight	1.0%	5.7%	3.7%	3.1%	2.2%	1.8%	1.7%
Mail	4.%	5.9%	3.7	3.1	2.3	1.8	1.8
Total	1.%	5.7%	3.7	3.1	2.3	1.8	1.8
Enplaned air freight							
Domestic	(3.8)	5.3%	3.5	2.9	1.9	1.3	1.2
International	29.9	10.0%	7.5	7.2	6.8	6.4	6.0

Note: The forecasts presented in this table were prepared using the information and assumptions given in the accompanying text. Inevitably, some of the assumptions used to develop the forecasts will not be realized and unanticipated events and circumstances may occur. Therefore, there are likely to be differences between the forecast and actual results, and those differences may be material.

Sources: *Historical*—San Diego County Regional Airport Authority records. *Forecast*—LeighFisher, November 2018.

Table B-2 (page 3 of 4)
AIR CARGO FORECASTS—ALTERNATIVE SCENARIOS
San Diego International Airport
In metric tons

	Historical		Low Forecast Scenario					
	2017	2018	2023	2028	2033	2038	2043	2050
Total air cargo								
Air freight								
Enplaned	75,097	72,960	81,390	87,450	92,210	97,090	102,710	111,100
Deplaned	91,038	94,826	106,930	114,920	121,180	127,630	135,020	146,080
Air freight total	166,135	167,786	188,320	202,370	213,390	224,720	237,730	257,180
Mail								
Enplaned	17,691	17,987	20,170	21,690	22,890	24,130	25,540	27,640
Deplaned	5,741	6,578	7,630	8,200	8,650	9,110	9,640	10,430
Mail total	23,432	24,566	27,800	29,890	31,540	33,240	35,180	38,070
Total air cargo								
Enplaned	92,788	90,947	101,560	109,140	115,100	121,220	128,250	138,740
Deplaned	96,779	101,404	114,560	123,120	129,830	136,740	144,660	156,510
Total air cargo	189,567	192,351	216,120	232,260	244,930	257,960	272,910	295,250
Percent of total								
Enplaned	48.9%	47.3%	47.0%	47.0%	47.0%	47.0%	47.0%	47.0%
Deplaned	51.1%	52.7%	53.0%	53.0%	53.0%	53.0%	53.0%	53.0%
Enplaned air freight								
Domestic								
Cargo airline	67,240	64,446	71,930	76,950	80,720	84,610	89,200	96,190
Passenger airline	5,738	5,763	6,140	6,570	6,890	7,220	7,610	8,210
Domestic total	72,979	70,209	78,070	83,520	87,610	91,830	96,810	104,400
International	2,118	2,751	3,320	3,940	4,590	5,260	5,900	6,710
Air freight total	75,097	72,960	81,390	87,460	92,200	97,090	102,710	111,110
Enplaned mail								
Cargo airline	15,115	15,027	16,800	18,070	19,070	20,100	21,270	23,020
Passenger airline	2,575	2,961	3,370	3,620	3,820	4,030	4,260	4,620
Mail total	17,691	17,987	20,170	21,690	22,890	24,130	25,530	27,640
Total enplaned air cargo	92,788	90,947	101,560	109,150	115,090	121,220	128,240	138,750

Table B-2 (page 4 of 4)
AIR CARGO FORECASTS—ALTERNATIVE SCENARIOS
San Diego International Airport
In metric tons

	Percent increase (decrease) 2017-2018	Low Forecast Scenario					
		Compound annual percent increase (decrease)					
		2018-2023	2023-2028	2028-2033	2033-2038	2038-2043	2043-2050
Total air cargo (enplaned and deplaned)							
Air freight	1.0%	2.9%	1.4%	1.1%	1.0%	1.1%	1.1%
Mail	4.8	3.1%	1.5	1.1	1.1	1.1	1.1
Total	1.5	3.0%	1.5	1.1	1.0	1.1	1.1
Enplaned air freight							
Domestic	(3.8)	2.7%	1.4	1.0	0.9	1.1	1.1
International	29.9	4.8%	3.5	3.1	2.8	2.3	1.9

Note: The forecasts presented in this table were prepared using the information and assumptions given in the accompanying text. Inevitably, some of the assumptions used to develop the forecasts will not be realized and unanticipated events and circumstances may occur. Therefore, there are likely to be differences between the forecast and actual results, and those differences may be material.

Sources: *Historical*—San Diego County Regional Airport Authority records. *Forecast*—LeighFisher, November 2018.

Table B-3

AIRCRAFT OPERATIONS FORECASTS—ALTERNATIVE SCENARIOS

San Diego International Airport

	Historical		High Forecast Scenario					
	2017	2018	2023	2028	2033	2038	2043	2050
Air Carrier								
Passenger airlines	182,712	197,244	252,180	306,270	362,450	411,160	456,030	525,640
Cargo airlines	4,082	3,850	4,870	5,750	6,590	7,200	7,650	8,290
Other	1,787	372	800	800	810	810	820	820
Air Carrier total	188,581	201,466	257,850	312,820	369,850	419,170	464,500	534,750
Air Taxi								
Cargo airlines	2,716	2,530	3,130	3,700	4,240	4,630	4,920	5,330
Other	7,946	9,967	11,000	11,000	11,000	11,000	11,000	11,000
Air Taxi total	10,662	12,497	14,130	14,700	15,240	15,630	15,920	16,330
General Aviation								
Itinerant	9,613	10,337	10,730	11,280	11,850	12,460	13,090	14,040
Local	--	--	--	--	--	--	--	--
General Aviation total	9,613	10,337	10,730	11,280	11,850	12,460	13,090	14,040
Military	707	758	700	700	700	700	700	700
Total Airport	209,563	225,058	283,410	339,500	397,640	447,960	494,210	565,820

	Percent increase (decrease)	High Forecast Scenario					
		Compound annual percent increase (decrease)					
	2017-2018	2018-2023	2023-2028	2028-2033	2033-2038	2038-2043	2043-2050
Air Carrier							
Passenger airlines	8.1%	6.3%	4.0%	3.4%	2.6%	2.1%	2.1%
Cargo airlines	(5.7)	6.1	3.4	2.8	1.8	1.2	1.2
Other	(82.1)	21.1	0.0	0.2	0.0	0.2	0.0
Air Carrier total	6.8	6.4	3.9	3.4	2.5	2.1	2.0
Air Taxi							
Cargo airlines	(6.8)	5.5	3.4	2.8	1.8	1.2	1.2
Other	25.4	2.5	0.0	0.0	0.0	0.0	0.0
Air Taxi total	17.2	3.1	0.8	0.7	0.5	0.4	0.4
General Aviation	7.5	0.9	1.0	1.0	1.0	1.0	1.0
Military	7.2	(2.0)	0.0	0.0	0.0	0.0	0.0
Total Airport	7.4	5.9	3.7	3.2	2.4	2.0	2.0

Note: The forecasts presented in this table were prepared using the information and assumptions given in the accompanying text. Inevitably, some of the assumptions used to develop the forecasts will not be realized and unanticipated events and circumstances may occur. Therefore, there are likely to be differences between the forecast and actual results, and those differences may be material.

Sources: *Historical*—San Diego County Regional Airport Authority records. *Forecast*—LeighFisher, November 2018.

Table B-3 (page 2 of 2)

AIRCRAFT OPERATIONS FORECASTS—ALTERNATIVE SCENARIOS

San Diego International Airport

	Historical		Low Forecast Scenario					
	2017	2018	2023	2028	2033	2038	2043	2050
Air Carrier								
Passenger airlines	182,712	197,244	228,060	249,960	268,850	288,790	311,590	346,480
Cargo airlines	4,082	3,850	4,400	4,690	4,890	5,110	5,360	5,760
Other	1,787	372	800	800	810	810	820	820
Air Carrier total	188,581	201,466	233,260	255,450	274,550	294,710	317,770	353,060
Air Taxi								
Cargo airlines	2,716	2,530	2,830	3,010	3,150	3,290	3,450	3,710
Other	7,946	9,967	9,000	9,000	9,000	9,000	9,000	9,000
Air Taxi total	10,662	12,497	11,830	12,010	12,150	12,290	12,450	12,710
General Aviation								
Itinerant	9,613	10,337	10,210	10,210	10,210	10,210	10,210	10,210
Local	--	--	--	--	--	--	--	--
General Aviation total	9,613	10,337	10,210	10,210	10,210	10,210	10,210	10,210
Military	707	758	700	700	700	700	700	700
Total Airport	209,563	225,058	256,000	278,370	297,610	317,910	341,130	376,680

	Percent increase (decrease)	Low Forecast Scenario					
		Compound annual percent increase (decrease)					
	2017-2018	2018-2023	2023-2028	2028-2033	2033-2038	2038-2043	2043-2050
Air Carrier							
Passenger airlines	8.1%	3.7%	1.9%	1.5%	1.4%	1.5%	1.5%
Cargo airlines	(5.7)	3.4	1.3	0.8	0.9	1.0	1.0
Other	(82.1)	21.1	0.0	0.2	0.0	0.2	0.0
Air Carrier total	6.8	3.7	1.8	1.5	1.4	1.5	1.5
Air Taxi							
Cargo airlines	(6.8)	2.8	1.2	0.9	0.9	1.0	1.0
Other	25.4	(2.5)	0.0	0.0	0.0	0.0	0.0
Air Taxi total	17.2	(1.4)	0.3	0.2	0.2	0.3	0.3
General Aviation	7.5	(0.3)	0.0	0.0	0.0	0.0	0.0
Military	7.2	(2.0)	0.0	0.0	0.0	0.0	0.0
Total Airport	7.4	3.3	1.7	1.3	1.3	1.4	1.4

Note: The forecasts presented in this table were prepared using the information and assumptions given in the accompanying text. Inevitably, some of the assumptions used to develop the forecasts will not be realized and unanticipated events and circumstances may occur. Therefore, there are likely to be differences between the forecast and actual results, and those differences may be material.

Sources: *Historical*—San Diego County Regional Airport Authority records. *Forecast*—LeighFisher, November 2018.

Appendix C
FAA Approval Letter for the Forecasts

U.S. Department
of Transportation
**Federal Aviation
Administration**

Western-Pacific Region
Airports Division
Los Angeles Airports District Office

777 S. Aviation Blvd, Suite 105
El Segundo, CA 90245

June 19, 2019

Ted Anasis, AICP
Manager—Planning and Environmental Affairs, SDCRAA
PO Box 82776
San Diego, CA 92138

San Diego International Airport (SAN)
Aviation Activity Forecast Approval

Dear Mr. Anasis,

The Federal Aviation Administration (FAA) has reviewed and approves the aviation forecast for the San Diego International Airport (SAN) dated May 17, 2019. This approval replaces the previous forecast approval from December 20, 2018 which presented unconstrained forecasts for SAN. As described in your letter (enclosed), SAN has since developed a constrained demand scenario which evaluated the limitation of SAN's single runway on unconstrained forecast growth.

Section 4.5 of the forecast analyzes the design aircraft and concludes that SAN's design aircraft is the Boeing 777. The most demanding group of aircraft that conducted at least 500 operations in 2017 had an Airport Reference Code of D-V, represented by a combination of the Boeing 777 (426 operations) and the Boeing 747-400 (282 operations). Based on FAA review of the Traffic Flow Management System Counts and FAA Advisory Circular 150/5000-17 *Critical Aircraft and Regular Use Determination*, the FAA agrees that SAN's design aircraft may change to Boeing 787-9 in the future.

It is important to note that the approval of this forecast does not guarantee future funding for capital improvements and will need to be further analyzed for Airport Improvement Program eligibility purposes.

If you have any questions about this forecast approval, please call me at 424-405-7276.

Sincerely,

Brenda Pérez
Community Planner

Enc. Request for Reapproval of Aviation Activity Forecasts for San Diego International Airport

SAN DIEGO
INTERNATIONAL AIRPORT
LET'S GO.

May 17, 2019

Federal Aviation Administration
Western-Pacific Region Airports Division
Attn: Ms. Brenda Perez
777 South Aviation Blvd, Suite 150
El Segundo, California 90245

Re: Request for Reapproval of Aviation Activity Forecasts for San Diego International Airport

Dear Ms. Perez:

The San Diego County Regional Airport Authority (the Authority) is pleased to provide an updated technical memorandum of the Aviation Activity Forecast Update for San Diego International Airport (SDIA) for the FAA's review and approval. The memorandum is provided in draft form and will be finalized following the FAA's review and approval, incorporating the FAA's communication into the final form. The Authority does not anticipate the need for or the preparation of additional forecasts or demand scenarios.

In December 2018, the FAA reviewed and approved unconstrained forecasts for SDIA, which were updated to reflect a 2018 base year and the strong growth in passenger traffic that has occurred since the forecasts for the Airport Development Plan (ADP) were prepared in 2012 and approved by the FAA in its letter dated May 7, 2013. Similar to the FAA's Terminal Area Forecast (TAF), SDIA's December 2018 approved forecasts are demand driven based on local and national economic conditions and do not include specific assumptions about physical, regulatory, environmental or other impediments to aviation activity growth.

Since the FAA approved SDIA's baseline unconstrained forecasts as the "preferred" forecasts in December 2018, subsequent analyses were conducted, including the development of Design Day Future Schedules (DDFSs) derived from the approved unconstrained forecasts. (The development of unconstrained DDFSs is dependent on approved annual forecasts to provide the basis for the derivation of average day peak month (ADPM) activity which serves as the control totals for the DDFSs.) These analyses indicated that:

- The capacity of SDIA's single runway, an estimated 50 operations per hour, will be exceeded starting in 2024 based on the unconstrained forecast DDFSs
- SDIA's unconstrained demand could be met until approximately 2030, assuming that:
  - Load factors increase to an average of 90%, compared with 84% in the unconstrained forecast
  - Aircraft gauge, in terms of the average number of seats per operation, increases to an average of 175 seats per operation, compared with 151 in the unconstrained forecast

  - Airline schedules are rebalanced to provide for the addition of new flights in off-peak hours
  - Slower growth in the number of cargo airline operations occurs in a constrained environment, reflecting an increase in the average tonnage per operation
  - The number and share of general aviation and military operations at SDIA gradually decrease, given the hourly operation limitations and increasing dominance of passenger airline operations
- The primarily narrowbody fleet of the airlines serving SDIA, accounting for 82.5% of passenger airline operations in 2018, as well as their orders for primarily narrowbody aircraft replacements, limit the ability of SDIA to meet unconstrained forecast demand
- In 2050, unmet demand, in term of enplaned passengers, is estimated to reach 6.4 million, i.e., 26.7 million enplaned passengers in the unconstrained forecast less 20.3 million passengers in the constrained demand scenario

In short, SDIA's unconstrained forecasts provided the necessary basis for the development of a constrained demand scenario which, in turn, allowed the Authority to evaluate the limitations of SDIA's single runway on unconstrained forecast growth. A description of the development of the constrained demand scenario is provided in Section 5.0 of the updated technical memorandum. At this time, the Authority is requesting the FAA's review and approval of the constrained demand scenario presented in this memorandum to represent the "preferred scenario", which will be used for airport planning, NEPA review, and Part 150/Noise analyses.

Per the FAA guidance, a comparison of the constrained demand scenario and the FAA 2018 Terminal Area Forecast (TAF) for SDIA is provided in the Technical Memorandum. The tables depicting the comparison can be found in in Section 6.0 (Page 40) and show that both the updated unconstrained forecast and constrained demand scenario are within the allowed variance of the 2018 TAF.

Should you have any questions or comments regarding the forecast or the San Diego International Airport Development Plan, please contact me at tanasis@san.org or (619) 400-2478. Thank you for your continued coordination and assistance.

Respectfully,

Ted Anasis

Ted Anasis, AICP
Manager – Planning & Environmental Affairs
San Diego County Regional Airport Authority

cc: Richard Dykas, FAA

Appendix D

CONSTRAINED DEMAND SCENARIO TECHNICAL APPENDIX

San Diego International Airport (SDIA) will not accommodate the unconstrained forecast level of demand for air service. The Airport's single runway does not provide enough capacity to serve the San Diego region's predicted growth in air operations as identified in Section 4 of this report. A Constrained Demand Scenario has been developed in response to the runway capacity limitations and the results are provided in Section 5 of this report.

The Airport's capacity limitations are well known and have been studied for more than three decades. The 2018 ADP Unconstrained Forecast Update of aviation demand for the San Diego region shows that within five to seven years, there will be more demand for air service than the Airport can accommodate. The San Diego County Regional Airport Authority (SDCRAA or Authority) asked Johnson Aviation to review the draft unconstrained forecasts update and analyze the facility constraints at SDIA. In collaboration with Leigh Fisher, Johnson Aviation developed the Constrained Demand Scenario in response to the growing aviation demand and limited airport capacity at SDIA. This Technical Appendix provides a summary of the information that was used in the analysis.

The following information is presented in this Technical Appendix:

- The operational capacity of San Diego International Airport's single runway; and
- How the constrained runway impacts future growth in operations and passengers.

The results of the constrained facilities assessment show that:

- The hourly sustained throughput capacity limit of SDIA's single runway is 50 operations per hour (landings and/or takeoffs);
- Airlines will attempt to serve as much of the passenger demand as possible with average load factors of up to 90 percent; and
- Airlines will further attempt to serve as much of the passenger demand as possible by replacing smaller regional jet aircraft in the fleet with narrow body aircraft, raising the average seats per operation to 175.

As shown in Section 5 of this report, growth in operations will begin to slow relative to the forecast of unconstrained demand as the Airport's capacity limit is reached and congestion increases. Therefore, it is necessary to prepare an analysis of *constrained* demand to predict activity levels that the Airport can realistically accommodate. This results in a *constrained aviation demand scenario* and in lower levels of predicted airplane operations and passenger enplanements in future years reflective of the Airport's actual capacity limitations.

D.1 Purpose and Approach

The purpose of the constrained facilities analysis is to inform readers about San Diego International Airport's runway constraint and how it will impact future activity levels identified in the Constrained Demand Scenario.

The approach used to assess facility constraints was to review prior analyses of the Airport's runway capacity and delay, review updated air traffic control and aircraft fleet information, review airline

operational and service trends, and identify the likely maximum sustained operations and passenger throughputs the Airport can accommodate.

The information provided in this chapter was used to prepare the constrained demand scenario of aviation activity which better reflects future operations and passenger levels. The constrained demand scenario of future activity levels will be used to prepare operations simulations and environmental impact analyses of reasonably foreseeable impacts documented in the Environmental Impact Report (EIR), prepared under the California Environmental Quality Act (CEQA), and Environmental Assessment, prepared under the National Environmental Policy Act (NEPA).

D.2 Background

This section provides the background on constrained aviation activity analysis and the historical context of the constrained demand scenario at SDIA.

D.2.1 Airport Development Plan Forecasts

The Airport Development Plan (ADP) was initiated by the Airport Authority in 2011 to plan for facility improvements at SDIA. One of the first steps in the ADP process was to prepare a forecast of aviation activity. The ADP forecast was completed in 2012 and was based on historical data through 2011 (See Appendix C). The 2012 forecast predicted that passenger levels would grow at an average annual rate of 1.9% between 2011 and 2050, while operations would grow at an average annual rate of 1.2% between 2011 and 2050. These rates of growth were relatively modest and did not predict that the Airport's capacity limitations would be reached until after 2040, which was beyond the ADP planning horizon. Therefore, there was no need to prepare a constrained facilities analysis and constrained demand scenario that would identify limitations in predicted levels of passenger and operations activity.

The ADP planning process continued, and the proposed ADP projects were documented in a Draft Environmental Impact Report (EIR) published in 2018. Between 2012 and 2018, SDIA experienced five consecutive years of record passenger and operations growth that exceeded the forecast rate of growth.

The Airport Authority initiated an update to the aviation activity forecast in 2018 to reflect recent growth and better inform the analysis of potential environmental impacts associated with the ADP. Sections 2, 3, and 4 of this report present these findings and updated forecasts. Like the 2012 forecast, the 2018 forecast update is unconstrained. A fundamental assumption of an unconstrained forecast is the availability of adequate capacity to accommodate the predicted demand. The updated draft unconstrained forecast was submitted to FAA for review and was approved by FAA in December 2018.

The 2018 Baseline forecast predicts that aircraft operations will exceed 260,000 annually by 2022 and 300,000 by 2026. Previous demand-capacity analysis of SDIA's single runway show that it would become severely congested at these levels of activity and that it would not accommodate activity beyond approximately 300,000 annual operations. Therefore, it is necessary to include a constrained demand scenario that better reflects the Airport's facility limitations on future growth.

D.2.2 San Diego's Long History of Capacity Studies

The operational limit of SDIA's Runway 9/27 is not a new issue for the Airport Authority or the San Diego region. Recognition of the Airport's runway limitations date back to the 1950s and robust analysis of the Airport's capacity limits were reviewed with planning and forecasting studies in 1980, and again in the mid-1990s. Planning studies in 2001 and 2004 were conducted in response to continued growth with the intent to establish the limit of the Airport's runway capacity and the Airport's ability to accommodate passenger demand. The analyses culminated in the decision to consider relocation of the San Diego region's main commercial service airport in 2007 with a vote of San Diego County residents, who defeated a ballot

measure that would have affirmed the recommendation to relocate the Airport. The voters' decision was made, and the region has moved forward with improvements at San Diego International Airport knowing that, at some future point, the Airport's operational limitations would curtail further growth in air service.

The Great Recession from 2008 to 2009 reduced aviation demand in the United States and in the San Diego region. When the previous forecast of aviation activity was completed for the ADP in 2011, it appeared that growth in air operations would not exceed the Airport's runway capacity until sometime between 2040 and 2050. However, since 2011, economic growth in the region combined with strong airfare competition at SDIA have resulted in five straight years of record growth. In 2018, SDIA accommodated more than 24 million passengers and 225,000 operations, the highest levels of activity in the Airport's history. The updated forecast, which considers the recent growth in activity, predicts that demand for air service will outstrip the Airport's capacity within the next five to seven years.

Studies going back to 1980 identified the constraints of SDIA's small land area, limited airport facilities, and single runway. As operations grew over time, these limitations became clearer. Economic downturns and air service changes over time have forestalled the operational limits of the single runway. Studies in the late 1970s by the San Diego Community Planning Organization and in the 1980 Port Master Plan by the Port District called out the small land area of Lindbergh Field and its downtown airport location adjacent to extensive urban development. These studies explored relocation alternatives and planned for an evaluation again in the mid-1990s.

The Airport Development Study in the late 1980s and the Immediate Action Plan in the mid-1990s studied constrained forecasts of passengers and operations based on the then average aircraft seating capacities and typical airline load factors. Each assessed growing passenger demand in San Diego County and the need for additional airport capacity to meet the long-term demand. Terminal improvements and additional aircraft gates were the immediate focus, while regional efforts were underway to study relocation of the Airport due to the limited capacity of the single runway.

In 2001, a Master Plan update for SDIA was completed but not adopted prior to the terrorist attacks of September 11, 2001. This Master Plan was based on demand forecasts prepared in 1998 and updated in 2001 during the middle and the end of the Dot-com and Telecom economic bubbles and subsequent economic fallout. The economic and travel downturn again reduced the immediate operational limitation of the single runway.

The most extensive previous forecast exercise for SDIA was completed in 2004 by SH&E, Inc. and was subsequently used to drive the planning and development of the Airport over the last decade. This was the first study prepared for the newly-created Airport Authority and it addressed both unconstrained demand forecasts and constrained activity forecasts. It informed the 2006 Site Selection Study and the 2008 Airport Master Plan.

D.2.3 Runway Demand-Capacity Analysis

Airport planners have long studied runway demand and capacity as a fundamental driver of airport facility requirements. Runways, like roadways, have finite capacity. The capacity of a runway is measured in terms of hourly, daily, and annual aircraft operations at an acceptable level of delay. Much like a roadway, as demand (the number of landings and takeoffs) increases, congestion ("delay") increases.

Airport planning studies use demand-capacity analysis to determine the limitations of existing runway infrastructure and assess the timing for construction of new or improved runway facilities necessary to accommodate growing demand. When airport facilities are limited by physical constraints that cannot be removed or remedied, the same analytical techniques can be used to predict the airport's operational limits.

D.2.4 FAA Capacity Analysis

The Federal Aviation Administration (FAA) studies airport capacity in the United States. Their goal is to "identify airports that are likely to need more capacity to accommodate anticipated growth in demand." These studies were conducted and documented by the Future Airport Capacity Task (FACT) reports. The results of the 2007 FAA FACT2 report state that SDIA will become constrained in approximately 2025 "even if all planned improvements are implemented;" and that "additional capacity enhancement is needed." The most recent report, FACT3, was published in 2015. The results of that study show that significant nationwide improvements in capacity have been made over the ten-year period from 2005 to 2015. These improvements were largely a result of the construction of 18 new runways and seven extended runways at 21 busy hub airports since 2000. However, SDIA is not one of the 21 airports with recent capacity improvements.

The FAA is also responsible for operating the United States airspace and air traffic control system and improvements have been made in the way air traffic is managed. These improvements are primarily based on the implementation of satellite-based air navigation to replace some functions of ground-based navigation. These improvements have enabled increased efficiency of arrivals and departures in and out of airports. Again, some technology and airspace improvements have helped to make SDIA operate more reliably relative to air traffic at other regional airports but these improvements have not increased the operational capacity of the single runway.

As part of the FACT3 process, FAA also published an Airport Capacity Profile for SDIA in May 2014 based on analysis completed by MITRE Corporation. The report states that SDIA's air traffic control (ATC) reported hourly rate of operations is 48, with a maximum model-estimated hourly throughput of 57 operations per hour during good "visual" weather. The higher model-estimated levels of traffic are rarely encountered and not sustained for more than a short period of time. This study also lacks an analysis of the congestion or delay level that flights would encounter at this level of operations to understand the real-world sustained throughput capacity of the runway. FAA's capacity profile for SDIA noted that these throughput rates are during visual conditions and that the lack of a full-length parallel taxiway on the north side of the runway could slightly reduce the reported capacity. When marginal or instrument weather conditions are present at SDIA, the model-estimated rate falls to 48 operations per hour, matching the ATC reported rate.

A key takeaway from the FAA's SDIA capacity profile is that ATC reports a maximum hourly throughput of 48 landings and takeoffs in all conditions. Further, the report does not anticipate that future enhancements in air traffic control and air navigation technology will improve these rates by more than approximately two percent. For SDIA to operate at a sustained rate of 48 to 50 operations per hour, one landing or takeoff would need to occur approximately every 72 to 75 seconds.

D.3 Constrained Facilities

San Diego International Airport is comprised of 661 acres of land. It is the smallest major airport in the United States. Further, the Airport is bounded by water, major roadways, dense urban development, and military facilities that would be exceedingly difficult and expensive to move or acquire. The limited real estate prevents the Airport from adding runway capacity. This section provides a review of the airport facilities that accommodate aircraft operations and describes how they work as a system. Each part is critical to the capacity of the overall system and a constraint in one part can limit the capacity of the entire system.

D.3.1 Runway

San Diego International Airport has one runway. Runway 9/27 is 9,401 feet long and is 200 feet wide. The single runway is the Airport's primary constraint.

There are a variety of variables that can affect the capacity of a runway. These variables include the runway length, width, pavement strength, orientation relative to prevailing winds, prevailing weather conditions, obstructions in the vicinity, and the fleet mix of aircraft using the airport.

Runway 9/27 is long enough, wide enough, and has enough strength to accommodate the fleet of aircraft serving US domestic air service and some limited long-haul international air service. The runway is oriented appropriately with the prevailing winds, and the region has excellent or marginal weather conditions more than 98% of the time, according to FAA's airport capacity profile report. San Diego International Airport is also served by a fleet of aircraft composed mostly of large, narrow body jet aircraft, which enables highly efficient use of the runway.

There is, however, a fundamental limitation to the number of landings and take-offs that can be accommodated in any given amount of time with a single runway. This limitation is primarily driven by the need to maintain in-trail separation between landing and departing airplanes.

FAA rules governing the separation of large jet aircraft dictate that large jet aircraft are separated by a minimum of three miles, when flying the final approach path to the Airport. The required separation results in a minimum time between operations of approximately 70 to 90 seconds. When the runway is operating at its maximum throughput rate, a plane lands or takes off every 72 seconds resulting in an hourly throughput limit of 50 operations.

It is very difficult to maintain this high level of ideal operational efficiency for more than 10 to 20 minutes at a time. It is not feasible to operate at the maximum throughput rate for extended periods of time for the following reasons:

- Aircraft are arriving at San Diego from all over the country and from other parts of the world. If flights are delayed at their originating airport, or enroute to San Diego, they will disrupt the timing of aircraft into the terminal airspace.
- This high degree of efficiency requires that aircraft land and quickly exit the runway to make room for the next plane to land. If a plane misses a runway exit and cannot efficiently leave the runway, the next landing aircraft may need to execute a missed approach to maintain safe separation. Missed approach procedures are conducted to ensure that that airport operations are conducted in a safe manner.
- Departing aircraft may be delayed at the gate for many reasons including late passengers, late cargo, or other complications with servicing.
- And, of course, once a plane is delayed, even if it is delayed at another airport, its schedule may be disrupted for the remainder of its flying day.

As noted earlier, the hourly throughput capacity of SDIA's single runway is approximately one landing or one take-off every 72 to 75 seconds. This is equivalent to about 50 operations per hour. Once there is a disruption introduced to the operation, delays will begin to accrue and continue building, until there is a break in the demand that allows operations to recover and return to normal flow.

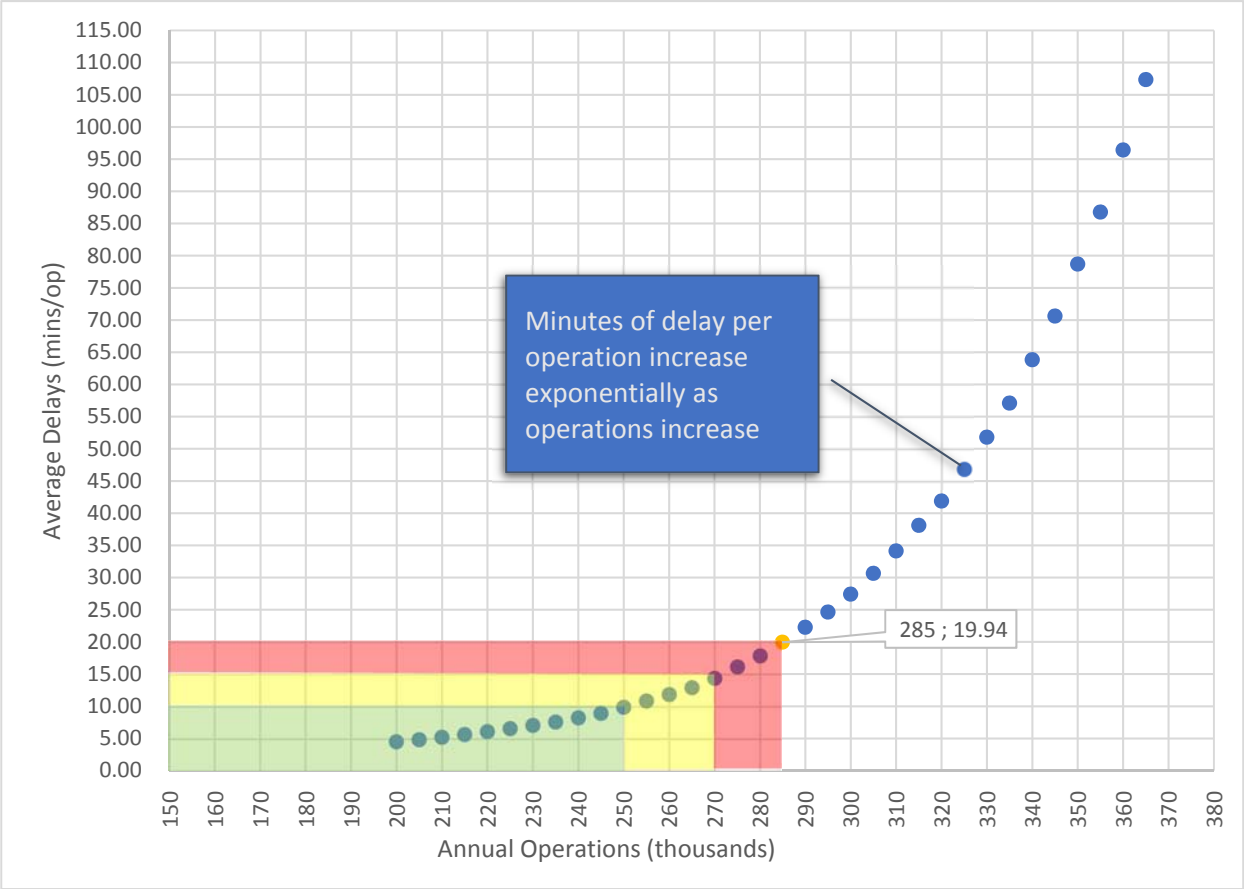
The Authority contracted SH&E, Inc. in 2004 to conduct a capacity and delay analysis for SDIA as part of an aviation activity forecast analysis. SH&E used a two-phased modeling approach. According to their technical report; "one phase of the analysis used models initially developed at the Massachusetts Institute of Technology (MIT) to assess the capacity and delay impacts of the Airport's most limiting constraint, its single runway. The other phase of the analysis used a high-level-of-detail simulation, SIMMOD, to analyze

airspace, runway, taxiway, and gate congestion." The analysis of SDIA's runway capacity completed in 2004 remains valid, today because the operational variables have changed only minimally.

The results of the modeling analysis completed in 2004 show that the Airport continues to operate with relatively moderate delay levels up to about 250,000 annual operations. Average annual all-weather delays exceed ten minutes per operation at 250,000 annual operations. Delays continue increasing rapidly reaching nearly 20 minutes per operation when demand reaches 285,000 annual operations. Figure D-1 depicts the relationship between growing annual operations at SDIA to the measured minutes per operation of average, all-weather delays**.

** "All-Weather" conditions refer to the weighted average percentage of time with cloud height and visibility conditions that dictate specific air traffic control operating rules at an airport. These conditions range from visual meteorological conditions (VMC or weather conditions that allow pilots to navigate by seeing and avoiding other air traffic and potential obstructions), marginal VMC (below visual conditions minima but better than instrument conditions) and instrument meteorological conditions (IMC or weather conditions that require exclusive use of instrument equipment and procedures for navigation).

Figure D-1
ANNUAL RUNWAY-RELATED DELAYS UNDER ALL WEATHER CONDITIONS
San Diego International Airport



Sources: SH&E, Inc., Final San Diego International Airport Aviation Activity Forecasts, San Diego County Regional Airport Authority, June 2004
Johnson Aviation, Inc. analysis, 2019

Figure D-1 demonstrates that once demand exceeds capacity, delays (as measured in minutes per operation) increase exponentially for each additional operation. The FAA has studied airport runway capacity for decades and has established policy guidance for planners to perform benefit cost analysis for construction of new runway infrastructure. While no new runway infrastructure is being contemplated at SDIA, it is helpful to review and consider FAA's policy guidance:

> Airports experiencing severe delay due to congestion will not be able to accommodate rising demand for air service. Average delay per operation of 10 minutes or more may be considered severe. At 20 minutes [of] average delay (approximately the highest recorded average delay per operation known to FAA at an airport in the U.S.), growth in operations at the airport will largely cease. Prior to reaching these levels, airlines would begin to use larger aircraft, adjust schedules, and cancel or consolidate flights during peak delay periods. Passengers would make use of alternative airports, seek other means of transportation (e.g., automobile or train), or simply avoid making some trips ††.

The following are findings from the 2004 SH&E, Inc. integrated modeling approach completed as part of the San Diego Aviation Activity Forecast and the extensive capacity and delay analysis performed as part of that study:

- Growth in good-weather and all-weather delays begins to accelerate rapidly as demand moves towards a level of 260,000 annual operations. Even prior to reaching this point, infrastructure improvements would be beneficial, particularly given the low-cost carrier presence at SDIA and their focus on maintaining efficient operations and high levels of aircraft utilization.
- As flight activity grows beyond 260,000 annual operations, runway-related delays average more than 10 minutes per flight across all weather conditions. During Instrument Flight Rules (IFR) weather conditions, which occur 29 percent of the time, runway-related delays will average more than 28 minutes per flight. This level of runway congestion and delay is expected to limit the Airport's ability to fully accommodate growth in underlying demand. At this point, additional runway capacity is required.
- At 300,000 annual operations, severe runway congestion will virtually eliminate further growth.
- The single runway is clearly the most limiting constraint at SDIA, and the most likely to have an impact on future growth in demand.

For preparing this constrained demand scenario, SDIA's hourly runway throughput is set at 50 operations. This ensures that the forecast of aviation activity reflects an activity level that may be achieved at SDIA albeit with potentially severe operational delays at these sustained activity levels. The hourly throughput limitation is established based on:

- The FAA guidance on preparation of benefit cost analysis for runway infrastructure projects;
- The integrated modeling analysis previously completed for SDIA and updated for current activity levels that demonstrates SDIA's delay levels exceeding 20 minutes at about 285,000 annual operations;

†† It should be noted that these are average delay savings per operation, and reflect the averaging of minimal delays in non-peak hours with very long delays at peak hours. Passengers and airlines will react first to the excess delays at peak hours. FAA Benefit-Cost Analysis Guidance, 1999, Update 2010.

- Interviews conducted with the SDIA Chief of Airport Operations and the FAA Air Traffic Control Tower Chief at SDIA; and
- Reviews of operations parameters including airfield layout, fleet mix, weather, and airspace.

D.3.2 Taxiway System

Taxiways connect terminal, cargo, and aircraft servicing facilities to the runway system. SDIA has a full-length taxiway parallel to Runway 9/27 on the south side of the runway called Taxiway B. Taxiway B connects the passenger airline terminal facilities to Runway 9/27.

Taxiway C is located north of and parallel to Runway 9/27 but only extends along the eastern half of the runway. The lack of a full-length parallel taxiway on the north side of the runway presents an operational challenge. When cargo and general aviation aircraft land on Runway 27, they have about 3,350 feet of runway to slow down and exit the runway to the north on Taxiway C5. If these landing aircraft cannot slow down and exit at Taxiway C5 they must exit to the south toward Taxiway B and taxi back to the east to cross Runway 9/27 to reach the cargo and general aviation facilities. Each time one of these operations occurs, Air Traffic Control must provide enough separation between landing and takeoff operations to enable the taxing aircraft to cross the runway. This interruption to the flow of landings and takeoffs can result in additional operational delays.

There is no plan to extend Taxiway C due to a lack of available land.

D.3.3 Terminal/Aircraft Gates

Aircraft gates are parking positions that are used while passengers enplane and deplane. SDIA currently has 51 gates with T1, T2 East, and T2 West having 19, 13, and 19 gates, respectively. Terminal 1 is the oldest existing terminal facility having opened in 1967 and needs replacement to provide a level of customer service equivalent to that provided at Terminal 2 West, SDIA's newest terminal facility that was built in 1998 and expanded in 2014.

The Airport proposes to replace Terminal 1 with a new terminal that would replace the 19 existing Terminal 1 gates and provide eleven additional gates. The proposed terminal facilities will provide a higher-level of customer service, provide more efficient security screening facilities that meet current standards, provide additional concessions opportunities for passengers, and relocate aircraft gates south to provide more efficient taxing of aircraft near the new terminal facility.

D.4 Market Responses

Passengers and airlines will likely respond to increased congestion through several mechanisms that will enable SDIA to accommodate growing passenger demand at an operationally limited facility. The mechanisms available to the airlines, to the Airport, and to the flying public are summarized below.

D.4.1 Flight Scheduling Adjustments (De-peaking)

Airline schedules at most airports are peaked. This means that there are periods of the day with a lot of activity followed by periods of the day with lower levels of activity. This contrast is most obvious between day and night and reflect the desire of most people to fly during the day. Even within the course of the day, there are periods of high and low activity. At SDIA there is a very busy period of activity between about 9 AM and 11 AM. This period is busy, because it reflects a time of day that many people prefer to fly east to arrive at these airports before it is excessively late.

Even today, SDIA is operating near its maximum throughput rate between the hours of 9 AM and 11 AM. There is little available capacity for airlines to schedule additional departures during this period. Therefore,

airlines will schedule additional activity during earlier or later periods, when activity levels at SDIA are not as congested.

This solution is available until SDIA is operating at or near its capacity for the duration of its operating day.

It is essential to note that SDIA has a curfew that prohibits departures between the hours of 11:30 PM and 6:30 AM. For this reason, SDIA has fewer "red-eye" flights to eastern airports than its west coast peer airports. It is assumed that SDIA's curfew will remain in effect in the future and that there will be no additional scheduled flights that depart the gate after 11:15 PM or before 6:15 AM or departing flights during the hours of 11:30 PM and 6:30 AM.

D.4.2 Fleet Mix Adjustments

Airlines may choose to change the aircraft they use to serve SDIA to better serve demand. Most airlines fly a range of aircraft types that vary in size. As demand increases at SDIA, airlines may choose to use larger aircraft to serve selected markets in lieu of adding additional flights.

SDIA is already characterized by a homogeneous fleet of aircraft in that about 82% of flights are narrow-body jet aircraft in the Boeing 737 and 757 families and the Airbus A320 family.

Airlines are faced with some limitations in their ability to serve one airport with larger aircraft despite the full range of aircraft in their fleet. Limitations include the fact that most airlines serve domestic routes with exclusively narrow-body aircraft while wide-body aircraft are used almost exclusively on international routes. Further, airlines use aircraft for twenty years or more and generally do not purchase aircraft with the intent to serve a single market.

As demand and congestion increase and airlines still desire to add capacity during peak periods, they will substitute larger narrow-body aircraft to serve demand. For example, an airline that serves SDIA on a route with a Boeing 737-700 may use a Boeing 737-800 in the future. The 737-700 provides 143 seats in a single-class layout while the 737-800 provides 175 seats. Switching from an Airbus A320 with 150 seats to an Airbus A321 with 181 seats would provide 31 additional seats per flight.

The constrained demand scenario analysis anticipates that airlines will serve markets from SDIA with larger narrow-body aircraft and that average seats per departure will increase from about 155 seats to 175 seats as the Airport becomes increasingly constrained.

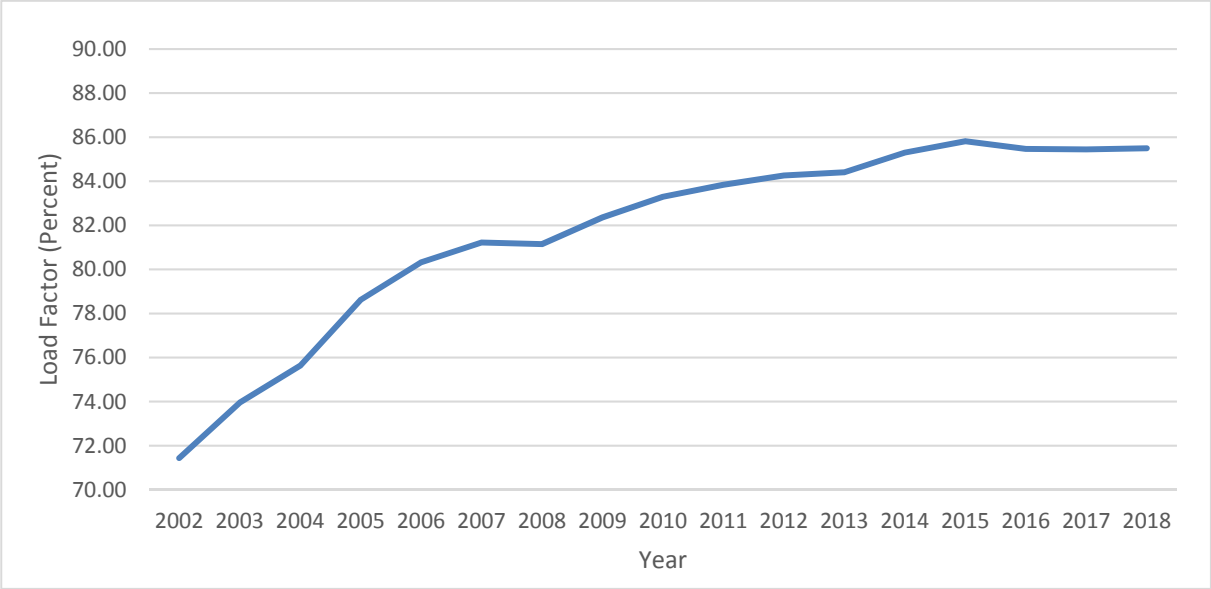
D.4.3 Increasing Load Factor

Load factor is a measure of the percent of occupied seats relative to the percent of available seats. If an airplane departs with 100 available seats and 80 are occupied by passengers, the aircraft has a load factor of 80%.

As demand increases and airlines cannot add flights or increase aircraft size, more of the available seats will be occupied reflective of increased demand. As shown in Figure D-2, Airline load factors in the United States of steadily increased from about 72 percent in 2002 to nearly 86 percent in 2018. Since 2015, however, the rise in load factors has stabilized and plateaued reflecting the reality that is very difficult for every available seat to be occupied on every departing flight.

SDIA already has relatively high load factors compared to its peer airports. In 2017, SDIA's average load factors exceeded 86%. The constrained demand analysis estimates that SDIA's average load factors will increase to 90%.

Figure D-2
US LARGE HUB AIRPORT DOMESTIC LOAD FACTOR
CY 2002 to CY 2018



Sources: US Department of Transportation, Bureau of Transportation Statistics, 2019
Johnson Aviation, Inc. analysis, 2019

D.4.4 Seat Pricing

Basic economic theory concludes that price is a product of supply and demand. As SDIA becomes increasingly congested the demand for air service will steadily outpace the supply of available seats. Airlines are likely to steadily increase fares as a result. This constrained facilities analysis and resulting constrained demand scenario does not evaluate the effect of rising prices on demand for air service at SDIA, but does acknowledge that higher fares are a likely result of increasing congestion at SDIA. The assumption is that airlines, as profit-motivated entities, will balance supply and demand over time to maintain pricing power and to maximize revenue per seat (yield).

D.4.5 Policy

Federal and local agencies may also introduce policies to address an increase in demand that leads to severe congestion. FAA has the authority to and has implemented controls at highly congested airports in New York that limit the number of permitted scheduled operations in a given hour or 30-minute period. New York LaGuardia Airport is limited to 71 hourly operations. If delays at SDIA reached excessive levels as determined by FAA, it would have the right to impose operational and scheduling restrictions on flights to and from SDIA to combat excessive delays.

The San Diego County Regional Airport Authority (SDCRAA) has some limited discretion to enact policies that encourage airlines to schedule flights in a manner that avoids excessive delays. However, there are strict limitations to the SDCRAA's ability to unilaterally impose restrictions under FAA Grant Assurances for public use airports. The SDCRAA's policy approach would require coordination with the airlines, along with their approval, to enact scheduling policies that prevent excessive delays.

Appendix E

2012 ADP Forecast Report

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LandUse USA
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TECHNICAL MEMORANDUM – AVIATION DEMAND FORECASTS

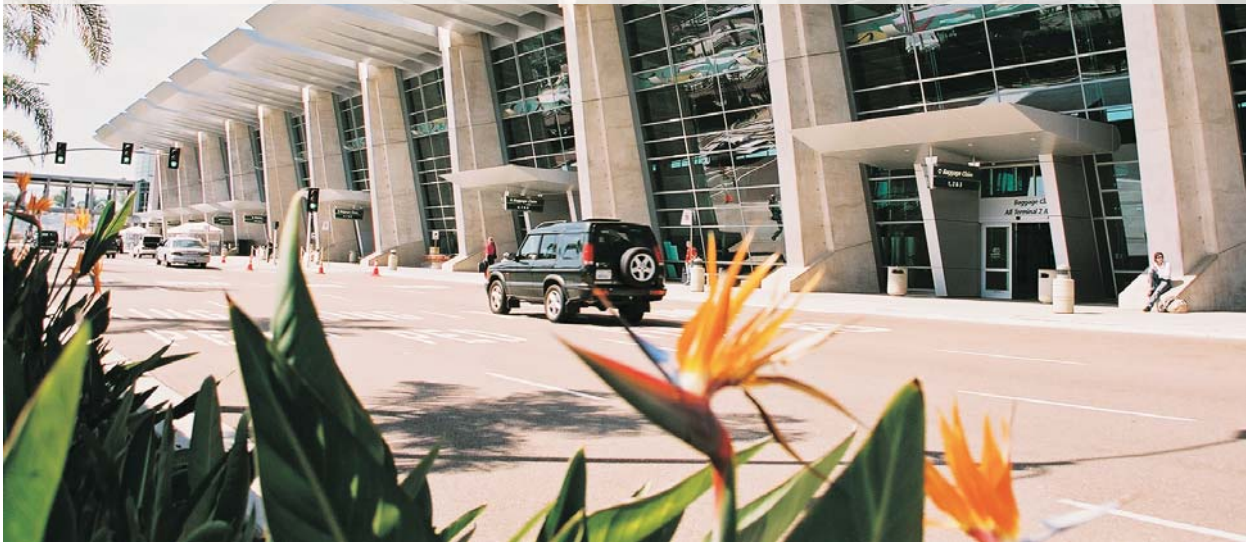
AIRPORT DEVELOPMENT PLAN

San Diego International Airport

Prepared for

San Diego County Regional Airport Authority
San Diego, CA

March 2013



SDIA AIRPORT DEVELOPMENT PLAN

SAN DIEGO INTERNATIONAL AIRPORT

Leigh | Fisher

TECHNICAL MEMORANDUM – AVIATION DEMAND FORECASTS

AIRPORT DEVELOPMENT PLAN

San Diego International Airport

Prepared for

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SDIA AIRPORT DEVELOPMENT PLAN

SAN DIEGO INTERNATIONAL AIRPORT

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CONTENTS

Chapter		Page
1	INTRODUCTION AND SUMMARY	1
	Forecast Process and Approach	1
	Enplaned Passengers	2
	Air Cargo	3
	Aircraft Operations	4
	Airport Service Region	5
	Airport Role	7
	Large Origin-Destination Passenger Base	7
	Primary Commercial Service Airport in San Diego County	7
	Twelfth Busiest Southwest Airlines Airport	9
2	ECONOMIC BASIS FOR AVIATION DEMAND	10
	Socioeconomic Trends	10
	Population	10
	Employment	10
	Unemployment Rates	12
	Income	13
	Nonagricultural Employment by Industry Sector	13
	San Diego Industry Clusters	15
	Major Employers	16
	Regional Housing Market	18
	Tourism	19
	Economic Outlook	20
	Global Economy	20
	U.S. Economy	20
	California Economy	21
	San Diego Economy	22
	Risks to the Economic Outlook	22
	Economic Basis for Forecast Aviation Demand	23
3	HISTORICAL PASSENGER AIRLINE TRAFFIC	24
	Airlines Serving San Diego International Airport	24
	Enplaned Passengers	25
	Domestic and International Passengers	25
	Originating Passengers and Airfares	27
	Airline Market Shares And Passenger Service	27
	Origin-Destination Markets	30
	Airfares For Domestic Origin-Destination Markets	32
	Monthly Airline Traffic	32
	Monthly Enplaned Passengers	32
	Monthly Scheduled Departing Seats	32
	Monthly Passenger Airline Aircraft Landings	32
	Monthly Enplaned Passenger Load Factor	32

CONTENTS *(continued)*

Chapter		Page
4	HISTORICAL AIR CARGO	38
	Historical Air Cargo Trends	38
	Airline Shares Of Air Cargo	40
	Monthly Air Cargo	40
	Monthly All-Cargo Airline Aircraft Landings	40
5	HISTORICAL AIRCRAFT OPERATIONS	43
	Air Carrier	43
	Air Taxi and Commuter	43
	General Aviation	45
	Military	45
	Monthly Aircraft Operations	45
6	AVIATION DEMAND FORECASTS	47
	Enplaned Passengers	47
	Forecast Approach and Methodology	47
	Enplaned Passenger Forecast Assumptions	53
	Estimated Enplaned Passengers in 2012	54
	Enplaned Passenger Forecasts	54
	Air Cargo	57
	Forecast Approach and Methodology	57
	Estimated Air Cargo in 2012	60
	Air Cargo Forecasts	60
	Aircraft Operations	63
	Forecast Approach and Methodology	63
	Forecast Assumptions	63
	Estimated Aircraft Operations in 2012	65
	Passenger Airline Aircraft Operations Forecasts	65
	All-Cargo Airline Aircraft Operations Forecasts	65
	General Aviation Aircraft Operations Forecasts	67
	Military Aircraft Operations Forecasts	68
	Total Aircraft Operations Forecasts	68
7	COMPARISON WITH THE FAA 2011 TAF	69
8	FORECASTS OF PEAK PERIOD DEMAND AND PASSENGER AIRLINE AIRCRAFT FLEET DISTRIBUTION	72
	Forecast Approach and Methodology	72
	Peak Period Demand Forecasts	72
	Aircraft Fleet Forecasts	78

TABLES

		Page
1	Southern California Population	5
2	Originating Passengers at Busiest U.S. Airports	8
3	Historical and Projected Socioeconomic Data	11
4	Comparative Unemployment Rates	12
5	Major Employers in San Diego County	17
6	San Diego County Visitors and Conventions	19
7	Historical and Projected GDP Growth by World Region	21
8	Airlines Serving San Diego	24
9	Historical Enplaned Passengers	26
10	Airline Market Shares of Enplaned Passengers	28
11	Nonstop Airline Service as OF July 2012	30
12	Historical Domestic Originating Passengers by Market in 2011	31
13	Average Domestic One-Way Airfares by Market in 2011	33
14	Historical Enplaned Passengers by Month	34
15	Historical Scheduled Departing Seats by Month	35
16	Historical Passenger Airline Aircraft Landings by Month	36
17	Historical Air Cargo (in tons)	39
18	Historical Air Cargo by Month	41
19	Historical All-Cargo Airline Landings by Month	42
20	Historical Aircraft Operations	44
22	Enplaned Passenger Forecasts – Baseline	56
23	Air Cargo Forecasts – Baseline (in tons)	62
24	Assumptions for Aircraft Operations Forecasts – Baseline	64
25	Aircraft Operations Forecasts– Baseline	66
26	FAA TAF Forecast Comparison (2011 – 2026)	70
27	Summary of SDIA ADP Forecasts Using FAA Template	71
28	Historical and Forecast Peak Period Demand – Baseline	73
29	ADPM Percent Distribution of Passenger Airline Aircraft Operations – Baseline	79

FIGURES

		Page
1	Historical and Forecast Enplaned Passengers	2
2	Historical and Forecast Air Cargo	3
3	Historical and Forecast Total Aircraft Operations	4
4	Airport Service Region	6
5	Primary Residence of Passengers	7
6	Southwest Airlines Top 20 Busiest Airports	9
7	Monthly Unemployment Rates	13
8	Comparative Distribution of Nonagricultural Employment	15
9	San Diego Industry Cluster Employment in 2011	16
10	Percent Change in Home Prices	18
11	Enplaned Passengers at San Diego International Airport	25
12	Domestic Originating Passengers and Airfares	27
13	Airline Shares of Enplaned Passengers in 2011	29
1 4	Enplaned Passenger Load Factor	37
15	Historical Air Cargo Trends	38
16	Airline Shares of Air Cargo in 2011	40
17	Historical Aircraft Operations	45
18	Unconstrained Forecast Approach	48
19	Historical Trend Analysis – Domestic Enplaned Passengers	49
20	Historical Trend Analysis – International Passengers	50
21	Economic Variables Historical and Predicted Domestic Originating Passengers	51
22	Cost of Travel Variables Historical and Predicted Domestic Originating Passengers	52
23	Representative Model Historical and Predicted Domestic Originating Passengers	53
24	Historical and Forecast Enplaned Passengers	55
25	Historical Trend Analysis – Air Cargo	57
26	Economic Variables Historical and Predicted Air Freight	59
27	Representative Model Historical and Predicted Air Freight	60
28	Historical and Forecast Air Cargo	61
29	Historical and Forecast Aircraft Operations	68
30	Distribution of Passenger Airline Scheduled Operations by Hour in July 2012	74
31	Arrivals and Departures by Hour in July 2012	75
32	Future Schedule Development	76
33	Baseline Forecast Distribution of Passenger Airline Scheduled Operations by Hour	77
34	Baseline Forecast Distribution of Passenger Airline Arrivals and Departures by Hour	78

CHAPTER 1
INTRODUCTION AND SUMMARY

This technical memorandum presents forecasts of aviation activity in support of the Airport Development Plan (ADP) for San Diego International Airport (the Airport or SDIA). The forecasts presented in this memorandum are "unconstrained" and, therefore, do not include specific assumptions about physical, regulatory, environmental or other impediments to aviation activity growth. The baseline unconstrained forecasts are the "preferred" forecasts recommended for FAA approval. Forecasts of aviation activity are presented for enplaned passengers, air cargo, and aircraft operations, including passenger, all-cargo, general aviation, and military operations. Using calendar year 2011 as the base year, annual forecasts were prepared for five future demand years—2016, 2021, 2026, 2031, and 2050. In addition, aviation activity for 2012 was estimated based on year to date activity (January through May 2012) available when this report was prepared.

FORECAST PROCESS AND APPROACH

The SDIA Airport Development Plan forecasts were prepared using a collaborative process which included: (1) a review of previous forecasts prepared for the Airport, including SDIA planning forecasts prepared in 2007 and the Federal Aviation Administration (FAA) 2011 Terminal Area Forecasts (TAF) for the Airport; (2) the collection and analysis of data related to the key issues and trends affecting future aviation demand at SDIA and the San Diego region; (3) the development of statistical models to identify historical causal factors; (4) a review of passenger traffic for the airports in the Los Angeles Basin; and (5) coordination with representatives of the San Diego County Regional Airport Authority and the FAA.

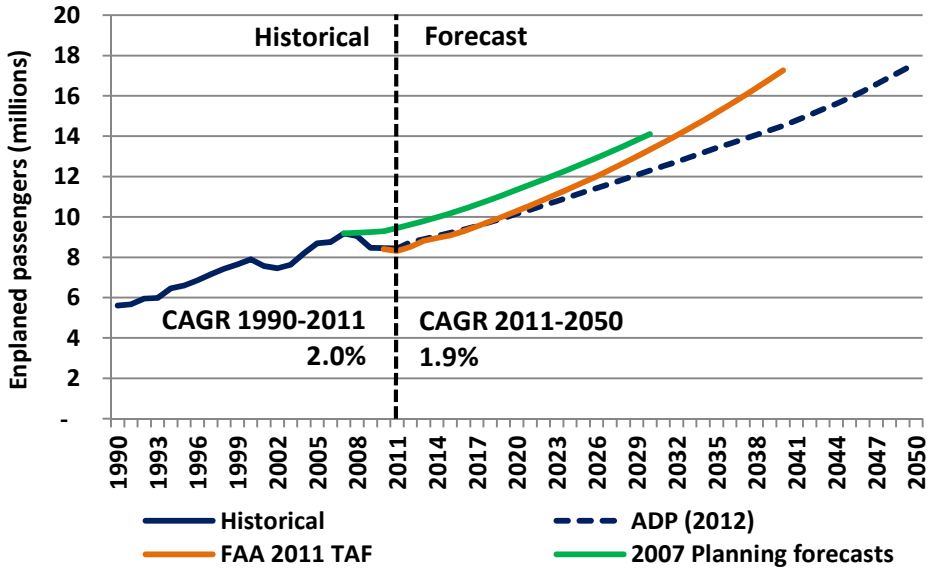
The approach used in developing forecasts for SDIA included consideration of the Airport service region and the role of the Airport in providing commercial passenger service and recent trends in airline service development at the Airport. In particular:

- The enplaned passenger forecasts were developed using a variety of analytical tools, including trend analysis, regression models, and market share analysis, to address the key components of aviation activity. In addition, recent airline service development at the Airport was considered in the preparation of the passenger forecasts.
- The air cargo forecasts were developed based on a review of the recent trends, an evaluation of key components of air cargo activity (i.e., enplaned and deplaned cargo (freight and mail) for all-cargo and passenger airlines), and domestic and international sectors.
- The aircraft operations forecasts were derived from the forecasts of passenger and cargo activity for the Airport. Forecasts of aircraft operations were developed by (1) disaggregating the total demand into the components (i.e., domestic and international, mainline (air carrier) and regional affiliate) and (2) making assumptions about average aircraft size in terms of seats per departure and average enplaned passenger load factors (percentage of seats occupied, on average) for future years. In addition, the future aircraft fleet plans of the airlines serving SDIA were also considered based on available information.

ENPLANED PASSENGERS

Figure 1 presents historical enplaned passengers for 1990 through 2011 and forecasts for 2012 through 2050, compared with the FAA 2011 TAF for the Airport. The ADP enplaned passenger forecasts are based on 2011 data and are within 1.0% of the FAA 2011 TAF in 2016 and 1.9% in 2021*. The enplaned passenger average growth rate of 1.9% per year between 2011 and 2050 is lower than the rate forecast by the FAA in its 2011 TAF for the Airport—an average of 2.4% per year from Federal Fiscal Year (FFY) 2010 to FFY 2040.** A detailed comparison of the ADP enplaned passenger forecasts and the FAA 2011 TAF is presented in Chapter 7.

Figure 1
HISTORICAL AND FORECAST ENPLANED PASSENGERS
San Diego International Airport



Note: The forecasts presented in this figure were prepared using the information and assumptions given in the accompanying text. Inevitably, some of the assumptions used to develop the forecasts will not be realized and unanticipated events and circumstances may occur. Therefore, there are likely to be differences between the forecast and actual results, and those differences may be material.

CAGR = Compound average annual growth rate

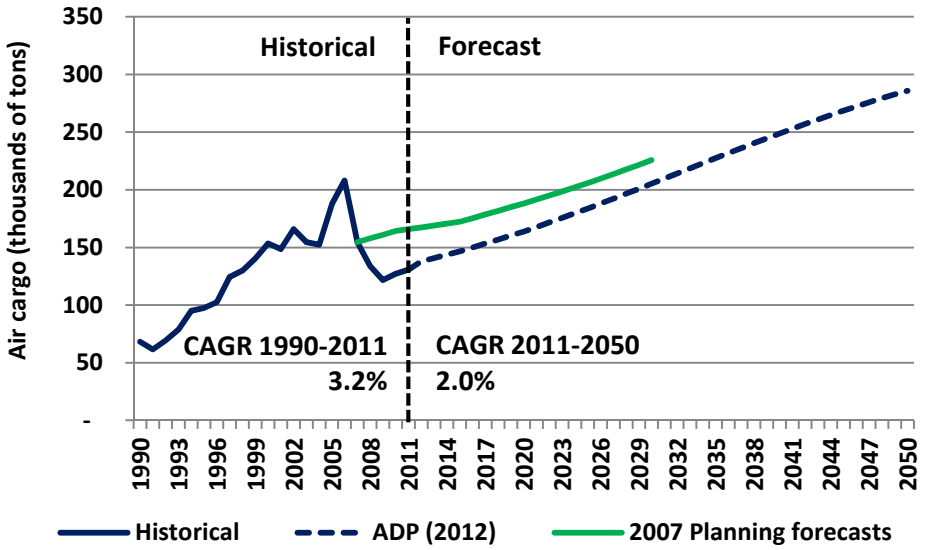
Sources: Historical: San Diego County Regional Airport Authority records.
ADP Forecast: LeighFisher, July 2012.
FAA 2011 TAF: U.S. Department of Transportation, Federal Aviation Administration, www.faa.gov.
2007 Planning forecasts: Destination Lindbergh: The Ultimate Build-Out, San Diego International Airport, *Aviation Activity Forecast*, August 2008.

*U.S. Department of Transportation, Federal Aviation Administration, *Forecasting Aviation Activity by Airport*, July 2001, and *Review and Approval of Aviation Forecasts*, June 2008, http://www.faa.gov
**The Federal Fiscal Year begins on October 1 and ends on September 30.

AIR CARGO

Figure 2 presents historical air cargo (in pounds) for 1990 through 2011 and forecasts for 2012 through 2050. (The FAA does not prepare cargo forecasts for individual airports as part of the TAF.) Since 2000, the cargo industry nationwide and at SDIA has experienced significant changes related to: (1) air cargo security regulations by the FAA and Transportation Security Administration (TSA); (2) consolidation in the air cargo industry; (3) an increasing trend in the volume of cargo transported by truck; (4) the national and global economic recessions; (5) use of all-cargo carriers by the U.S. Postal Service to transport mail; and (6) increased use of mail substitutes (e.g., email). Total cargo (enplaned and deplaned air freight and mail) is forecast to increase an average of 2.0% per year at the Airport as shown on Figure 2.

Figure 2
HISTORICAL AND FORECAST AIR CARGO
San Diego International Airport



Note: The forecasts presented in this figure were prepared using the information and assumptions given in the accompanying text. Inevitably, some of the assumptions used to develop the forecasts will not be realized and unanticipated events and circumstances may occur. Therefore, there are likely to be differences between the forecast and actual results, and those differences may be material.

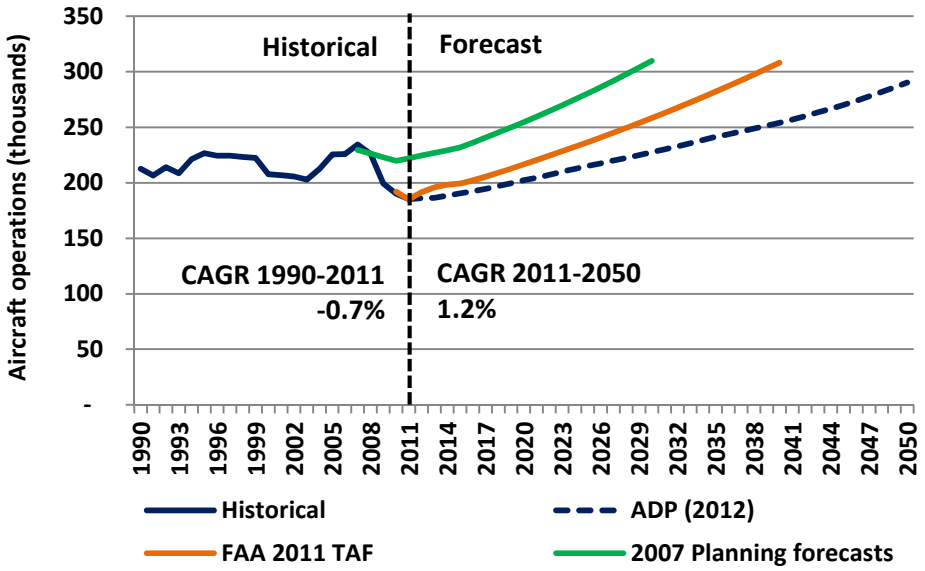
CAGR = Compound average annual growth rate
Includes enplaned and deplaned air freight and mail.

Sources: Historical: San Diego County Regional Airport Authority records.
ADP Forecast: LeighFisher, July 2012.
2007 Planning forecasts: Destination Lindbergh: The Ultimate Build-Out, San Diego International Airport, *Aviation Activity Forecast*, August 2008.

AIRCRAFT OPERATIONS

Figure 3 presents historical total aircraft operations for 1990 through 2011 and forecasts for 2012 through 2050, compared with the FAA 2011 TAF for the Airport. (Total aircraft operations include air carrier, air taxi and commuter, general aviation, and military takeoffs and landings.) The aircraft operations forecasts are based on 2011 data and are within 3.3% of the FAA 2011 TAF in 2016 and 5.8% in 2021. The forecast average growth rate in total aircraft operations of 1.2% per year between 2011 and 2050 is lower than the rate forecast by the FAA in its 2011 TAF for the Airport—an average of 1.6% per year from FFY 2010 to FFY 2040. A detailed comparison of the ADP aircraft operations forecasts and the FAA 2011 TAF is presented in Chapter 7.

Figure 3
HISTORICAL AND FORECAST TOTAL AIRCRAFT OPERATIONS
San Diego International Airport



Note: The forecasts presented in this figure were prepared using the information and assumptions given in the accompanying text. Inevitably, some of the assumptions used to develop the forecasts will not be realized and unanticipated events and circumstances may occur. Therefore, there are likely to be differences between the forecast and actual results, and those differences may be material.

CAGR = Compound average annual growth rate

Sources: Historical: San Diego County Regional Airport Authority records.
ADP Forecast: LeighFisher, July 2012.
FAA 2011 TAF: U.S. Department of Transportation, Federal Aviation Administration, www.faa.gov.
2007 Planning forecasts: Destination Lindbergh: The Ultimate Build-Out, San Diego International Airport, *Aviation Activity Forecast*, August 2008.

AIRPORT SERVICE REGION

The primary area of the Airport service region, both in terms of population and geography, is San Diego County, as shown on Figure 4. In 2011, the population of San Diego County was 3.1 million as shown in Table 1. Because economic growth and activity within the primary area stimulate a significant portion of passenger demand at the Airport, statistics for San Diego County were used to evaluate aviation activity trends at the Airport.

The secondary area served by the Airport, which includes many of the counties surrounding San Diego County, is defined by the location of and driving distance to other air carrier airports, as well as by the availability, price, and quality of airline service at those other airports. San Diego County is part of the southern California region which includes five airports in the Los Angeles Basin. Los Angeles International Airport, a large-hub airport and international gateway with an average of 757 daily departures, is located approximately 125 road miles north of SDIA. The airports located in Burbank (Bob Hope), Ontario, and Orange County are medium-hubs with an average of 73, 68, and 113 daily departures, respectively, in 2011. Long Beach Airport is a small-hub airport (105 miles north) providing an average of 42 daily departures in 2011. Each of the 5 Los Angeles Basin airports is served by low cost carriers, including JetBlue, Southwest, and Frontier airlines.

Table 1
SOUTHERN CALIFORNIA POPULATION

		2011	
Metropolitan Statistical Area	County	Population	Percent of total
San Diego-Carlsbad-San Marcos MSA	**San Diego**	**3,140,069**	**13.7%**
Los Angeles-Long Beach-Santa Ana MSA	Los Angeles	9,889,056	43.1
	Orange	3,055,745	13.3
Subtotal		12,944,801	56.4%
Riverside-San Bernardino-Ontario MSA			
	San Bernardino	2,065,377	9.0%
	Riverside	2,239,620	9.8
Subtotal		4,304,997	18.8%
Bakersfield MSA	Kern	851,710	3.7%
Oxnard-Thousand Oaks-Ventura MSA	Ventura	831,771	3.6
Santa Barbara-Santa Maria-Goleta MSA	Santa Barbara	426,878	1.9
San Luis Obispo-Paso Robles MSA	San Luis Obispo	271,969	1.2
El Centro MSA	Imperial	77,057	0.8
Southern California region		22,949,252	100.0%

MSA = Metropolitan Statistical Area

Source: U.S. Department of Commerce Bureau of the Census, www.census.gov, accessed May 2012.

Road miles from San Diego to:

Burbank	133
Long Beach	105
Los Angeles	125
Ontario	115
Santa Ana	89

Figure 4
AIRPORT SERVICE REGION
San Diego International Airport
November 2012
LeighFisher

AIRPORT ROLE

The role of an airport is important in evaluating the domestic and international components of aviation activity and preparing forecasts. San Diego International Airport has an important role in the national, state, and local air transportation systems. SDIA is a large-hub airport* as defined by the FAA and is the 28th busiest airport in the United States, in terms of total passengers (enplaned plus deplaned). The ADP forecasts were developed with consideration of the Airport's (1) large origin and destination (O&D) passenger base, (2) role as the primary commercial service airport in San Diego County, and (3) role as the twelfth busiest airport for Southwest Airlines.

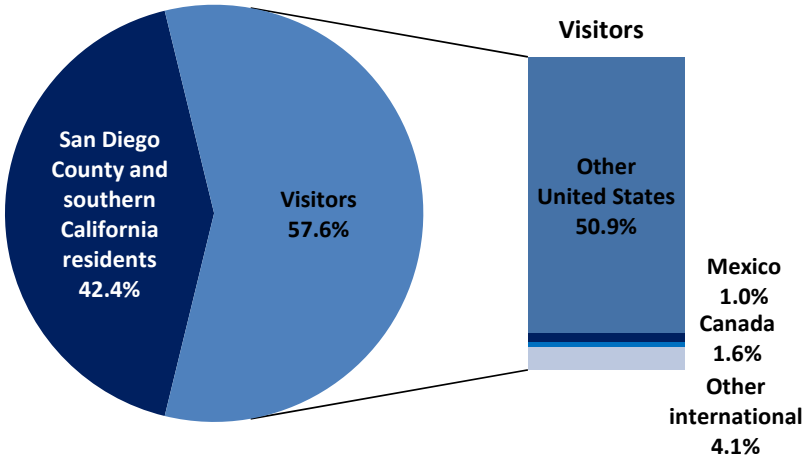
Large Origin-Destination Passenger Base

The Airport's large O&D passenger base is related to the strength of the San Diego economy and supports service development by Southwest Airlines and the other airlines serving the Airport. SDIA is the 19th busiest airport in the United States, in terms of origin and destination passengers (O&D), as shown in Table 2. The Airport's large O&D passenger base is related to the strength of the San Diego economy and tourism. The flights of 8.03 million passengers originated from the Airport in 2011 (i.e., these originating passengers did not connect with another flight at the Airport).

Primary Commercial Service Airport in San Diego County

SDIA is the primary commercial service airport in San Diego County, with 8.4 million enplaned passengers in 2011. SDIA had an average of 241 scheduled daily aircraft departures in August 2012 to a total of 44 destinations, 36 domestic and 8 international. According to a passenger survey conducted in 2012 as part of the ADP, San Diego County and southern California residents accounted for 42.4% of SDIA passengers in 2012, while the remaining 57.6% were visitors, as shown on Figure 5.

Figure 5
PRIMARY RESIDENCE OF PASSENGERS
San Diego International Airport



Source: 2012 Passenger Intercept Survey, San Diego International Airport, July 2012.

*As defined by the FAA, a large hub airport accounts for 1% or more annual U.S. enplaned passengers. www.faa.gov.

Table 2
ORIGINATING PASSENGERS AT BUSIEST U.S. AIRPORTS

2011 Rank	City (airport)	Total O&D passengers (millions) *(a)*			Average annual percent increase (decrease)	
		2000	2007	2011	2000-2007	2007-2011
1	Los Angeles (International)	22.9	23.2	22.9	0.2%	(0.3)%
2	New York (Kennedy)	12.5	18.6	18.6	5.9	0.0
3	Orlando (International)	13.5	16.6	16.1	3.0	(0.8)
4	Las Vegas	13.9	18.4	16.7	4.1	(2.3)
5	San Francisco	14.3	12.6	15.3	(1.8)	4.9
6	Atlanta	15.9	15.5	13.8	(0.3)	(2.9)
7	Chicago (O'Hare)	15.3	17.2	14.8	1.6	(3.7)
8	Boston	11.8	13.1	13.4	1.4	0.6
9	Denver	9.3	12.7	13.0	4.7	0.5
10	Seattle-Tacoma	10.1	11.7	11.7	2.0	(0.0)
11	Newark	13.1	13.8	11.8	0.8	(3.8)
12	New York (LaGuardia)	11.0	11.5	11.0	0.7	(1.2)
13	Dallas/Fort Worth	11.3	12.0	10.9	0.9	(2.5)
14	Phoenix (Sky Harbor)	10.5	12.6	10.5	2.7	(4.4)
15	Fort Lauderdale-Hollywood	7.4	10.6	10.4	5.3	(0.5)
16	Miami	9.5	9.2	10.1	(0.5)	2.4
17	Baltimore/Washington	7.7	8.5	8.2	1.4	(1.0)
18	Minneapolis-Saint Paul	8.0	8.6	8.3	0.9	(0.8)
19	**San Diego**	**7.4**	**8.8**	**8.0**	**2.5**	**(2.2)**
20	Philadelphia	6.7	9.6	7.7	5.1	(5.4)
21	Detroit	8.3	8.9	7.7	1.0	(3.6)
22	Tampa	7.1	8.7	7.6	3.0	(3.4)
23	Houston (Bush)	6.5	8.9	7.5	4.5	(4.1)
24	Washington (Reagan)	6.1	7.4	7.4	2.9	(0.1)
25	Honolulu	8.3	8.4	7.0	0.1	(4.6)
26	Washington (Dulles)	4.7	7.1	6.1	6.2	(3.8)
27	Portland, Oregon	5.5	6.2	5.8	1.7	(1.6)
28	Chicago (Midway)	5.7	6.4	5.6	1.7	(3.4)
29	St. Louis	5.5	5.6	5.1	0.4	(2.3)
30	Charlotte (Douglas)	1.8	4.2	3.5	12.6	(4.3)
	Average for airports listed				2.5%	(1.8)%

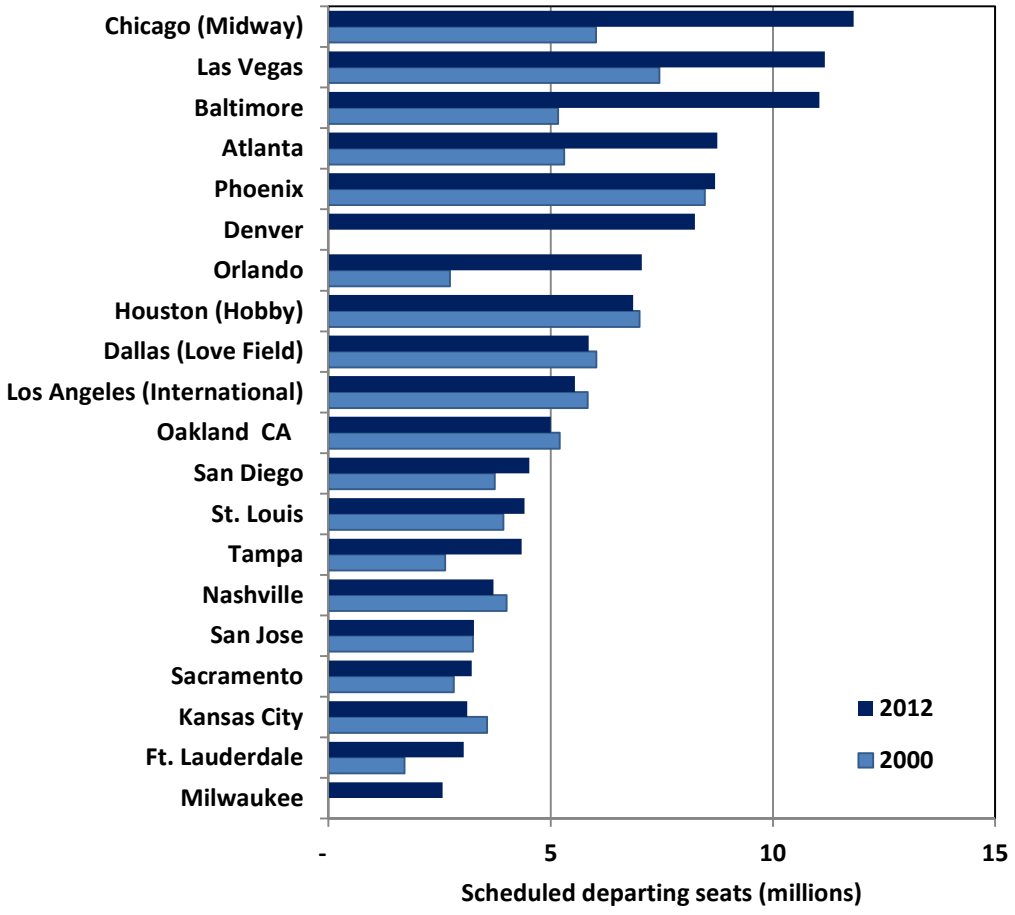
(a) Enplaned plus deplaned passengers.

Source: San Diego County Regional Airport Authority records and Airports Council International, Worldwide Airport Traffic Report and North American Airport Rankings, for years noted.

Twelfth Busiest Southwest Airlines Airport

In 2012, SDIA is estimated to account for 2.4% of the total scheduled departing seats in Southwest Airlines' system, making it the twelfth busiest airport in Southwest's system, as shown on Figure 6. As of July 2012, Southwest provided service from SDIA to 19 domestic destinations with an average of 92 scheduled daily aircraft departures.

Figure 6
SOUTHWEST AIRLINES TOP 20 BUSIEST AIRPORTS



Source: Official Airline Guides, Inc., online database, accessed November 2012.

CHAPTER 2
ECONOMIC BASIS FOR AVIATION DEMAND

The economy of San Diego County is an important determinant of long-term passenger and cargo demand at the Airport. Generally, regions with large populations, high levels of employment, and high average per capita incomes will generate strong demand for airline travel. The demographics and economy of the region—as measured by changes in population, employment, and per capita income—as well as airline service and airfares—are typically the most important factors affecting origin-destination (O&D) passenger demand. In 2011, approximately 95% of the Airport's passengers were O&D passengers; the remaining 5% were connecting passengers.

The following sections present a discussion of the economic basis for airline traffic at the Airport—the historical population, nonagricultural employment, and per capita income of San Diego County, comparative unemployment rates, and tourism. Also provided is a summary of the economic outlook for world regions, the United States, California, and San Diego County.

SOCIOECONOMIC TRENDS

Table 3 presents comparative trends in population, nonagricultural employment, and per capita personal income in San Diego County, the State of California, and the United States in 1990 and from 2000 through 2011. Projections are also presented for 2016, 2021, 2026, 2031, and 2050.

Population

Historically, population in San Diego County and the State increased faster than in the nation. From 1990 to 2011, population in San Diego County increased an average of 2.4% per year, while population in the State and the nation increased an average of 2.0% and 1.1% per year, respectively. Population growth in San Diego County is projected to increase an average of 0.9% per year between 2011 and 2050, with stronger growth in the near-term—an average increase of 1.6% per year between 2011 and 2016.

Employment

From 1990 to 2011, nonagricultural employment in San Diego County increased an average of 1.2% per year, faster than for the State and nation (an average of 0.5% and 0.9% per year, respectively). Since 2000, nonagricultural employment growth in San Diego County has slowed, increasing an average of 0.2% per year between 2000 and 2011, compared with an average decrease of 0.4% per year in the State and relatively no change in the nation. Nonagricultural employment growth during the past 10 years reflects the effects of the national economic recessions in 2001 and 2008. Nonagricultural employment in San Diego County is projected to increase an average of 0.9% per year between 2011 and 2050, with stronger growth in the near-term—an average increase of 1.4% per year between 2011 and 2016.

Table 3

HISTORICAL AND PROJECTED SOCIOECONOMIC DATA

	Population (thousands)			Nonagricultural employment (thousands)			Per capita personal income in 2000 dollars		
	San Diego County	State of California	United States	San Diego County	State of California	United States	San Diego County	State of California	United States
Historical									
1990	2,505	29,828	248,710	967	12,500	109,487	27,314	28,314	25,499
2000	2,814	33,872	282,162	1,194	14,489	131,785	33,779	33,404	30,319
2005	2,938	35,828	295,517	1,282	14,802	133,703	36,339	33,890	31,259
2006	2,947	36,021	298,380	1,302	15,065	136,086	37,109	35,042	32,223
2007	2,976	36,250	301,231	1,309	15,185	137,598	37,438	35,347	32,810
2008	3,022	36,604	304,094	1,299	14,995	136,790	37,284	34,761	32,750
2009	3,061	36,961	306,772	1,231	14,092	130,807	35,169	32,705	31,180
2010	3,095	37,254	309,350	1,223	13,937	129,874	35,725	33,288	31,538
2011	3,140	37,692	311,592	1,231	14,061	131,359	n.a.	33,894	31,895
Projected									
2016	3,399	39,236	328,029	1,321	14,917	139,236	39,249	35,637	33,609
2021	3,569	41,127	344,303	1,393	15,961	148,872	42,437	38,186	36,117
2026	3,737	43,019	360,764	1,456	17,069	159,176	45,645	41,261	39,147
2031	3,902	44,850	377,108	1,512	18,246	170,193	48,655	44,810	42,667
2050	4,055	46,583	393,322	1,568	19,496	181,972	51,767	48,833	46,683
	Percent increase (decrease))								
2005-2006	0.3	0.5	1.0	1.5	1.8	1.8	2.1	3.4	3.1
2006-2007	1.0	0.6	1.0	0.6	0.8	1.1	0.9	0.9	1.8
2007-2008	1.6	1.0	1.0	(0.8)	(1.2)	(0.6)	(0.4)	(1.7)	(0.2)
2008-2009	1.3	1.0	0.9	(5.2)	(6.0)	(4.4)	(5.7)	(5.9)	(4.8)
2009-2010	1.1	0.8	0.8	(0.7)	(1.1)	(0.7)	1.6	1.8	1.1
2010-2011	1.4	1.2	0.7	0.7	0.9	1.1	n.a.	1.8	1.1
	Average annual percent increase (decrease)								
Historical									
1990-2000	2.4	2.1	1.3	2.1	1.5	1.9	2.1	1.7	1.7
2000-2011	2.3	1.9	0.9	0.2	(0.4)	(0.1)	0.6 *(a)*	0.1	0.4
1990-2011	2.4	2.0	1.1	1.2	0.5	0.9	1.4 *(a)*	0.9	1.1
Projected									
2011-2016	1.6	0.8	1.0	1.4	1.2	1.2	1.6 *(a)*	1.0	1.1
2016-2021	1.0	0.9	1.0	1.1	1.4	1.3	1.6	1.4	1.4
2021-2026	0.9	0.9	0.9	0.9	1.4	1.3	1.5	1.6	1.6
2026-2031	0.9	0.8	0.9	0.8	1.3	1.3	1.3	1.7	1.7
2031-2050	0.6	0.7	0.8	0.7	1.3	1.3	1.5	1.8	1.8
2011-2050	0.9	0.8	0.9	0.9	1.3	1.3	1.5 *(a)*	1.6	1.7

n.a. = not available

(a) Represents the average annual percent change from 2010.

Source: Historical: U.S. Department of Commerce, Bureau of the Census, www.census.gov, accessed November 2012. California Department of Finance, www.dof.ca.gov. Published February 10, 2012; accessed May 2012. U.S. Department of Commerce, Bureau of Economic Analysis, Regional Accounts Data, www.bea.gov, accessed May 2012. Expressed in 2000 dollars using the consumer price index.

Projected: San Diego Regional Planning Agency, 2050 Regional Growth Forecast, published February 26, 2010; accessed May 2012. Woods & Poole, Economic and Demographic Projections, May 2012.

Unemployment Rates

In addition to the employment trends cited above, the unemployment rate is also indicative of general economic conditions. Table 4 shows comparative annual unemployment rates in San Diego County, the State, and the nation as a whole for 2000 through 2011. The unemployment rate in San Diego County has followed the trends in the nation, and has remained less than the State rate since 1990.

Table 4
COMPARATIVE UNEMPLOYMENT RATES

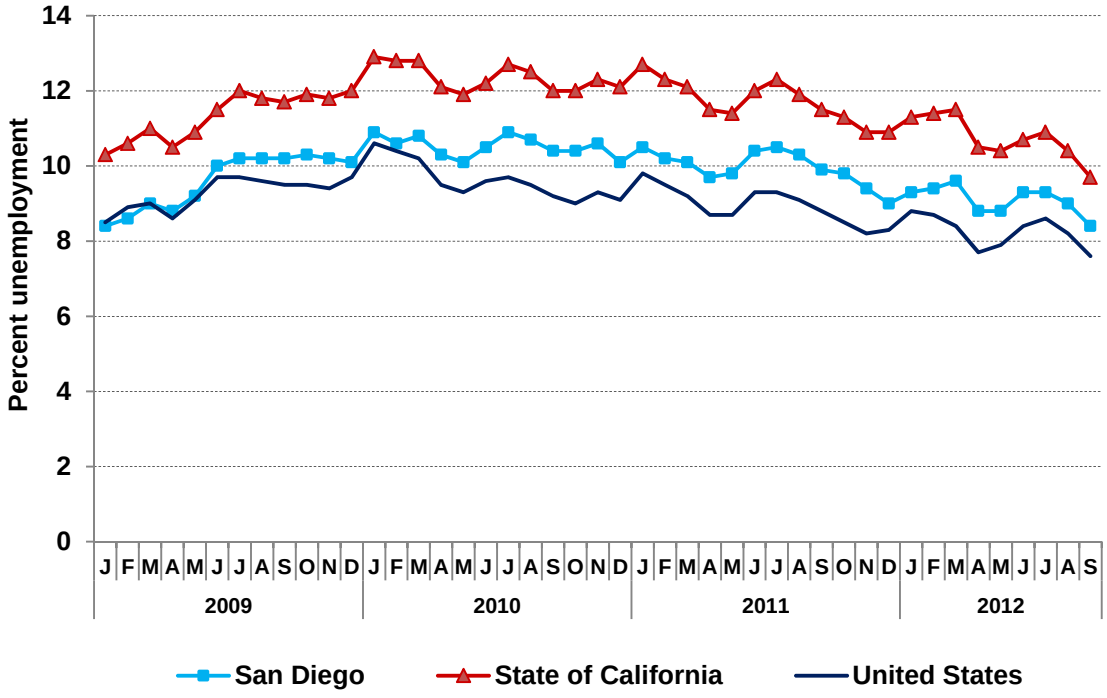
	San Diego County	State of California	United States
1990	4.6	5.8	5.6
2000	3.9	4.9	4.0
2001	4.2	5.4	4.7
2002	5.2	6.7	5.8
2003	5.2	6.8	6.0
2004	4.7	6.2	5.5
2005	4.3	5.4	5.1
2006	4.0	4.9	4.6
2007	4.6	5.4	4.6
2008	6.0	7.2	5.8
2009	9.6	11.3	9.3
2010	10.5	12.4	9.6
2011	10.0	11.7	8.9

Note: Unemployment rates are not seasonally adjusted and represent annual averages.

Source: U.S. Department of Labor, Bureau of Labor Statistics, www.bls.gov, accessed November 2012.

Since the beginning of the recession in January 2008, monthly unemployment rates in San Diego County, the State of California, and the United States have increased, as shown on Figure 7. In September 2012, the San Diego County unemployment rate (unadjusted) was 8.4%, lower than that for the State (9.7%) but higher than that for the nation (7.6%).

Figure 7
MONTHLY UNEMPLOYMENT RATES



Note: Unemployment rates not seasonally adjusted.

Source: U.S. Department of Labor, Bureau of Labor Statistics, www.bls.gov, accessed November 2012.

Income

From 1990 to 2010, per capita personal income in San Diego County increased an average of 1.4% per year, faster than that for the State (an average of 0.9% per year) and the nation (an average of 1.1% per year), as shown in Table 3. Since 2000, the growth in per capita income has slowed. In 2010, per capita income in San Diego County exceeded that for the nation. Per capita personal income in San Diego County is projected to increase an average of 1.5% per year between 2010 and 2050.

Nonagricultural Employment by Industry Sector

Figure 8 shows a comparative distribution of nonagricultural employment by industry sector for San Diego County in 2000 and in 2011, and for the State and the nation in 2011.

- ***Business Services***. Business services in San Diego County accounted for the largest share of nonagricultural employment, with 25.6% in 2000 and 24.6% in 2011. From 2000 to 2011, San Diego County employment in business services decreased an average of 0.1% per year, largely as the result of job losses in information services.*

*Information services includes traditional, Internet, and software publishing; the motion picture and sound recording industries; the broadcasting industries; the telecommunications industries; Web search portals, data processing industries; and the information services industries.

- ***Government***. Employment by federal, state and local government agencies* increased an average of 0.9% per year between 2000 and 2011. The share of government employment in San Diego County increased from 17.3% in 2000 to 18.6% in 2011.

- ***Trade.*** Trade is comprised of wholesale and retail trade. From 2000 to 2011, San Diego County employment in trade decreased an average of 0.1% per year, reflecting slower growth in retail trade than in wholesale trade. The share of trade employment in San Diego County decreased from 20.3% in 2000 to 19.5% in 2011.

- ***Education and Health Services.*** Employment in education and health services in San Diego County increased an average of 2.4% per year between 2000 and 2011 and was the fastest growing industry sector. The share of education and health services employment in San Diego County increased from 9.7% in 2000 to 12.1% in 2011.

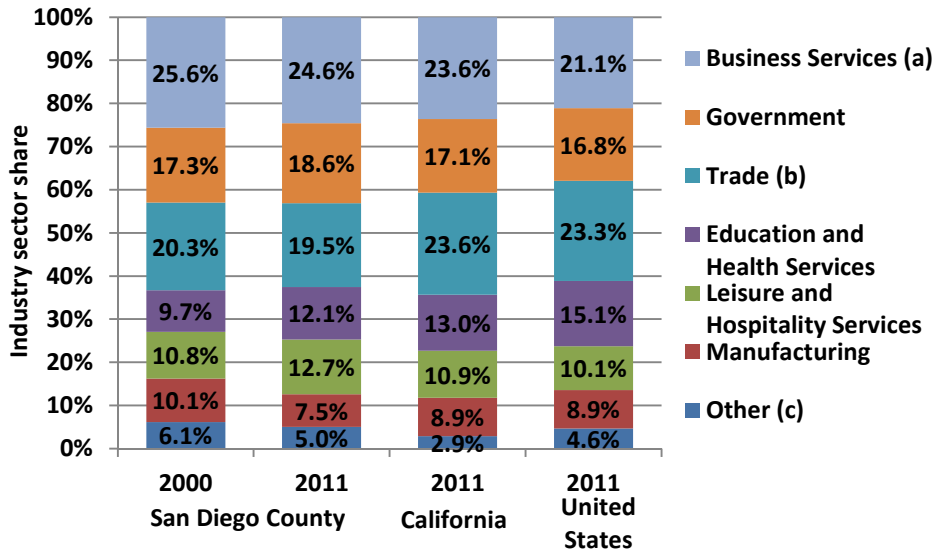
- ***Leisure and Hospitality Services.*** San Diego County employment in leisure and hospitality services increased an average of 1.8% per year between 2000 and 2011. The share of leisure and hospitality services in San Diego County increased from 10.8% in 2000 to 12.7% in 2011.

- ***Manufacturing.*** Manufacturing employment in San Diego County decreased an average of 2.4% per year between 2000 and 2011 and experienced the largest employment losses of any industry sector. The manufacturing sectors in California and the nation also experienced job losses between 2000 and 2011, decreasing an average of 3.6% and 3.4% per year, respectively, during that period. The share of manufacturing employment in San Diego County decreased from 10.1% in 2000 to 7.5% in 2011.

- ***Other Activities.*** Other employment in San Diego County decreased an average of 1.5% per year between 2000 and 2011, largely as the result of job losses in construction. The share of other employment in San Diego County decreased from 6.1% in 2000 to 5.0% in 2011.

*As reported by the U.S. Department of Labor, Bureau of Labor Statistics, government employment includes only civilian employees.

Figure 8
COMPARATIVE DISTRIBUTION OF NONAGRICULTURAL EMPLOYMENT



(a) Includes professional and business services, finance and information.
(b) Includes wholesale and retail trade.
(c) Includes mining, finance, insurance, real estate, construction, transportation and public utilities.

Source: U.S. Department of Labor, Bureau of Labor Statistics, www.bls.gov, accessed May 2012.

San Diego Industry Clusters

San Diego's economy is driven by companies that export goods and services nationally and globally, bringing in new investment and jobs that support economic growth as well as air service development. Companies that make up industry clusters, also referred to as the "traded sector", tend to *cluster* because they draw competitive advantage from their proximity to competitors, to a skilled workforce, to specialized suppliers, and to a shared base of sophisticated knowledge about their industry.

As shown on Figure 9, San Diego County has 16 industry clusters based on a 2006 SANDAG study.* In 2011, these 16 industry clusters accounted for about one-third of total employment and included a mix of mature, stabilizing, and emerging industries.

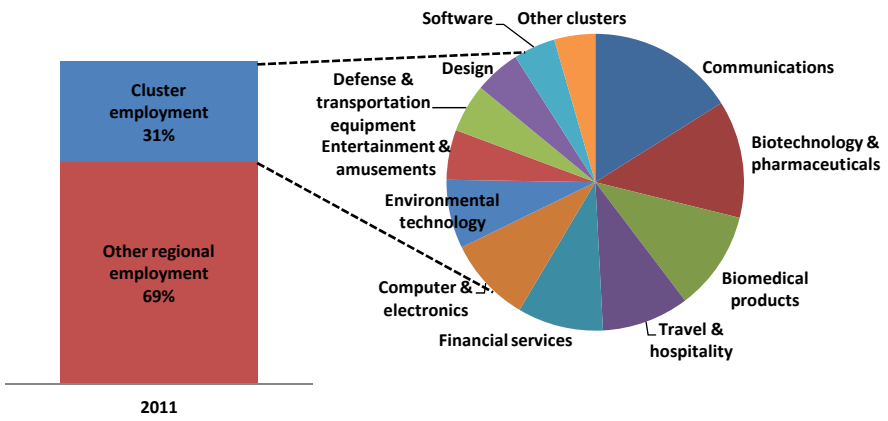
- Mature clusters in San Diego County, including Defense and Transportation, Financial Services, and Computer and Electronics, are primary economic drivers, although comprised of industries that have declining or low employment growth.

- Stabilizing clusters add diversity and economic stability to the region and provide employment opportunities to those who do not have the training or experience to gain entrance into a high tech-related field. Examples of stabilizing clusters in San Diego County include Travel and Hospitality, Amusement and Entertainment, Horticulture, Fruit and Vegetables, Recreational Goods, and Specialty Foods.

*SANDAG, Traded Clusters in the San Diego Region, September 2006.

- Emerging clusters are comprised of young, fast-growing industries that are becoming more integrated and important to the regional economy. Environmental Technology, Recreational Goods Manufacturing, Biotechnology and Pharmaceuticals, Biomedical Products, Communications, and Software are all examples of emerging clusters in the San Diego region. Employment in three emerging clusters experienced strong growth between 2001 and 2011--Biotechnology and Pharmaceuticals (an average of 3.4% per year), Biomedical Products (an average of 2.2% per year), Environmental Technology (an average of 2.7% per year).

Figure 9
SAN DIEGO INDUSTRY CLUSTER EMPLOYMENT IN 2011



Note: Other clusters include horticulture, recreational goods, fruits and vegetables, specialty foods, and publishing.

Source: U.S. Department of Labor, Bureau of Labor Statistics, Quarterly Census of Employment and Wages, www.bls.gov, accessed July 2012.

Major Employers

Table 5 lists the major employers with headquarters in San Diego County in 2011. Health care and leisure and hospitality services together account for more than half (13 of the 25) of major companies reflecting the importance of these sectors to the economy of San Diego County.

Table 5
MAJOR EMPLOYERS IN SAN DIEGO COUNTY

Company	Location	Industry
32nd St Naval Station *(a)*	San Diego	Federal Government
Sharp Memorial Hospital *(a)*	San Diego	Health care
Kaiser Permanente (Clinics) *(b)*	San Diego	Health care
San Diego Naval Medical Center *(b)*	San Diego	Federal Government
University of California, San Diego Medical School *(b)*	La Jolla	Education
Barona Casino	Lakeside	Leisure and hospitality
Barona Resort	Lakeside	Leisure and hospitality
General Dynamics NASSCO	San Diego	Manufacturing
Goodrich Aerostructures Group	Chula Vista	Manufacturing
Hairspray	San Diego	Retail trade
Kaiser Permanente (Hospitals)	San Diego	Health care
Marine Corps Recruit Depot	San Diego	Federal Government
Mary Sharp Birch Hospital for Women	San Diego	Health care
Merchants Building Maintenance	San Diego	Business Services
Palomar Memorial Hospital	Escondido	Health care
Palomar Pomerado Health Rehab	Escondido	Health care
San Diego County Sheriff	Santee	Local government
Scripps Research Institute	La Jolla	Education
Sea World San Diego	San Diego	Leisure and hospitality
Sharp Grossmont Hospital	La Mesa	Health care
Solar Turbines Inc.	San Diego	Business Services
Sony Electronics Inc.	San Diego	Manufacturing
Sycuan Casino	El Cajon	Leisure and hospitality
Tri City Hospital	Oceanside	Health care
Viejas Casino & Outlet Center	Alpine	Leisure and hospitality

Note: Companies listed have 1,000 to 4,999 employees, except as noted.

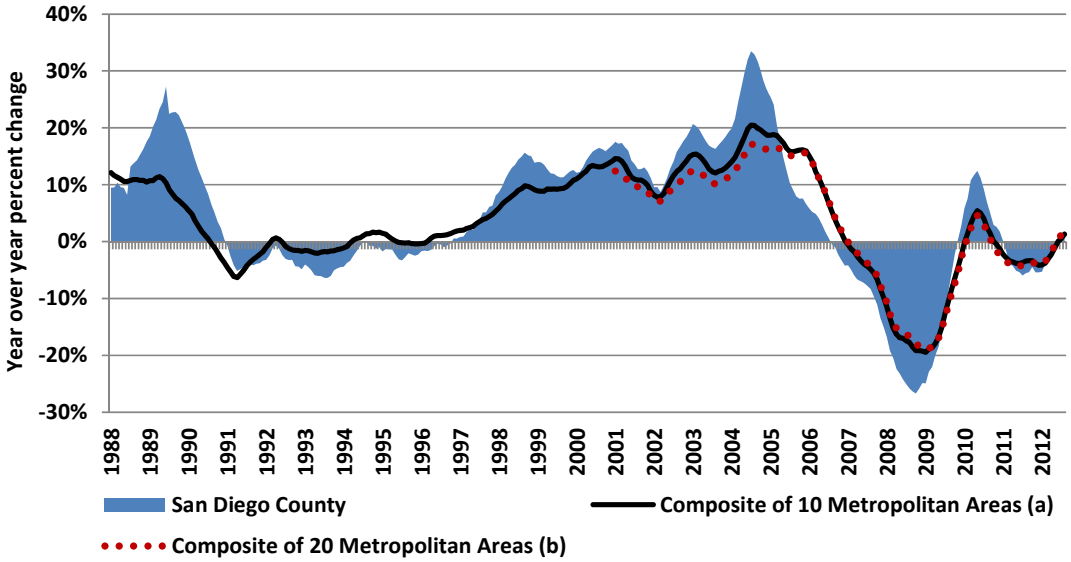
(a) More than 10,000 employees.
(b) 5,000 to 9,999 employees.

Source State of California Employment Development Department, www.edd.ca.gov, accessed May 2012.

Regional Housing Market

Figure 10 presents the percent change in home prices for San Diego County from January 1988 through August 2012, compared with composites for 10 and 20 selected metropolitan areas, based on the Standard & Poor's/Case-Shiller Home Price Index. As shown, home prices in San Diego County exceeded the increases in home prices for the metropolitan areas in the composite index from mid-1988 through early 2005. Since 2005, home prices in San Diego County have generally followed the trends for the metropolitan areas in the composite index, except between mid-2009 through early 2011 when San Diego County home price increases exceeded the metropolitan area average. From early-2011 through June 2012, home prices in San Diego County decreased followed by increases in July and August, consistent with home prices for the composite of 20 metropolitan areas.

Figure 10
PERCENT CHANGE IN HOME PRICES
San Diego County and Selected Metropolitan Areas



Note: Data for 20 metropolitan areas begins in 2001.

(a) Includes Boston, Chicago, Denver, Las Vegas, Los Angeles, Miami, New York, San Diego, San Francisco, and Washington, D.C.

(b) Includes Atlanta, Charlotte, Cleveland, Dallas, Detroit, Minneapolis, Phoenix, Portland, Seattle, and Tampa in addition to the areas mentioned above.

Source: Standard & Poors/Case-Shiller Home Price Indices, www.standardandpoors.com, accessed November 2012.

Tourism

Tourism represents an increasingly important source of economic activity in San Diego County. According to the San Diego Convention and Visitors Bureau, San Diego hosted 74 conventions, events and shows in 2011, compared with 64 in 2010 (a 15.6% increase). In 2011, a total of 566,658 convention delegates attended conventions at the San Diego Convention Center and generated an estimated $579 million in economic impact for San Diego County. The San Diego Convention Center has 204,114 square feet of meeting space and 615,701 square feet of total exhibit space.

Table 6
SAN DIEGO COUNTY VISITORS AND CONVENTIONS

	Visitors *(a)*		Conventions *(b)*		
	Number	Percent overnight	Number	Delegates	Delegate spending (millions)
2000	n.a.	n.a.	51	245,790	253.5
2001	n.a.	n.a.	49	286,550	296.3
2002	26,283,000	57%	52	331,650	316.6
2003	26,418,000	58%	60	450,000	408.8
2004	26,746,000	59%	47	399,900	362.3
2005	31,777,000	49%	54	470,950	462.1
2006	32,200,000	49%	71	573,398	604.5
2007	31,563,000	49%	66	655,819	700.4
2008	31,102,000	49%	68	633,883	772.0
2009	29,606,000	49%	71	519,418	542.0
2010	29,875,000	50%	64	543,931	567.0
2011	31,100,000	50%	74	566,658	579.0
	Compound average annual percent increase (decrease)				
2000-2005	6.5%		1.1%	13.9%	12.8%
2005-2010	(1.2)		3.5	2.9	4.2
2000-2010	1.6		2.3	8.3	8.4
2010-2011	4.1		15.6	4.2	2.1

n.a. = not available

(a) Includes visitors traveling to San Diego by all modes of transportation.
(b) Conventions held at the San Diego Convention Center.

Source San Diego Convention and Visitors Bureau, www.sandiego.org, accessed July 2012.

In 2011, about one-third (35%) of all overnight visitors arrived by air and accounted for nearly half (45%) of the $6.68 billion in spending by overnight visitors, according to the San Diego Visitors and Convention Bureau.

ECONOMIC OUTLOOK

The economic outlook for the United States, the State of California, and San Diego County forms a basis for anticipated growth in airline traffic at the Airport. Economic activity in San Diego County and the State is directly linked to the production of goods and services in the world and the rest of the United States. Both airline travel and the movement of cargo through the Airport depend on the economic linkages between and among the regional, State, national, and global economies. The economic and other assumptions underlying the forecasts of enplaned passengers are based on a review of global, national, State, and regional economic outlooks as well as an analysis of historical socioeconomic trends and airline traffic trends, as presented in the section titled "Historical Airline Traffic."

Global Economy

Globalization of the world economy has created linkages between national economies that relate not only to trade but also to air travel. San Diego County and the State have strong linkages to the global economy through a number of industry sectors and the three world regions that are currently served at SDIA. The economic growth of these world regions, in terms of Gross Domestic Product (GDP), is directly related to the growth in air travel. Projections of GDP for the world regions are shown in Table 7. Continued growth in the economies of the world regions most closely aligned with the San Diego economy and airline service at SDIA are expected to contribute to continued growth in passenger traffic at the Airport.

U.S. Economy

The U.S. economy continues to recover from the financial crisis and global recession, although the pace of the recovery remains slow. The consensus among economists is that downturns following financial crises tend to be more prolonged than other downturns. In addition, such recessions raise the level and duration of unemployment, reduce the number of hours that employees work, and dampen investment. Continued high unemployment, lower disposable incomes, and reduced spending by businesses and consumers, particularly in the near-term, has the potential to dampen growth in the U.S. economy and passenger traffic nationally and at SDIA.

The Congressional Budget Office (CBO) expects that U.S. economic growth, as measured by U.S. GDP in constant dollars, will increase 2.1% in 2012, decrease 0.5% in 2013 as a result of increases in federal taxes and reductions in federal spending, and then increase an average of 3.5% per year between 2013 and 2020.* The CBO projects that the unemployment rate will decrease to 8.2% in the fourth quarter of 2012, increase to 8.8% in 2013, and decrease to 5.4% in 2020. The CBO's projections are influenced to a large extent by fiscal policy specified by current law which will result in tax increases and spending cuts in January 2013. In an alternative scenario, the CBO projects stronger economic growth (an estimated increase of 1.7% in U.S. GDP in 2013) if some or all of the fiscal restrictions are removed.

*Congressional Budget Office, Budget and Economic Outlook: Fiscal Years 2012 to 2022, August 22, 2012.

Table 7
HISTORICAL AND PROJECTED GDP GROWTH BY WORLD REGION

World region	Compound average annual percent increase (decrease) in GDP (in constant U.S. dollars)		
	Historical		Projected
	1990-2010	2000-2010	2010-2030
Asia	n.a.	4.2%	4.6%
Canada	1.9%	3.6	2.3
Europe *(a)*	(1.2) *(b)*	4.9	1.7
Latin America	3.6	6.7	4.2
Mexico	1.5	1.4	4.2
Middle East/Africa	n.a.	11.0	2.4
United States	3.4	1.6	2.7
World	1.8	5.2	3.3

n.a. = not available

(a) Data are for the Euro area.
(b) Percent change between 1991 and 2000.

Sources: Historical: International Monetary Fund, *World Economic Outlook* database, www.imf.org, accessed July 2011 and U.S. Department of Commerce, Bureau of Economic Analysis, www.bea.gov, accessed July 2012.
Projected: Global Insight as reported in U.S. Department of Transportation, Federal Aviation Administration, *FAA Aerospace Forecasts, Fiscal Years 2011-2031,* March 2011.

California Economy

California has experienced an uneven economic recovery, with some sectors of the economy such as high technology and exports reporting growth which is offset by a weak real estate market and continued volatility in equity markets. Near-term economic projections prepared by the University of California at Los Angeles (UCLA) Anderson Forecast* are for:

- Continued slow steady gains in employment through 2012, with expected growth of 1.9%, 1.8% and 2.5% in 2012, 2013 and 2014, respectively.
- Steady job growth in California that will bring the state's unemployment rate in line with the national average by the end of 2014. The unemployment rate will linger around 10.6% through 2012 and average 9.7% in 2013, and will drop to 8.3% in 2014.
- Modest growth in housing starts for the remainder of 2012 at approximately one quarter of the U.S. rate in predominantly multi-family housing with housing permits forecast to increase 40% in 2013 and double the U.S. rate in 2014, to 130,000 permits.

*UCLA Anderson Forecast, *June 2012 Economic Outlook*, June 20, 2012, www.uclaforecast.com.

San Diego Economy

The economic drivers of San Diego County are diverse and include a mix of mature, stable, and emerging industries. Near-term economic projections prepared by the National University System Institute for Policy Research* are for:

- Employment to increase 1.8% in 2012, the strongest growth in six years.
- Gross metropolitan product, in constant dollars, to increase 1.8% in 2012, accompanied by a 1.4% increase in taxable sales.
- Housing construction to increase 15% in 2012.

The San Diego economy is expected to rebound faster than California as a whole. San Diego's unemployment rate is expected to decrease faster than most of California because of an increase in demand for high tech jobs and trade. At a presentation at the University of San Diego in April 2012, the San Francisco Federal Reserve President John Williams noted that "As the national economy improves, we'll see more improvement here, especially because (of) high tech and a lot of that is driven by the demand in the rest of the country."

Risks to the Economic Outlook

While the near-term outlook is improving and the mid- to long-term outlook is favorable, there are risks that expectations for growth may not be achieved. Key risks include:

- Inflation risks still persist due to the sizable amount of liquidity that the Federal Reserve Bank has injected into the banking system, which could eventually trigger upward pressures on prices. Also, increases in oil prices and rapid expansion of U.S. industrial capacity could trigger upward pressure on inflation.
- U.S. consumers may not be able to generate much spending growth due to persistent unemployment, reduced wealth and home values, and the various reasons described above.
- Increases in fuel prices related to rising global demand and political instability in oil producing countries in the Middle East and North Africa present a risk to continued economic recovery and growth.
- A significant worsening of the banking and fiscal problems in Europe could lead to further turmoil in international financial markets that could affect U.S. financial markets—reducing wealth, severely constraining the availability of credit, reducing hiring, and causing higher unemployment.
- In the long term, the principal risks to U.S. economic performance are the sizable external and fiscal deficits. The continuing deficits in the U.S. balance of payments could result in greater volatility in the currency markets, which would then translate into higher interest rates and, potentially, slower economic growth. These risks could be compounded if the fiscal deficit is not reduced in the near-term, thereby leading to increased financing requirements and subsequent increases in interest rates. Increased interest rates could lead to lower levels of investment and, consequently, slower productivity growth.

**Economic Ledger*, December 2011, www.nusinstitute.org. The National University System Institute for Policy Research, LLC, (NUS-IPR) is a non-partisan organization that formulates and promotes high quality economic, policy, and public-opinion research so as to improve the efficiency and effectiveness of local governments in San Diego County and to improve the quality of life enjoyed by the region's citizens.

Economic Basis for Forecast Aviation Demand

The economic outlook for world regions, the United States, the State of California, and San Diego County form a basis for anticipated growth in aviation demand at the Airport. Employment and income projections for San Diego County and the State of California are for gradual but continued economic growth, particularly in biotechnology and pharmaceuticals, health care services, education, leisure and hospitality services. Factors expected to contribute to economic growth in San Diego County and associated increases in airline travel include: (1) the diversity in the economic base, which lessens its vulnerability to weaknesses in particular industry sectors, (2) growth in the existing and emerging San Diego industry sectors described earlier, (3) an educated labor force able to support the development of knowledge-based and service industries, and (4) continued reinvestment to support the development of tourism, conventions, and other businesses. This outlook is reflected in the aviation demand forecasts presented in Chapter 6, "Aviation Demand Forecasts."

CHAPTER 3
HISTORICAL PASSENGER AIRLINE TRAFFIC

A review of airline activity at the Airport provided the foundation for the enplaned passenger forecasts and included an analysis of: (1) the airline passenger service and market shares; (2) overall trends in enplaned passengers, including originating connecting passengers, and (3) monthly airline traffic for enplaned passengers, scheduled departing seats, and passenger airline landings.

AIRLINES SERVING SAN DIEGO INTERNATIONAL AIRPORT

The Airport is served by 20 passenger airlines, including 6 mainline airlines, 3 regional affiliates of which 1 is associated with more than one mainline airline, 7 low-cost carriers, and 4 foreign-flag airlines, as shown in Table 8. In addition, Japan Airlines is scheduled to begin Boeing 787 service from San Diego to Tokyo on December 2, 2012.

Table 8
AIRLINES SERVING SAN DIEGO

Mainline	Low cost carriers
Alaska Airlines	Allegiant Airlines
American Airlines *(a)*	Frontier Airlines *(d)*
Delta Air Lines *(b)*	jetBlue Airways
Hawaiian Airlines	Southwest Airlines *(e)*
United Airlines *(c)*	Spirit Airlines
US Airways	Sun Country Airlines
	Virgin America

Regional affiliates	Foreign-flag
American Eagle (American)	Air Canada
SkyWest (Delta, United, US Airways)	British Airways
Horizon (Alaska)	Volaris
	West Jet

(a) American filed for bankruptcy on November 29, 2011.
(b) Delta completed its merger with Northwest on October 29, 2008, and a single operating certificate was issued on December 31, 2009.
(c) United completed its merger with Continental on October 1, 2010, and a single operating certificate was issued on November 30, 2011.
(d) Acquired by Republic Airways Holdings on October 1, 2009.
(e) Southwest completed its merger with AirTran on May 2, 2011, and a single operating certificate was issued on March 1, 2012.

Sources: San Diego County Regional Airport Authority records and Official Airline Guides, Inc., online database, accessed November 2012.

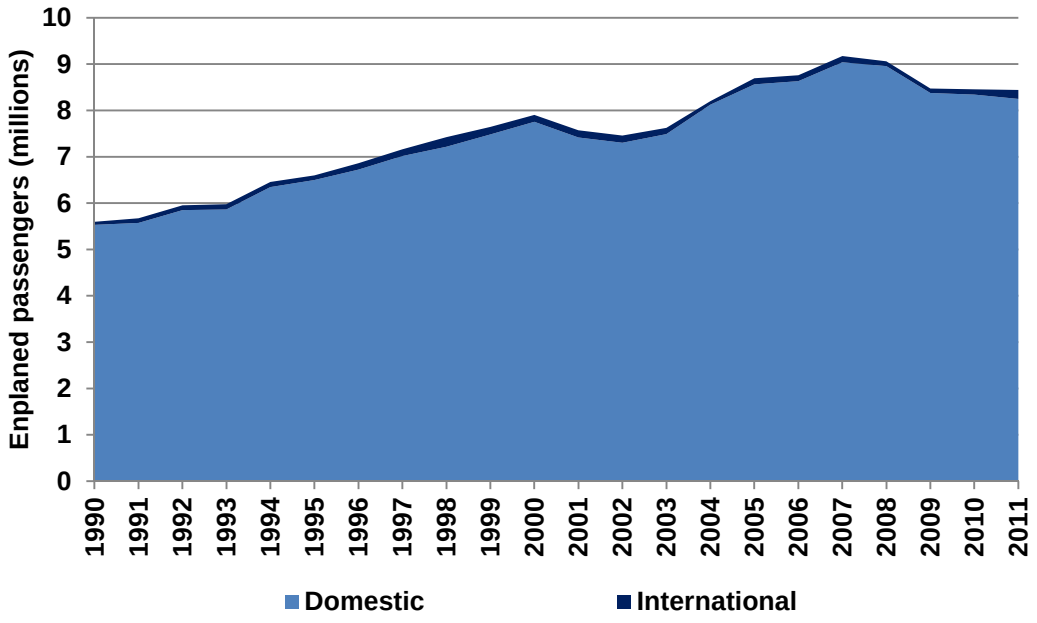
ENPLANED PASSENGERS

As shown in Table 9, the number of enplaned passengers at the Airport increased an average of 2.0% per year between 1990 and 2011, similar to growth in the nation as a whole during this period (an average increase of 2.2% per year).

Domestic and International Passengers

Between 1990 and 2011, the number of domestic enplaned passengers at San Diego International Airport increased an average of 1.9% per year, as shown in Table 9. The number of international passengers at the Airport increased an average increase of 5.2% per year between 1990 and 2011, faster than growth in the nation as a whole during this period (an average increase of 3.5% per year). International passengers accounted for 2.3% of total passengers in 2011, compared with a 1990 share of 1.2%.

Figure 11
ENPLANED PASSENGERS AT SAN DIEGO INTERNATIONAL AIRPORT



Source: San Diego County Regional Airport Authority records and U.S. Department of Transportation, T100 Database, accessed May 2012.

Table 9
HISTORICAL ENPLANED PASSENGERS
San Diego International Airport

	Domestic	International	Total	Percent increase (decrease)
1990	5,530,405	66,942	5,597,347	
1991	5,572,592	99,828	5,672,420	1.3%
1992	5,850,933	101,293	5,952,226	4.9
1993	5,862,343	115,829	5,978,172	0.4
1994	6,346,853	110,939	6,457,792	8.0
1995	6,500,263	98,015	6,598,278	2.2
1996	6,724,235	135,237	6,859,472	4.0
1997	7,017,674	142,699	7,160,373	4.4
1998	7,218,290	205,401	7,423,691	3.7
1999	7,482,569	163,539	7,646,108	3.0
2000	7,753,920	150,523	7,904,443	3.4
2001	7,418,373	152,366	7,570,739	(4.2)
2002	7,302,422	154,718	7,457,140	(1.5)
2003	7,489,032	134,566	7,623,598	2.2
2004	8,124,791	75,896	8,200,687	7.6
2005	8,561,714	130,980	8,692,694	6.0
2006	8,633,671	125,998	8,759,669	0.8
2007	9,040,253	132,686	9,172,939	4.7
2008	8,955,478	105,677	9,061,155	(1.2)
2009	8,376,678	96,103	8,472,781	(6.5)
2010	8,340,716	115,460	8,456,176	(0.2)
2011	8,247,416	195,196	8,442,612	(0.2)

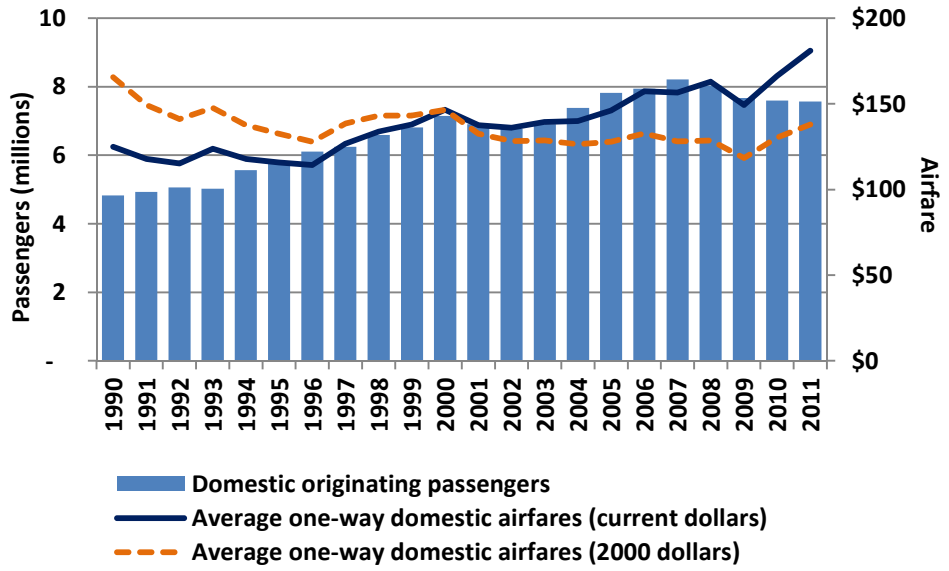
	Compound average annual percent increase (decrease)		
1990-2000	3.4%	8.4%	3.5%
2000-2002	(3.0)%	1.4%	(2.9)%
2002-2007	4.4%	(3.0)%	4.2%
2007-2011	(2.3)%	10.1%	(2.1)%
1990-2011	1.9%	5.2%	2.0%

Source: San Diego County Regional Airport Authority records.

Originating Passengers and Airfares

SDIA is primarily an O&D airport with more than 95% of its passengers originating from or destined for San Diego. O&D passenger demand is affected by the demographics and economy of the region served by the airport as well as airline service and airfares. From 1990 to 2011, the number of domestic originating passengers at SDIA increased an average of 2.2% per year. As shown on Figure 12, average one-way airfares in current dollars (unadjusted for inflation) have increased since 1990—an average increase of 1.8% per year between 1990 and 2011. In contrast, airfares in 2000 dollars have generally decreased—an average decrease of 0.9% per year between 1990 and 2011, except for recent increases in 2010 and 2011 related to the economic recession and airline industry efforts to reduce capacity.

Figure 12
DOMESTIC ORIGINATING PASSENGERS AND AIRFARES
San Diego International Airport



Source: U.S. Department of Transportation, *Origin-Destination Survey of Airline Passenger Traffic, Domestic*, online database (Databank 1A), accessed May 2012.

AIRLINE MARKET SHARES AND PASSENGER SERVICE

The market shares for the passenger airlines serving the Airport are shown in Table 10 and Figure 13. In 2011, Southwest Airlines had the largest market share of enplaned passengers (38.4%) at the Airport, followed by United Airlines (mainline and regional affiliates) (17.3%), Delta Air Lines (12.2%), and American Airlines (9.6%).

Table 10
AIRLINE MARKET SHARES OF ENPLANED PASSENGERS
San Diego International Airport

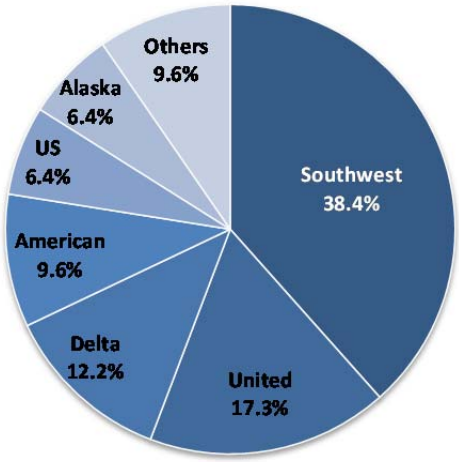
	2008	2009	2010	2011
Southwest *(a)*	3,246,277	3,151,626	3,241,173	3,244,498
United *(b)*	1,607,186	1,587,338	1,621,416	1,464,338
Delta *(c)*	991,777	974,732	1,009,201	1,027,475
American *(d)*	972,550	969,344	835,191	807,417
US Airways	622,862	552,807	512,435	543,907
Alaska	450,490	418,945	470,468	543,369
Frontier *(e)*	237,415	178,345	188,067	210,847
Virgin America	139,191	158,149	134,925	148,872
jetBlue	241,294	204,537	149,384	143,091
Others	552,113	276,958	293,916	308,798
	9,061,155	8,472,781	8,456,176	8,442,612

	Share of total			
	2008	2009	2010	2011
Southwest *(a)*	35.8%	37.2%	38.3%	38.4%
United *(b)*	17.7	18.7	19.2	17.3
Delta *(c)*	10.9	11.5	11.9	12.2
American *(d)*	10.7	11.4	9.9	9.6
US Airways	6.9	6.5	6.1	6.4
Alaska	5.0	4.9	5.6	6.4
Frontier *(e)*	2.6	2.1	2.2	2.5
Virgin America	1.5	1.9	1.6	1.8
jetBlue	2.7	2.4	1.8	1.7
Others	6.1	3.3	3.5	3.7
	100.0%	100.0%	100.0%	100.0%

(a) Southwest completed its merger with AirTran on May 2, 2011, and a single operating certificate was issued on March 1, 2012.
(b) United completed its merger with Continental on October 1, 2010, and a single operating certificate was issued on November 30, 2011.
(c) Delta completed its merger with Northwest on October 29, 2008, and a single operating certificate was issued on December 31, 2009.
(d) American filed for bankruptcy on November 29, 2011.
(e) Acquired by Republic Airways Holdings on October 1, 2009.

Source: San Diego County Regional Airport Authority records.

Figure 13
AIRLINE SHARES OF ENPLANED PASSENGERS IN 2011
San Diego International Airport



Source: San Diego County Regional Airport Authority records.

As of July 2012, Southwest Airlines provided 92 daily scheduled nonstop departures at the Airport, as shown in Table 11. Southwest's domestic flights were primarily (74 out of 92) to cities in the Pacific and Rocky Mountain regions. The other airlines serving the Airport provided 150 scheduled nonstop daily departures—143 domestic and 7 International.

Table 11
NONSTOP AIRLINE SERVICE AS OF JULY 2012
San Diego International Airport

Sector/Region	Average daily scheduled nonstop departures: Southwest Airlines	Average daily scheduled nonstop departures: Other airlines	Average daily scheduled nonstop departures: Total	Number of cities: Southwest Airlines	Number of cities: Other airlines
Domestic					
Pacific	39	62	100	4	10
South	11	29	40	6	6
Rocky Mountain	35	23	59	6	4
Midwest	7	16	23	3	4
Northeast	--	13	13	--	4
	92	143	235	19	28
International					
Canada	--	3	3	--	3
Central America	--	3	3	--	4
Europe	--	1	1	--	1
	--	7	7	--	8
Total Airport	**92**	**150**	**242**	**19**	**36**

Note: Includes mainline and regional affiliates.

Sources: Official Airline Guides, Inc. online database, accessed July 2012.

ORIGIN-DESTINATION MARKETS

In 2011, the top 20 domestic O&D passenger markets at SDIA accounted for 67.6% of the total originating passengers, as shown in Table 12. The San Francisco area is the largest originating passenger market in 2011 with 15.6% of total originating passengers. The New York market is the second largest O&D market, with 4.9% of total originating passengers, followed by Washington, D.C. (4.3%), Denver (4.2%), and Seattle (4.1%). In July 2012, the Airport had 42 daily scheduled flights to San Francisco airports, 29 of which were by Southwest Airlines.

Table 12

HISTORICAL DOMESTIC ORIGINATING PASSENGERS BY MARKET IN 2011

Ranked by total originating passengers at San Diego International Airport

Origin-destination market	Air miles from San Diego	Percent of originating passengers	Average daily scheduled nonstop departures in July 2012		
			Southwest Airlines	Other airlines	All airlines
San Francisco *(a)*	447	15.60%	29	13	42
New York *(b)*	2,438	4.9	--	9	9
Washington, D.C. *(c)*	852	4.3	2	4	6
Denver	2,247	4.2	5	9	14
Seattle	1,051	4.1	--	8	8
Phoenix	302	4	11	8	19
Sacramento	481	4	9	--	9
Chicago *(d)*	258	3.9	4	8	12
Las Vegas	1,719	3.9	11	2	13
Dallas/Ft. Worth *(e)*	1,183	2.5	--	10	10
Boston	2,580	2.1	--	2	2
Portland	933	2.1	2	7	9
Houston	1,530	1.9	--	4	4
Minneapolis	2,607	1.8	--	5	5
Philadelphia	2,363	1.6	--	3	3
Salt Lake City	626	1.6	--	5	5
Atlanta	1,885	1.4	--	6	6
Detroit	1,951	1.3	--	3	3
Honolulu	2,609	1.2	--	2	2
Orlando	2,141	1.1	--	--	--
Airports listed		67.60%	73	108	181
Other airports		32.4	19	42 *(f)*	61
Total		100.00%	92	150	242

(a) San Francisco, Oakland, and Mineta San Jose International airports.
(b) Newark Liberty International, LaGuardia, and John F. Kennedy International airports.
(c) Reagan Washington National, Baltimore/Washington International Thurgood Marshall, and Washington Dulles International airports.
(d) Chicago O'Hare and Midway International airports.
(e) Dallas/Fort Worth International Airport and Love Field.
(f) Includes 7 international departures.

Sources U.S. Department of Transportation, Origin-Destination Survey of Airline Passenger Traffic, Domestic, online database (Databank 1A), and Official Airline Guides, Inc., online database, accessed July 2012.

AIRFARES FOR DOMESTIC ORIGIN-DESTINATION MARKETS

Table 13 provides SDIA one-way airfare data for the top 20 domestic O&D passenger markets in 2011, compared with airfares for the Los Angeles Basin airports. For San Francisco, SDIA's largest O&D market, the average airfare at Burbank and Orange County airports was considerably higher than SDIA's average airfare in 2011, while the overall average airfare for all LA Basin airports is comparable. Airfares to New York are considerably higher at Los Angeles International and Orange County airports than SDIA airfares in 2011. SDIA airfares are lower to Denver than each of the LA Basin airports in 2011.

MONTHLY AIRLINE TRAFFIC

Trends in monthly airline traffic, including enplaned passengers, scheduled departing seats, enplaned passenger load factor, and passenger airline landings are presented in the following sections.

Monthly Enplaned Passengers

Table 14 presents monthly enplaned passenger data for the Airport for January 2007 through May 2012. The monthly data show the seasonal variation in enplaned passenger traffic, with peak levels occurring in July and August and the lowest monthly activity occurring from November through February.

Monthly Scheduled Departing Seats

Table 15 presents monthly scheduled departing seats data for the Airport for January 2007 through December 2012. The trends in the number of scheduled departing seats follow the seasonal variation in enplaned passengers. The peak month shares of annual seats are less than the peak month shares of enplaned passengers, largely because of differences in monthly load factors (the percentage of occupied seats on an aircraft).

Monthly Passenger Airline Aircraft Landings

Table 16 presents monthly passenger airline aircraft landings data for the Airport for January 2007 through May 2012.

Monthly Enplaned Passenger Load Factor

As shown on Figure 14, enplaned passenger load factors at SDIA ranged from a low of 65% in January 2009 to a high of 83.6% during August 2010. Load factors at the Airport in recent years have averaged more than 75% reflecting, in part, reductions in airline seating capacity.

Table 13

AVERAGE DOMESTIC ONE-WAY AIRFARES BY MARKET IN 2011

Ranked by total originating passengers at San Diego International Airport

Origin-destination market	SDIA one-way airfare	Percent higher (lower) than SDIA airfare					
		Los Angles International	Orange County	Burbank	LA/Ontario International	Long Beach	LA Basin airport average
San Francisco *(a)*	$116	(6.0%)	13.1%	9.1%	(2.6%)	(26.1%)	(0.6%)
New York *(b)*	262	17.1	12.1	(14.2)	(17.7)	(13.8)	13.1
Washington, D.C. *(c)*	264	(7.2)	(12.6)	(11.9)	(15.2)	(20.3)	(9.0)
Denver	122	6.1	4.1	47.1	24.1	9.1	9.1
Seattle	150	(1.0)	(5.7)	(2.6)	(7.7)	(20.4)	(5.6)
Phoenix	108	6.1	11.1	3.1	4.1	(1.1)	6.1
Sacramento	127	3.1	3.1	1.1	1.1	(27.8)	(0.7)
Chicago *(d)*	193	(0.3)	6.1	5.1	(1.0)	(15.8)	0.1
Las Vegas	104	(13.8)	18.1	5.1	4.1	(37.1)	(8.5)
Dallas/Ft. Worth *(e)*	206	(16.2)	(0.5)	(12.5)	(7.8)	(7.2)	(11.9)
Boston	227	10.1	0.1	(2.9)	(2.5)	(5.0)	7.1
Portland	149	10.1	(3.3)	5.1	(0.9)	(17.5)	0.1
Houston	205	8.1	17.1	(8.9)	23.1	(10.1)	10.1
Minneapolis	193	7.1	20.1	(4.3)	(7.0)	0.1	8.1
Philadelphia	254	9.1	(14.5)	(5.0)	(2.2)	28.1	3.1
Salt Lake City	162	(16.6)	(10.6)	5.1	(0.0)	(33.6)	(18.5)
Atlanta	259	(20.1)	(6.0)	(22.3)	(12.0)	(20.8)	(17.7)
Detroit	219	1.1	(8.9)	(11.7)	(11.9)	(12.1)	(1.7)
Honolulu	286	(10.7)	(1.7)	17.1	(8.3)	23.1	(10.3)
Orlando	201	7.1	6.1	6.1	1.1	4.1	6.1
Airports listed	169	15.1	(3.1)	(16.5)	(11.3)	(29.2)	4.1
Other airports	207	4.1	4.1	0.1	6.1	(22.5)	3.1
Total	181	11.1	(2.7)	(16.8)	(6.4)	(31.4)	3.1

(a) San Francisco, Oakland, and Mineta San Jose International airports.
(b) Newark Liberty International, LaGuardia, and John F. Kennedy International airports.
(c) Reagan Washington National, Baltimore/Washington International Thurgood Marshall, and Washington Dulles International airports.
(d) Chicago O'Hare and Midway International airports.
(e) Dallas/Fort Worth International Airport and Love Field.

Sources: U.S. Department of Transportation, *Origin-Destination Survey of Airline Passenger Traffic, Domestic*, online database (Databank 1A), and Official Airline Guides, Inc., online database, accessed July 2012.

Table 14

HISTORICAL ENPLANED PASSENGERS BY MONTH

San Diego International Airport

Year	January	February	March	April	May	June	July	August	September	October	November	December	Total
	Month												
2007	642,946	644,130	758,396	767,769	762,664	813,109	876,877	901,065	739,397	767,720	764,915	733,951	9,172,939
2008	676,438	690,274	809,636	780,721	791,196	852,114	860,853	871,856	670,859	718,512	668,760	669,936	9,061,155
2009	605,207	589,481	693,236	712,754	708,898	765,422	835,971	817,594	662,849	723,055	681,907	676,407	8,472,781
2010	618,036	577,277	700,889	698,188	703,248	758,465	811,643	810,476	680,247	722,083	688,419	687,205	8,456,176
2011	615,521	581,576	688,309	689,241	708,595	757,805	794,406	794,928	699,738	711,956	686,504	714,033	8,442,612
2012	626,213	629,283	729,909	717,469	709,239								
	Year-over-year percent increase (decrease)												
2007-2008	5.2%	7.2%	6.8%	1.7%	3.7%	4.8%	(1.8)%	(3.2)%	(9.3)%	(6.4)%	(12.6)%	(8.7)%	(1.2)%
2008-2009	(10.5)	(14.6)	(14.4)	(8.7)	(10.4)	(10.2)	(2.9)	(6.2)	(1.2)	0.6	2.0	1.0	(6.5)
2009-2010	2.1	(2.1)	1.1	(2.0)	(0.8)	(0.9)	(2.9)	(0.9)	2.6	(0.1)	1.0	1.6	(0.2)
2010-2011	(0.4)	0.7	(1.8)	(1.3)	0.8	(0.1)	(2.1)	(1.9)	2.9	(1.4)	(0.3)	3.9	(0.2)
2011-2012	1.7	8.2	6.0	4.1	0.1								
	Percent of total												
2007	7.0%	7.0%	8.3%	8.4%	8.3%	8.9%	9.6%	9.8%	8.1%	8.4%	8.3%	8.0%	100.0%
2008	7.5	7.6	8.9	8.6	8.7	9.4	9.5	9.6	7.4	7.9	7.4	7.4	100.0
2009	7.1	7.0	8.2	8.4	8.4	9.0	9.9	9.6	7.8	8.5	8.0	8.0	100.0
2010	7.3	6.8	8.3	8.3	8.3	9.0	9.6	9.6	8.0	8.5	8.1	8.1	100.0
2011	7.3	6.9	8.2	8.2	8.4	9.0	9.4	9.4	8.3	8.4	8.1	8.5	100.0
5-year average (2007-2011)	7.2	7.1	8.4	8.4	8.4	9.1	9.6	9.6	7.9	8.4	8.0	8.0	100.0

Note: Data include domestic and international passengers enplaned on mainline and regional passenger airlines.

Source: San Diego County Regional Airport Authority records.

Table 15

HISTORICAL SCHEDULED DEPARTING SEATS BY MONTH

San Diego International Airport

Year	January	February	March	April	May	June	July	August	September	October	November	December	Total
	Month												
2007	972,858	881,903	999,936	967,248	1,012,816	1,040,222	1,090,205	1,108,552	1,058,766	1,095,835	1,038,082	1,046,002	12,312,425
2008	1,026,672	969,775	1,060,180	1,053,291	1,085,626	1,094,568	1,134,954	1,104,094	957,684	985,820	940,823	956,527	12,370,014
2009	927,803	846,564	946,959	914,902	966,931	992,708	1,026,092	1,002,194	901,787	928,985	879,112	902,751	11,236,788
2010	871,412	795,790	897,929	883,633	945,019	956,388	985,765	969,904	872,840	912,288	856,741	882,379	10,830,088
2011	866,604	787,664	893,347	859,627	913,015	931,738	968,092	962,262	890,364	914,414	864,091	910,177	10,761,395
2012	859,486	826,412	919,318	885,621	916,848	958,650	1,017,493	990,860	888,622	920,854	879,518	919,592	10,983,274
	Year-over-year percent increase (decrease)												
2007-2008	5.5%	10.0%	6.0%	8.9%	7.2%	5.2%	4.1%	(0.4)%	(9.5)%	(10.0)%	(9.4)%	(8.6)%	0.5%
2008-2009	(9.6)	(12.7)	(10.7)	(13.1)	(10.9)	(9.3)	(9.6)	(9.2)	(5.8)	(5.8)	(6.6)	(5.6)	(9.2)
2009-2010	(6.1)	(6.0)	(5.2)	(3.4)	(2.3)	(3.7)	(3.9)	(3.2)	(3.2)	(1.8)	(2.5)	(2.3)	(3.6)
2010-2011	(0.6)	(1.0)	(0.5)	(2.7)	(3.4)	(2.6)	(1.8)	(0.8)	2.0	0.2	0.9	3.2	(0.6)
2011-2012	(0.8)	4.9	2.9	3.0	0.4	2.9	5.1	3.0	(0.2)	0.7	1.8	1.0	2.1
	Percent of total												
2007	7.9%	7.2%	8.1%	7.9%	8.2%	8.4%	8.9%	9.0%	8.6%	8.9%	8.4%	8.5%	100.0%
2008	8.3	7.8	8.6	8.5	8.8	8.8	9.2	8.9	7.7	8.0	7.6	7.7	100.0
2009	8.3	7.5	8.4	8.1	8.6	8.8	9.1	8.9	8.0	8.3	7.8	8.0	100.0
2010	8.0	7.3	8.3	8.2	8.7	8.8	9.1	9.0	8.1	8.4	7.9	8.1	100.0
2011	8.1	7.3	8.3	8.0	8.5	8.7	9.0	8.9	8.3	8.5	8.0	8.5	100.0
2012	7.8	7.5	8.4	8.1	8.3	8.7	9.3	9.0	8.1	8.4	8.0	8.4	100.0
5 year average (2007-2011)	8.1	7.4	8.3	8.1	8.6	8.7	9.1	8.9	8.1	8.4	8.0	8.2	100.0

Note: Data include domestic and international passengers enplaned on mainline and regional passenger airlines.

Source: Official Airline Guides, Inc., online database, accessed November 2012.

Table 16

HISTORICAL PASSENGER AIRLINE AIRCRAFT LANDINGS BY MONTH

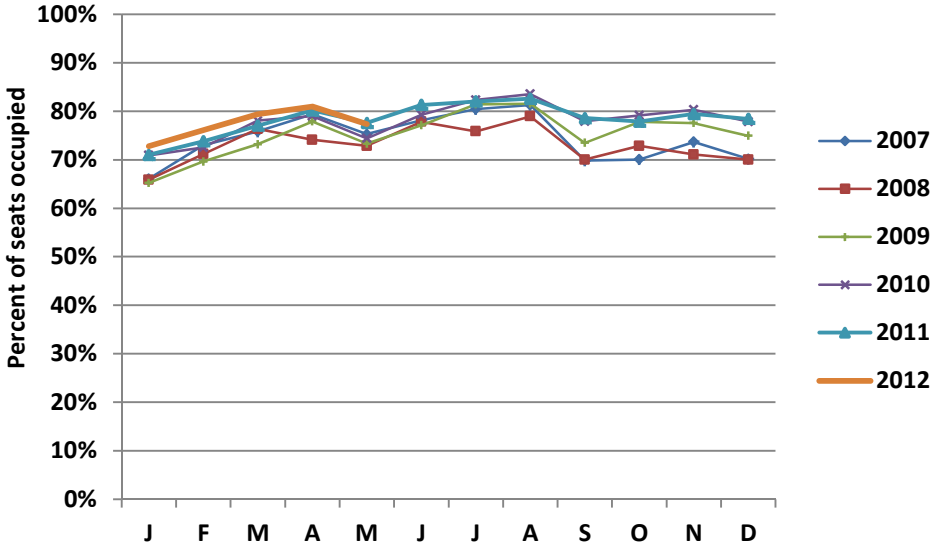
San Diego International Airport

Year	January	February	March	April	May	June	July	August	September	October	November	December	Total
	Month												
2007	15,614	14,206	16,246	15,368	16,280	16,964	17,826	18,142	17,140	17,728	16,894	17,014	199,422
2008	16,424	15,594	17,110	16,766	17,440	17,448	17,928	17,594	14,678	15,076	14,198	14,336	194,592
2009	14,153	13,062	14,577	14,170	14,949	15,067	15,748	15,380	13,801	14,154	13,385	13,699	172,145
2010	13,038	12,061	13,817	13,601	14,405	14,430	14,743	14,488	13,024	13,487	12,749	13,115	162,958
2011	12,940	11,825	13,489	12,898	13,540	13,932	14,367	14,117	12,281	13,385	12,782	13,394	158,950
2012	12,625	12,179	13,495	13,172	13,524								
	Year-over-year percent increase (decrease)												
2007-2008	5.2%	9.8%	5.3%	9.1%	7.1%	2.9%	0.6%	(3.0)%	(14.4)%	(15.0)%	(16.0)%	(15.7)%	(2.4)%
2008-2009	(13.8)	(16.2)	(14.8)	(15.5)	(14.3)	(13.6)	(12.2)	(12.6)	(6.0)	(6.1)	(5.7)	(4.4)	(11.5)
2009-2010	(7.9)	(7.7)	(5.2)	(4.0)	(3.6)	(4.2)	(6.4)	(5.8)	(5.6)	(4.7)	(4.8)	(4.3)	(5.3)
2010-2011	(0.8)	(2.0)	(2.4)	(5.2)	(6.0)	(3.5)	(2.6)	(2.6)	(5.7)	(0.8)	0.3	2.1	(2.5)
2011-2012	(2.1)	3.0	0.0	2.1	(0.1)								
	Percent of total												
2007	7.8%	7.1%	8.1%	7.7%	8.2%	8.5%	8.9%	9.1%	8.6%	8.9%	8.5%	8.5%	100.0%
2008	8.4	8.0	8.8	8.6	9.0%	9.0	9.2	9.0	7.5	7.7	7.3	7.4	100.0
2009	8.2	7.6	8.5	8.2	8.7%	8.8	9.1	8.9	8.0	8.2	7.8	8.0	100.0
2010	8.0	7.4	8.5	8.3	8.8%	8.9	9.0	8.9	8.0	8.3	7.8	8.0	100.0
2011	8.1	7.4	8.5	8.1	8.5%	8.8	9.0	8.9	7.7	8.4	8.0	8.4	100.0
5 year average (2007-2011)	8.1	7.5	8.5	8.2	8.6	8.8	9.1	9.0	8.0	8.3	7.9	8.1	100.0

Note: Data include domestic and international passengers enplaned on mainline and regional passenger airlines.

Source: San Diego County Regional Airport Authority records.

Figure 14
ENPLANED PASSENGER LOAD FACTOR
San Diego International Airport



Sources: San Diego County Regional Airport Authority and Official Airline Guides, Inc., online database, accessed November 2012.

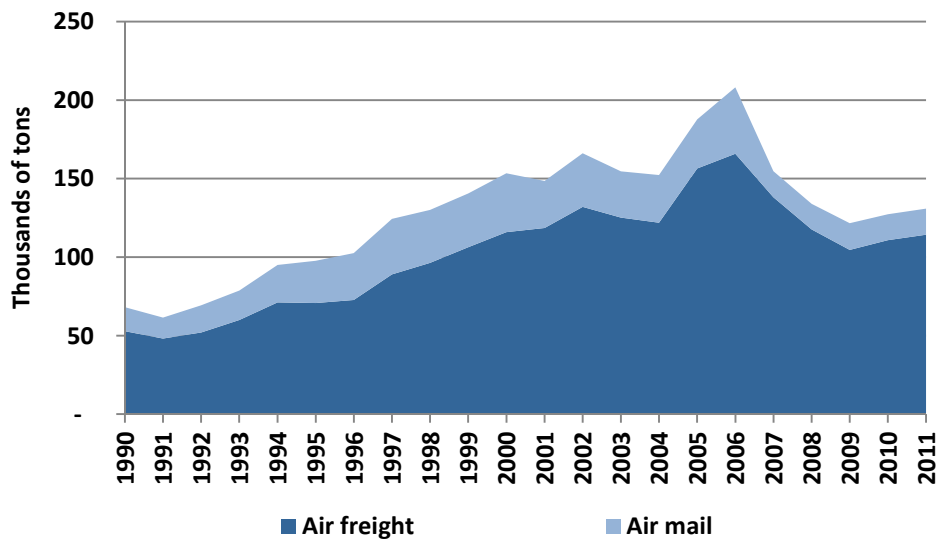
CHAPTER 4
HISTORICAL AIR CARGO

A review of air cargo activity at the Airport provided the foundation for the air cargo forecasts and included an analysis of: (1) overall trends in air cargo, domestic and International; (2) all-cargo airline market shares; and (3) monthly activity for air cargo and all-cargo airline landings.

HISTORICAL AIR CARGO TRENDS

The Airport is served by four all-cargo airlines—BAX Global, DHL, Federal Express, and United Parcel Service. Figure 15 and Table 17 present historical trends in air cargo at the Airport from 1990 through 2011. Total freight and mail at the Airport increased from 68,127 tons in 1990 to a peak of 207,992 in 2006 and then decreased to 130,850 tons in 2011, for an average increase of 3.1% per year between 1990 and 2011. Enplaned air cargo at the Airport accounted for 54% of total cargo tonnage (enplaned plus deplaned) in 2011, consistent with recent historical trends.

Figure 15
HISTORICAL AIR CARGO TRENDS
San Diego International Airport



Note: Sum of enplaned and deplaned cargo in tons.

Source: San Diego County Regional Airport Authority records.

Table 17
HISTORICAL AIR CARGO *(in tons)*
San Diego International Airport

Year	Air mail	Air freight	Total	Percent change	Percent of total Enplaned	Percent of total Deplaned
1990	15,306	52,821	68,127	--%	53%	47%
1991	13,322	48,174	61,496	(9.7%)	53%	47%
1992	17,373	51,975	69,348	13.1%	53%	47%
1993	18,800	59,910	78,710	13.1%	52%	48%
1994	23,822	71,167	94,989	21.1%	51%	49%
1995	26,935	70,732	97,667	3.1%	52%	48%
1996	29,789	72,725	102,514	5.1%	52%	48%
1997	35,328	88,981	124,309	21.1%	53%	47%
1998	33,671	96,341	130,012	5.1%	54%	46%
1999	34,291	106,271	140,562	8.1%	53%	47%
2000	37,527	115,843	153,370	9.1%	51%	49%
2001	30,016	118,483	148,498	(3.2%)	52%	48%
2002	34,118	131,932	166,050	12.1%	52%	48%
2003	29,449	125,157	154,606	(6.9%)	50%	50%
2004	30,417	121,840	152,257	(1.5%)	47%	53%
2005	31,296	156,410	187,705	23.1%	46%	54%
2006	42,221	165,771	207,992	11.1%	41%	59%
2007	16,653	138,036	154,689	(25.6%)	55%	45%
2008	16,337	117,579	133,916	(13.4%)	56%	44%
2009	16,931	104,607	121,538	(9.2%)	56%	44%
2010	16,437	110,824	127,261	5.1%	54%	46%
2011	16,658	114,192	130,850	3.1%	54%	46%
	Compound average annual percent increase (decrease)					
1990-2000	9.4%	8.2%	8.5%			
2000-2006	2.1%	6.1%	5.1%			
2006-2011	(17.0%)	(7.2%)	(8.9%)			
1990-2011	0.1%	4.1%	3.1%			

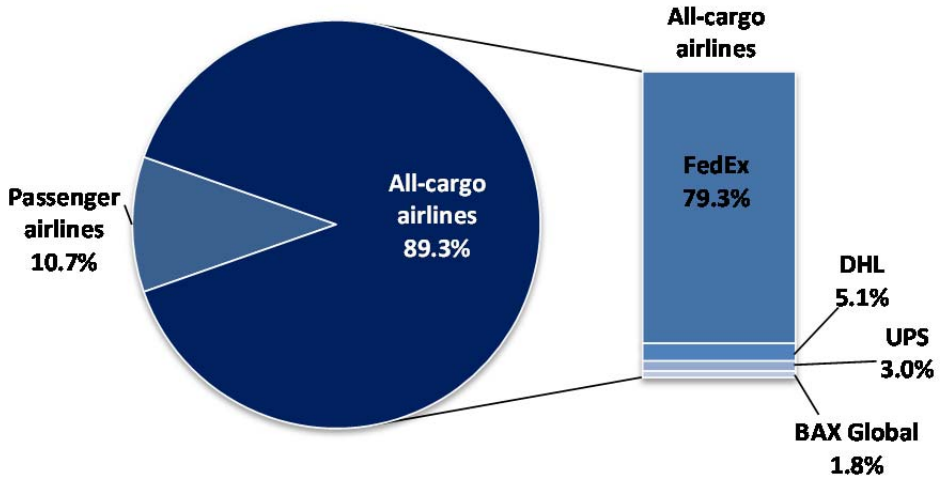
Note: Data include enplaned and deplaned air freight and mail on domestic and international flights.

Source: San Diego County Regional Airport Authority records.

AIRLINE SHARES OF AIR CARGO

Airline market shares of air cargo and mail at the Airport are shown in Figure 16. In 2011, all-cargo airlines accounted for 89.3% of air cargo at the Airport, and the remaining 10.7% was carried as belly cargo on passenger flights. Of the cargo airlines serving the Airport, FedEx accounted for the largest share of air cargo in 2011 (79.3%), followed by DHL with 5.1%, United Parcel Service (UPS) with 3.0%, and BAX Global with 1.8%, as shown on Figure 16.

Figure 16
AIRLINE SHARES OF AIR CARGO IN 2011
San Diego International Airport



Note: Sum of enplaned and deplaned cargo and freight and mail in tons

Source: San Diego County Regional Airport Authority records.

MONTHLY AIR CARGO

Table 18 presents monthly air cargo data for the Airport for January 2007 through May 2012. The monthly data show the seasonal variation in air cargo activity, with peak levels occurring typically in December and the lowest monthly activity occurring from January through February.

MONTHLY ALL-CARGO AIRLINE AIRCRAFT LANDINGS

Table 19 presents monthly all-cargo airline aircraft landings data for the Airport for January 2007 through May 2012.

Table 18
HISTORICAL AIR CARGO BY MONTH
San Diego International Airport

Year	January	February	March	April	May	June	July	August	September	October	November	December	Total
	Month												
2007	13,292	13,034	15,175	12,397	13,615	13,440	11,987	13,743	11,874	12,416	12,085	11,632	154,689
2008	12,201	11,890	11,868	12,255	11,765	10,807	11,615	11,460	10,068	10,341	9,415	10,231	133,916
2009	10,029	8,994	9,661	9,600	9,870	9,499	9,987	9,518	9,961	10,716	10,921	12,782	121,538
2010	9,876	9,654	10,901	10,561	10,285	10,350	11,413	10,296	10,333	11,178	10,484	11,929	127,261
2011	10,184	10,003	11,876	10,538	10,298	11,428	10,729	11,132	10,956	11,187	10,782	11,736	130,850
2012	10,344	11,218	12,158	10,467	11,040								
	Year-over-year percent increase (decrease)												
2007-2008	(8.2)%	(8.8)%	(21.8)%	(1.1)%	(13.6)%	(19.6)%	(3.1)%	(16.6)%	(15.2)%	(16.7)%	(22.1)%	(12.0)%	(13.4)%
2008-2009	(17.8)	(24.4)	(18.6)	(21.7)	(16.1)	(12.1)	(14.0)	(16.9)	(1.1)	3.6	16.0	24.9	(9.2)
2009-2010	(1.5)	7.3	12.8	10.0	4.2	9.0	14.3	8.2	3.7	4.3	(4.0)	(6.7)	4.7
2010-2011	3.1	3.6	8.9	(0.2)	0.1	10.4	(6.0)	8.1	6.0	0.1	2.8	(1.6)	2.8
2011-2012	1.6	12.1	2.4	(0.7)	7.2								
	Percent of total												
2007	8.6%	8.4%	9.8%	8.0%	8.8%	8.7%	7.7%	8.9%	7.7%	8.0%	7.8%	7.5%	100.0%
2008	9.1	8.9	8.9	9.2	8.8	8.1	8.7	8.6	7.5	7.7	7.0	7.6	100.0
2009	8.3	7.4	7.9	7.9	8.1	7.8	8.2	7.8	8.2	8.8	9.0	10.5	100.0
2010	7.8	7.6	8.6	8.3	8.1	8.1	9.0	8.1	8.1	8.8	8.2	9.4	100.0
2011	7.8	7.6	9.1	8.1	7.9	8.7	8.2	8.5	8.4	8.5	8.2	9.0	100.0
5-year average (2007-2011)	8.3	8.0	8.9	8.3	8.3	8.3	8.4	8.4	8.0	8.4	8.1	8.8	100.0

Note: Data include enplaned and deplaned air freight and mail on domestic and international flights.

Source: San Diego County Regional Airport Authority records.

Table 19

HISTORICAL ALL-CARGO AIRLINE LANDINGS BY MONTH

San Diego International Airport

Year	January	February	March	April	May	June	July	August	September	October	November	December	Total
	Month												
2007	610	598	616	564	624	592	586	620	564	614	600	558	7,146
2008	616	620	584	614	602	578	614	590	524	542	478	530	6,892
2009	612	582	584	598	548	570	596	548	558	590	510	648	6,944
2010	542	508	590	588	576	538	532	572	586	594	506	562	6,694
2011	566	530	634	570	544	540	498	542	528	478	474	548	6,452
2012	788	476	534	498	542								
	Year-over-year percent increase (decrease)												
2007-2008	1.0%	3.7%	(5.2)%	8.9%	(3.5)%	(2.4)%	4.8%	(4.8)%	(7.1)%	(11.7)%	(20.3)%	(5.0)%	(3.6)%
2008-2009	(0.6)	(6.1)	--	(2.6)	(9.0)	(1.4)	(2.9)	(7.1)	6.5	8.9	6.7	22.3	0.8
2009-2010	(11.4)	(12.7)	1.0	(1.7)	5.1	(5.6)	(10.7)	4.4	5.0	0.7	(0.8)	(13.3)	(3.6)
2010-2011	4.4	4.3	7.5	(3.1)	(5.6)	0.4	(6.4)	(5.2)	(9.9)	(19.5)	(6.3)	(2.5)	(3.6)
2011-2012	39.2	(10.2)	(15.8)	(12.6)	(0.4)								
	Percent of total												
2007	8.5%	8.4%	8.6%	7.9%	8.7%	8.3%	8.2%	8.7%	7.9%	8.6%	8.4%	7.8%	100.0%
2008	8.9	9.0	8.5	8.9	8.7	8.4	8.9	8.6	7.6	7.9	6.9	7.7	100.0
2009	8.8	8.4	8.4	8.6	7.9	8.2	8.6	7.9	8.0	8.5	7.3	9.3	100.0
2010	8.1	7.6	8.8	8.8	8.6	8.0	7.9	8.5	8.8	8.9	7.6	8.4	100.0
2011	8.8	8.2	9.8	8.8	8.4	8.4	7.7	8.4	8.2	7.4	7.3	8.5	100.0
5-year average (2007-2011)	8.6	8.3	8.8	8.6	8.5	8.3	8.3	8.4	8.1	8.2	7.5	8.3	100.0

Note: Data include enplaned and deplaned air freight and mail on domestic and international flights.

Source: San Diego County Regional Airport Authority records.

CHAPTER 5
HISTORICAL AIRCRAFT OPERATIONS

This chapter summarizes historical total aircraft operations at the Airport from 1990 through 2011. Aircraft operations include the total number of departures and arrivals by air carrier, air taxi and commuter, general aviation, and military aircraft. An aircraft operation is defined as either a takeoff or a landing at the Airport. Table 20 and Figure 17 present a summary of total aircraft operations at SDIA by type.

AIR CARRIER

Air carrier operations are those performed in revenue service by the passenger and all-cargo airlines serving the Airport. Included are scheduled flights, charter flights, diverted flights, and ferry operations (empty flights). The FAA defines an air carrier aircraft, for traffic counting purposes, as capable of carrying more than 60 passengers and provides a list of model types that are counted as air carrier operations (Appendix 3 in Order JO 7210.3W), even if the aircraft is conducting air freight operations.* As shown in Table 20, air carrier aircraft operations increased an average of 1.2% per year between 1990 and 2008. Since 2008, the number of air carrier operations at SDIA has decreased—an average of 3.7% per year between 2008 and 2011, reflecting the effects of the economic recession and airline systemwide capacity reductions.

AIR TAXI AND COMMUTER

Air taxi and commuter operations consist of unscheduled operations of "for hire" air taxis and the scheduled operations of commuter airlines, including regional affiliate airlines operating aircraft with less than 60 seats. The FAA defines air taxi and commuter operations as those performed by aircraft other than those listed in Appendix 3 noted above and which use three-letter company designators. Fractional ownership and management companies and corporate flight departments that use a three-letter company designator are included in air taxi operations. As shown in Table 20, air taxi and commuter aircraft operations decreased an average of 0.6% per year between 1990 and 2008. Since 2008, air taxi and commuter have decreased an average of 16.4% per year reflecting increased fuel costs and the comparatively higher cost of operating small regional jet aircraft.

*U.S. Department of Transportation, Federal Aviation Administration, Order JO 7210.3W, February 11, 2010, http://www.faa.gov/air_traffic/publications.

Table 20
HISTORICAL AIRCRAFT OPERATIONS
San Diego International Airport

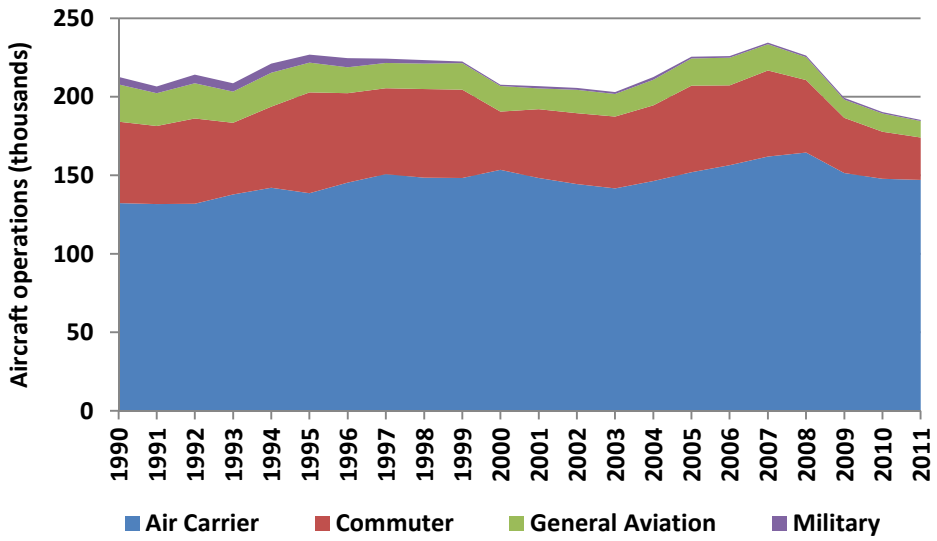
	Commercial flights						
	Air carrier *(a)*	Commuter/ air taxi *(b)*	Subtotal	General aviation	Military	Total	Percent increase (decrease)
1990	132,211	51,889	184,100	23,752	4,701	212,553	--
1991	131,661	49,616	181,277	20,934	4,276	206,487	(2.9)
1992	131,853	54,273	186,126	22,378	5,479	213,983	3.6
1993	137,779	45,628	183,407	19,860	5,239	208,506	(2.6)
1994	141,968	51,695	193,663	21,536	5,845	221,044	6.0
1995	138,550	64,118	202,668	19,009	5,038	226,715	2.6
1996	145,250	56,983	202,233	16,514	5,719	224,466	(1.0)
1997	150,695	54,701	205,396	16,008	2,791	224,195	(0.1)
1998	148,472	56,413	204,885	16,114	2,258	223,257	(0.4)
1999	148,173	56,300	204,473	16,847	1,036	222,356	(0.4)
2000	153,371	37,168	190,539	16,282	823	207,644	(6.6)
2001	148,262	43,762	192,024	13,239	1,451	206,714	(0.4)
2002	144,347	45,149	189,496	14,828	1,229	205,553	(0.6)
2003	141,605	45,762	187,367	14,314	1,197	202,878	(1.3)
2004	146,270	48,190	194,460	16,297	1,711	212,468	4.7
2005	151,925	55,031	206,956	17,328	1,139	225,423	6.1
2006	156,335	50,885	207,220	17,579	985	225,784	0.2
2007	161,896	54,788	216,684	16,644	1,042	234,370	3.8
2008	164,382	46,215	210,597	14,501	1,059	226,157	(3.5)
2009	151,390	35,091	186,481	11,624	1,105	199,210	(11.9)
2010	147,726	29,891	177,617	11,612	908	190,137	(4.6)
2011	146,990	27,044	174,034	10,406	703	185,143	(2.6)
	Average annual percent increase (decrease)						
1990-2000	1.5%	(3.3)%	0.3%	(3.7)%	(16.0)%	(0.2)%	
2000-2008	0.9	2.8	1.3	(1.4)	3.2	1.1	
2008-2011	(3.7)	(16.4)	(6.2)	(10.5)	(12.8)	(6.5)	
1990-2008	1.2	(0.6)	0.7	(2.7)	(7.9)	0.3	
1990-2011	0.5	(3.1)	(0.3)	(3.9)	(8.7)	(0.7)	

Note: Sum of takeoffs and landings.

(a) Includes all-cargo carrier operations.
(b) Includes scheduled and for-hire service passenger and cargo service on aircraft with less than 60 seats.

Source: San Diego County Regional Airport Authority records.

Figure 17
HISTORICAL AIRCRAFT OPERATIONS
San Diego International Airport



Note: Sum of takeoffs and landings.

Source: San Diego County Regional Airport Authority records.

GENERAL AVIATION

General aviation operations include all civil aircraft operations not classified as air carrier or air taxi and commuter operations. As shown in Table 20, general aviation aircraft operations decreased an average of 3.9% per year between 1990 and 2011. According to the FAA 2011 TAF, a total of 6 general aviation aircraft were based at the Airport in 2011, comprised entirely of jet engine aircraft.

MILITARY

Military aircraft operations at the Airport have averaged approximately 1,100 operations per year from 2000 through 2011. In 2011, military operations totaled 703, less than the 12-year average. Historically, military operations have varied with geopolitical trends.

MONTHLY AIRCRAFT OPERATIONS

Table 21 presents monthly total aircraft operations data for the Airport for January 2007 through May 2012. The monthly data show the seasonal variation in total aircraft operations, with July and August each accounting for 9% of annual operations in 2011. From 2007 through 2011, July and August accounted for the peak share of annual aircraft operations at the Airport, with an average of approximately 9% of annual operations.

Table 21

HISTORICAL AIRCRAFT OPERATIONS BY MONTH

San Diego International Airport

Year	January	February	March	April	May	June	July	August	September	October	November	December	Total
	Month												
2007	18,383	16,809	18,803	17,894	19,161	19,852	20,809	21,720	20,229	20,946	20,071	19,693	234,370
2008	19,176	18,339	18,985	19,572	20,357	20,392	20,705	20,120	17,380	17,692	16,707	16,732	226,157
2009	16,539	15,238	16,601	16,382	17,330	17,357	18,168	17,876	16,051	16,419	15,471	15,778	199,210
2010	15,149	14,026	16,028	15,768	16,930	16,845	17,282	17,085	15,147	15,818	14,850	15,209	190,137
2011	15,018	13,676	15,646	14,839	15,720	15,891	16,598	16,494	15,081	15,604	14,970	15,606	185,143
2012	14,820	14,243	15,793	15,111	15,706								
	Year-over-year percent increase (decrease)												
2007-2008	4.3%	9.1%	1.0%	9.4%	6.2%	2.7%	(0.5%)	(7.4%)	(14.1%)	(15.5%)	(16.8%)	(15.0%)	(3.5%)
2008-2009	(13.8)	(16.9)	(12.6)	(16.3)	(14.9)	(14.9)	(12.3)	(11.2)	(7.6)	(7.2)	(7.4)	(5.7)	(11.9)
2009-2010	(8.4)	(13.8)	(3.5)	(3.7)	(2.3)	(2.9)	(4.9)	(4.4)	(5.6)	(3.7)	(4.0)	(3.6)	(4.6)
2010-2011	(0.9)	(8.4)	(2.4)	(5.9)	(7.1)	(5.7)	(4.0)	(3.5)	(0.4)	(1.4)	0.8	2.6	(2.6)
2011-2012	(1.3)	4.1	0.9	1.8	(0.1)								
	Percent of total												
2007	7.8%	7.2%	8.0%	7.6%	8.2%	8.5%	8.9%	9.3%	8.6%	8.9%	8.6%	8.4%	100.0%
2008	8.5	8.1	8.4	8.7	9.0	9.0	9.2	8.9	7.7	7.8	7.4	7.4	100.0
2009	8.3	7.6	8.3	8.2	8.7	8.7	9.1	9.0	8.1	8.2	7.8	7.9	100.0
2010	8.0	7.4	8.4	8.3	8.9	8.9	9.1	9.0	8.0	8.3	7.8	8.0	100.0
2011	8.1	7.4	8.5	8.0	8.5	8.6	9.0	8.9	8.1	8.4	8.1	8.4	100.0
5-year average	8.1	7.5	8.3	8.2	8.6	8.7	9.0	9.0	8.1	8.4	7.9	8.0	100.0

Note: Data include passenger, cargo, general aviation, and military operations.

Source: San Diego County Regional Airport Authority records.

CHAPTER 6
AVIATION DEMAND FORECASTS

This chapter summarizes the forecasts of enplaned passengers, air cargo, and total aircraft operations for SDIA, including the forecast approach, methodology, and assumptions. As noted earlier, the baseline forecasts presented in this report are "unconstrained" and, therefore, do not include specific assumptions about physical, regulatory, environmental or other impediments to aviation activity growth. Forecasts of aviation activity are presented for enplaned passengers, air cargo, and aircraft operations, including passenger, all-cargo, general aviation, and military operations. Using calendar year 2011 as the base year, annual forecasts were prepared for five future demand years—2016, 2021, 2026, 2031, and 2050. In addition, aviation activity for 2012 was estimated based on year to date activity (January through May 2012) available when this report was prepared, as well as future flight schedule data provided by Official Airline Guides, Inc..

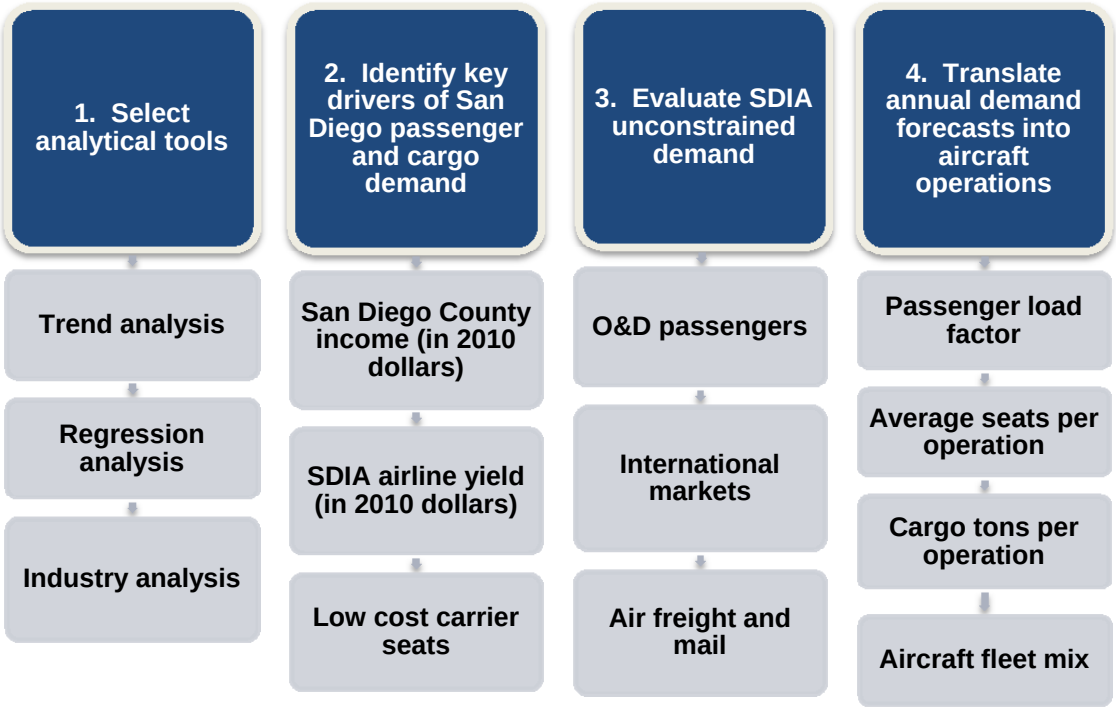
ENPLANED PASSENGERS

The key elements considered in the preparation of passenger forecasts for the Airport included (1) SDIA's large origin and destination (O&D) passenger base, (2) role as the primary commercial service airport in San Diego County, and (3) role as the twelfth busiest airport for Southwest Airlines and (4) the key factors affecting future passenger traffic such as national and global economic conditions, oil price volatility, and airline industry trends.

Forecast Approach and Methodology

As shown in Figure 18, the forecast approach incorporated a multi-tiered approach to evaluate passenger and cargo traffic at SDIA. It was recognized that no one approach would provide input on all of the key factors that affect aviation demand in San Diego County. For example, an econometric analysis would provide input on the relationships between historical domestic and international passengers and regional economic conditions but little to no input on such factors as (1) the role of individual markets in airline scheduling and service decisions, (2) recent trends in the airline industry that have affected an airline's decisions in route planning and aircraft acquisition, and (3) the effect of low-cost carrier service on passenger traffic. Input from these factors is important to the development of reliable forecasts that can serve as the basis for planning efforts at the Airport.

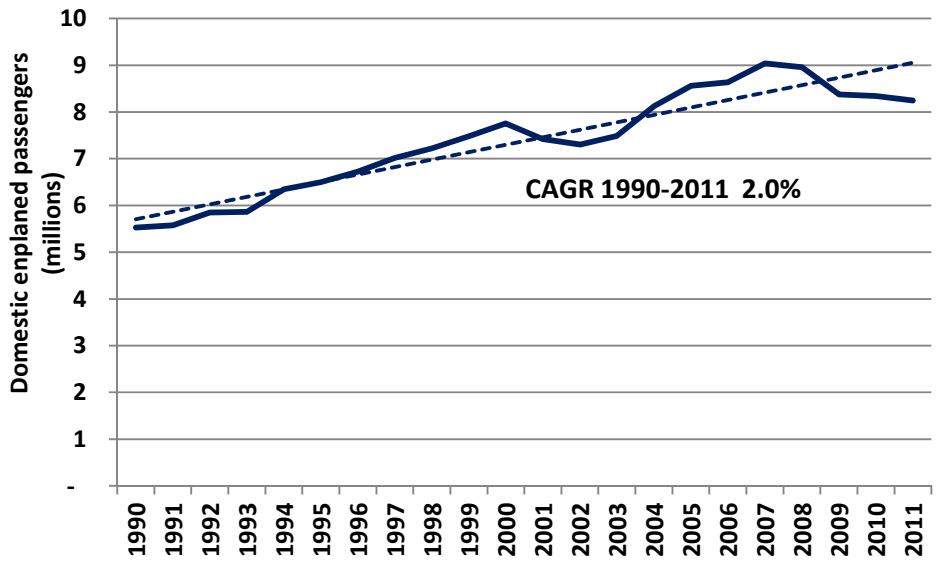
Figure 18
UNCONSTRAINED FORECAST APPROACH
San Diego County Passenger Demand



Historical Trend Analysis

Trend analysis is used in aviation forecasting to examine changes in traffic characteristics or underlying factors over time. Simple mathematical techniques such as linear and exponential trends are used to represent changes in the historical data. The calculation of compound average annual growth rates is an example of trend analysis and is frequently used in aviation forecasting to benchmark future growth against historical trends. As shown on Figure 19, the compound average annual growth rate for domestic enplaned passengers in San Diego County is 2.0% between 1990 and 2011. Economic cycles account for a large share of the variance in domestic passenger trends since 1990. In recent years, increasing fuel prices and airline reductions in systemwide capacity contributed to decreases in domestic passenger traffic at U.S. airports, including SDIA.

Figure 19
HISTORICAL TREND ANALYSIS – DOMESTIC ENPLANED PASSENGERS
San Diego International Airport



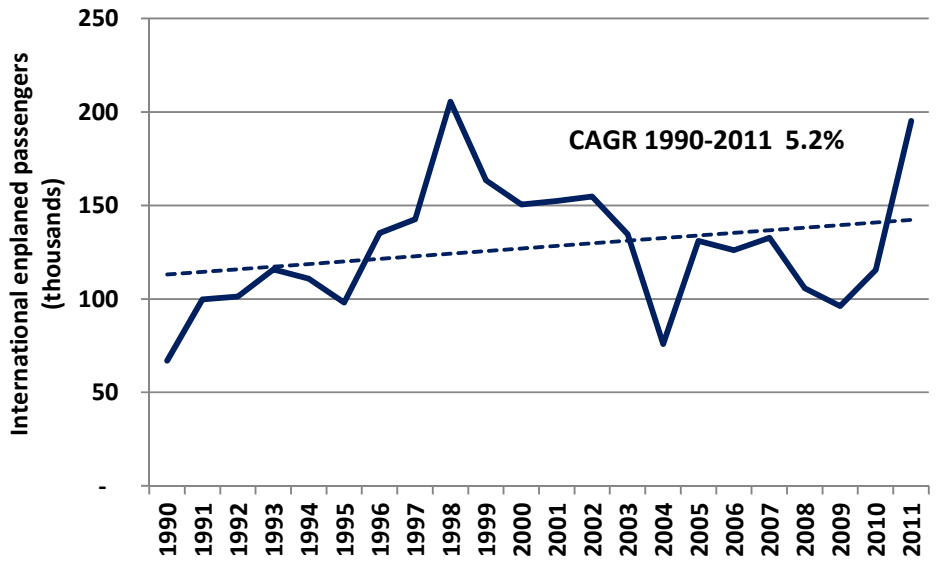
CAGR = Compound average annual growth rate

Source: San Diego County Regional Airport Authority records.

Similarly, as shown on Figure 20, the compound average annual growth rate for international passengers at SDIA is 5.2% per year between 1990 and 2011. International passenger service and traffic at SDIA has varied significantly since 1990.

Although trend analysis can be a valuable benchmarking tool, this technique does not model causal relationships, relies on the assumption that historical trends will continue into the future, and is unable to reflect changes in the underlying causal factors such as economic conditions or fuel prices. As a result, regression analysis was used as the primary basis for forecasting passenger demand at SDIA with the trend analysis informing the regression results.

Figure 20
HISTORICAL TREND ANALYSIS – INTERNATIONAL PASSENGERS
San Diego International Airport



CAGR = Compound average annual growth rate

Source: San Diego County Regional Airport Authority records.

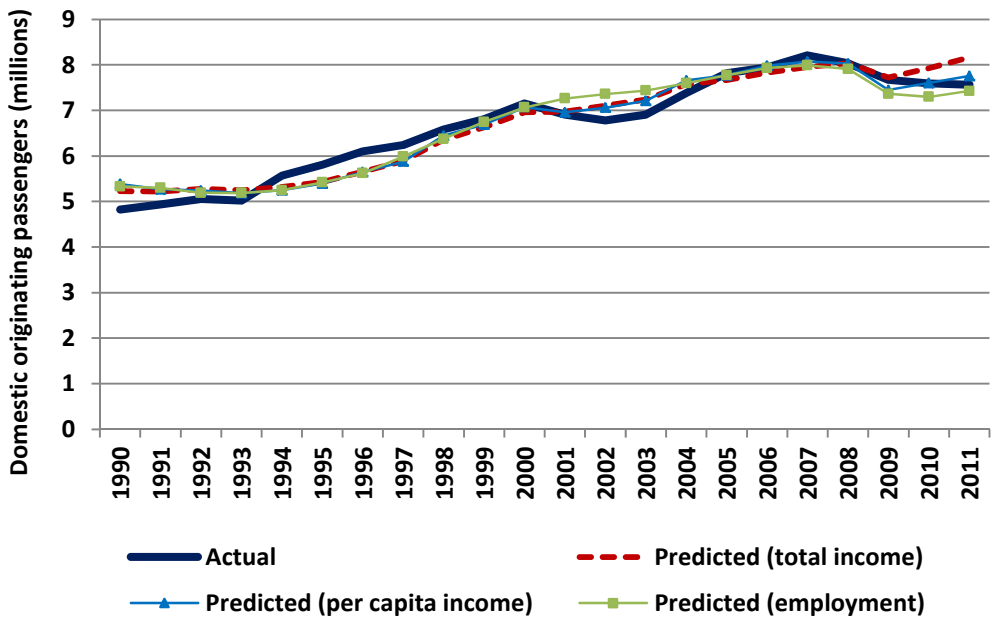
Regression Analysis

In regression analysis, a mathematical equation defines causal relationships between aviation activity and socioeconomic, airline travel cost, service, and other factors. This analytical tool typically requires independent forecasts of causal factors to produce aviation forecasts. To prepare passenger forecasts for SDIA, regressions analyses of domestic originating and international passenger activity were conducted.

Domestic Originating Passengers. The trend in domestic originating passengers can be explained by a regression analysis relating passenger trends to economic and airline industry metrics. Typically, a passenger regression model includes an income variable (e.g., total personal income, per capita income, or GDP—all expressed in constant dollars) and a cost of travel variable (e.g., yield or airfare—also expressed in constant dollars). The primary objective is to represent the two key variables that affect air travel demand, i.e., how much people have to spend and how much it costs to travel. Other variables may be important as well, depending on the traffic market characteristics.

As shown in Figure 21, the historical trend in domestic originating passengers relates strongly to regional economic activity. Regression models which included economic variables such as total income, per capita personal income, or employment in San Diego County explained more than 90% of the historical variation in domestic originating passengers.

Figure 21
ECONOMIC VARIABLES
HISTORICAL AND PREDICTED DOMESTIC ORIGINATING PASSENGERS
San Diego International Airport

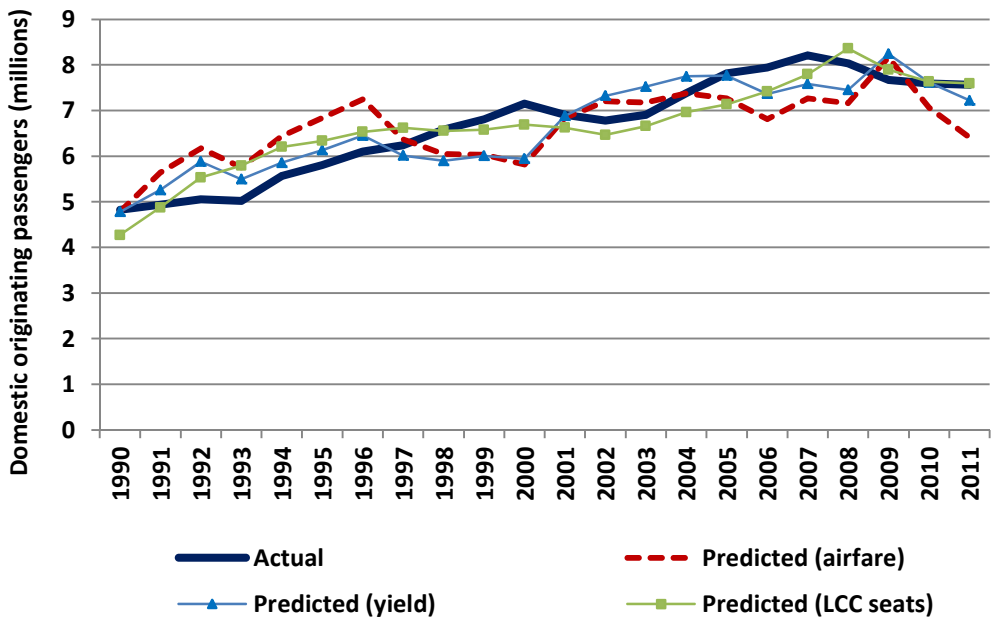


Sources: Actual—U.S. Department of Transportation, *Origin-Destination Survey of Airline Passenger Traffic, Domestic,* online database, accessed December 2011.
Predicted—LeighFisher, July 2012.

Figure 22 presents regression models which included cost of travel variables such as airfare, airline yield, or the number of low cost carrier seats* at SDIA explained 46% to 82% of the historical variation in domestic originating passengers.

*The number of low cost carrier seats at SDIA was used as a proxy for the cost of travel because increased low cost carrier competition at an airport has a downward influence on the cost of travel. That is, average airfares typically decrease with the addition of low cost carrier service and stimulate additional passenger traffic at an airport.

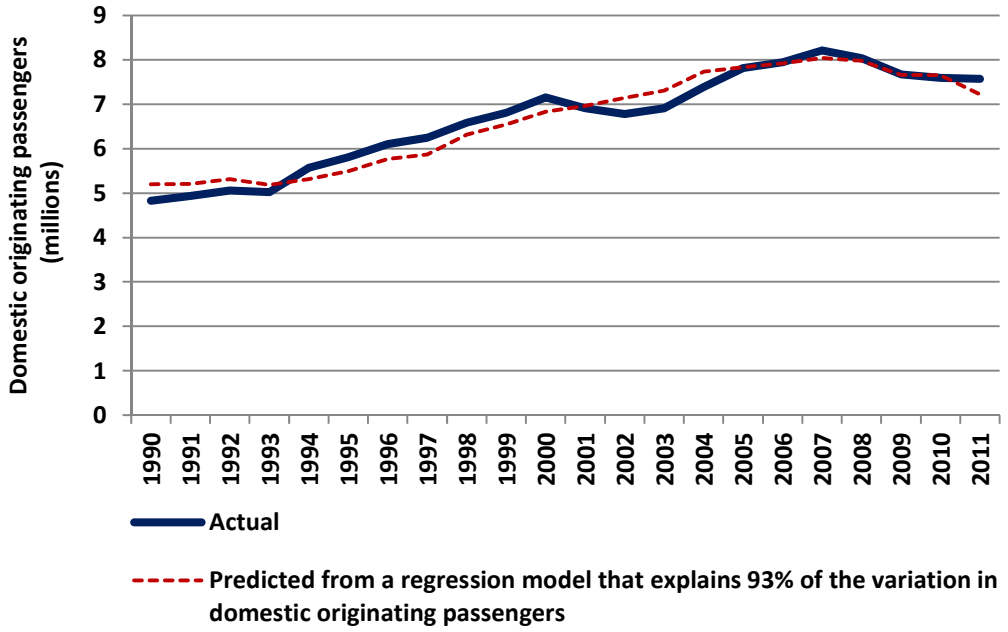
Figure 22
COST OF TRAVEL VARIABLES
HISTORICAL AND PREDICTED DOMESTIC ORIGINATING PASSENGERS
San Diego International Airport



Sources: Actual—U.S. Department of Transportation, *Origin-Destination Survey of Airline Passenger Traffic, Domestic,* online database, accessed December 2011.
Predicted—LeighFisher, July 2012.

A representative regression model which includes an income variable and a cost of travel variable is shown on Figure 23. The historical trend in domestic originating passengers at SDIA relates strongly to the predicted values from a regression model which includes per capita personal income in San Diego County, in 2011 dollars, and airline yield (the airfare paid per mile flown) at SDIA, in 2011 dollars. The forecasts of domestic originating passengers at SDIA were based on projections of per capita personal income in San Diego County, presented in Table 3, and projections of SDIA airline yield based on the FAA's national forecasts.

Figure 23
REPRESENTATIVE MODEL
HISTORICAL AND PREDICTED DOMESTIC ORIGINATING PASSENGERS
San Diego International Airport



Sources: Actual—U.S. Department of Transportation, *Origin-Destination Survey of Airline Passenger Traffic, Domestic,* online database, accessed December 2011.
Predicted—LeighFisher, July 2012.

International Passengers. As shown in Figure 20, the number of international passengers has varied significantly since 1990 and, as a result, international passenger trends at SDIA do not relate well to economic and airline industry metrics. Therefore, a regression model was not developed to forecast SDIA international passengers. Instead, bottom up forecasts of international passengers and service were developed and benchmarked to industry forecasts of international passenger traffic by world region prepared by Airbus, The Boeing Corporation, and International Air Transport Association (IATA).

Industry Analysis

Industry trends, both past and present, were important in considering the reasonableness of the forecasts generated by the statistical analysis and evaluating the capacity of the airline industry to support the forecast passenger demand. For example, the current fleet mix and orders for new aircraft by airlines serving SDIA could affect the realization of the forecasts. Similarly, the potential for new entrant airlines and the development of additional low cost carrier service could accelerate growth beyond that forecast. Such factors are not reflected in the statistical analysis since many have not yet occurred.

Enplaned Passenger Forecast Assumptions

Forecasts of enplaned passengers were developed taking into account analyses of the economic basis for airline traffic, analyses of historical airline traffic, and an assessment of the key factors that may affect future airline traffic, as discussed previously. In general, it was assumed that, in the long term, changes in

airline traffic at the Airport will occur largely as a function of growth in the population and economy of the Airport service region and changes in airline service. It was also assumed that continued development of airline service at the Airport will not be constrained by the availability of aviation fuel, long-term limitations in airline fleet capacity, limitations in the capacity of the air traffic control system or the Airport, or government policies or actions that restrict growth. Also considered were recent and potential developments in the national economy and in the air transportation industry as they have affected or may affect airline traffic at the Airport.

For 2012 through FY 2030, it was assumed that:

- The U.S. economy will continue a gradual recovery from the economic recession and experience sustained GDP growth averaging between 2.0% and 2.5% per year, consistent with the historical trends and long-term growth projections (see Table 7).
- The economy of San Diego County (as measured by employment and per capita income) will increase at a rate comparable to that of the U.S. as a whole (see Table 3).
- The economies of the world regions will experience sustained growth in GDP, (consistent with the historical trends and long-term growth projections (see Table 7).
- SDIA will continue to be the primary commercial service airport for San Diego County and one of the top 20 busiest airports for Southwest Airlines.
- A generally stable international political environment and safety and security precautions will ensure airline traveler confidence in aviation without imposing unreasonable inconveniences.
- There will be no major disruption of airline service or airline travel behavior as a result of international hostilities or terrorist acts or threats.
- Aviation fuel prices will stabilize at levels that are historically high, but lower than the record prices reached in mid-2008.
- Competition among the airlines serving the Airport will ensure the continued availability of competitive airfares.

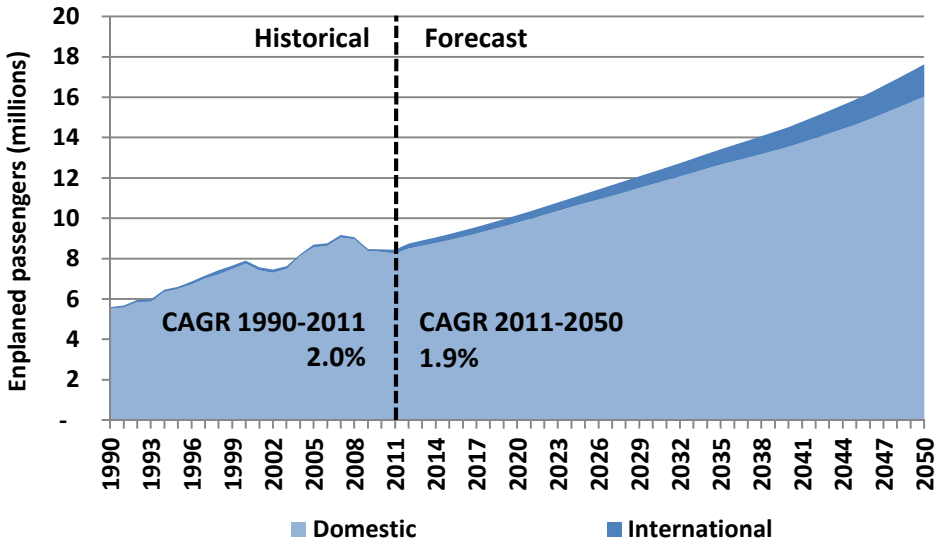
Estimated Enplaned Passengers in 2012

In 2012, the number of enplaned passengers at the Airport is estimated to total 8.7 million, a 3.6% increase from the 2011 total, reflecting actual data for the first 5 months of 2012 (January through May) and published flight schedules for the Airport.

Enplaned Passenger Forecasts

As shown on Figure 24 and in Table 22, the number of passengers at the Airport is forecast to increase from 8.4 million passengers in 2011 to 17.6 million in 2050, an average rate of 1.9% per year. The number of domestic passengers at the Airport is forecast to increase an average of 1.7% per year between 2011 and 2030, compared with an average increase of 5.5% in international passenger traffic.

Figure 24
HISTORICAL AND FORECAST ENPLANED PASSENGERS
San Diego International Airport



Note: The forecasts presented in this figure were prepared using the information and assumptions given in the accompanying text. Inevitably, some of the assumptions used to develop the forecasts will not be realized and unanticipated events and circumstances may occur. Therefore, there are likely to be differences between the forecast and actual results, and those differences may be material.

CAGR = Compound annual growth rate

Sources: Historical: San Diego County Regional Airport Authority records.
Forecast: LeighFisher, July 2012.

Table 22

ENPLANED PASSENGER FORECASTS - BASELINE

San Diego International Airport

	Historical	Estimated	Forecast				
	2011	2012	2016	2021	2026	2031	2050
Domestic							
Mainline airline	3,997,137	4,112,800	4,391,500	4,826,700	5,290,500	5,751,100	7,761,100
Regional airline	431,990	419,100	447,500	491,800	539,100	586,000	790,800
Low cost carrier	3,818,289	3,964,700	4,233,300	4,652,900	5,100,000	5,544,000	7,481,600
Domestic total	8,247,416	8,496,600	9,072,300	9,971,400	10,929,600	11,881,100	16,033,500
International	195,196	249,600	303,400	387,200	494,200	630,800	1,593,900
Total Airport	8,442,612	8,746,200	9,375,700	10,358,600	11,423,800	12,511,900	17,627,400
Percent of total Airport							
Domestic	97.7%	97.1%	96.8%	96.3%	95.7%	95.0%	91.0%
International	2.3%	2.9%	3.2%	3.7%	4.3%	5.0%	9.0%

	Compound annual percent increase (decrease)					
	2011-2012	2011-2016	2016-2021	2021-2026	2026-2031	2031-2050
Domestic						
Mainline airline	2.9%	1.9%	1.9%	1.9%	1.7%	1.6%
Regional airline	(3.0)	0.7	1.9	1.9	1.7	1.6
Low cost carrier	3.8	2.1	1.9	1.9	1.7	1.6
Domestic total	3.0	1.9	1.9	1.9	1.7	1.6
International	27.9	9.2	5.0	5.0	5.0	5.0
Total Airport	3.6	2.1	2.0	2.0	1.8	1.8

Note: The forecasts presented in this table were prepared using the information and assumptions given in the accompanying text. Inevitably, some of the assumptions used to develop the forecasts will not be realized and unanticipated events and circumstances may occur. Therefore, there are likely to be differences between the forecast and actual results, and those differences may be material.

Sources: Historical: San Diego County Regional Airport Authority records.
Forecast: LeighFisher, July 2012.

AIR CARGO

The key elements considered in the preparation of cargo forecasts for the Airport included (1) historical cargo trends at SDIA, (2) shares of passenger and all-cargo airline activity, and (3) the key factors affecting future cargo activity such as national and global economic conditions, oil price volatility, and airline industry trends.

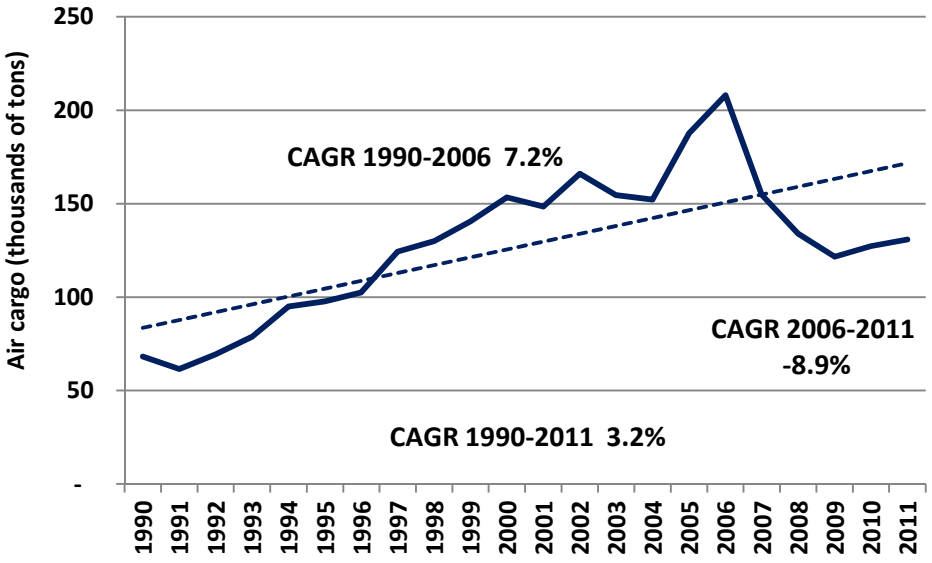
Forecast Approach and Methodology

Similar to the forecast approach for passengers as shown previously in Figure 18, the methodology for preparing cargo forecasts incorporated a multi-tiered approach to evaluate cargo activity at SDIA.

Historical Trend Analysis

As shown on Figure 25, total air cargo (freight and mail) at SDIA increased an average of 3.2% between 1990 and 2011, including continued increases between 1990 and 2006 averaging 7.2% per year. Since 2006, air cargo at the Airport has decreased an average decrease of 8.9% per year between 2006 and 2011, reflecting the effects of the 2008-2009 economic recession, fuel price volatility, and consolidation in the air cargo industry.

Figure 25
HISTORICAL TREND ANALYSIS – AIR CARGO
San Diego International Airport



Notes: CAGR = Compound average annual growth rate
Includes enplaned and deplaned freight and mail.

Source: San Diego County Regional Airport Authority records.

Regression Analysis

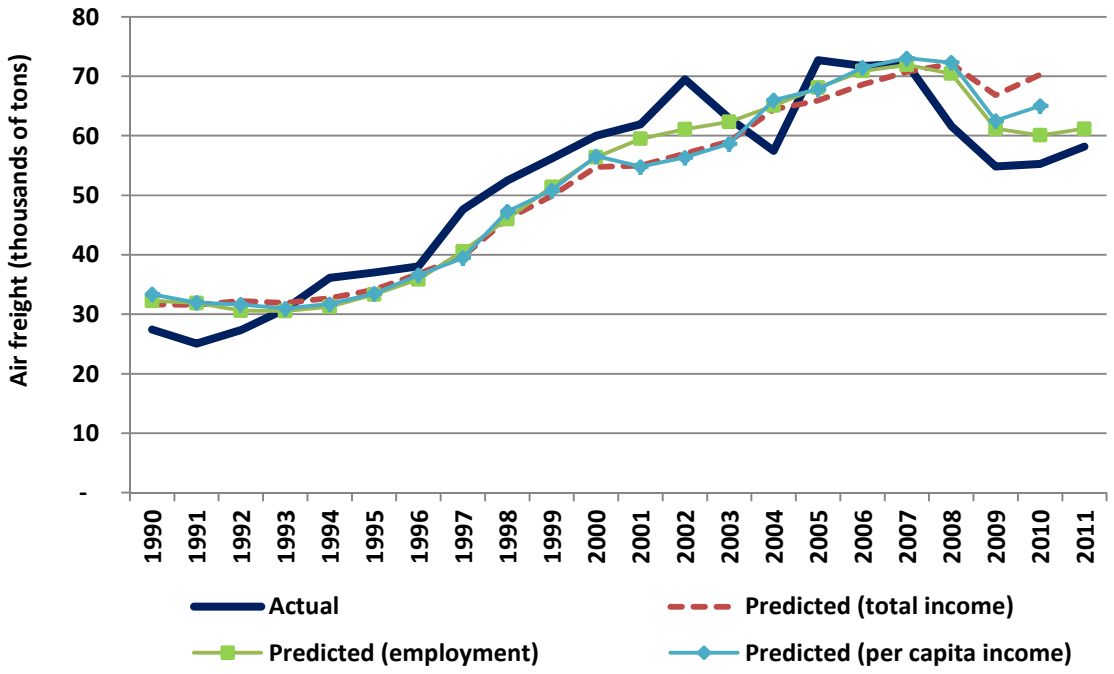
To prepare air cargo forecasts for SDIA, regressions analyses of air freight were conducted. Regression analyses of air mail were not conducted because of the small volume of mail relative to freight and the volatility in air mail volume historically, reflecting year-to-year changes in contracts with the U.S. Postal Service.

Similar to the analysis of passenger traffic, the trend in air freight can be explained by a regression analysis relating cargo trends to economic and airline industry metrics. Typically, an air cargo regression model includes an economic variable (e.g., total personal income, per capita income, or GDP—all expressed in constant dollars) and a cost variable (e.g., price of oil, jet fuel—also expressed in constant dollars). It is important to note that, unlike the analysis of passenger demand, cost variables specific to SDIA cargo activity are not available. The primary objective is to represent the two key variables that affect air cargo demand, i.e., economic activity driving the demand for air cargo services and how much it costs to transport cargo. Other variables may be important as well, depending on the traffic market characteristics.

As shown in Figure 26, the historical trend in air freight relates strongly to regional economic activity. Regression models which included economic variables such as total income, per capita personal income, or employment in San Diego County explained 83% to 89% of the historical variation in air freight. In contrast, regression models which included only cost of travel variables such as West Texas Intermediate (WTI) oil prices explained a small share of the historical variation in air freight.

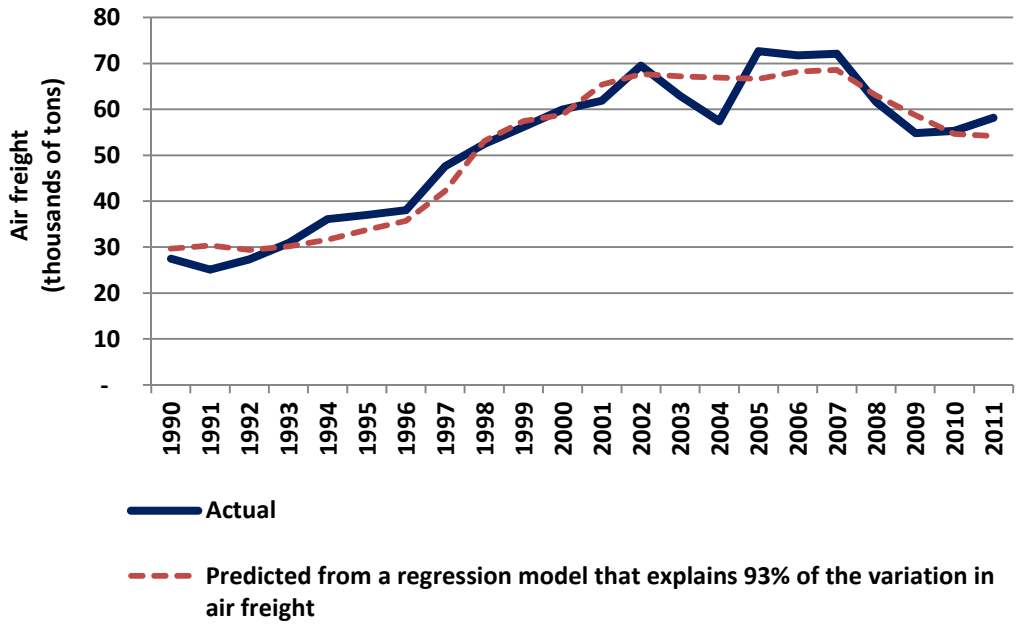
A representative regression model which includes an economic variable and a cost variable is shown on Figure 27. The historical trend in air freight at SDIA relates strongly to the predicted values from a regression model based which includes employment in San Diego County and West Texas Intermediate (WTI) oil prices, in 2011 dollars. The forecasts of air freight at SDIA were based on projections of employment in San Diego County, presented in Table 3, and projections of oil prices based on the FAA's national forecasts.

Figure 26
ECONOMIC VARIABLES
HISTORICAL AND PREDICTED AIR FREIGHT
San Diego International Airport



Sources: Actual—San Diego County Regional Airport Authority records.
Predicted—LeighFisher, July 2012.

Figure 27
REPRESENTATIVE MODEL
HISTORICAL AND PREDICTED AIR FREIGHT
San Diego International Airport



Sources: Actual— San Diego County Regional Airport Authority records.
Predicted—LeighFisher, July 2012.

Industry Analysis

Industry trends, both past and present, were important in considering the reasonableness of the forecasts generated by the statistical analysis and evaluating the capacity of the airline industry to support the forecast air freight demand. In recent years, the cargo industry has been adversely affected by increased fuel prices, the world economic recession, and competition from other transportation modes. Although these factors have already had an impact on the cargo industry, the potential for continued adjustments is not reflected in the statistical analysis.

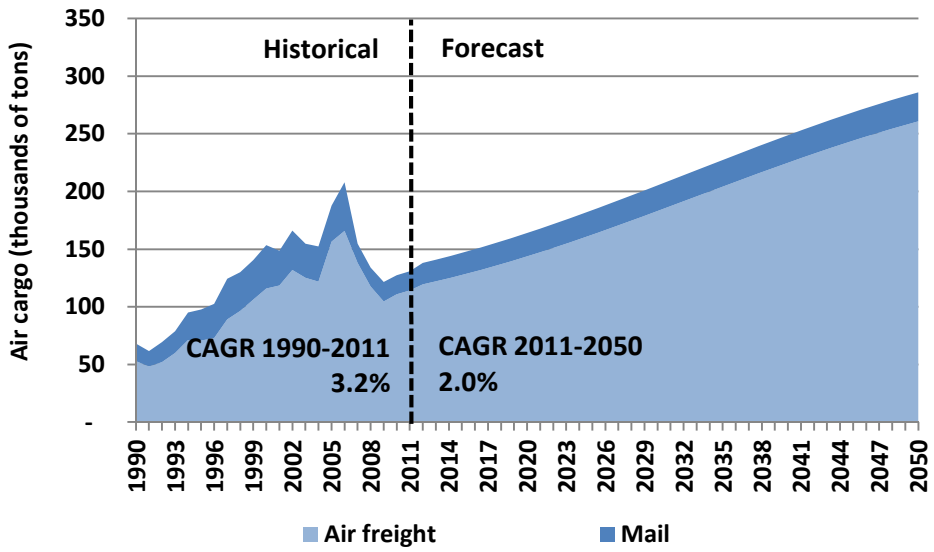
Estimated Air Cargo in 2012

In 2012, total air cargo at the Airport is estimated to total 138,000 tons, a 5.5% increase from the 2011 total, reflecting actual data for the first 5 months of 2012 (January through May).

Air Cargo Forecasts

As shown on Figure 28 and in Table 23, total air cargo at the Airport is forecast to increase from 130,850 tons in 2011 to 286,000 tons in 2050, an average rate of 2.0% per year. Air freight at the Airport is forecast to increase an average of 2.1% per year between 2011 and 2050, compared with an average increase of 1.1% in mail.

Figure 28
HISTORICAL AND FORECAST AIR CARGO
San Diego International Airport



Note: The forecasts presented in this figure were prepared using the information and assumptions given in the accompanying text. Inevitably, some of the assumptions used to develop the forecasts will not be realized and unanticipated events and circumstances may occur. Therefore, there are likely to be differences between the forecast and actual results, and those differences may be material.

CAGR = Compound average annual growth rate
Includes enplaned and deplaned air cargo.

Sources: Historical: San Diego County Regional Airport Authority records.
Forecast: LeighFisher, July 2012.

Table 23
AIR CARGO FORECASTS – BASELINE *(in tons)*
San Diego International Airport

	Historical 2011	Estimated 2012	Forecast 2016	2021	2026	2031	2050
Air freight	114,192	119,500	130,400	147,200	166,500	187,300	260,800
Mail	16,658	18,500	19,500	20,500	21,500	22,400	25,200
Total air cargo	130,850	138,000	149,900	167,700	188,000	209,700	286,000
Percent of total							
Enplaned	54.4%	54.3%	54.4%	54.3%	54.4%	54.4%	54.4%
Deplaned	45.6%	45.7%	45.6%	45.7%	45.6%	45.6%	45.6%
Enplaned air freight							
Domestic							
Cargo airline	52,064	51,900	57,000	64,800	73,900	83,500	117,400
Passenger airline	3,991	4,100	4,300	4,700	5,200	5,800	8,200
Domestic total	56,055	56,000	61,300	69,500	79,100	89,300	125,600
International	2,124	4,600	5,000	5,700	6,400	7,300	10,200
Air freight total	58,179	60,600	66,300	75,200	85,500	96,600	135,800
Enplaned mail							
Cargo airline	10,800	11,800	12,700	13,300	14,000	14,600	16,400
Passenger airline	2,146	2,600	2,500	2,600	2,700	2,800	3,100
Mail total	12,946	14,400	15,100	16,000	16,700	17,400	19,500
Total enplaned air cargo	71,125	75,000	81,400	91,200	102,200	114,000	155,300

	Compound annual percent increase (decrease) 2011-2012	2011-2016	2016-2021	2021-2026	2026-2031	2031-2050
Air freight	4.6%	2.7%	2.5%	2.5%	2.4%	1.8%
Mail	11.1	3.2	1.0	1.0	0.8	0.6
Total air cargo	5.5	2.8	2.3	2.3	2.2	1.6
Enplaned air freight						
Domestic						
Cargo airline	(0.3)	1.8	2.6	2.7	2.5	1.8
Passenger airline	2.7	1.5	1.8	2.0	2.2	1.8
Domestic total	(0.1)	1.8	2.5	2.6	2.5	1.8
International	116.6	18.7	2.7	2.3	2.7	1.8
Air freight total	4.2	2.6	2.6	2.6	2.5	1.8
Enplaned mail						
Cargo airline	9.3	3.3	0.9	1.0	0.8	0.6
Passenger airline	21.2	3.1	0.8	0.8	0.7	0.5
Mail total	11.2	3.1	1.2	0.9	0.8	0.6
Total enplaned air cargo	5.4	2.7	2.3	2.3	2.2	1.6

Note: The forecasts presented in this table were prepared using the information and assumptions given in the accompanying text. Inevitably, some of the assumptions used to develop the forecasts will not be realized and unanticipated events and circumstances may occur. Therefore, there are likely to be differences between the forecast and actual results, and those differences may be material.

Sources: Historical: San Diego County Regional Airport Authority records.
Forecast: LeighFisher, July 2012.

AIRCRAFT OPERATIONS

This section summarizes the forecasts of total aircraft operations, including passenger airline, all-cargo airline, general aviation, and military operations.

Forecast Approach and Methodology

The forecasts of total aircraft operations are derived from the forecasts of passenger and cargo demand described previously and an evaluation of general aviation and military operations. In particular:

- The forecasts of passenger airline aircraft departures are based on the enplaned passenger forecasts and assumptions regarding average aircraft size and enplaned passenger load factor.
- The forecasts of all-cargo airline aircraft departures are based on the air cargo forecasts and assumptions regarding average cargo tonnage per operation and type of all-cargo service (integrated carrier or regional feeder).
- The forecasts of general aviation aircraft operations are based on historical trends, the number of aircraft based at the Airport, the average daily utilization of those aircraft, assumptions regarding aircraft utilization in the future, and industry forecasts of general aviation activity such as those prepared by the FAA.
- The forecasts of military aircraft operations are based on data for the base year of the forecasts and carried forward through the forecast period. Military operations typically increase and decrease with geopolitical trends and therefore this activity may vary in a given year.

Forecast Assumptions

Table 24 presents the forecast assumptions for passenger and cargo airline aircraft operations, including assumptions for the average enplaned passenger load factor, the average number of seats per departure, and average cargo tonnage per cargo airline operation.

Table 24

ASSUMPTIONS FOR AIRCRAFT OPERATIONS FORECASTS - BASELINE

San Diego International Airport

	Historical	Estimated	Forecast				
	2011	2012	2016	2021	2026	2031	2050
Enplaned passenger load factor							
Domestic							
Mainline airline	86.1%	85.5%	85.5%	85.5%	85.5%	85.5%	85.5%
Regional airline	79.8	78.5	78.9	79.4	79.9	80.4	83.1
Low cost carrier	72.2	74.3	75.0	76.5	78.0	79.5	84.4
Domestic total	78.7	79.5	79.9	80.8	81.5	82.3	84.9
International	71.2	75.5	76.2	77.3	78.4	79.6	84.3
Total Airport	78.6	79.4	79.8	80.6	81.4	82.2	84.8
Average seats per departure							
Domestic							
Mainline airline	158.9	156.7	157.4	158.2	158.9	159.9	166.1
Regional airline	46.5	46.1	49.9	55.1	60.9	66.9	88.7
Low cost carrier	140.2	140.9	143.7	147.3	151.0	154.4	160.4
Domestic total	133.3	133.2	136.3	140.0	143.6	147.0	156.6
International	138.9	144.4	147.3	151.0	154.8	158.6	171.6
Total Airport	133.4	133.6	136.6	140.4	144.1	147.6	157.8
Enplaned freight per operation (tons)							
All-cargo airlines	16.1	15.7	19.7	20.7	21.7	22.8	27.5

	Compound annual percent increase (decrease)					
	2011-2012	2011-2016	2016-2021	2021-2026	2026-2031	2031-2050
Enplaned passenger load factor						
Domestic						
Mainline airline	(0.7%)	(0.1%)	0.0%	0.0%	0.0%	0.0%
Regional airline	(1.7)	(0.2)	0.1	0.1	0.1	0.2
Low cost carrier	3.0	0.8	0.4	0.4	0.4	0.3
Domestic total	1.0	0.3	0.2	0.2	0.2	0.2
International	6.0	1.4	0.3	0.3	0.3	0.3
Total Airport	1.1	0.3	0.2	0.2	0.2	0.2
Average seats per departure						
Domestic						
Mainline airline	(1.4)	(0.2)	0.1	0.1	0.1	0.2
Regional airline	(0.8)	1.4	2.0	2.0	1.9	1.5
Low cost carrier	0.5	0.5	0.5	0.5	0.4	0.2
Domestic total	(0.0)	0.4	0.5	0.5	0.5	0.3
International	3.9	1.2	0.5	0.5	0.5	0.4
Total Airport	0.1	0.5	0.5	0.5	0.5	0.4
Enplaned freight per operation (tons)						
All-cargo airlines	(2.4)	4.1	0.9	0.9	1.0	1.0

Note: The forecasts presented in this table were prepared using the information and assumptions given in the accompanying text. Inevitably, some of the assumptions used to develop the forecasts will not be realized and unanticipated events and circumstances may occur. Therefore, there are likely to be differences between the forecast and actual results, and those differences may be material.

Sources: Historical: San Diego County Regional Airport Authority records. Forecast: LeighFisher, July 2012.

Estimated Aircraft Operations in 2012

In 2012, the number of aircraft operations at the Airport is estimated to total 186,220, a 0.6% increase from the 2011 total, reflecting actual data for the first 5 months of 2012 (January through May), as shown in Table 25.

Passenger Airline Aircraft Operations Forecasts

Passenger aircraft operations include total departures and arrivals performed by mainline and regional affiliate aircraft in the service of transporting passengers, as shown in Table 25. Passenger airline aircraft operations were calculated by dividing the enplaned passenger forecasts by sector (e.g., domestic and International) and category (e.g., mainline and regional affiliate carrier) by the estimated number of passengers enplaned per departure. In 2011, the average number of passengers enplaned per departure for the Airport as a whole was approximately 106 and is derived by multiplying the load factor by the average seats per departure (e.g., 79.4% x 133.6 = 106.1). This number is expected to increase slowly over the forecast period based on an estimated increase in the average number of seats per aircraft and an estimated load factor, or percent of available seats filled with passengers. The average number of passengers enplaned per departure is expected to reach approximately 134 in 2050. Dividing the enplaned passenger forecasts by the forecast number of passengers enplaned per departure yields passenger airline aircraft departures. The forecast departures were then multiplied by two to yield passenger airline aircraft operations for each category of activity.

Passenger airline aircraft operations at SDIA are forecast to increase from 162,550 in 2011 to 263,390 operations in 2050, an average increase of 1.2% per year, reflecting an average increase of 1.4% per year in air carrier operations and relatively no change in air taxi operations, as shown in Table 25.

All-Cargo Airline Aircraft Operations Forecasts

Cargo airline operations at SDIA include the flight activity by airlines dedicated exclusively to the transportation of freight such as FedEx and by commuter/regional size aircraft. Air carrier size aircraft that perform all-cargo operations at the airport include widebody (e.g., Airbus A-300, Boeing 767, and MD-11) and narrowbody (e.g., Boeing 757) aircraft. Commuter or regional aircraft that perform all-cargo operations at the airport include small piston and turboprop aircraft such as the Beechcraft 99 and Swearingen Metroliner aircraft. In 2011, there were 6,452 cargo airline operations performed at the Airport.

Table 25

AIRCRAFT OPERATIONS FORECASTS – BASELINE

San Diego International Airport

	Historical 2011	Estimated 2012	Forecast 2016	2021	2026	2031	2050
Air Carrier							
Passenger airlines	140,200	141,990	149,260	160,610	172,590	184,480	241,920
Cargo airlines	3,988	4,080	4,160	4,500	4,880	5,240	6,100
Other *(a)*	2,802	2,800	2,800	2,800	2,800	2,800	2,800
Air Carrier total	146,990	148,870	156,220	167,910	180,270	192,520	250,820
Air Taxi							
Passenger airlines	22,350	21,610	22,740	22,490	22,190	21,820	21,470
Cargo airlines	2,464	2,520	2,570	2,780	3,010	3,240	3,770
Other *(a)*	2,230	2,000	2,000	2,000	2,000	2,000	2,000
Air Taxi total	27,044	26,130	27,310	27,270	27,200	27,060	27,240
General Aviation							
Itinerant	10,406	10,520	11,050	11,600	12,150	12,690	14,250
Local	--	--	--	--	--	--	--
General Aviation total	10,406	10,520	11,050	11,600	12,150	12,690	14,250
Military	702	700	700	700	700	700	700
Total Airport	185,142	186,220	195,280	207,480	220,320	232,970	293,010

	Compound annual percent increase (decrease) 2011-2012	2011-2016	2016-2021	2021-2026	2026-2031	2031-2050
Air Carrier						
Passenger airlines	1.3%	1.3%	1.5%	1.4%	1.3%	1.4%
Cargo airlines	2.3	0.8	1.6	1.6	1.4	0.8
Other *(a)*	(0.1)	(0.0)	0.0	0.0	0.0	0.0
Air Carrier total	1.3	1.2	1.5	1.4	1.3	1.4
Air Taxi						
Passenger airlines	(3.3)	0.3	(0.2)	(0.3)	(0.3)	(0.1)
Cargo airlines	2.3	0.8	1.6	1.6	1.5	0.8
Other *(a)*	(10.3)	(2.2)	0.0	0.0	0.0	0.0
Air Taxi total	(3.4)	0.2	(0.0)	(0.1)	(0.1)	0.0
General Aviation						
Itinerant	1.1	1.2	1.0	0.9	0.9	0.6
Local	--	--	--	--	--	--
General Aviation total	1.1	1.2	1.0	0.9	0.9	0.6
Military	(0.3)	(0.1)	0.0	0.0	0.0	0.0
Total Airport	0.6	1.1	1.2	1.2	1.1	1.2

Note: The forecasts presented in this table were prepared using the information and assumptions given in the accompanying text. Inevitably, some of the assumptions used to develop the forecasts will not be realized and unanticipated events and circumstances may occur. Therefore, there are likely to be differences between the forecast and actual results, and those differences may be material.

(a) Includes unscheduled, empty, and ferry flights.

Sources: Historical: San Diego County Regional Airport Authority records. Forecast: LeighFisher, July 2012.

The forecast of all-cargo operations was developed by first estimating the share of future cargo tonnage expected to be carried by air carrier and commuter aircraft. The cargo tonnage expected to be carried by all-cargo carriers was then divided by an estimated cargo tons per departure ratio to yield total air carrier cargo operations. For example, all-cargo aircraft for domestic service carried approximately 32,300 pounds per operation in 2011. The ratio of tons per operation is expected to increase gradually over the forecast period to account for expected growth in cargo related to economic activity.

Cargo airline aircraft operations at SDIA are forecast to increase an average of 1.1% per year from 6,452 in 2011 to 9,870 in 2050, as shown in Table 25.

General Aviation Aircraft Operations Forecasts

General aviation (GA) activity includes all flight operations by aircraft other than scheduled or charter passenger aircraft and military aircraft. GA includes not only pilot training and recreational flights on small single engine or multi-engine propeller driven aircraft, but also operations on large business jet aircraft.

On a nationwide basis, the number of general aviation aircraft operations has been in slow decline due to factors such as increases in aircraft, fuel, and insurance costs, as well as increased avionic instrument requirements. The 2008-2009 economic recession and the financial credit crisis further reduced general aviation activity nationwide. For the future, the FAA expects general aviation traffic to recover slowly.

The flight operations of GA aircraft are categorized as local or itinerant operations. Local operations are flights that operate within visual range or close proximity of the airport. Itinerant operations typically include those flights that leave the airport destined for another airport and require the filing of flight plans with the local air traffic control authorities. Historically, itinerant operations have accounted for nearly all GA operations at the Airport. In 2011, a total of 10,406 itinerant GA operations were performed at the Airport (100% of GA operations), as shown in Table 25.

GA operations in the future are forecast to continue to be comprised of itinerant operations only. The total number of general aviation operations is forecast to increase an average of 0.8% per year from 2010 through 2050, compared with a forecast growth rate of 0.9% per between 2011 and 2040 for the nation as a whole.*

In 2011, a total of 6 jet aircraft were based at the Airport. The total number of based aircraft at the Airport is forecast to remain unchanged through 2050.

*U.S. Department of Transportation, Federal Aviation Administration, Terminal Area Forecasts, Fiscal Years 2011-2040, www.faa.gov.

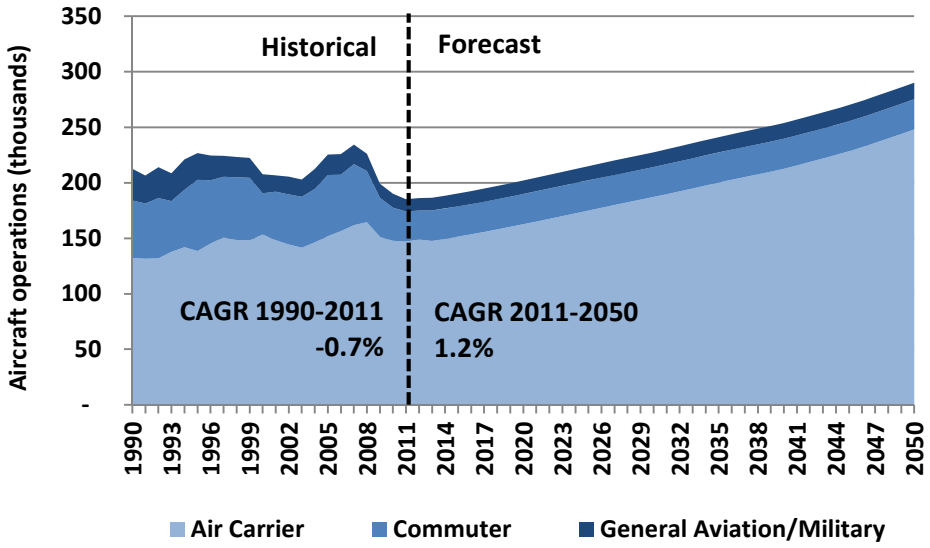
Military Aircraft Operations Forecasts

The number of military operations at the Airport averaged approximately 1,100 operations per year between 2000 and 2011. In 2011, military operations totaled 702, less than the 12-year average. Military operations are expected remain at a level of about 700 operations from 2011 through 2050, as shown in Table 25.

Total Aircraft Operations Forecasts

Total aircraft operations at SDIA are forecast to increase from 185,142 in 2011 to 293,010 operations in 2050, an average increase of 1.2% per year, as shown in Table 25 and on Figure 29. This forecast is unconstrained and does not reflect assumptions related to physical, regulatory, environmental and other potential impediments to aviation activity growth. With one runway and limited property, the capacity of SDIA is constrained. The single runway represents the most constraining factor for the Airport, limiting the number of aircraft operations (takeoffs and landings) that can be accommodated to an estimated 286,000 annual operations.

Figure 29
HISTORICAL AND FORECAST AIRCRAFT OPERATIONS
San Diego International Airport



Note: The forecasts presented in this figure were prepared using the information and assumptions given in the accompanying text. Inevitably, some of the assumptions used to develop the forecasts will not be realized and unanticipated events and circumstances may occur. Therefore, there are likely to be differences between the forecast and actual results, and those differences may be material.

CAGR = Compound annual growth rate

Sources: Historical: San Diego County Regional Airport Authority records.
Forecast: LeighFisher, July 2012.

CHAPTER 7
COMPARISON WITH THE FAA 2011 TAF

Table 26 presents a comparison of the baseline aviation demand forecasts prepared for San Diego International Airport and the FAA 2011 TAF for the Airport. The baseline unconstrained forecasts are the "preferred" forecasts recommended for FAA approval. The forecasts are compared for the components of total enplaned passengers, commercial aircraft operations and total aircraft operations. The format of Table 26 is based on the template provided by the FAA for the comparison of airport planning forecasts and the FAA TAF.* As required, the results are presented for the base year of 2011 and forecast horizons years which are equal to the base year, plus 1, 5, 10 and 15 years (2012, 2016, 2021, and 2026). The SDIA Airport Development Plan aviation demand forecasts have been compared graphically with the FAA 2011 TAF in the figures presented throughout this report, including Figures 1 and 3.

The key findings of the comparison of the SDIA ADP aviation demand forecasts with the FAA 2011 TAF are:

- The forecast of enplaned passengers for SDIA is higher than the TAF in 2016 and lower than the TAF in 2021. The variance between the SDIA ADP enplaned passenger forecast and the FAA 2011 TAF is 1.0% in 2016 and 1.9% in 2021, as shown in Table 26.
- The forecast of commercial operations for SDIA varies from the FAA 2011 TAF by 10.0% or less (3.7% in 2016 and 6.5% in 2021).
- The forecast of total aircraft operations for SDIA varies from the FAA 2011 TAF by 10.0% or less (3.3% in 2016 and 5.8% in 2021).
- Overall, the SDIA ADP aviation demand forecasts are similar to the FAA 2011 TAF for the Airport and "differ by less than 10 percent in the 5-year forecast period, and 15 percent in the 10-year forecast period", as stipulated in the FAA forecast guidance.

Table 27 presents a summary of the SDIA ADP aviation demand forecasts using a second template provided by the FAA.

*U.S. Department of Transportation, Federal Aviation Administration, *Forecasting Aviation Activity by Airport*, July 2001, and *Review and Approval of Aviation Forecasts*, June 2008, http://www.faa.gov.

Table 26
FAA TAF FORECAST COMPARISON *(2011 – 2026)*
San Diego International Airport

	Year *(a)*	SDIA ADP	FAA 2011 TAF	SDIA ADP vs. 2011 TAF (percent variance)
Passenger enplanements				
Base yr.	2011	8,442,612	8,304,057	1.7%
Base yr. + 5 yrs.	2016	9,376,000	9,285,951	1.0%
Base yr. + 10 yrs.	2021	10,359,000	10,564,693	(1.9)%
Base yr. + 15 yrs.	2026	11,424,000	12,020,173	(5.0)%
Commercial operations *(b)*				
Base yr.	2011	174,034	173,536	0.3%
Base yr. + 5 yrs.	2016	183,500	190,631	(3.7)%
Base yr. + 10 yrs.	2021	195,200	208,790	(6.5)%
Base yr. + 15 yrs.	2026	207,500	228,688	(9.3)%
Total operations *(c)*				
Base yr.	2011	185,142	184,840	0.2%
Base yr. + 5 yrs.	2016	195,300	201,892	(3.3)%
Base yr. + 10 yrs.	2021	207,500	220,383	(5.8)%
Base yr. + 15 yrs.	2026	220,300	240,623	(8.4)%

(a) The SDIA Airport Development Plan was prepared on a calendar year basis and the FAA 2011 TAF was prepared on a U.S. government fiscal year basis (October through September).
(b) Commercial operations include operations by passenger airlines, all-cargo airlines, and air taxi operators.
(c) Total operations include commercial operations plus operations by general aviation and military.

Sources: Base year 2011 (actual)—San Diego County Regional Airport Authority records.
SDIA ADP Forecasts—LeighFisher, July 2012.
FAA 2011 TAF for SDIA—U.S. Department of Transportation, Federal Aviation Administration, www.faa.gov, accessed January 2012.

Table 27
SUMMARY OF SDIA ADP FORECASTS USING FAA TEMPLATE
San Diego International Airport

		Forecast				Average annual compound growth rates			
	Base year 2011	Base year + 1 year 2012	Base year + 5 years 2016	Base year + 10 years 2021	Base year + 15 years 2026	Base year to +1 year 2011 - 2012	Base year to +5 years 2010 - 2016	Base year to +10 years 2011 - 2021	Base year to +15 years 2011 - 2026
Passenger enplanements									
Air carrier *(a)*	7,984,200	8,327,000	8,929,000	9,867,000	10,885,000	4.3%	2.3%	2.1%	2.1%
Commuter *(b)*	458,412	419,000	447,000	492,000	539,000	(8.6)%	(0.5)%	0.7%	1.1%
Total	8,442,612	8,746,000	9,376,000	10,359,000	11,424,000	3.6%	2.1%	2.1%	2.0%
Aircraft operations									
Itinerant									
Air carrier	146,990	148,900	149,300	167,900	180,300	1.3%	0.3%	1.3%	1.4%
Commuter/air taxi	27,044	26,100	34,200	27,300	27,200	(3.5)%	4.8%	0.1%	0.0%
Total commercial operations	174,034	175,000	183,500	195,200	207,500	0.6%	1.1%	1.2%	1.2%
General aviation	10,406	10,500	11,100	11,600	12,100	0.9%	1.3%	1.1%	1.0%
Military	702	700	700	700	700	(22.9)%	(5.1)%	(2.6)%	(1.7)%
Local									
General aviation	--	--	--	--	--	--	--	--	--
Military	--	- --	--	--	--	--	--	--	--
Total operations	185,142	186,200	195,300	207,500	220,300	0.5%	1.1%	1.1%	1.2%
Cargo/mail (enplaned + deplaned tons)	130,850	138,010	149,960	167,680	188,000	5.5%	2.8%	2.5%	2.4%
Based Aircraft									
Single-engine (nonjet)	--	--	--	--	--	--	--	--	--
Multiengine (nonjet)	--	--	--	--	--	--	--	--	--
Jet engine	6	6	6	6	6	--	--	--	--
Helicopter	--	--	--	--	--	--	--	--	--
Other	--	--	--	--	--	--	--	--	--
Total	6	6	6	6	6	--	--	--	--
Operational factors									
Average aircraft size (seats)									
Air Carrier *(a)*	148.1	147.8	149.8	152.3	154.8				
Commuter *(b)*	46.5	46.1	49.9	55.1	60.9				
Average enplaning load factor									
Air Carrier *(a)*	78.5%	79.5%	79.9%	80.7%	81.5%				
Commuter *(b)*	79.8%	78.5%	78.9%	79.4%	79.9%				
GA operations per based aircraft	1,734	1,750	1,850	1,933	2,033				

Note: The SDIA ADP was prepared on a calendar year basis and the FAA 2011 TAF was prepared on a U.S. government fiscal year basis (October through September).

(a) Includes mainline and charter airline activity as summarized in the previous tables in this report.
(b) Includes regional affiliate airline activity, which includes flights using regional aircraft with more than 60 seats.

Sources: Base year 2011 (actual)—San Diego County Regional Airport Authority records. SDIA ADP Forecasts—LeighFisher, July 2012. FAA 2011 TAF for SDIA—U.S. Department of Transportation, Federal Aviation Administration, www.faa.gov, accessed January 2012.

CHAPTER 8
FORECASTS OF PEAK PERIOD DEMAND AND PASSENGER AIRLINE AIRCRAFT FLEET DISTRIBUTION

This chapter summarizes the forecasts of peak period demand for the average day peak month (ADPM) at the Airport for 2016, 2021, 2026, 2031, and 2050. The forecasts of ADPM aircraft operations are derived from the annual forecasts of enplaned passengers and aircraft operations presented in Tables 22 and 25, respectively. In addition, forecasts of passenger airline aircraft fleet distribution by activity type for the Airport are presented.

FORECAST APPROACH AND METHODOLOGY

The forecasts of peak period demand and passenger airline aircraft fleet were based on a 2011 base year distribution of operations by equipment type (e.g., Airbus 319, Boeing 737-800). The 2011 distribution was developed using published passenger airline schedules and SDIA airport records.

Peak Period Demand Forecasts

Peak period demand forecasts were prepared for the ADPM and the peak hour forecasts of passenger airline aircraft operations for the ADPM.

ADPM Forecasts

The peak month for passenger airline activity at SDIA is July. In 2011, July accounted for 9.4% of enplaned passengers, 9.0% of passenger airline scheduled departing seats, and 9.0% of passenger airline landings, as shown in Tables 14, 15, and 16. A 5-year average for 2007 through 2011, shows a similar peak month pattern—July accounted for an average of 9.6% of enplaned passengers, 9.1% of passenger airline scheduled departing seats, and 9.1% of passenger airline landings.

As shown in Table 21, July accounted for 9.0% of annual total aircraft operations in 2011. From 2007 through 2011, July accounted for the peak share of total aircraft operations at the Airport, with an average of 9.0% of annual operations.

Table 28 presents a summary of the ADPM forecasts of enplaned passengers, 2011 through 2050. The peak month shares of annual activity are assumed to represent future peak demand. The ADPM is the mathematical average of peak month activity (i.e., the peak month number of operations divided by 31 days in the peak month). The ADPM level of activity serves as the “control total” for the ADPM flight schedules which are used as input to detailed technical analyses such as facility requirements analysis and demand capacity modeling.

Table 28

HISTORICAL AND FORECAST PEAK PERIOD DEMAND – BASELINE

San Diego International Airport

	Historical	Estimated	Forecast				
	2011	2012	2016	2021	2026	2031	2050
Enplaned passengers							
Annual passengers	8,442,612	8,746,200	9,375,700	10,358,600	11,423,800	12,511,900	17,627,400
Peak month	794,406	839,635	900,067	994,426	1,096,685	1,201,142	1,692,230
Peak month percent of annual	9.4%	9.6%	9.6%	9.6%	9.6%	9.6%	9.6%
Average day peak month (ADPM)	25,643	27,085	29,034	32,078	35,377	38,747	54,588
Passenger airline scheduled aircraft operations							
Annual operations	162,550	163,600	172,000	183,100	194,780	206,300	263,390
Peak month	14,868	14,964	15,732	16,748	17,816	18,870	24,092
Peak month percent of annual	9.1%	9.1%	9.1%	9.1%	9.1%	9.1%	9.1%
Average day peak month (ADPM)	480	483	507	540	575	609	777
Total aircraft operations							
Annual operations	185,142	186,220	195,280	207,480	220,320	232,970	293,010
Peak month	16,598	16,695	17,507	18,601	19,752	20,886	26,268
Peak month percent of annual	9.0%	9.0%	9.0%	9.0%	9.0%	9.0%	9.0%
Average day peak month (ADPM)	535	539	565	600	637	674	847

Note: The forecasts presented in this table were prepared using the information and assumptions given in the accompanying text. Inevitably, some of the assumptions used to develop the forecasts will not be realized and unanticipated events and circumstances may occur. Therefore, there are likely to be differences between the forecast and actual results, and those differences may be material.

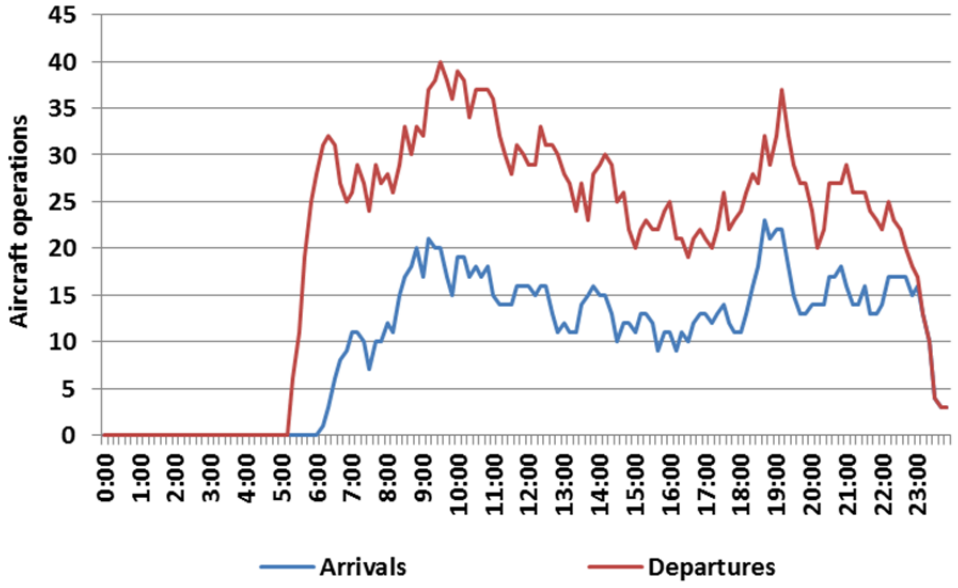
Peak month percent of annual represent 5-year averages for 2007 through 2011.
Total aircraft operations include passenger, cargo, general aviation, and military operations.

Sources: Historical: San Diego County Regional Airport Authority records.
Forecast: LeighFisher, July 2012.

Passenger Airline Peak Hour Forecasts

The peak hour for passenger airline aircraft operations (arrivals and departures) at SDIA in July 2012 is during the 60-minute period from 8:30 to 9:30 am, accounting for 8.2% of ADPM total passenger airline operations, as shown on Figure 30.

Figure 30
DISTRIBUTION OF PASSENGER AIRLINE SCHEDULED OPERATIONS BY HOUR IN JULY 2012
San Diego International Airport

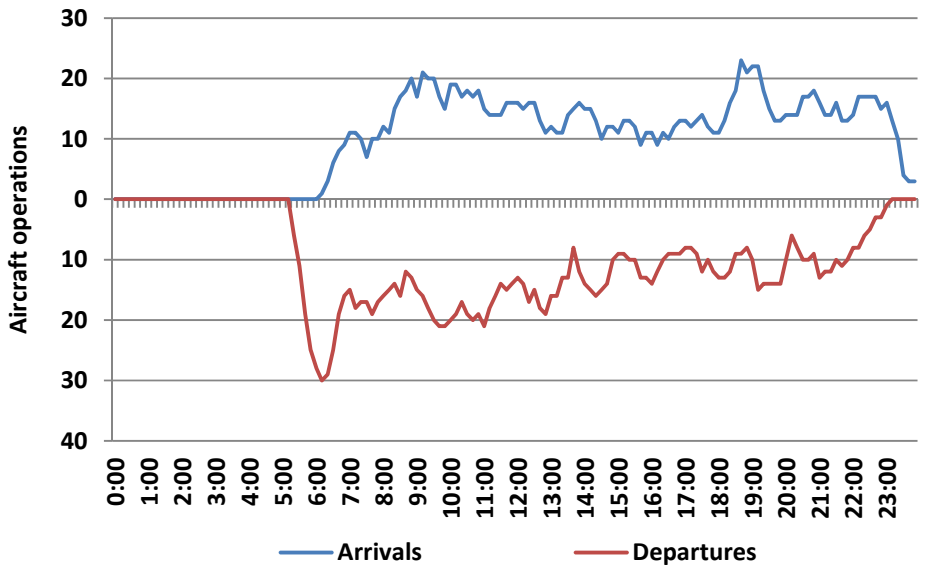


Note: Operations are summarized for a 60-minute rolling hour.

Source: Official Airline Guides, Inc., online database, accessed July 2012.

As shown on Figure 31, the peak hour for passenger airline scheduled aircraft arrivals at SDIA in July 2012 is during the 60-minute period from 5:40 to 6:40 pm. A similar number of arrivals occur during the 60-minute period from 8:10 to 9:10 am. The peak hour for aircraft departures at SDIA in July 2011 is during the 60-minute period from 5:10 to 6:10 am.

Figure 31
ARRIVALS AND DEPARTURES BY HOUR IN JULY 2012
San Diego International Airport



Note: Operations are summarized for a 60-minute rolling hour.

Source: Official Airline Guides, Inc., online database, accessed July 2012.

Future passenger airline schedules were developed using published airline schedules for July 2012. As shown on Figure 32, additional flights (arrivals and departures) were added to the July 2012 schedule to reflect: (1) the ADPM operations for each forecast year (the "control totals" shown in Table 28) which relate directly to the annual forecasts, (2) the hourly percentage distribution of arrivals and departures represented by the July 2012 schedule, (3) the fleet mix of the airlines serving SDIA and their future fleet plans, and (4) the markets currently served at SDIA and the potential for new markets. The hourly distribution of operations from the flight schedules obtained for July 2012 is assumed to remain relatively unchanged during the forecast period.

Figure 32
FUTURE SCHEDULE DEVELOPMENT
San Diego International Airport

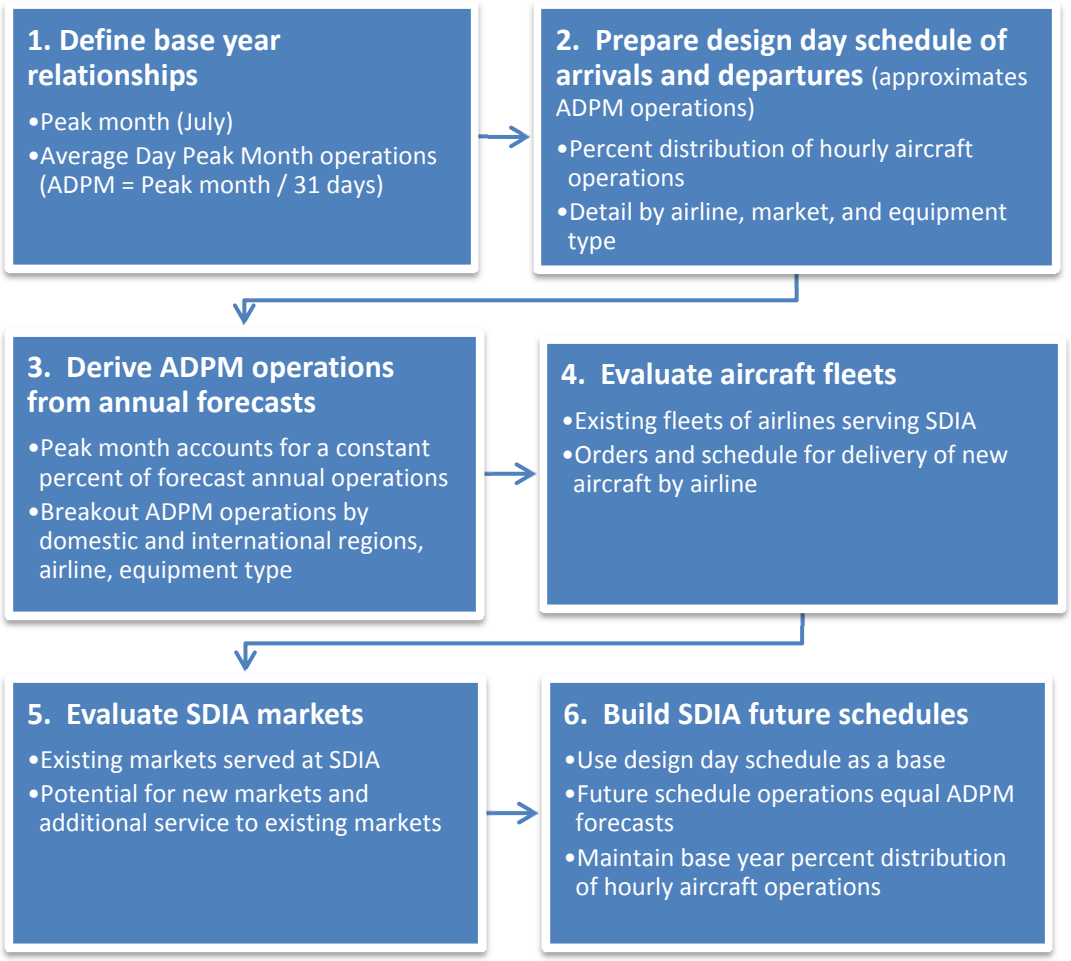
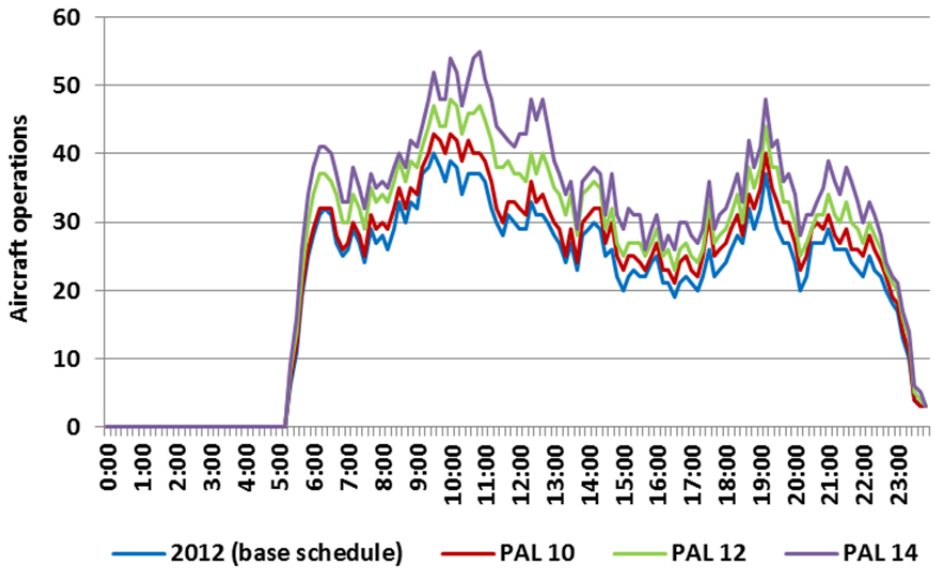


Figure 33 summarizes the baseline forecasts of passenger airline scheduled operations (arrivals and departures) for Planning Activity Levels (PAL) 10, 12, and 14 reflecting approximately 10 million, 12 million, and 14 million enplaned passengers, respectively.

Figure 33
BASELINE FORECAST DISTRIBUTION OF PASSENGER AIRLINE SCHEDULED OPERATIONS BY HOUR
San Diego International Airport

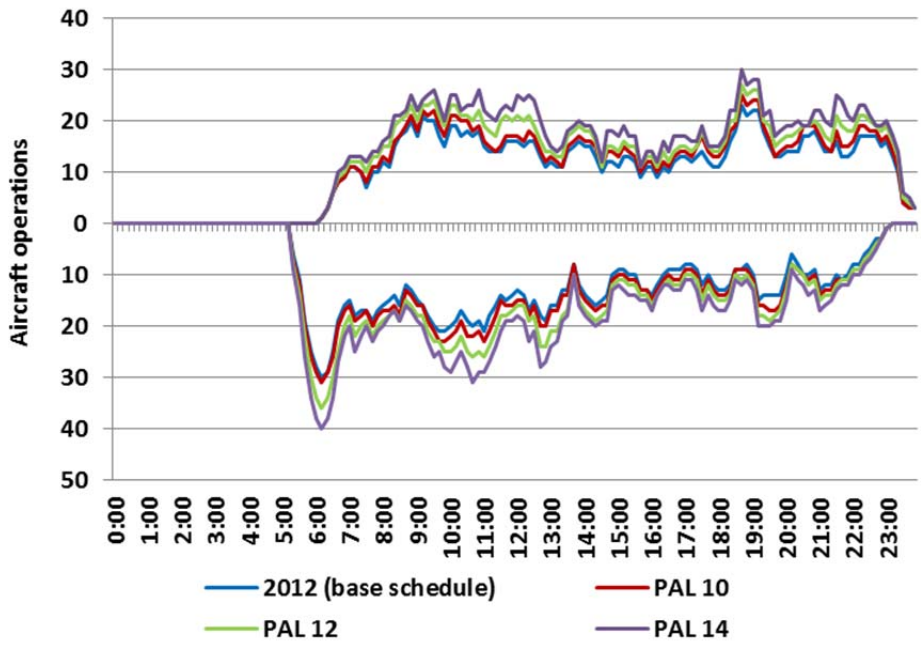


Note: Operations are summarized for a 60-minute rolling hour.
Includes arrivals and departures.

Source: Base schedule: Official Airline Guides, Inc., online database, accessed July 2012.
Forecast: LeighFisher, July 2012.

Figure 34 presents the baseline forecast of hourly distribution of arrivals and departures for each of the flight schedules.

Figure 34
BASELINE FORECAST DISTRIBUTION OF PASSENGER AIRLINE ARRIVALS AND DEPARTURES BY HOUR
San Diego International Airport



Note: Operations are summarized for a 60-minute rolling hour.

Source: Base schedule: Official Airline Guides, Inc., online database, accessed July 2012.
Forecast: LeighFisher, July 2012.

Aircraft Fleet Forecasts

Table 29 presents the ADPM passenger airline fleet mix for 2011 and for the forecast years (2012, 2016, 2021, 2026, 2031, and 2050) in terms of the percentage of ADPM passenger airline aircraft operations. The passenger airline fleet mix in the future schedules for PALs 10, 12, and 14 are based on the annual baseline forecasts of fleet mix.

Table 29

ADPM PERCENT DISTRIBUTION OF PASSENGER AIRLINE AIRCRAFT OPERATIONS – BASELINE

San Diego International Airport

	Historical	Estimated	Forecast				
	2011	2012	2016	2021	2026	2031	2050
Domestic							
Narrowbody							
A318	120	0.8%	0.0%	0.0%	0.0%	0.0%	0.0%
A319	124	3.7	4.9	3.1	2.5	2.5	1.8
A320	145	10.8	7.8	8.0	6.1	3.8	1.3
A320neo	145	0.0	0.0	0.0	2.5	5.0	7.6
A321	183	2.9	2.5	2.5	2.6	2.6	2.7
A717	117	0.0	0.0	1.0	1.0	1.0	0.5
B737-300/400	138	17.4	11.1	7.3	2.4	0.0	0.0
B737-500	114	3.7	1.6	0.0	0.0	0.0	0.0
B737-700	124	22.0	29.9	32.2	35.5	34.8	32.6
B737-800	157	8.7	11.9	15.4	16.2	16.6	17.2
B737-900	173	2.1	1.6	5.7	6.9	9.5	12.6
B737 MAX	157	0.0	0.0	0.0	2.2	6.3	9.8
B757-200/300	205	5.8	5.7	5.7	5.8	3.4	0.9
MD-80	141	3.3	2.9	0.9	0.0	0.0	0.0
MD-90	150	0.4	0.8	0.8	0.9	0.9	0.5
Subtotal--narrowbody		81.7%	80.7%	82.6%	84.6%	86.4%	87.4%
Regional jets							
More than 60 seats							
CRJ-700	70	2.1%	2.9%	3.9%	4.8%	4.8%	4.8%
CRJ-900	76	0.4	0.4	0.6	0.7	0.7	0.7
ERJ-170	73	0.0	0.0	0.0	0.0	0.0	0.0
ERJ-175	78	0.0	0.0	0.0	0.0	0.0	0.0
ERJ-190	99	0.0	0.0	0.0	0.0	0.0	0.0
Subtotal		2.5%	3.3%	4.5%	5.5%	5.5%	5.5%
60 seats or less							
CRJ-100/200	50	2.9%	2.9%	1.2%	0.0%	0.0%	0.0%
ERJ-145	50	4.1	2.0	2.1	1.9	0.5	0.0
Subtotal		7.1%	4.9%	3.3%	1.9%	0.5%	0.0%
Subtotal--regional jets		9.5%	8.2%	7.8%	7.4%	6.0%	5.5%
Turboprop							
EMB120	74	4.6%	5.3%	3.8%	1.7%	0.2%	0.0%
Q400	34	0.0	1.6	1.2	1.0	1.7	0.7
Subtotal--turboprop		4.6%	7.0%	5.0%	2.8%	1.9%	0.7%

Table 29 (Page 2 of 2)

ADPM PERCENT DISTRIBUTION OF PASSENGER AIRLINE AIRCRAFT OPERATIONS - BASELINE

San Diego International Airport

	Historical	Estimated	Forecast				
	2011	2012	2016	2021	2026	2031	2050
Widebody							
A330-200	--	0.0%	0.4%	0.4%	0.4%	0.4%	0.4%
B767-200/300	196	1.2	1.2	1.2	1.2	1.2	1.2
Subtotal--widebody		1.2	1.6	1.6	1.6	1.6	1.6
Subtotal--Domestic		97.1%	97.5%	97.0%	96.4%	95.9%	95.3%
International							
Narrowbody							
A319	120	1.2%	0.8%	0.9%	1.0%	1.1%	1.2%
B737-700	124	0.4	0.4	0.5	0.5	0.5	0.6
B737-800	157	0.4	0.4	0.5	0.5	0.5	0.6
Subtotal--narrowbody		2.1%	1.6%	1.8%	1.9%	2.1%	2.3%
Regional jets							
ERJ-190	99	0.4%	0.4%	0.4%	0.4%	0.4%	0.4%
Widebody							
B777	270	0.4%	0.4%	0.4%	0.3%	0.4%	0.4%
A350	250	0.0	0.0	0.0	0.0	0.0	0.0
B787-8	235	0.0	0.0	0.4	0.9	1.2	1.1
B787-9	270	0.0	0.0	0.0	0.0	0.0	0.5
Subtotal--widebody		0.4%	0.4%	0.8%	1.2%	1.6%	2.0%
Subtotal--International		2.9%	2.5%	3.1%	3.6%	4.2%	4.8%
TOTAL PASSENGER AIRLINES		100.0%	100.0%	100.0%	100.0%	100.0%	100.0%

Note: The forecasts presented in this table were prepared using the information and assumptions given in the accompanying text. Inevitably, some of the assumptions used to develop the forecasts will not be realized and unanticipated events and circumstances may occur. Therefore, there are likely to be differences between the forecast and actual results, and those differences may be material.

Totals may not add due to rounding.

Sources: Historical: San Diego County Regional Airport Authority records.
Forecast: LeighFisher, July 2012.

APPENDIX A
ALTERNATIVE FORECAST SCENARIOS

This appendix summarizes the alternative forecasts of enplaned passengers, air cargo, and total aircraft operations for SDIA. In addition to the baseline forecasts of aviation demand presented in Chapter 6, "Aviation Demand Forecasts", two alternative scenarios are prepared for planning purposes and to use as tools to manage uncertainty and anticipate the facility requirements associated with higher levels of aviation activity compared with the baseline forecast.

ALTERNATIVE FORECAST SCENARIO ASSUMPTIONS

Two alternative forecast scenarios were developed based on the analysis of passenger and cargo activity presented in Chapter 6.

- Scenario 1 is a fast growth scenario reflecting faster regional economic growth than the projections used for the baseline forecasts, as measured by San Diego County per capita personal income (in constant dollars). In Scenario 1, per capita personal income in San Diego County is projected to increase an average of 2.0% per year between 2011 and 2050, compared with an average increase of 1.5% per year during the same period in the baseline forecast. Similarly, annual growth in San Diego County total personal income (in constant dollars) is assumed to increase average of 0.5% per faster in Scenario 1 than in the baseline forecast.

- Scenario 2 is a slow growth scenario reflecting slower regional economic growth. In Scenario 2, San Diego County per capita personal income (in constant dollars) is projected to increase an average of 1.0% per year between 2011 and 2050, compared with an average increase of 1.5% per year during the same period in the baseline forecast. Similarly, annual growth in in San Diego County total personal income (in constant dollars) is assumed to increase average of 0.5% per slower in Scenario 2 than in the baseline forecast.

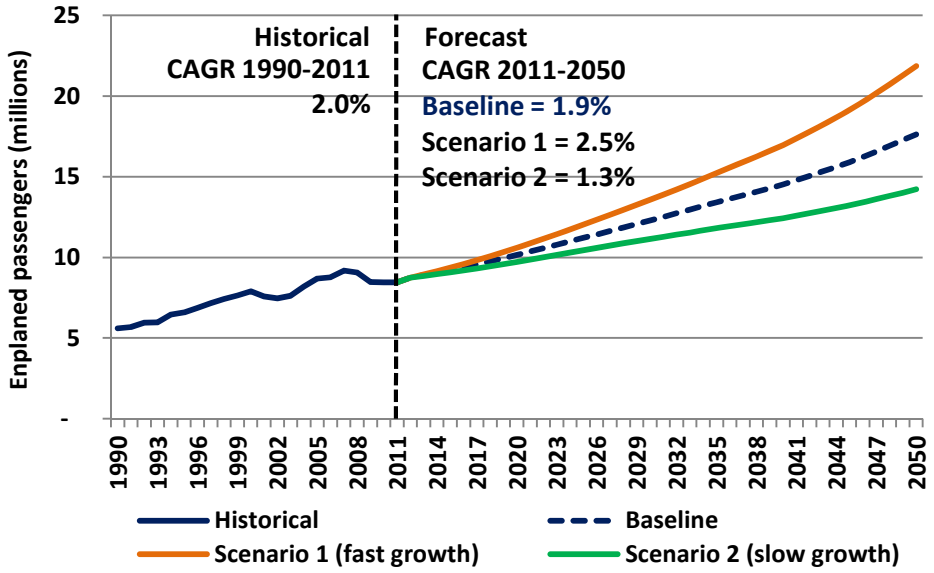
All other assumptions used in the alternative forecast scenarios are unchanged from the baseline forecast, including airline yields at SDIA, average load factors, average seats per departure, and cargo carried per operation.

ENPLANED PASSENGER ALTERNATIVE FORECAST SCENARIOS

The enplaned passenger alternative forecast scenarios are presented in Tables A-1 and A-2. In Scenario 1 (fast growth), the number of enplaned passengers at SDIA is forecast to increase an average of 2.5% per year between 2011 and 2050, from 8.4 million in 2011 to 21.9 million in 2050, as shown in Table A-1. In Scenario 2 (slow growth), the number of enplaned passengers at SDIA is forecast to increase an average of 1.3% per year between 2011 and 2050, from 8.4 million in 2011 to 14.2 million in 2050, as shown in Table A-2.

Figure A-1 presents a comparison of the alternative forecast scenarios of enplaned passengers at SDIA with the baseline forecast.

Figure A-1
HISTORICAL AND FORECAST ENPLANED PASSENGERS
ALTERNATIVE FORECAST SCENARIOS
San Diego International Airport



Note: The forecasts presented in this figure were prepared using the information and assumptions given in the accompanying text. Inevitably, some of the assumptions used to develop the forecasts will not be realized and unanticipated events and circumstances may occur. Therefore, there are likely to be differences between the forecast and actual results, and those differences may be material.

CAGR = Compound average annual growth rate

Source: Historical: San Diego County Regional Airport Authority records.
Forecast: LeighFisher, July 2012.

Table A-30

ENPLANED PASSENGER FORECAST – SCENARIO 1 (FAST GROWTH)

San Diego International Airport

	Historical	Estimated	Forecast				
	2011	2012	2016	2021	2026	2031	2050
Domestic							
Mainline airline	3,997,137	4,112,800	4,484,700	5,060,200	5,694,100	6,354,900	9,475,500
Regional airline	431,990	419,100	457,000	515,600	580,200	647,500	965,500
Low cost carrier	3,818,289	3,964,700	4,323,200	4,878,000	5,489,000	6,126,000	9,134,200
Domestic total	8,247,416	8,496,600	9,264,900	10,453,800	11,763,300	13,128,400	19,575,200
International	195,196	249,600	315,100	421,700	564,300	755,200	2,285,000
Total Airport	8,442,612	8,746,200	9,580,000	10,875,500	12,327,600	13,883,600	21,860,200
Percent of total Airport							
Domestic	97.7%	97.1%	96.7%	96.1%	95.4%	94.6%	89.5%
International	2.3%	2.9%	3.3%	3.9%	4.6%	5.4%	10.5%

	Compound annual percent increase (decrease)					
	2011-2012	2011-2016	2016-2021	2021-2026	2026-2031	2031-2050
Domestic						
Mainline airline	2.9%	2.3%	2.4%	2.4%	2.2%	2.1%
Regional airline	(3.0)	1.1	2.4	2.4	2.2	2.1
Low cost carrier	3.8	2.5	2.4	2.4	2.2	2.1
Domestic total	3.0	2.4	2.4	2.4	2.2	2.1
International	27.9	10.1	6.0	6.	6.0	6.0
Total Airport	3.6	2.6	2.6	2.5	2.4	2.4

Note: The forecasts presented in this table were prepared using the information and assumptions given in the accompanying text. Inevitably, some of the assumptions used to develop the forecasts will not be realized and unanticipated events and circumstances may occur. Therefore, there are likely to be differences between the forecast and actual results, and those differences may be material.

Sources: Historical: San Diego County Regional Airport Authority records.
Forecast: LeighFisher, July 2012.

Table A-31

ENPLANED PASSENGER FORECASTS – SCENARIO 2 (SLOW GROWTH)

San Diego International Airport

	Historical	Estimated	Forecast				
	2011	2012	2016	2021	2026	2031	2050
Domestic							
Mainline airline	3,997,137	4,112,800	4,299,800	4,602,900	4,913,700	5,202,000	6,350,200
Regional airline	431,990	419,100	438,100	469,000	500,700	530,000	647,000
Low cost carrier	3,818,289	3,964,700	4,144,900	4,437,100	4,736,700	5,014,600	6,121,500
Domestic total	8,247,416	8,496,600	8,882,800	9,509,000	10,151,100	10,746,600	13,118,700
International	195,196	249,600	292,000	355,300	432,200	525,900	1,108,000
Total Airport	8,442,612	8,746,200	9,174,800	9,864,300	10,583,300	11,272,500	14,226,700
Percent of total Airport							
Domestic	97.7%	97.1%	96.8%	96.4%	95.9%	95.3%	92.2%
International	2.3%	2.9%	3.2%	3.6%	4.1%	4.7%	7.8%

	Compound annual percent increase (decrease)					
	2011-2012	2011-2016	2016-2021	2021-2026	2026-2031	2031-2050
Domestic						
Mainline airline	2.9%	1.5%	1.4%	1.3%	1.1%	1.1%
Regional airline	(3.0)	0.3	1.4	1.3	1.1	1.1
Low cost carrier	3.8	1.7	1.4	1.3	1.1	1.1
Domestic total	3.0	1.5	1.4	1.3	1.1	1.1
International	27.9	8.4	4.0	4.0	4.0	4.0
Total Airport	3.6	1.7	1.5	1.4	1.3	1.2

Note: The forecasts presented in this table were prepared using the information and assumptions given in the accompanying text. Inevitably, some of the assumptions used to develop the forecasts will not be realized and unanticipated events and circumstances may occur. Therefore, there are likely to be differences between the forecast and actual results, and those differences may be material.

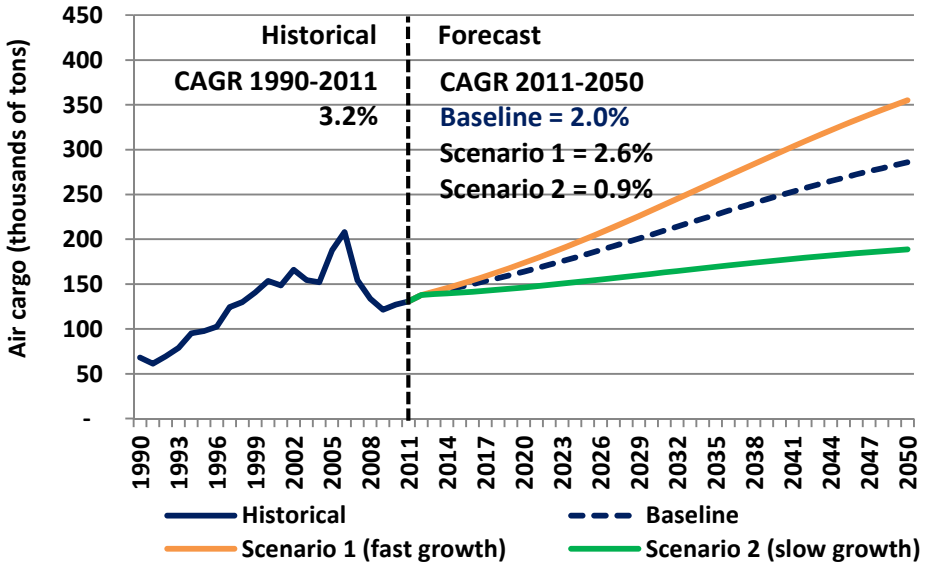
Sources: Historical: San Diego County Regional Airport Authority records.
Forecast: LeighFisher, July 2012.

AIR CARGO ALTERNATIVE FORECAST SCENARIOS

The alternative air cargo forecast scenarios are presented in Tables A-3 and A-4. In Scenario 1 (fast growth), air cargo (air freight and mail) is forecast to increase an average of 2.6% per year between 2011 and 2050, from 130,850 tons in 2011 to 355,000 tons in 2050, as shown in Table A-3. In Scenario 2 (slow growth), air cargo tonnage is forecast to increase an average of 0.9% per year between 2011 and 2050, from 130,850 tons in 2011 to 188,700 tons in 2050, as shown in Table A-4.

Figure A-2 presents a comparison of the alternative forecast scenarios of air cargo at SDIA with the baseline forecast.

Figure A-2
HISTORICAL AND FORECAST AIR CARGO ALTERNATIVE FORECAST SCENARIOS
San Diego International Airport



Note: The forecasts presented in this figure were prepared using the information and assumptions given in the accompanying text. Inevitably, some of the assumptions used to develop the forecasts will not be realized and unanticipated events and circumstances may occur. Therefore, there are likely to be differences between the forecast and actual results, and those differences may be material.

CAGR = Compound average annual growth rate

Source: Historical: San Diego County Regional Airport Authority records.
Forecast: LeighFisher, July 2012.

Table A-32

AIR CARGO FORECASTS – SCENARIO 1 (FAST GROWTH)

San Diego International Airport

	Historical	Estimated	Forecast				
	2011	2012	2016	2021	2026	2031	2050
Air freight	114,192	119,500	134,900	158,400	185,900	216,200	329,800
Mail	16,658	18,500	19,500	20,500	21,500	22,400	25,200
Total air cargo	130,850	138,000	154,400	178,900	207,400	238,600	355,000
Percent of total							
Enplaned	54.4%	54.3%	54.4%	54.3%	54.4%	54.4%	54.4%
Deplaned	45.6%	45.7%	45.6%	45.7%	45.6%	45.6%	45.6%
Enplaned air freight							
Domestic							
Cargo airline	52,064	51,900	58,900	69,700	82,300	96,200	148,600
Passenger airline	3,991	4,100	4,700	5,500	6,500	7,600	11,700
Domestic total	56,055	56,000	63,600	75,200	88,800	103,800	160,300
International	2,124	4,600	5,200	6,100	7,200	8,400	13,000
Air freight total	58,179	60,600	68,800	81,300	96,000	112,200	173,300
Enplaned mail							
Cargo airline	10,800	11,800	12,400	13,100	13,700	14,300	16,000
Passenger airline	2,146	2,600	2,700	2,900	3,000	3,100	3,500
Mail total	12,946	14,400	15,100	16,000	16,700	17,400	19,500
Total enplaned air cargo	71,125	75,000	83,900	97,300	112,700	129,600	192,800

	Compound annual percent increase (decrease)					
	2011-2012	2011-2016	2016-2021	2021-2026	2026-2031	2031-2050
Air freight	4.6%	3.4%	3.3%	3.3%	3.1%	2.2%
Mail	11.1	3.2	1.0	1.0	0.8	0.6
Total air cargo	5.5	3.4	3.0	3.0	2.8	2.1
Enplaned air freight						
Domestic						
Cargo airline	(0.3)	2.5%	3.4	3.4	3.2	2.3
Passenger airline	2.7	3.3%	3.2	3.4	3.2	2.3
Domestic total	(0.1)	2.6	3.4	3.4	3.2	2.3
International	116.6	19.6	3.2	3.4	3.1	2.3
Air freight total	4.2	3.4	3.4	3.4	3.2	2.3
Enplaned mail						
Cargo airline	9.3	2.8	1.1	0.9	0.9	0.6
Passenger airline	21.2	4.7	1.4	0.7	0.7	0.6
Mail total	11.2	3.1	1.2	0.9	0.8	0.6
Total enplaned air cargo	5.4	3.4	3.0	3.0	2.8	2.1

Note: The forecasts presented in this table were prepared using the information and assumptions given in the accompanying text. Inevitably, some of the assumptions used to develop the forecasts will not be realized and unanticipated events and circumstances may occur. Therefore, there are likely to be differences between the forecast and actual results, and those differences may be material.

Sources: Historical: San Diego County Regional Airport Authority records. Forecast: LeighFisher, July 2012.

Table A-33

AIR CARGO FORECASTS – SCENARIO 2 (SLOW GROWTH)

San Diego International Airport

	Historical 2011	Estimated 2012	Forecast 2016	2021	2026	2031	2050
Air freight	114,192	119,500	121,900	127,100	133,600	140,600	163,500
Mail	16,658	18,500	19,500	20,500	21,500	22,400	25,200
Total air cargo	130,850	138,000	141,400	147,600	155,100	163,000	188,700
Percent of total							
Enplaned	54.4%	54.3%	54.4%	54.3%	54.4%	54.4%	54.4%
Deplaned	45.6%	45.7%	45.6%	45.7%	45.6%	45.6%	45.6%
Enplaned air freight							
Domestic							
Cargo airline	52,064	51,900	52,900	55,100	57,900	61,000	71,200
Passenger airline	3,991	4,100	4,200	4,400	4,600	4,800	5,600
Domestic total	56,055	56,000	57,100	59,500	62,500	65,800	76,800
International	2,124	4,600	4,600	4,800	5,100	5,400	6,200
Air freight total	58,179	60,600	61,700	64,300	67,600	71,200	83,000
Enplaned mail							
Cargo airline	10,800	11,800	12,400	13,100	13,700	14,300	16,000
Passenger airline	2,146	2,600	2,700	2,900	3,000	3,100	3,500
Mail total	12,946	14,400	15,100	16,000	16,700	17,400	19,500
Total enplaned air cargo	71,125	75,000	76,800	80,300	84,300	88,600	102,500

	Compound annual percent increase (decrease) 2011-2012	2011-2016	2016-2021	2021-2026	2026-2031	2031-2050
Air freight	4.6%	1.3%	0.8%	1.0%	1.0%	0.8%
Mail	11.1	3.2	1.0	1.0	0.8	0.6
Total air cargo	5.5	1.6	0.9	1.0	1.0	0.8
Enplaned air freight						
Domestic						
Cargo airline	(0.3)	0.3	0.8	1.0	1.0	0.8
Passenger airline	2.7	1.0	0.9	0.9	0.9	0.8
Domestic total	(0.1)	0.4	0.8	1.0	1.0	0.8
International	116.6	16.7	0.9	1.2	1.1	0.7
Air freight total	4.2	1.2	0.8	1.0	1.0	0.8
Enplaned mail						
Cargo airline	9.3	2.8	1.1	0.9	0.9	0.6
Passenger airline	21.2	4.7	1.4	0.7	0.7	0.6
Mail total	11.2	3.1	1.2	0.9	0.8	0.6
Total enplaned air cargo	5.4	1.5	0.9	1.0	1.0	0.8

Note: The forecasts presented in this table were prepared using the information and assumptions given in the accompanying text. Inevitably, some of the assumptions used to develop the forecasts will not be realized and unanticipated events and circumstances may occur. Therefore, there are likely to be differences between the forecast and actual results, and those differences may be material.

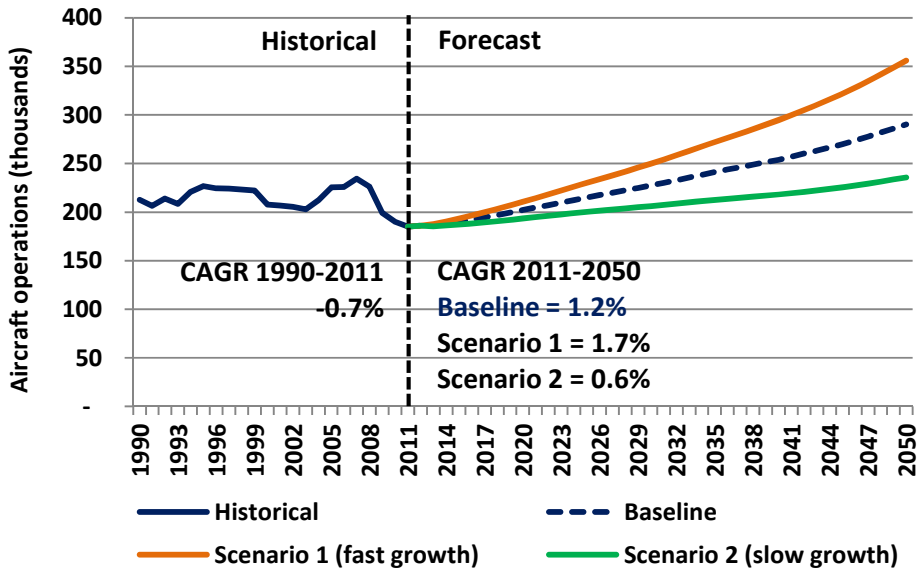
Sources: Historical: San Diego County Regional Airport Authority records. Forecast: LeighFisher, July 2012.

ALTERNATIVE AIRCRAFT OPERATIONS FORECASTS

Tables A-5 and A-6 provide aircraft operations forecasts for Scenarios 1 and 2. In Table A-5, the passenger and cargo airline operations are shown as derived from the enplaned passenger and air cargo tonnage totals associated with Scenario 1; Table A-6 provides the same for Scenario 2. In Scenario 1 (fast growth), total aircraft operations (passenger and cargo airlines, general aviation, and military) are forecast to increase an average of 1.7% per year between 2011 and 2050, from 185,142 in 2011 to 358,660 in 2050, as shown in Table A-5. In Scenario 2 (slow growth), total aircraft operations are forecast to increase an average of 0.6% per year between 2011 and 2050, from 185,142 in 2011 to 238,520 in 2050, as shown in Table A-6.

Figure A-3 presents a comparison of the alternative forecast scenarios of aircraft operations at SDIA with the baseline forecast.

Figure A-3
HISTORICAL AND FORECAST AIRCRAFT OPERATIONS
ALTERNATIVE FORECAST SCENARIOS
San Diego International Airport



Note: The forecasts presented in this figure were prepared using the information and assumptions given in the accompanying text. Inevitably, some of the assumptions used to develop the forecasts will not be realized and unanticipated events and circumstances may occur. Therefore, there are likely to be differences between the forecast and actual results, and those differences may be material.

CAGR = Compound average annual growth rate

Source: Historical: San Diego County Regional Airport Authority records.
Forecast: LeighFisher, July 2012.

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Table A-34

AIRCRAFT OPERATIONS FORECASTS – SCENARIO 1 (FAST GROWTH)

San Diego International Airport

	Historical 2011	Estimated 2012	Forecast 2016	2021	2026	2031	2050
Air Carrier							
Passenger airlines	140,200	141,990	152,630	168,760	186,410	204,890	300,210
Cargo airlines	3,988	4,080	4,290	4,830	5,430	6,040	7,720
Other *(a)*	2,802	2,800	2,800	2,800	2,800	2,800	2,800
Air Carrier total	146,990	148,870	159,720	176,390	194,640	213,730	310,730
Air Taxi							
Passenger airlines	22,350	21,610	23,220	23,580	23,880	24,110	26,210
Cargo airlines	2,464	2,520	2,650	2,980	3,350	3,730	4,770
Other *(a)*	2,230	2,000	2,000	2,000	2,000	2,000	2,000
Air Taxi total	27,044	26,130	27,870	28,560	29,230	29,840	32,980
General Aviation							
Itinerant	10,406	10,520	11,050	11,600	12,150	12,690	14,250
Local	--	--	--	--	--	--	--
General Aviation total	10,406	10,520	11,050	11,600	12,150	12,690	14,250
Military	702	700	700	700	700	700	700
Total Airport	185,142	186,220	199,340	217,250	236,720	256,960	358,660

	Compound annual percent increase (decrease)					
	2011-2012	2011-2016	2016-2021	2021-2026	2026-2031	2031-2050
Air Carrier						
Passenger airlines	1.3%	1.7%	2.0%	2.0%	1.9%	2.0%
Cargo airlines	2.3	1.5	2.4	2.4	2.2	1.3
Other *(a)*	(0.1)	(0.0%	0.0	0.0	0.0	0.0
Air Carrier total	1.3	1.7	2.0	2.0	1.9	2.0
Air Taxi						
Passenger airlines	(3.3)	0.8	0.3	0.3	0.2	0.4
Cargo airlines	2.3	1.5	2.4	2.4	2.2	1.3
Other *(a)*	(10.3)	(2.2)	0.0	0.0	0.0	0.0
Air Taxi total	(3.4)	0.6	0.5	0.5	0.4	0.5
General Aviation						
Itinerant	1.1	1.2	1.0	0.9	0.9	0.6
Local	--	--	--	--	--	--
General Aviation total	1.1	1.2	1.0	0.9	0.9	0.6
Military	(0.3)	(0.1)	0.0	0.0	0.0	0.0
Total Airport	0.6	1.5	1.7	1.7	1.7	1.8

Note: The forecasts presented in this table were prepared using the information and assumptions given in the accompanying text. Inevitably, some of the assumptions used to develop the forecasts will not be realized and unanticipated events and circumstances may occur. Therefore, there are likely to be differences between the forecast and actual results, and those differences may be material.

(a) Includes unscheduled, empty, and ferry flights.

Sources: Historical: San Diego County Regional Airport Authority records.
Forecast: LeighFisher, July 2012.

Table A-35

AIRCRAFT OPERATIONS FORECASTS – SCENARIO 2 (SLOW GROWTH)

San Diego International Airport

	Historical 2011	Estimated 2012	Forecast 2016	2021	2026	2031	2050
Air Carrier							
Passenger airlines	140,200	141,990	146,050	152,920	159,860	166,160	195,230
Cargo airlines	3,988	4,080	3,860	3,820	3,820	3,830	3,700
Other *(a)*	2,802	2,800	2,800	2,800	2,800	2,800	2,800
Air Carrier total	146,990	148,870	152,710	159,540	166,480	172,790	201,730
Air Taxi							
Passenger airlines	22,350	21,610	22,260	21,450	20,610	19,730	17,560
Cargo airlines	2,464	2,520	2,380	2,360	2,360	2,370	2,280
Other *(a)*	2,230	2,000	2,000	2,000	2,000	2,000	2,000
Air Taxi total	27,044	26,130	26,640	25,810	24,970	24,100	21,840
General Aviation							
Itinerant	10,406	10,520	11,050	11,600	12,150	12,690	14,250
Local	--	--	--	--	--	--	--
General Aviation total	10,406	10,520	11,050	11,600	12,150	12,690	14,250
Military	702	700	700	700	700	700	700
Total Airport	185,142	186,220	191,100	197,650	204,300	210,280	238,520

	Compound annual percent increase (decrease)					
	2011-2012	2011-2016	2016-2021	2021-2026	2026-2031	2031-2050
Air Carrier						
Passenger airlines	1.3%	0.8%	0.9%	0.9%	0.8%	0.9%
Cargo airlines	2.3	(0.7)	(0.2)	0.0	0.1	(0.2)
Other *(a)*	(0.1)	(0.0)	0.0	0.0	0.0	0.0
Air Carrier total	1.3	0.8	0.9	0.9	0.7	0.8
Air Taxi						
Passenger airlines	(3.3)	(0.1)	(0.7)	(0.8)	(0.9)	(0.6)
Cargo airlines	2.3	(0.7)	(0.2)	0.0	0.1	(0.2)
Other *(a)*	(10.3)	(2.2)	0.0	0.0	0.0	0.0
Air Taxi total	(3.4)	(0.3)	(0.6)	(0.7)	(0.7)	(0.5)
General Aviation						
Itinerant	1.1	1.2	1.0	0.9	0.9	0.6
Local	--	--	--	--	--	--
General Aviation total	1.1	(1.3)	1.0	0.9	0.9	0.6
Military	(0.3)	(0.1)	0.0	0.0	0.0	0.0
Total Airport	0.6	0.5	0.7	0.7	0.6	0.7

Note: The forecasts presented in this table were prepared using the information and assumptions given in the accompanying text. Inevitably, some of the assumptions used to develop the forecasts will not be realized and unanticipated events and circumstances may occur. Therefore, there are likely to be differences between the forecast and actual results, and those differences may be material.

(a) Includes unscheduled, empty, and ferry flights.

Sources: Historical: San Diego County Regional Airport Authority records.
Forecast: LeighFisher, July 2012.

APPENDIX B
REGRESSION ANALYSIS

Regression analysis compares the historical relationship between a dependent variable, in this case, enplaned passengers, and an independent or "predictor" variable. The predictor variable is eventually used to project future levels of the dependent variable. In aviation demand forecasts, the predictor variable is typically represented by an economic or demographic metric such as population, employment, or personal income. Regression analyses produce a mathematical equation that identifies the strength or reliability of the historical correlation between the dependent variable (enplaned passengers) and predictor variables. The statistical reliability of this equation is typically measured by a regression statistic known as "R-squared." An R-squared of 1.0 would represent a perfect historical correlation between the dependent and predictor variable and suggest that the measurement of this historical relationship will be a reliable predictor of future results.

Two regression models were defined during the forecast process to evaluate historical trends in SDIA domestic originating passengers and air freight and are presented in Table B-1.

Table B-1
REGRESSION MODELS
San Diego International Airport

	Coefficient	t-statistic	P-value
Domestic originating passengers			
Dependent variable = ln(SDIA domestic originating passengers)			
Independent variables			
ln(San Diego County per capita personal income, 2011 dollars)	1.07	7.11	0.0000
ln(SDIA airline yield, 2011 dollars)	-0.24	-1.68	0.1096
Constant	4.95	2.56	0.0198
Observations	21		
Adjusted R-squared	0.93		
Air freight			
Dependent variable = ln(SDIA air freight)			
Independent variables			
ln(San Diego County nonagricultural employment)	3.18	15.13	0.0000
ln(West Texas Intermediate oil prices, 2011 dollars)	-0.21	-3.84	0.0011
Constant	-10.76	-7.97	0.0000
Observations	22		
Adjusted R-squared	0.93		

Source: LeighFisher, July 2012.