Chapter Two

Forecasts

An important factor when planning the future needs of an airport involves a definition of aviation demand that may reasonably be expected to occur in the near term (five years), intermediate term (10 years), and long term (20 years). Aviation demand forecasting for Denton Enterprise Airport (DTO) will primarily consider based aircraft, aircraft operations, and peak activity periods. Additionally, this chapter will consider the potential demand for commercial airline passenger activities at DTO. Capacity concerns at the two major commercial service airports in the Dallas-Fort Worth metropolitan area – Dallas Fort Worth International Airport (DFW) and Dallas Love Field (DAL) – have raised the question of whether a third commercial service airport is needed to serve the metroplex. This report will evaluate what demand levels could be expected if the City of Denton chooses to pursue commercial activity at DTO.

The Texas Department of Transportation (TxDOT) has oversight responsibility to review and approve aviation forecasts developed in conjunction with airport planning studies for non-primary airports in Texas. TxDOT reviews individual airport forecasts with the objective of comparing them to the Federal Aviation Administration (FAA) *Terminal Area Forecasts* (TAF) and the *National Plan of Integrated Airport Systems* (NPIAS). Even though the TAF is updated annually, there has almost always been a disparity between the TAF and master planning forecasts, primarily because the TAF forecasts are the result of a top-down model that does not consider local conditions or recent trends. While the FAA forecasts are a point of comparison for master plan forecasts, they also serve other purposes, such as asset allocation by the FAA and TxDOT.

When reviewing a sponsor's forecast from the master plan, TxDOT must ensure that the forecast is based on reasonable planning assumptions, uses current data, and is developed using appropriate forecast methods. As stated in FAA Order 5090.3C, *Field Formulation of the National Plan of Integrated Airport Systems*, forecasts should be:

- Realistic;
- Based on the latest available data;
- Reflective of current conditions at the airport (as a baseline);
- Supported by information in the study; and
- Able to provide adequate justification for airport planning and development.

The forecast process for an airport master plan consists of a series of basic steps that vary in complexity, depending on the issues to be addressed and the level of effort required. The steps include a review of previous forecasts, determination of data needs, identification of data sources, collection of data, selection of forecast methods, preparation of the forecasts, and documentation and evaluation of the results. FAA Advisory Circular (AC) 150/5070-6C, *Airport Master Plans*, outlines seven steps involved in the forecast process:

1. **Identify Aviation Activity Measures**: Identify the levels and types of aviation activities likely to impact facility needs. For general aviation, this typically includes based aircraft and operations.
2. **Review Previous Airport Forecasts**: These may include the FAA TAF, state or regional system plans, and previous master plans.
3. **Gather Data**: Determine what data are required to prepare the forecasts, identify data sources, and collect historical and forecast data.
4. **Select Forecast Methods**: Several appropriate methodologies and techniques are available, including regression analysis, trend analysis, market share or ratio analysis, exponential smoothing, econometric modeling, comparison with other airports, survey techniques, cohort analysis, choice and distribution models, range projections, and professional judgement.
5. **Apply Forecast Methods and Evaluate Results**: Prepare the actual forecasts and evaluate them for reasonableness.
6. **Summarize and Document Results**: Provide supporting text and tables, as necessary.
7. **Compare Forecast Results with the FAA's TAF**: Based aircraft and total operations are considered consistent with the TAF if they meet one of the following criteria:
   - Forecasts differ by less than 10 percent in the five-year forecast period and less than 15 percent in the 10-year forecast period;
   - Forecasts do not affect the timing or scale of an airport project; or
   - Forecasts do not affect the role of the airport, as defined in the current version of FAA Order 5090.3, *Field Formulation of the National Plan of Integrated Airport Systems.*

Aviation activity can be affected by many influences on the local, regional, and national levels, making it virtually impossible to predict year-to-year fluctuations of activity over 20 years with any certainty; therefore, it is important to remember that forecasts are meant to serve as guidelines, and planning must remain flexible enough to respond to a range of unforeseen developments.

The following forecast analysis for the airport was produced following these basic guidelines. Existing forecasts are examined and compared against current and historical activity. The historical aviation activity is then examined with other factors and trends that can affect demand, with the intention of providing an updated set of aviation demand projections for the airport that will permit airport management to make planning adjustments as necessary to maintain a viable, efficient, and cost-effective facility.

The forecasts for this master plan will utilize a base year of 2024 with a long-range forecast out to 2044.

NATIONAL AVIATION TRENDS

Each year, the FAA updates and publishes a national aviation forecast. Included in this publication are forecasts for large air carriers, regional/commuter air carriers, general aviation, and FAA workload measures. The forecasts are prepared to meet the budget and planning needs of the FAA and provide information that can be used by state and local authorities, the aviation industry, and the public. When this chapter was prepared, the current edition was *FAA Aerospace Forecast – Fiscal Years* (FY) *2024-2044*. The FAA primarily uses the economic performance of the United States as an indicator of future aviation industry growth. Similar economic analyses are applied to the outlook for aviation growth in international markets. The following discussion is a brief synopsis of highlights from the FAA's national general aviation forecasts. A summary is also shown on **Exhibit 2A**.

NATIONAL GENERAL AVIATION (GA) TRENDS

The long-term outlook for general aviation is promising, as growth at the high end of the segment offsets continuing retirements at the traditional low end. The active general aviation fleet is forecast to remain relatively stable between 2024 and 2044, increasing by just 0.4 percent. While steady growth in both gross domestic product (GDP) and corporate profits results in continued growth of the turbine and rotorcraft fleets, the largest segment of the fleet – fixed-wing piston aircraft – continues to shrink over the forecast period.

The FAA forecasts the fleet mix and hours flown for single-engine piston (SEP) aircraft; multi-engine piston (MEP) aircraft; turboprops; business jets; piston and turbine helicopters; and light sport, experimental, and other aircraft (e.g., gliders and balloons). The FAA forecasts active aircraft, not total aircraft. An active aircraft is one that is flown at least one hour during the year. From 2010 through 2013, the FAA undertook an effort to have all aircraft owners re-register their aircraft. This effort resulted in a 10.5 percent decrease in the number of active general aviation aircraft, mostly in the piston category. **Table 2A** shows the primary general aviation demand indicators, as forecast by the FAA.

TABLE 2A | FAA General Aviation Forecast

Demand Indicator	2024	2044	CAGR
General Aviation Fleet			
Total Fixed-Wing Piston	136,485	130,790	-0.2%
Total Fixed-Wing Turbine	27,905	41,580	2.0%
Total Helicopters	10,090	14,025	1.7%
Total Other (experimental, light sport, etc.)	35,625	42,580	0.9%
Total GA Fleet	*210,105*	*228,975*	*0.4%*
General Aviation Operations			
Local	15,900,404	17,570,920	0.5%
Itinerant	15,125,333	16,568,634	0.5%
Total General Aviation Operations	*31,025,737*	*34,139,554*	*0.5%*
CAGR = compound annual growth rate (2024-2044)			

Source: FAA Aerospace Forecast – FY 2024-2044

FAA forecasts of total operations – based on activity at control towers across the United States – are categorized as air carrier, air taxi/commuter, general aviation, and military. While the fleet size remains relatively level, the number of general aviation operations at towered airports is projected to increase from 31.0 million in 2024 to 34.1 million in 2044, with an average increase of 0.5 percent per year as growth in turbine, rotorcraft, and experimental hours offsets a decline in fixed-wing piston hours. This includes annual growth rates of 0.5 percent for both local and itinerant general aviation operations.

BUSINESS JET OPERATIONAL TRENDS

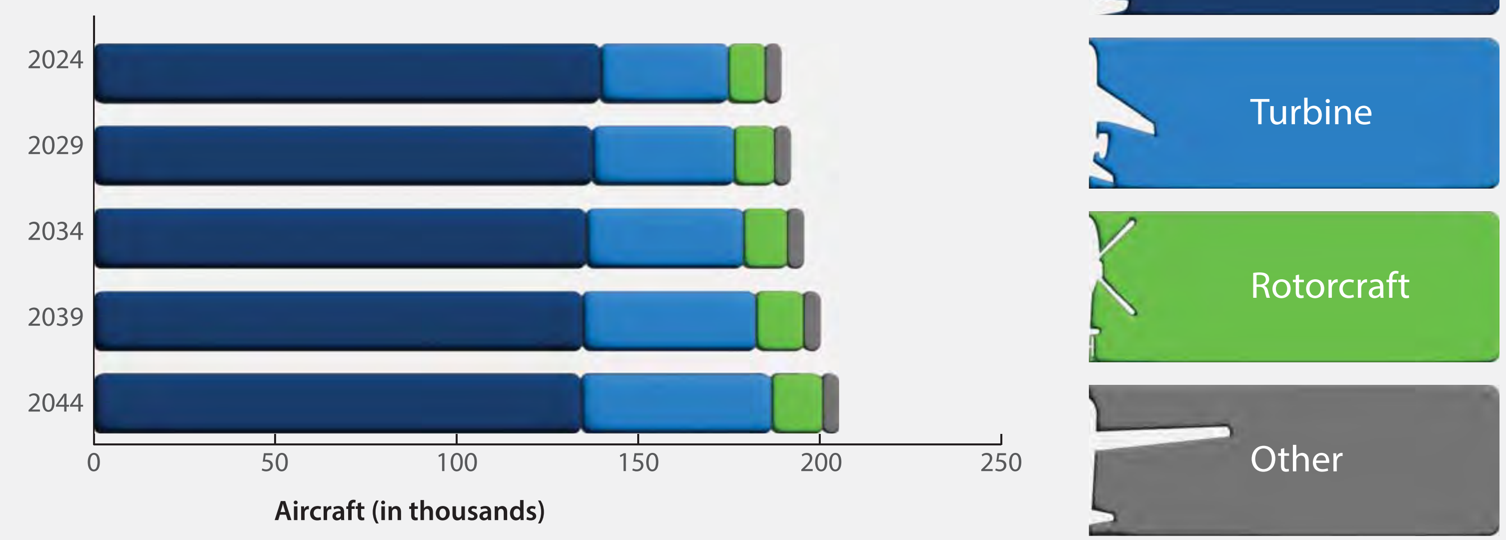
General aviation airports are often hubs of diverse activity, although they frequently serve predominantly piston-powered aircraft. These aircraft, including single-engine airplanes and light twin-engine aircraft, comprise most of the based aircraft and operations at DTO. Routine activities for these aircraft vary from local flights and flight training to recreational flying and short-haul travel. Piston-powered aircraft are generally more numerous and engaged in more frequent, shorter operations, which contributes to a busy, vibrant atmosphere at general aviation airports.

In contrast, business jets are less numerous and conduct fewer operations overall but are physically demanding in a different way. Business jets require more space for operations, due to their larger size and need for longer runways. Arrivals and departures by business jets can place greater demands on airport infrastructure, such as requiring more intensive ground handling, fueling, and maintenance services. The operational impact of business jets includes increased coordination and infrastructure support; their presence is prominently felt, even if they operate less frequently compared to their piston-powered counterparts. At reliever airports, such as DTO, business jets typically drive the critical aircraft discussion. For this reason, additional focus is placed on national business jet trends to help understand growth patterns and how they might impact future operations at DTO.

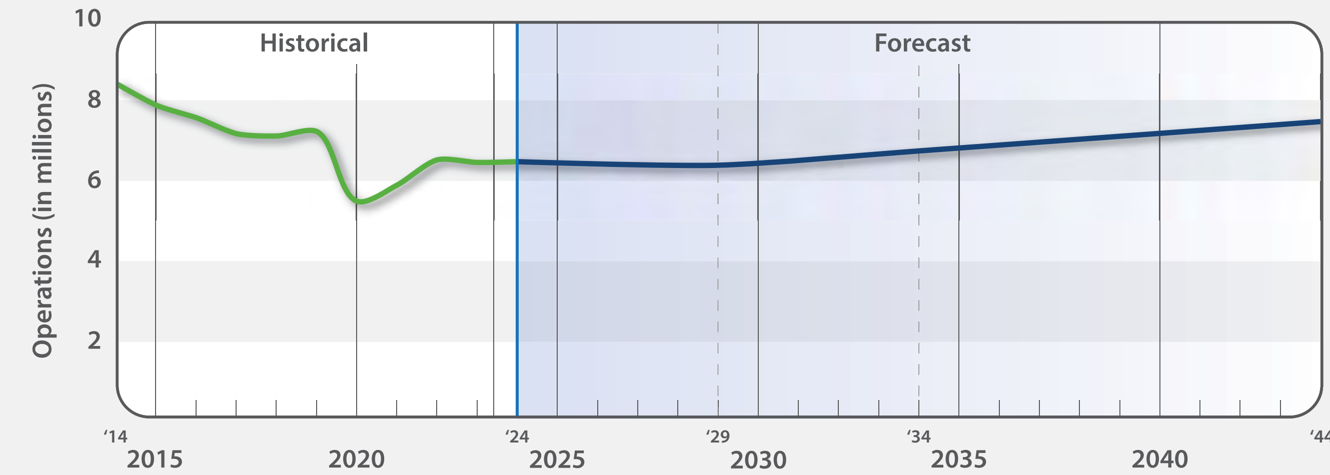
Since the early 2000s, business jet operational trends have evolved significantly, driven by advancements in technology, changing economic conditions, and shifts in travel preferences. Advances in aircraft technology have led to the development of business jets with greater range and performance capabilities. Newer models can cover longer distances non-stop, reducing the need for intermediate stops. Ultra-long-range business jets, such as the Gulfstream G700/G800, Bombardier Global 7500 and the Boeing Business Jet (BBJ) have ranges over 7,000 nautical miles (nm) are seeing growing demand from corporations and high-net-worth individuals who seek more flexibility and range. A strong focus has been made on improving fuel efficiency and reducing operating costs. Modern business jets are designed with more efficient engines and aerodynamic enhancements that lower fuel consumption and operational expenses. Some of the most fuel-efficient business jet models include the Embraer Phenom 300, Pilatus PC-24, Cessna Citation XLS, and Learjet 75.

The FAA's Traffic Flow Management System Count (TFMSC) database provides data on aircraft operations across the country. As shown in **Table 2B**, the top 15 business jets with the most operations in 2023 are led by two of the most efficient business jets, the Embraer Phenom 300 and the Cessna Citation Excel/XLS. It's interesting to note that of the top 15 business jets, ten have experienced declining growth rates over the past five years, reflecting a shift in operations to newer models.

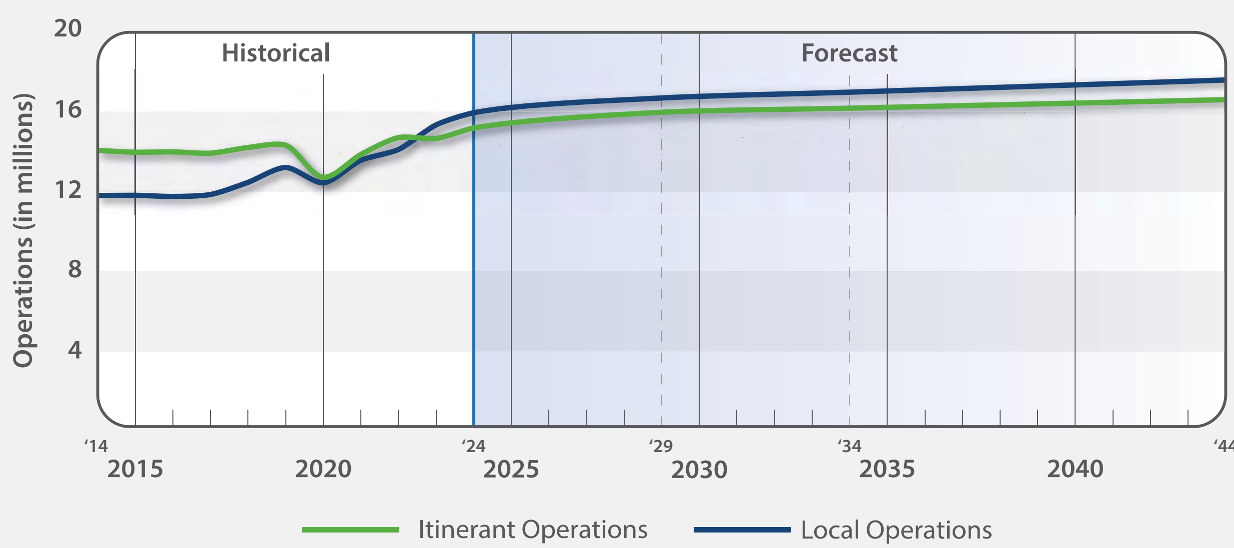
U.S. Active General Aviation Aircraft



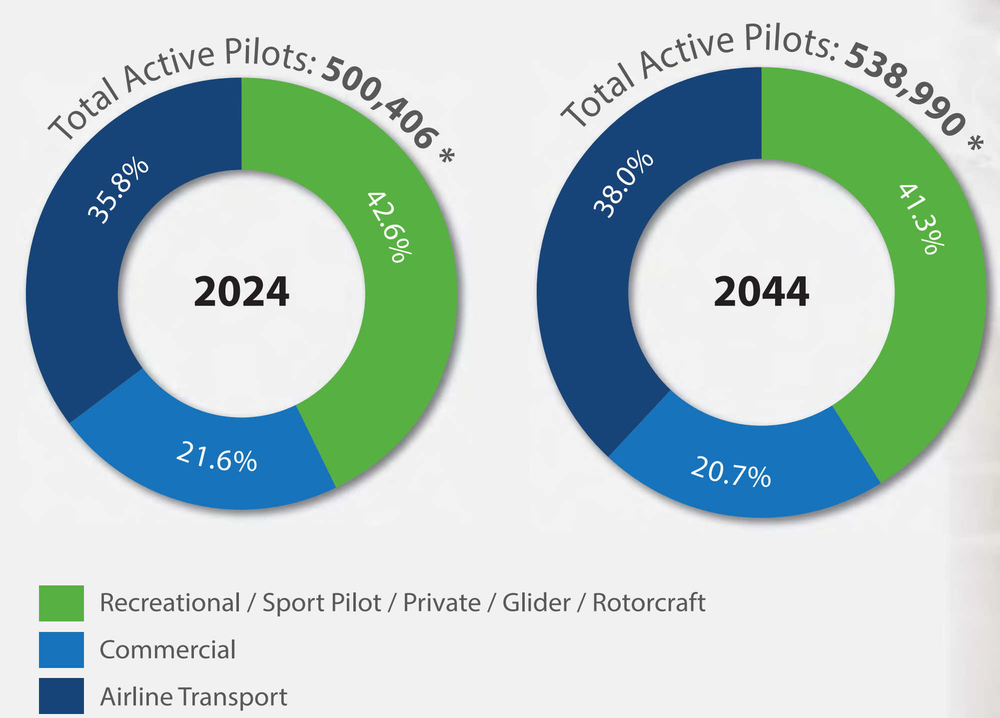
U.S. Air Taxi Operations



U.S. General Aviation Operations



Active Pilots By Certificate



**Excludes Student Pilot Certificates*

Source: FAA Aerospace Forecasts FY2024-2044

This page intentionally left blank

TABLE 2B | 2023 Top 15 Busiest Business Jets by Operations

Aircraft Type	OPERATIONS						2018-2023
	2018	2019	2020	2021	2022	2023	CAGR
E55P - Embraer Phenom 300	221,701	247,960	213,923	335,646	354,249	364,473	10.5%
C56X - Cessna Excel/XLS	355,740	340,406	242,977	357,612	380,367	348,189	-0.4%
C68A - Cessna Citation Latitude	97,497	150,649	133,150	229,559	252,954	280,900	23.6%
CL35 - Bombardier Challenger 350	123,317	143,688	140,716	217,882	235,031	247,682	15.0%
C25B - Cessna Citation CJ3	130,723	146,270	125,983	179,269	193,852	205,414	9.5%
BE40 - Raytheon/Beech Beechjet 400/T-1	250,126	239,224	209,219	244,373	234,904	200,351	-4.3%
H25B - BAe HS 125/700-800/Hawker 800	217,294	205,703	158,778	240,801	229,572	199,945	-1.7%
C560 - Cessna Citation V/Ultra/Encore	216,556	208,845	170,545	228,409	219,329	197,453	-1.8%
CL60 - Bombardier Challenger 600/601/604	194,437	185,781	131,174	193,995	202,902	191,198	-0.3%
GLF4 - Gulfstream IV/G400	181,856	177,559	133,027	202,549	196,146	175,076	-0.8%
CL30 - Bombardier (Canadair) Challenger 300	200,083	200,584	127,629	172,303	169,523	162,637	-4.1%
C525 - Cessna CitationJet/CJ1	165,117	156,999	124,413	166,026	166,923	152,938	-1.5%
F2TH - Dassault Falcon 2000	149,611	141,059	90,177	131,785	149,210	142,460	-1.0%
C680 - Cessna Citation Sovereign	150,583	148,348	101,731	151,397	158,480	137,455	-1.8%
GLF5 - Gulfstream V/G500	135,211	133,554	89,818	127,765	150,344	136,674	0.2%
CAGR = compound annual growth rate							

Source: FAA TFMSC Database

Table 2C shows the business jets with the fastest operational growth rates over the past five years. These aircraft represent newer models, such as the Cessna Citation Longitude and Latitude (newest Cessna models), the Gulfstream G500 and Bombardier Global 7500 (ultra-long-range aircraft), and the Cirrus Vision SF50 (Vision Jet) and HondaJet (light business jets).

TABLE 2C | Top 15 Fastest Operational Growth Business Jets

Aircraft Type	OPERATIONS						2018-2023
	2018	2019	2020	2021	2022	2023	CAGR
C700 - Cessna Citation Longitude	2,332	2,204	8,484	29,044	51,928	69,941	97.4%
GA5C - G-7 Gulfstream G500	1,510	5,080	6,464	13,900	17,868	26,823	77.8%
GL7T - Bombardier Global 7500	1,166	1,356	3,351	8,808	15,338	20,687	77.7%
SF50 - Cirrus Vision SF50	13,460	25,240	36,700	62,547	82,853	98,641	48.9%
HDJT - Honda HA-420 HondaJet	17,228	24,899	27,295	48,402	67,416	61,344	28.9%
E545 - Embraer EMB-545 Legacy 450	28,530	39,244	39,788	62,344	71,203	82,852	23.8%
C68A - Cessna Citation Latitude	97,497	150,649	133,150	229,559	252,954	280,900	23.6%
C25M - Cessna Citation M2	18,586	25,696	25,778	38,670	49,915	52,380	23.0%
FA8X - Dassault Falcon 8X	2,906	3,572	2,503	4,146	7,052	7,028	19.3%
E550 - Embraer Legacy 500	19,573	26,790	20,039	30,973	36,636	42,614	16.8%
CL35 - Bombardier Challenger 350	123,317	143,688	140,716	217,882	235,031	247,682	15.0%
GLF6 - Gulfstream G650	43,657	52,603	37,724	55,534	73,457	79,797	12.8%
E55P - Embraer Phenom 300	221,701	247,960	213,923	335,646	354,249	364,473	10.5%
G280 - Gulfstream G280	49,906	64,222	42,360	66,010	79,495	79,726	9.8%
C25B - Cessna Citation CJ3	130,723	146,270	125,983	179,269	193,852	205,414	9.5%
CAGR = compound annual growth rate							

Source: FAA TFMSC Database

Table 2D provides a five-year breakdown of business jet operations by aircraft reference code (ARC). These data show that the B-II and C-II categories accounted for over 66 percent of total business jet operations in 2023. The highest growth categories are A-I (small/efficient jet) and B-III (ultra-long-range jets). The A-I category has grown at a compound annual growth rate (CAGR) of 48.9 percent and is represented by a single aircraft: the Cirrus Vision SF50. The B-III category has a CAGR of 21.0 percent and is primarily comprised of the Dassault Falcon F7X and 8X and the Bombardier Global 7500.

TABLE 2D | National Business Jet Operations by ARC

Aircraft Reference Code (ARC) | Example Aircraft	OPERATIONS						2018-2023 CAGR
	2018	2019	2020	2021	2022	2023	
A-I | Cirrus Vision SF50	13,460	25,240	36,700	62,547	82,853	98,641	48.9%
B-I | Beechjet 400	783,248	751,782	619,231	788,859	805,071	719,046	-1.7%
C-I | Learjet 45	398,732	368,053	292,293	397,439	385,763	335,301	-3.4%
B-II | Phenom 300	1,598,020	1,653,404	1,298,810	1,926,275	2,018,435	1,970,766	4.3%
C-II | Challenger 300	1,439,252	1,429,196	1,054,897	1,560,040	1,634,500	1,554,406	1.6%
D-II | Gulfstream G400	181,856	177,559	133,027	202,549	196,146	175,076	-0.8%
B-III | Falcon F7X	37,790	46,527	39,367	64,736	87,139	97,955	21.0%
C-III | Global Express	161,970	178,013	128,218	195,516	234,013	249,602	9.0%
D-III | Gulfstream G500	135,211	133,554	89,818	127,765	150,344	136,674	0.2%

CAGR = compound annual growth rate

Source: FAA TFMSC Database

RISKS TO THE FORECAST

While the FAA is confident its forecasts for aviation demand and activity can be reached, they are dependent on several factors, including the strength of the global economy, security (including the threat of international terrorism), and oil prices. Higher oil prices could lead to shifts in consumer spending away from aviation, dampening a recovery in air transport demand. The COVID-19 pandemic introduced a new risk, and although the industry has rebounded, the threat of future global health emergencies and potential economic fallout remains.

AIRPORT SERVICE AREA

The initial step in determining the aviation demand for an airport is to define its generalized service area for various segments of aviation. The service area is primarily defined by evaluating the locations of competing airports and their capabilities, services, and relative attraction and convenience. In determining the aviation demand for an airport, it is necessary to identify the role of the airport, as well as the specific areas of aviation demand the airport is intended to serve. DTO is classified as a reliever airport within the NPIAS, meaning that its main purposes are to relieve congestion at local commercial service airports, such as DFW and DAL, and to provide more general aviation access to the overall community.

The service area for an airport is a geographic region from which the airport can be expected to attract the largest share of its activity. The definition of the service area can be used to identify other factors, such as socioeconomic and demographic trends, that influence aviation demand at an airport. Aviation demand will also be impacted by the proximity and strength of aviation services offered at competing airports, as well as the local and regional surface transportation network.

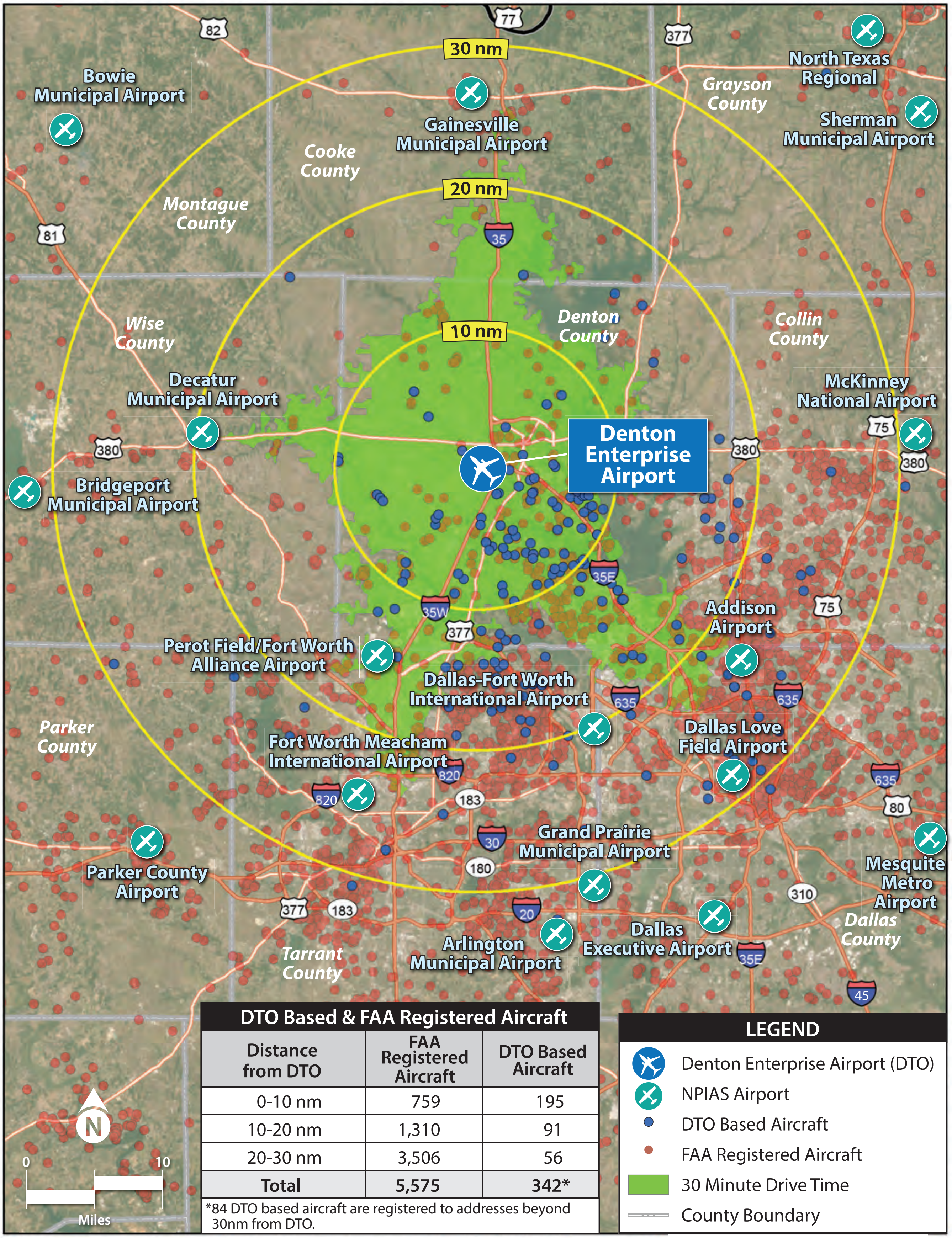
As in any business enterprise, the more attractive a facility is in terms of services and capabilities, the more competitive it will be in the market. If an airport's attractiveness increases in relation to nearby airports, so will the size of its service area. If its facilities and services are adequate and/or competitive, some level of aviation activity might be attracted to an airport from more distant locales.

As a rule, a general aviation airport's service area can extend for approximately 30 nautical miles (nm). As outlined in Chapter One, there are nine public-use airports with at least one paved runway within a 30-nm radius of DTO. Two of these airports are not included in the NPIAS and are therefore not eligible to receive federal grants through the *Airport Improvement Program*. Two other airports are classified as primary commercial service airports: DAL and DFW. Of the remaining five airports, only Fort Worth Alliance Airport (AFW), Addison Airport (ADS), and Fort Worth Meacham International Airport (FTW) offer runway lengths of over 7,000 feet.

When evaluating the GA service area, two primary demand segments must be considered: based aircraft and itinerant operations. An airport's ability to attract based aircraft is an important factor when defining the service area; proximity is a consideration for most aircraft owners. Aircraft owners typically choose to base at airports close to their homes or businesses. **Exhibit 2B** depicts a radius of 10, 20, and 30 nm from DTO, extending beyond Denton County and into neighboring Cooke, Grayson, Collin, Dallas, Parker, Wise, and Montague counties. Registered aircraft in the region and aircraft based at DTO are also shown on the exhibit, with large clusters of registered aircraft located in the Dallas-Fort Worth metroplex and near other regional airports, such as Decatur Municipal Airport (LUD) to the west, McKinney National Airport (TKI) to the east, and Gainesville Municipal Airport (GLE) to the north. In total, there are 5,575 registered aircraft within a 30-nm radius of DTO. The airport has 426 aircraft in its based aircraft inventory, 412 of which have been validated by the FAA. Of the aircraft in DTO's inventory, 83 percent are attributed to addresses within 30 nm of the airport and 47 percent within 10 nm of the airport. This map indicates that DTO's based aircraft service area extends the breadth of a 30-nm range, with a specific focus on the immediate surrounding area within Denton County.

The second demand segment to consider is itinerant operations. These are operations that are performed by aircraft that arrive from outside the airport area and land at DTO or depart from DTO for another airport. In most cases, pilots will use airports nearer their intended destinations; however, this is dependent on the airport's ability to accommodate aircraft operators in terms of the facility and services available. As a result, airports with better facilities and services are more likely to attract a larger portion of the region's itinerant operations.

When compared to other public-use airports in the region, DTO offers the typical array of general aviation services and amenities, including fueling services, aircraft maintenance and repairs, ground handling, passenger and crew services, flight planning and support, aircraft storage and tiedowns, aircraft cleaning, and administrative support. All of the reliever airports within the 30-nm radius of DTO (AFW, ADS, and FTW) have control towers and longer runways. Except ADS, each of these airports offers instrument approach minimums of ½-mile. From a location standpoint, DTO is the most convenient airport for visitors in and around Denton and the north/northwestern portions of the metroplex, whereas AFW and FTW are better situated to accommodate transient traffic in Fort Worth and Dallas, depending on the final destination.



DTO Based & FAA Registered Aircraft		
Distance from DTO	FAA Registered Aircraft	DTO Based Aircraft
0-10 nm	759	195
10-20 nm	1,310	91
20-30 nm	3,506	56
Total	**5,575**	**342***

*84 DTO based aircraft are registered to addresses beyond 30nm from DTO.

LEGEND

- Denton Enterprise Airport (DTO)
- NPIAS Airport
- DTO Based Aircraft
- FAA Registered Aircraft
- 30 Minute Drive Time
- County Boundary

Based on the above discussion, DTO's primary service area for the purposes of this study includes the entirety of Denton County. Due to the airport's proximity to and influence from the Dallas-Fort Worth metroplex, the forecasting analysis will also consider the socioeconomic impacts of the broader metroplex on aviation activity at DTO.

SERVICE AREA SOCIOECONOMICS

The socioeconomic characteristics of an airport's service area can provide valuable information from which to derive an understanding of the dynamics of growth near an airport. This information is crucial in determining aviation demand level requirements, as most aviation demand is directly related to the socioeconomic conditions of the surrounding region. Statistical analysis of population, employment, income, and gross regional product (GRP) trends outlines the economic strength of a region and can help determine the ability of the area to sustain a strong economy in the future. Socioeconomic data utilized in the development of new based aircraft and operations forecasts for DTO include historical and projected population, employment, per capita personal income, and GRP data from Woods & Poole Economics, Inc. 10 years of historical data, projections through 2044 for the service area, and a comparison to the Dallas-Fort Worth metropolitan statistical area (DFW MSA) are summarized in **Table 2E**.

TABLE 2E | Socioeconomic Information

Year	POPULATION		EMPLOYMENT		PER CAPITA PERSONAL INCOME (2017 DOLLARS)		GROSS REGIONAL PRODUCT (MILLIONS OF 2017 DOLLARS)	
	Denton County	DFW MSA	Denton County	DFW MSA	Denton County	DFW MSA	Denton County	DFW MSA
Historical								
2014	750,659	6,879,061	343,043	4,464,858	$51,413	$51,620	$26,521	$430,114
2015	776,070	7,025,043	363,123	4,634,309	$53,371	$52,245	$28,319	$450,245
2016	804,342	7,175,705	376,890	4,794,803	$54,259	$52,356	$30,169	$464,687
2017	830,783	7,314,691	393,859	4,930,540	$55,127	$54,001	$32,263	$480,016
2018	853,505	7,429,882	416,086	5,085,293	$57,498	$56,008	$33,604	$501,500
2019	883,339	7,543,556	427,954	5,184,757	$59,743	$57,412	$35,762	$522,036
2020	914,398	7,666,418	439,264	5,170,447	$61,717	$58,945	$37,761	$516,239
2021	943,883	7,774,647	480,791	5,492,350	$65,328	$62,323	$40,887	$548,925
2022	977,760	7,947,439	511,765	5,845,179	$64,093	$60,718	$43,962	$581,798
2023	1,007,703	8,100,037	529,270	5,977,584	$65,335	$63,343	$47,115	$611,810
2024	1,030,322	8,215,046	544,797	6,106,951	$66,527	$64,674	$49,165	$631,695
Forecast								
2029	1,149,177	8,800,501	634,701	6,797,728	$73,201	$71,675	$61,048	$738,624
2034	1,277,079	9,397,522	737,969	7,506,003	$80,644	$79,103	$75,487	$854,998
2044	1,559,212	10,615,729	985,715	9,002,703	$97,702	$95,577	$113,669	$1,121,736
CAGRs								
2014-2024	3.2%	1.8%	4.7%	3.2%	2.6%	2.3%	6.4%	3.9%
2024-2044	2.1%	1.3%	3.0%	2.0%	1.9%	2.0%	4.3%	2.9%

CAGR = compound annual growth rate

Source: Woods & Poole Economics Inc. 2024

FORECASTING APPROACH

The development of aviation forecasts proceeds through analytical and judgmental processes. A series of mathematical relationships is tested to establish statistical logic and rationale for projected growth; however, the judgment of the forecast analyst – based on professional experience, knowledge of the aviation industry, and assessment of the local situation – is important in the final determination of the preferred forecast. The most reliable approach to estimating aviation demand is through the utilization of more than one analytical technique. Methodologies frequently considered include trend line/time-series projections, correlation/regression analysis, and market share analysis. The forecast analyst may elect to not use certain techniques, depending on the reasonableness of the forecasts produced using other techniques.

Trend line/time-series projections are probably the simplest and most familiar of the forecasting techniques. A basic trend line projection is produced by fitting growth curves to historical data and then extending them out into the future. A basic assumption of this technique is that outside factors will continue to affect aviation demand in much the same manner as in the past. As broad as this assumption may be, the trend line projection serves as a reliable benchmark for comparing other projections.

Correlation analysis provides a direct relationship measure between two separate sets of historical data. If there is a reasonable correlation between the data sets, further evaluation using regression analysis may be employed.

Regression analysis measures statistical relationships between dependent and independent variables, yielding a correlation coefficient. The correlation coefficient (Pearson's r) measures association between the changes in the dependent variable and the independent variable(s). If the r^2 value (coefficient determination) is greater than 0.95, it indicates good predictive reliability. A value less than 0.95 may be used, but with the understanding that the predictive reliability is lower.

Market share analysis involves a historical review of the airport activity as a percentage, or share, of a larger regional, state, or national aviation market. A historical market share trend is determined, providing an expected market share for the future. These shares are then multiplied by the forecasts of the larger geographical area to produce a market share projection. This method has the same limitations as trend line projections but can provide a useful check on the validity of other forecasting techniques.

Forecasts will age and become less reliable the farther one is from the base year, particularly due to changing local and national conditions; nevertheless, the FAA requires that a 20-year forecast be developed for long-range airport planning. Facility and financial planning usually require at least a 10-year view because it often takes more than five years to complete a major facility development program; however, it is important to use forecasts that do not overestimate revenue-gathering capabilities or understate demand for facilities needed to meet public (user) needs.

A wide range of factors is known to influence the aviation industry and can have significant impacts on the extent and nature of aviation activity in both the local and national markets. Historically, the nature and trend of the national economy has had a direct impact on the level of aviation activity; nevertheless, trends emerge over time and provide the basis for airport planning.

Future facility requirements – such as general aviation hangars and terminals, ramp areas, and runways – are derived from projections of various aviation demand indicators. Using a broad spectrum of local, regional, and national socioeconomic and aviation information and analyzing the most current aviation trends, forecasts are presented for the following aviation demand indicators:

- Based Aircraft
- Based Aircraft Fleet Mix
- General Aviation Operations
- Air Taxi and Military Operations
- Operational Peaks

The following forecast analyses examine each of these aviation demand categories expected at DTO over the next 20 years. Each segment will be examined individually and collectively to provide an understanding of the overall aviation activity at the airport through 2044.

PREVIOUS FORECASTS

Consideration is given to any forecasts of aviation demand for the airport that have been completed recently. For DTO, recently prepared forecasts reviewed are those in the current FAA TAF, which was published in January 2024, and the most recent airport master plan, which was completed in 2015.

On an annual basis, the FAA publishes the TAF for each airport included in the NPIAS. The TAF is a generalized forecast of airport activity that is used by the FAA primarily for internal planning purposes. It is available to airports and consultants to use as a baseline projection and is an important point of comparison when developing local forecasts.

The 2015 *Denton Enterprise Airport Master Plan* is now nine years old and was prepared prior to the COVID-19 pandemic. Since that time, total operations and based aircraft have experienced growth, but at different rates than what was previously projected. **Table 2F** presents the 2024 TAF and 2015 master plan projections compared to actual data for DTO.

It is important to note that the TAF based aircraft count is higher than the current FAA-validated count from the based aircraft registry. The TAF reflects 474 based aircraft in 2024, while the registry reflects 412 FAA-validated based aircraft. The total operations count used in the TAF is more than 24,000 operations lower than the count reported by the DTO airport traffic control tower (ATCT); the tower reported 221,478 operations for the most recent 12-month period ending in July 2024. Once the forecasts presented in this chapter are approved by the FAA, the FAA could update the TAF to reflect the selected forecasts.

TABLE 2F | Previous Forecasts

Year	BASED AIRCRAFT			TOTAL OPERATIONS		
	FAA TAF	DTO MP 2015[A]	ACTUAL	FAA TAF	DTO MP 2015[a]	Actual
2012	291	375	N/A	156,131	169,000	157,986
2013	390	393	N/A	162,519	175,877	160,740
2014	390	413	N/A	155,998	183,034	158,210
2015	364	433	379	166,815	190,482	164,797
2016	458	454	364	141,696	198,233	136,656
2017	362	476	451	124,962	206,300	125,608
2018	295	482	362	141,688	209,103	147,777
2019	278	488	311	139,964	211,944	135,744
2020	345	494	288	138,506	214,823	136,630
2021	345	500	301	133,220	217,742	138,703
2022	452	506	398	166,077	220,700	173,758
2023	463	516	445	196,034	223,508	204,797
2024	474	525	412	197,360	226,351	221,478[b]
2025	487	535	–	198,705	229,231	–
2026	500	546	–	200,069	232,147	–
2027	513	556	–	201,453	235,100	–
2028	526	567	–	202,856	238,500	–
2029	540	577	–	204,279	241,950	–
2030	554	588	–	205,723	245,449	–
2031	568	600	–	207,187	248,999	–
2032	582	611	–	208,671	252,600	–
2033	597	623	–	210,177	256,253	–
2034	612	634	–	211,706	259,959	–
2035	627	647	–	213,255	263,719	–
2036	642	659	–	214,828	267,533	–
2037	657	671	–	216,422	271,403	–
2038	672	684	–	218,038	275,328	–
2039	688	697	–	219,679	279,310	–
2040	704	711	–	221,344	283,350	–
2041	720	724	–	223,031	287,448	–
2042	736	738	–	224,743	291,605	–
2043	752	752	–	226,481	295,822	–
2044	768	766	–	228,242	300,101	–

[a] The 2015 master plan utilized a base year of 2012 with projections for 2017, 2022, 2027, and 2032. All other years included in the table have been interpolated or extrapolated.
[b] 2024 operational data represent data from the most recent 12-month calendar period ending in July 2024.

Sources: FAA Terminal Area Forecast, January 2024; Denton Enterprise Airport Master Plan, October 2015; FAA Based Aircraft Inventory Program (data not available prior to 2014); FAA OPSNET

GENERAL AVIATION FORECASTS

General aviation encompasses all portions of civil aviation except commercial service and military operations. To determine the types and sizes of facilities that should be planned to accommodate general aviation activity at DTO, certain elements of this activity must be forecast. These indicators of general aviation demand include based aircraft, aircraft fleet mix, and annual operations.

The number of based aircraft is the most basic indicator of general aviation demand. By first developing a forecast of based aircraft for the airport, other demand indicators can be projected. The process of developing forecasts of based aircraft begins with an analysis of aircraft ownership in the primary general aviation service area through a review of historical aircraft registrations. An initial forecast of registered aircraft is developed and will be used as one data point to arrive at a based aircraft forecast for the airport.

BASED AIRCRAFT FORECAST

Forecasts of based aircraft may directly influence needed facilities and applicable design standards. The needed facilities may include hangars, aprons, taxilanes, etc. The applicable design standards may include separation distances and object clearing surfaces. The sizes and types of based aircraft are also an important consideration; the addition of numerous small aircraft may have no effect on design standards, while the addition of a few larger business jets can have a substantial impact on applicable design standards.

Because of the numerous variables known to influence aviation demand, several separate forecasts of based aircraft are developed. Each forecast is examined for reasonableness and any outliers are discarded or given less weight. Collectively, the remaining forecasts will create a planning envelope. A single planning forecast is then selected for use in developing facility needs for the airport. The selected forecast of based aircraft can be one of the forecasts developed, based on the experience and judgement of the forecaster, or it can be a blend of the forecasts.

Based Aircraft Inventory

Documentation of the historical number of based aircraft at the airport has been somewhat intermittent. The FAA did not require airports to report based aircraft numbers until recently, with the establishment of a based aircraft inventory (www.basedaircraft.com) in which it is possible to cross-reference based aircraft claimed by one airport with other airports. The FAA now utilizes this based aircraft inventory as a baseline for determining how many and what types of aircraft are based at any individual airport. This database evolves daily as aircraft are added or removed. It is the responsibility of the sponsor (owner) of each airport to input based aircraft information into the FAA database.

Airport staff have undertaken a comprehensive physical count and submitted the count to the FAA for validation. The most recent validation of based aircraft at DTO occurred on July 24, 2024, and identified 412 validated based aircraft. Of the validated based aircraft, there are 306 single-engine piston aircraft, 58 multi-engine aircraft (turboprops and pistons), 34 business jets, and 14 helicopters.

Registered Aircraft Forecast

Aircraft ownership trends for the primary service area (Denton County) typically dictate based aircraft trends for an airport. As such, a forecast of registered aircraft for the primary service area is developed for use as an input for the subsequent based aircraft forecast.

Table 2G presents the history of registered aircraft in the service area from 2014 through 2024. These figures are derived from the FAA aircraft registration database, which categorizes registered aircraft by county based on the zip code of the registered aircraft. Although this information generally provides a correlation to based aircraft, it is not uncommon for some aircraft to be registered in one county but based at an airport outside the county, or vice versa.

TABLE 2G | Registered Aircraft Fleet Mix in Denton County, Texas

Year	SEP	MEP	TP	Jet	H	Other*	Electric	UAV	Total
2014	784	83	12	17	47	29	0	0	972
2015	807	86	13	22	51	24	0	2	1,005
2016	815	87	19	20	51	25	0	11	1,028
2017	822	87	16	23	61	22	1	12	1,044
2018	809	82	10	29	71	22	1	12	1,036
2019	834	79	17	36	84	27	1	8	1,086
2020	873	76	18	42	78	28	1	8	1,124
2021	882	71	16	36	85	31	1	7	1,129
2022	857	74	15	31	115	32	1	8	1,133
2023	1,080	74	15	39	133	30	1	6	1,378
2024	1,105	70	21	39	128	29	1	6	1,399
10-year CAGR	**3.5%**	**-1.7%**	**5.8%**	**8.7%**	**10.5%**	**0.0%**	**N/A**	**N/A**	**3.7%**

SEP = single-engine piston
MEP = multi-engine piston
TP = turboprop
H = helicopter
UAV = unmanned aerial vehicle
CAGR = compound annual growth rate
N/A = not applicable
*Other includes gliders, ultralights, experimental aircraft

Sources: FAA Aircraft Registry Database; FAA Census of U.S. Civil Aircraft

Over the 10-year period, aircraft registrations in the service area have shown strong growth increasing at a CAGR of 3.7 percent. The fleet mix breakout shows that single-piston aircraft account for 79 percent of registered aircraft in 2024, but the strongest growth has been in the more sophisticated aircraft categories (turboprops, jets, helicopters). UAVs (drones) were not included as a separate category until 2015, with two registered aircraft, and the number has fluctuated over nine years, ending with six aircraft registered in 2024.

TABLE 2H | Regression Analysis

Independent Variable	r^2
Timeseries	0.622
Population	0.679
Employment	0.722
Income	0.686
Gross Regional Product	0.759

Source: Coffman Associates analysis

Although there are no recently prepared forecasts for the service area counties regarding registered aircraft, one was prepared for this study using market share, population ratio, and historical growth rate/trendline projection methods. Several regression forecasts were also considered; these examined the correlation of registered aircraft with the service area population, employment, income, and GRP. **Table 2H** details the results of this analysis, which considered the correlation between registered aircraft (dependent variable) and several independent variables, as described above. None of the resulting regressions produced an r^2 value greater than 0.759, indicating poor correlation; therefore, the regressions have been excluded from consideration.

Trend Line/Historical Growth Rate Projection

Utilizing the last 10 years of registered aircraft data, a trend line projection was completed. This resulted in 2,076 registered aircraft by 2044 (2.0 percent CAGR). A five-year trend was also prepared to consider the most recent trend. The five-year trend line projection results in 2,706 registered aircraft by 2044 (3.4 percent CAGR).

Over the last ten years, the number of registered aircraft in the service area has a CAGR of 3.7 percent. By applying this CAGR to the current number of registered aircraft, a forecast emerges that results in 2,898 registered aircraft by 2044.

Market Share of Texas Based Aircraft

Consideration was also given to the ratio of service area registered aircraft compared to the total number of based aircraft, both historically and forecasted by the FAA to be in the State of Texas. This was done due to the expected growth in based aircraft numbers at the state level, as opposed to the general flatlining trend of national registrations.

The county's 1,399 registered aircraft count in 2024 represents approximately 10.59 percent of all based aircraft in Texas. If the county maintained this market share, it would result in 1,732 aircraft by 2044 (1.1 percent CAGR). Because the historical trend has shown market share growth for the county, an increasing market share projection was prepared that considered an increase in market share to 13.32 percent (increases by the 10-year market share change of 2.72 percent). This results in a total county aircraft count of 2,178 by 2044 (2.2 percent CAGR). **Table 2J** shows the market share of the service area compared to Texas totals.

TABLE 2J | Registered Aircraft Projections – Market Share of Texas Based Aircraft

Year	Registered Aircraft	Texas Based Aircraft	% of Total Texas Based Aircraft
2014	972	12,279	7.92%
2015	1,005	11,865	8.47%
2016	1,028	13,065	7.87%
2017	1,044	12,416	8.41%
2018	1,036	12,920	8.02%
2019	1,086	11,968	9.07%
2020	1,124	11,600	9.69%
2021	1,129	11,977	9.43%
2022	1,133	12,937	8.76%
2023	1,378	13,080	10.54%
2024	1,399	13,208	10.59%
Constant Market Share			
2029	1,473	13,902	10.59%
2034	1,552	14,648	10.59%
2044	1,732	16,353	10.59%
Increasing Market Share			
2029	1,567	13,902	11.27%
2034	1,751	14,648	11.95%
2044	2,178	16,353	13.32%

Sources: Texas TAF, January 2024; Coffman Associates analysis

Ratio of Registered Aircraft to Population

The number of registered aircraft in an area often fluctuates based on population trends. In 2024, the service area had 1.36 registered aircraft per 1,000 residents. Over the past 10 years, this ratio has shown small fluctuations and averaged 1.26 aircraft per 1,000 residents. Two projections have been prepared:

one based on maintaining the current ratio constant over the forecast period, and an increasing ratio projection that reflects the ratio increasing by the change from the historical maximum and minimum (0.21). Maintaining the constant ratio (1.36) through 2044 results in 2,117 registered aircraft (2.1 percent CAGR). The increasing ratio projection results in 2,443 registered aircraft by 2044 (2.8 percent CAGR).

Registered Aircraft Forecast Summary

Table 2K summarizes the seven registered aircraft forecasts for Denton County. Overall, registrations in the county have shown strong growth, particularly in the past two years. Denton County has outpaced the rest of the state and the Dallas-Fort Worth metropolitan area in socioeconomic growth, with projections indicating a slight moderation over the next 20 years but still leading economic growth in both the state and the area. The 10-year 3.7 percent CAGR of county aircraft registrations is well ahead of Texas based aircraft growth (2.0 percent CAGR) and national active general aviation aircraft growth (0.3 percent CAGR) over the same period. All trends suggest Denton County will continue to experience growth in registered aircraft but likely at a more moderate pace; therefore, the increasing market share projection, with a CAGR of 2.2 percent, is viewed as the most realistic scenario. The selected registered aircraft forecast results in 1,567 registered aircraft in 2029, 1,751 in 2034, and 2,178 in 2044.

TABLE 2K | Registered Aircraft Forecast Summary

Projection	2029	2034	2044	CAGR 2024-2044
5-Year Trend Line	1,707	2,040	2,706	3.4%
10-Year Growth Rate	1,678	2,014	2,898	3.7%
10-Year Trend Line	1,503	1,694	2,076	2.0%
Constant % of TX Based	1,473	1,552	1,732	1.1%
Increasing % of TX Based	**1,567**	**1,751**	**2,178**	**2.2%**
Constant AC/1000 Population	1,560	1,734	2,117	2.1%
Increasing AC/1000 Population	1,620	1,867	2,443	2.8%

Boldface indicates selected forecast.
AC = aircraft
CAGR = compound annual growth rate
Source: Coffman Associates analysis

Based Aircraft Market Share of Registered Aircraft Forecast

Utilizing the forecast of registered aircraft in Denton County, a market share forecast of based aircraft at DTO has been developed. In 2024, the 412 based aircraft at DTO represented 29.4 percent of the aircraft registered in the county. By maintaining this market share constant through the planning years, a forecast emerges that results in 641 based aircraft by 2044 (2.2 percent CAGR). An evaluation of historical based aircraft indicated that DTO's market share has fluctuated over time but has averaged 32.9 percent in the past 10 years; therefore, an increasing market share projection was prepared with the assumption that DTO's market share would return to its 10-year average, resulting in 717 based aircraft by 2044 (2.8 percent CAGR). **Table 2L** presents the two market share projections.

TABLE 2L | Based Aircraft Market Share of Registered Aircraft Forecast

Year	DTO Based Aircraft	Denton County Registered Aircraft	DTO Market Share %
2015	379	1,005	37.7%
2016	364	1,028	35.4%
2017	451	1,044	43.2%
2018	362	1,036	34.9%
2019	311	1,086	28.6%
2020	288	1,124	25.6%
2021	301	1,129	26.7%
2022	398	1,133	35.1%
2023	445	1,378	32.3%
2024	412	1,399	29.4%
CAGR	**0.8%**	**3.4%**	**–**
Constant Market Share			
2029	461	1,567	29.4%
2034	516	1,751	29.4%
2044	641	2,178	29.4%
CAGR	**2.2%**	**2.2%**	**–**
Increasing Market Share			
2029	475	1,567	30.3%
2034	546	1,751	31.2%
2044	717	2,178	32.9%
CAGR	**2.8%**	**2.2%**	**–**

Sources: basedaircraft.com; Coffman Associates analysis

Growth Rate Projections

According to the airport's validated based aircraft records, the based aircraft count has increased slightly in the last 10 years, with a 0.8 percent CAGR. Maintaining this CAGR over the forecast period results in 487 based aircraft by 2044.

Given that based aircraft within the state are projected to grow over the planning period, a growth rate projection utilizing the state's 20-year CAGR of 1.1 percent has also been considered. When the 20-year CAGR is applied to DTO based aircraft, a forecast emerges that yields 510 based aircraft by 2044.

Socioeconomic Growth Projections

Based aircraft growth is often related to population and economic activity of the service area. For this reason, based aircraft projections tied to projected growth in population, employment, income, and GRP for the service area were also prepared. CAGRs for these variables through 2044 are 2.1 percent for population; 3.0 percent for employment; 1.9 percent for income; and 4.3 percent for GRP. Applying these CAGRs results in 623 based aircraft for population, 745 for employment, 605 for income, and 953 for GRP by 2044.

Regression Analysis

Several forecasts were prepared utilizing historical based aircraft data and the regression model. Correlations were examined utilizing independent variables, including population, employment, income, GRP, and Texas based aircraft, as well as a time series regression. The regression that produced the best correlation was the regression with Texas based aircraft, which had an r^2 value of 0.436. The others had r^2 values below 0.1. As described previously, correlation values over 0.95 indicate good predictive reliability. The results from the Texas based aircraft regression are included for comparison purposes; this regression produced a projection of 613 based aircraft at DTO by 2044, with a CAGR of 2.0 percent.

Selected Based Aircraft Forecast

Selecting a based aircraft forecast is ultimately based on the judgment of the forecast analyst. A selected forecast should be reasonable and based on a sound methodology. The methodology presented in this analysis examined the history of aircraft ownership in the service area (Denton County). Utilizing the selected registered aircraft projection, a market share analysis was conducted based on maintaining a constant market share and an increasing market share over the forecast period. Additional projections considered the FAA TAF's projection for based aircraft growth in the state, maintaining DTO's 10-year growth rate, growth rates based on key socioeconomic indicators (population, employment, and GRP), and a regression examining the correlation with Texas based aircraft. These 10 projections are summarized in **Table 2L**.

TABLE 2L | Based Aircraft Forecast Summary

Projection	2024	2029	2034	2044	CAGR 2024-2044
DTO 2024 TAF	474	540	612	768	2.4%
DTO 2024 TAF Growth Rate		465	524	668	2.4%
Constant Market Share		461	516	641	2.2%
Increasing Market Share		**475**	**546**	**717**	**2.8%**
10-Year Growth Rate		430	448	487	0.8%
Texas TAF Growth Rate	412	435	458	510	1.1%
Service Area Population Growth Rate		457	507	623	2.1%
Service Area Employment Growth Rate		478	554	745	3.0%
Service Area GRP Growth Rate		454	499	605	1.9%
Regression with Texas Based Aircraft		459	506	613	2.0%

Boldface indicates selected forecast.
CAGR = compound annual growth rate

Sources: FAA TAF; basedaircraft.com; Coffman Associates analysis

Future aircraft basing at the airport will depend on several factors, including the state of the economy, fuel costs, available facilities, competing airports, and hangar development potential. Forecasts consider projections for a strong growing local economy, as well as reasonable development of airport facilities necessary to accommodate aviation demand. DTO will not experience significant based aircraft growth unless new hangar facilities are constructed. Competing airports will play a role in deciding demand; however, DTO should fare well in this competition, as it is served by a runway system capable of handling most general aviation aircraft, and there is additional demand for based aircraft hangars.

Consideration must also be given to the current and future aviation conditions at the airport. DTO is in a desirable location northwest of the DFW metropolitan area. The U.S. 288 loop extension planned for the west side of the airport will increase the development potential of the airport by making the west side more accessible. The airport also maintains an extensive hangar waiting list of 329 individuals, which is a strong indicator of existing demand.

The potential for available hangar space is not the only factor in future based aircraft levels. Economic projections for Denton County are expected to outpace those within the Dallas-Fort Worth metropolitan area, which is one of the fastest growing metropolitan areas in the country. These indicators suggest strong demand for aviation activity at DTO now and in the future. For these reasons, the increasing market share projection has been selected as the preferred forecast, with 475 based aircraft projected by 2029, 546 by 2034, and 717 by 2044 (2.8 percent CAGR). The selected forecast is reasonably optimistic and assumes DTO can increase its market share of registered aircraft in the county with expanded facilities, and that continued population and employment growth of the local area will drive demand for more based aircraft.

Exhibit 2C presents the 10 based aircraft forecasts that comprise the planning envelope.

BASED AIRCRAFT FLEET MIX FORECAST

It is important to understand the current and projected based aircraft fleet mix at an airport to ensure the proper planning of facilities. For example, the various separation requirements and obstacle clearing surfaces for a particular area will be based on whether the area is planned to be utilized by small piston aircraft or large business jets.

The current based aircraft fleet mix consists of 306 single-engine aircraft, 58 multi-engine aircraft (pistons and turboprops), 34 jets, and 14 helicopters. As a general aviation reliever airport with significant levels of both flight training and corporate aviation activities, DTO should continue to have a diverse fleet mix. The forecasted growth trends in the DTO based aircraft fleet mix take FAA projections of the national general aviation fleet mix into consideration. Growth is expected in all categories, with the most sophisticated aircraft, turboprops, jets, and helicopters leading in overall percentage growth. **Table 2M** presents the forecast fleet mix for based aircraft at DTO.

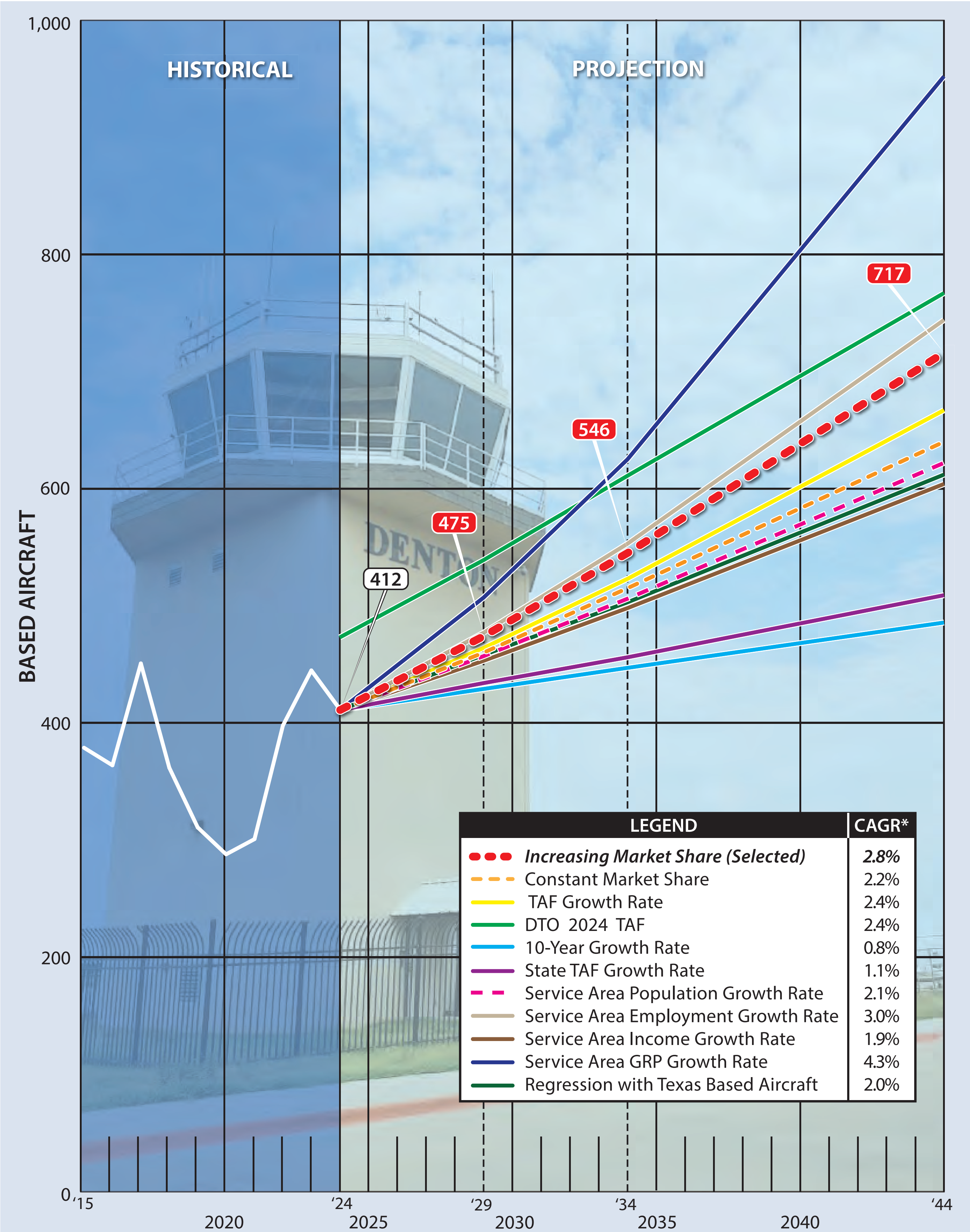
TABLE 2M | Based Aircraft Fleet Mix

Aircraft Type	2024	Percent	2029	Percent	2034	Percent	2044	Percent
Single-Engine	306	74.3%	351	73.9%	401	73.4%	520	72.5%
Multi-Engine	58	14.1%	68	14.3%	79	14.5%	105	14.6%
Jet	34	8.3%	40	8.4%	46	8.4%	65	9.1%
Helicopter	14	3.4%	16	3.4%	19	3.5%	25	3.5%
Other	0	0.0%	0	0.0%	1	0.2%	2	0.3%
Total	**412**	**100%**	**475**	**100%**	**546**	**100%**	**717**	**100%**

Sources: FAA Based Aircraft Registry; Coffman Associates analysis

OPERATIONS FORECAST

Operations at DTO are classified as either general aviation, air taxi, or military. General aviation operations include a wide range of activity, from recreational use and flight training to business and corporate uses. Air taxi operations are those conducted by aircraft operating under Federal Aviation Regulations (FAR) Part 135, otherwise known as for-hire or on-demand activity. Air taxi operations typically include commuter, air cargo, air ambulance, and many fractional ownership operations. Military operations include those operations conducted by the branches of the U.S. military. Air carrier is an additional category of operations conducted by large aircraft with 60 or more passenger seats. These flights are very infrequent at DTO; therefore, air carrier operations are not included as part of the operations forecast.



*Compound Annual Growth Rate

Sources: FAA TAF; basedaircraft.com; Coffman Associates analysis

It should be noted that the FAA's forecast of air taxi operations trends lower in the short term and returns to growth after 2028 due to ongoing changes to the scheduled airline aircraft fleet mix. Airlines are transitioning away from 50-seat regional jets that are counted under the air taxi category to larger jets with seating capacities of 60 seats or more that are counted under the air carrier category. This airline fleet mix transition should have no impact on unscheduled DTO air taxi operations.

Aircraft operations are further classified as local and itinerant. A local operation is a takeoff or landing performed by an aircraft operating within sight of an airport or executing simulated approaches or touch-and-go operations at an airport. Local operations are generally characterized by training activity. Itinerant operations are those performed by aircraft with specific origins or destinations away from an airport. Typically, itinerant operations increase with business and commercial use because business aircraft are primarily used to transport passengers from one location to another.

Several methods have been employed to develop a reasonable planning envelope of future potential aircraft operations. The following sections present several new operations forecasts. Counts from the DTO ATCT were utilized in this analysis. **Table 2N** shows the historical operations data for DTO since 2004.

TABLE 2N | Historical Operations Data

Calendar Year	ITINERANT					LOCAL			Total Operations
	Air Carrier	Air Taxi	General Aviation	Military	Subtotal	General Aviation	Military	Subtotal	
2004	0	566	22,175	14	22,755	34,855	2	34,857	57,612
2005	1	1,094	34,081	35	35,211	51,423	168	51,591	86,802
2006	199	849	30,853	22	31,923	56,901	8	56,909	88,832
2007	23	726	30,576	66	31,391	68,119	224	68,343	99,734
2008	7	1,130	40,041	117	41,295	85,373	2	85,375	126,670
2009	0	392	46,911	175	47,478	94,602	24	94,626	142,104
2010	0	685	49,236	256	50,177	91,911	24	91,935	142,112
2011	4	756	64,380	130	65,270	82,735	26	82,761	148,031
2012	39	1,103	65,446	202	66,790	91,164	32	91,196	157,986
2013	12	1,473	68,676	227	70,388	90,298	54	90,352	160,740
2014	38	1,919	70,351	178	72,486	85,708	16	85,724	158,210
2015	54	1,457	73,215	169	74,895	89,852	50	89,902	164,797
2016	5	1,665	61,514	189	63,373	73,279	4	73,283	136,656
2017	16	1,932	60,504	158	62,610	62,949	49	62,998	125,608
2018	35	1,440	61,535	50	63,060	84,703	14	84,717	147,777
2019	10	1,337	63,098	125	64,570	71,166	8	71,174	135,744
2020	15	963	64,154	31	65,163	71,463	4	71,467	136,630
2021	24	1,572	58,357	60	60,013	78,672	18	78,690	138,703
2022	17	2,574	71,679	50	74,320	99,426	12	99,438	173,758
2023	10	1,590	89,063	76	90,739	114,054	4	114,058	204,797
2024*	5	3,075	102,829	51	105,960	115,514	4	115,518	221,478
20yr CAGR	N/A	8.8%	8.0%	6.7%	8.0%	6.2%	3.5%	6.2%	7.0%
10yr CAGR	-18.4%	4.8%	3.9%	-11.7%	3.9%	3.0%	-12.9%	3.0%	3.4%

*2024 data represent a 12-month period ending July 2024

Source: FAA Operations and Performance Data (OPSNET)

Historical Growth Rate Projections

For the most recent 10-year period, DTO's ATCT indicates CAGRs of 3.9 percent for itinerant GA operations, 3.0 percent for local GA operations, and 4.8 percent for air taxi operations. Projections based on these historical growth rates have been applied to generate forecasts that result in 219,700 itinerant GA, 209,800 local GA, and 7,900 air taxi operations by 2044.

Market Share Projections

Market share analysis compares known historical and forecast data points to arrive at a trend for the unknown variable (DTO operations). The first forecast considers the current market share of GA (itinerant and local) and air taxi operations at the airport compared to the FAA's forecast for operations for the State of Texas.

For 2024, DTO accounts for 4.25 percent of Texas itinerant GA operations, 3.95 percent of local GA operations, and 0.67 percent of air taxi operations. By carrying these percentages forward through the planning horizon, a constant market share forecast emerges. **Table 2P** shows the results. The constant market share is considered a low range projection, as historical data indicate DTO's market share has grown for each operational category over the past 10 years.

TABLE 2P | Operations Market Share Projections

	GENERAL AVIATION ITINERANT			GENERAL AVIATION LOCAL			AIR TAXI		
Year	DTO	Texas	DTO Market %	DTO	Texas	DTO Market %	DTO	Texas	DTO Market %
2004	22,175	2,656,787	0.83%	34,855	2,781,281	1.25%	566	975,760	0.06%
2005	34,081	2,560,320	1.33%	51,423	2,621,264	1.96%	1,094	955,846	0.11%
2006	30,853	2,533,090	1.22%	56,901	2,725,495	2.09%	849	950,775	0.09%
2007	30,576	2,519,472	1.21%	68,119	2,778,925	2.45%	726	931,320	0.08%
2008	40,041	2,494,329	1.61%	85,373	2,677,230	3.19%	1,130	869,367	0.13%
2009	46,911	2,276,580	2.06%	94,602	2,536,875	3.73%	392	731,549	0.05%
2010	49,236	2,297,062	2.14%	91,911	2,416,054	3.80%	685	758,483	0.09%
2011	64,380	2,320,340	2.77%	82,735	2,325,402	3.56%	756	730,388	0.10%
2012	65,446	2,298,770	2.85%	91,164	2,351,608	3.88%	1,103	742,489	0.15%
2013	68,676	2,340,826	2.93%	90,298	2,332,819	3.87%	1,473	789,901	0.19%
2014	70,351	2,223,719	3.16%	85,708	2,374,079	3.61%	1,919	778,214	0.25%
2015	73,215	2,184,065	3.35%	89,852	2,499,125	3.60%	1,457	680,624	0.21%
2016	61,514	2,169,255	2.84%	73,279	2,713,896	2.70%	1,665	574,186	0.29%
2017	60,504	2,101,907	2.88%	62,949	2,670,762	2.36%	1,932	487,409	0.40%
2018	61,535	2,114,223	2.91%	84,703	2,659,478	3.18%	1,440	478,819	0.30%
2019	63,098	2,219,465	2.84%	71,166	2,603,526	2.73%	1,337	478,806	0.28%
2020	64,154	2,117,858	3.03%	71,463	2,571,668	2.78%	963	415,581	0.23%
2021	58,357	2,173,905	2.68%	78,672	2,572,044	3.06%	1,572	503,330	0.31%
2022	71,679	2,338,821	3.06%	99,426	2,710,202	3.67%	2,574	526,587	0.49%
2023	89,063	2,390,236	3.73%	114,054	2,861,285	3.99%	1,590	466,078	0.34%
2024*	102,829	2,421,991	4.25%	115,514	2,922,850	3.95%	3,075	457,101	0.67%
20yr CAGR	7.97%	-0.46%	–	6.17%	0.25%	–	8.83%	-3.72%	–
10yr CAGR	3.87%	0.86%	–	3.03%	2.10%	–	4.83%	-5.18%	–

Continues on next page

TABLE 2P | Operations Market Share Projections (continued)

	GENERAL AVIATION ITINERANT			GENERAL AVIATION LOCAL			AIR TAXI		
Year	DTO	Texas	DTO Market %	DTO	Texas	DTO Market %	DTO	Texas	DTO Market %
Constant Market Share – Low Range									
2029	107,600	2,533,465	4.25%	120,600	3,050,406	3.95%	2,800	415,322	0.67%
2034	109,900	2,588,499	4.25%	123,400	3,123,590	3.95%	2,900	433,102	0.67%
2044	115,100	2,710,927	4.25%	129,900	3,286,859	3.95%	3,200	471,778	0.67%
CAGR	0.57%	0.57%	–	0.59%	0.59%	–	0.16%	0.16%	–
Increasing Market Share – Mid Range									
2029	113,500	2,533,465	4.48%	122,100	3,050,406	4.00%	3,400	415,322	0.83%
2034	125,300	2,588,499	4.84%	128,000	3,123,590	4.10%	4,300	433,102	0.98%
2044	152,800	2,710,927	7.66%	165,000	3,286,859	5.02%	6,100	471,778	1.29%
CAGR	2.00%	0.57%	–	1.80%	0.59%	–	3.48%	0.16%	–
Increasing Market Share – High Range									
2029	125,700	2,533,465	4.96%	141,400	3,050,406	4.64%	3,900	415,322	0.94%
2034	153,700	2,588,499	5.94%	166,100	3,123,590	5.32%	5,200	433,102	1.21%
2044	229,700	2,710,927	8.47%	219,700	3,286,859	6.69%	8,300	471,778	1.75%
CAGR	4.10%	0.57%	–	3.27%	0.59%	–	5.09%	0.16%	–

*2024 data represent a 12-month period ending July 2024
CAGR = compound annual growth rate

Sources: Texas Operations – FAA TAF; Historical DTO Operations – DTO ATCT counts; DTO Projections – Coffman Associates analysis

To reflect historical trends, a mid-range increasing market share projection was prepared. The mid-range projection takes DTO's 2044 market share of itinerant GA operations to 7.66 percent, reflecting the total market share growth of the previous 20-year period (3.41 percent). DTO's 2044 market share of local GA operations is taken to 5.02 percent, and the 2044 market share of air taxi operations is taken to 1.29 percent; both reflect modest increases in market share. The results of these mid-range projections are also shown in **Table 2P**.

High-range increasing market share projections were also prepared. These consider the potential for market shares and CAGRs to exceed growth seen in the past 10-year period. The resulting projections take DTO's 2044 market shares to 8.47 percent (itinerant GA), 6.69 percent (local GA), and 1.75 percent (air taxi). The results of the high-range projections are shown in **Table 2P**.

Regression Analysis

Several forecasts were prepared utilizing historical operations data and the regression model. Independent variables examined included GA and air taxi operations in the State of Texas, as well as population, employment, income, GRP, and time-series regressions. The regression that produced the best correlation for each operational category was utilized to develop a projection. In the case of itinerant GA operations, the best correlation was the time-series regression, which resulted in an r^2 value of 0.730. For local GA operations, the best regression correlation was with employment, which resulted in an r^2 value of 0.450. The time-series regression had the best correlation for air taxi operations, which had an r^2 value of 0.551.

As described previously, correlation values over 0.95 indicate good predictive reliability. The values for each regression are well below the reliability mark but have been included in the forecast for comparison purposes.

General Aviation and Air Taxi Operations Forecast Summary

Table 2Q summarizes the projections prepared for itinerant and local GA operations and air taxi operations at DTO. The FAA's TAF projections for DTO are included for comparison purposes.

TABLE 2Q | Operations Forecast Summary

Projection	2024	2029	2034	2044	CAGR 2024-2044
Itinerant General Aviation					
10-Year Growth Rate	102,829	124,300	150,300	219,700	3.87%
Constant Market Share – Low Range		107,600	109,900	115,100	0.57%
Increasing Market Share – Mid Range		**113,500**	**125,300**	**152,800**	**2.00%**
Increasing Market Share – High Range		125,700	153,700	229,700	4.10%
Time-Series Regression (r^2 = 0.730)		99,100	112,600	139,600	1.54%
DTO 2024 TAF		91,466	98,532	114,343	0.53%
Local General Aviation					
10-Year Growth Rate	115,514	134,100	155,700	209,800	3.03%
Constant Market Share – Low Range		120,560	123,450	129,900	0.59%
Increasing Market Share – Mid Range		**122,100**	**128,000**	**165,000**	**1.80%**
Increasing Market Share – High Range		141,400	166,100	219,700	3.27%
Employment Regression (r^2 = 0.450)		119,100	136,600	178,400	2.20%
DTO 2024 TAF		111,046	111,407	112,132	-0.15%
Air Taxi					
10-Year Growth Rate	3,075	3,900	4,900	7,900	4.83%
Constant Market Share – Low Range		2,800	2,900	3,200	0.20%
Increasing Market Share – Mid Range		**3,400**	**4,300**	**6,100**	**3.48%**
Increasing Market Share – High Range		3,900	5,200	8,300	5.09%
Time-Series Regression (r^2 = 0.551)		2,500	2,900	3,700	0.93%
DTO 2024 TAF		1,678	1,678	1,678	-2.98%

Boldface indicates selected forecast.
CAGR = compound annual growth rate

Source: Coffman Associates analysis

Market trends indicate that GA and air taxi operations will continue to grow in the State of Texas. More people are traveling to Texas for business and recreation – many by air. Airlines are developing new programs to grow the next generation of pilots, which has led to the creation of new flight schools and flight training programs. Flight schools are expanding, and more students and aircraft are coming to DTO. Airport management is committed to developing new facilities and services to maintain DTO's position as the best choice for airport services in the region for all GA users, including the growing corporate/business aircraft market. Socioeconomic indicators suggest that DTO's service area will continue to thrive over the planning period, bringing new business opportunities and potential users and tenants. As discussed in the based aircraft section, there is strong demand for new based aircraft at DTO.

The construction of the parallel runway in 2019 has increased the airport's capacity, resulting in an operational spike over the past few years. It is expected that in the coming years, operations levels will mature and growth rates will further moderate through 2044. For these reasons, the mid-range increasing market share projections of itinerant and local GA operations have been selected. These forecasts carry forward DTO's historical trend of growing market share while moderating high historical growth rates when compared to state and national operational trends.

Air taxi operations have also experienced significant operational level increases in recent years, with a 4.83 percent CAGR over the past 10 years. Over the 12-month period ending July 2024, DTO exceeded 3,000 total air taxi operations for the first time. Between 2014 and 2023, DTO averaged only 1,600 air taxi operations. As with GA operations, it is expected that the operational growth rate will moderate over the next 20 years. For this reason, the mid-range increasing market share projection has been selected. This forecast shows air taxi operations almost doubling by 2044, reflecting the growing nature of Denton County and the wider Dallas-Fort Worth metropolitan area, which is likely to drive more air taxi operations.

Exhibit 2D graphically represents the operations projections that comprise the planning envelope.

Military Operations Forecast

Military aircraft can and do utilize civilian airports across the country. DTO occasionally experiences activity by military aircraft. Forecasts of military activity are inherently difficult to predict because of the national security nature of military operations and the fact that such missions can change without notice; thus, it is typical for the FAA to use a flatline forecast for military operations. For DTO, the FAA TAF projects itinerant operations to remain static at 81 over the forecast period. The FAA TAF projects no local military operations at DTO. These TAF estimates are also utilized for the master plan forecast.

Total Operations Forecast Summary

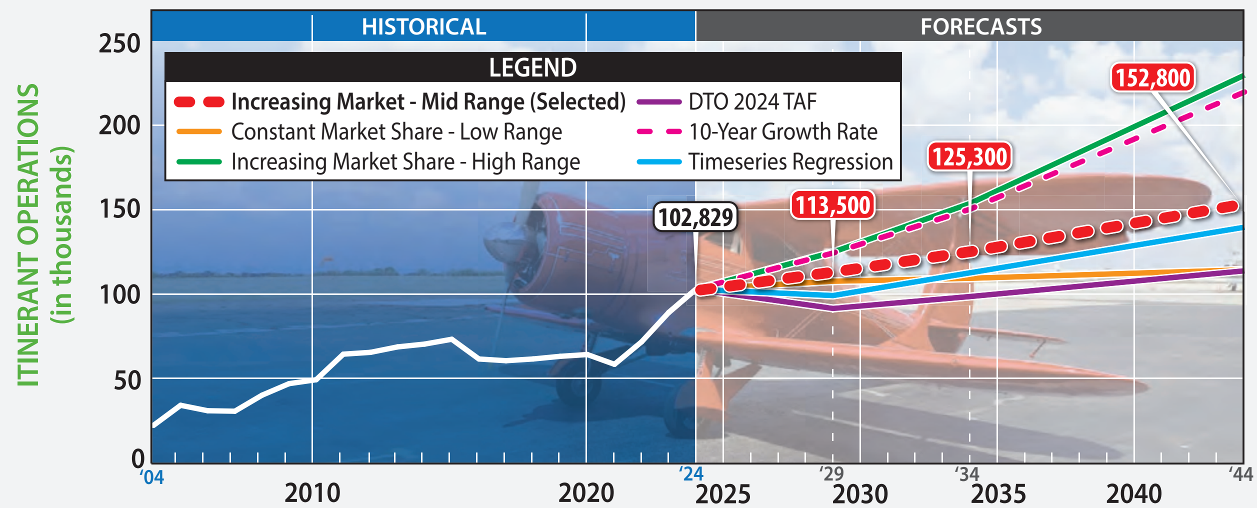
Table 2R presents the summary of the selected operations forecasts. The summary table details the culmination of each selected operations forecast. Air carrier operations are projected at the historical average over the past five years, which is 14 annual operations.

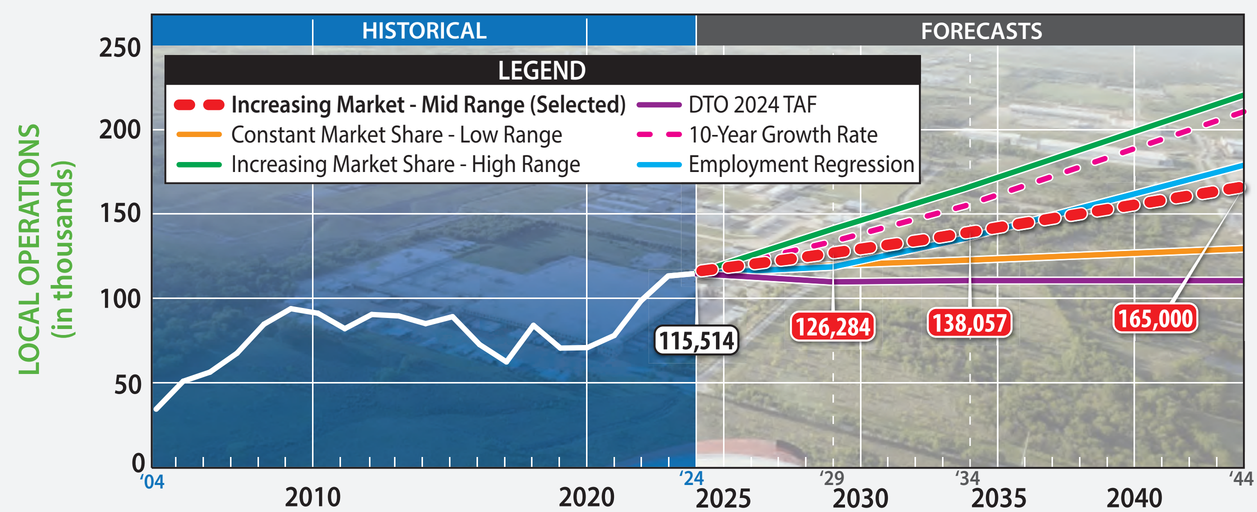
Over the planning horizon, total DTO operations are projected to grow from 221,487 in 2024 to 323,995 by 2044 at a CAGR of 1.92 percent.

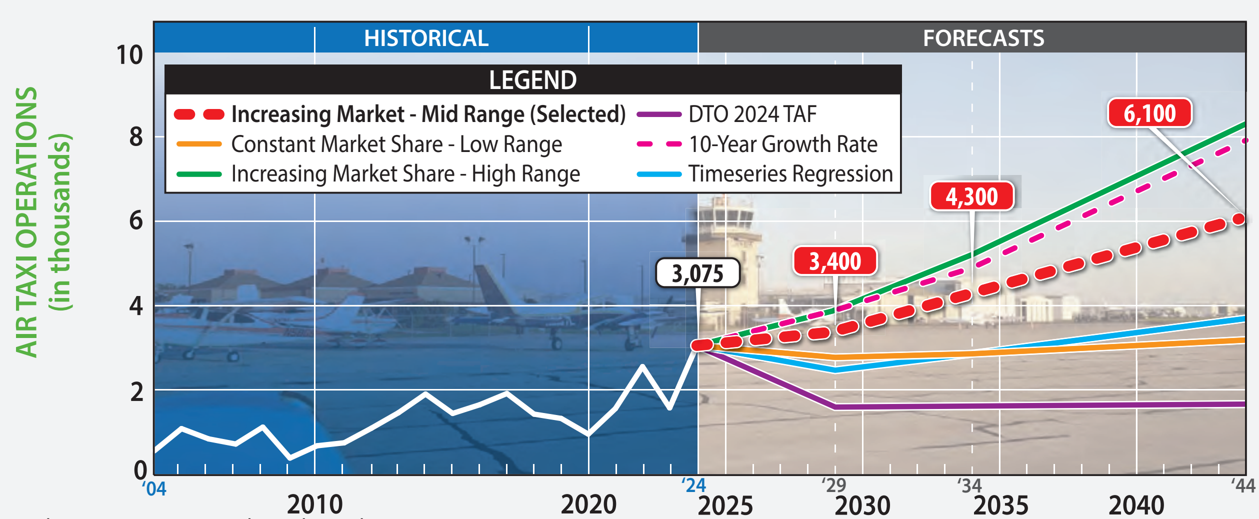
TABLE 2R | Total Operations Forecast Summary

Year	ITINERANT					LOCAL			Total Operations
	Air Carrier	Air Taxi	General Aviation	Military	Total	General Aviation	Military	Total	
2024*	14	3,075	102,829	51	105,969	115,514	4	115,518	221,487
2029	14	3,400	113,500	81	116,995	126,284	0	126,284	243,279
2034	14	4,300	125,300	81	129,695	138,057	0	138,057	267,752
2044	14	6,100	152,800	81	158,995	165,000	0	165,000	323,995
CAGR	**0.00%**	**3.48%**	**2.00%**	**2.34%**	**2.05%**	**1.80%**	**-100%**	**1.80%**	**1.92%**

*Data represent a 12-month period ending July 2024
CAGR = compound annual growth rate
Source: Coffman Associates analysis







*2024 data represent 12 months ending July 2024

Sources: Coffman Associates analysis

PEAKING CHARACTERISTICS

Peaking characteristics play an important role in determining airport capacity and facility requirements. The FAA's Traffic Flow Management System Counts (TFMSC) data collected by the tower have been examined to identify peaking periods. The peaking periods used to develop facility requirements are described below.

Peak Month | The peak month each year since 2020 (after the parallel runway was constructed) averaged 10.4 percent of total operations.

Design Day | The design day is calculated by dividing the peak month by the number of days of the month. The peak month typically occurs during a month with 31 days, so design day was calculated by dividing the peak month by 31.

Busy Day | The busy day is calculated by averaging the busiest day each week during the peak month. In this case, the busiest day each week of the month of June 2024 (peak month of the base year) represented approximately 18.0 percent of the week's total operations.

Design Hour | The design hour was calculated by identifying the average hourly operations during design days during the peak month. Calculations exclude overnight hours (between 11:00 p.m. and 6:00 a.m.), which would skew down the design hour. The design hour during design days of June 2024 represented 28.9 percent of design day operations.

Peak period projections based on the baseline calculations are included in **Table 2S**.

TABLE 2S | Peak Period Forecasts

	2024	2029	2034	2044
Annual Operations	221,487	243,279	267,752	323,995
Peak Month	22,043	25,226	27,763	33,595
Design Day	711	814	896	1,084
Busy Day	898	1,028	1,131	1,369
Design Hour	205	235	259	313

Source: Coffman Associates analysis

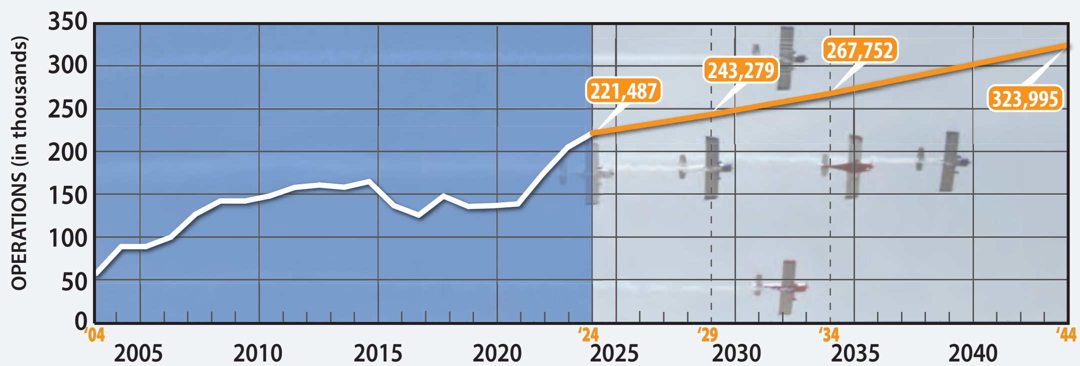
FORECAST SUMMARY

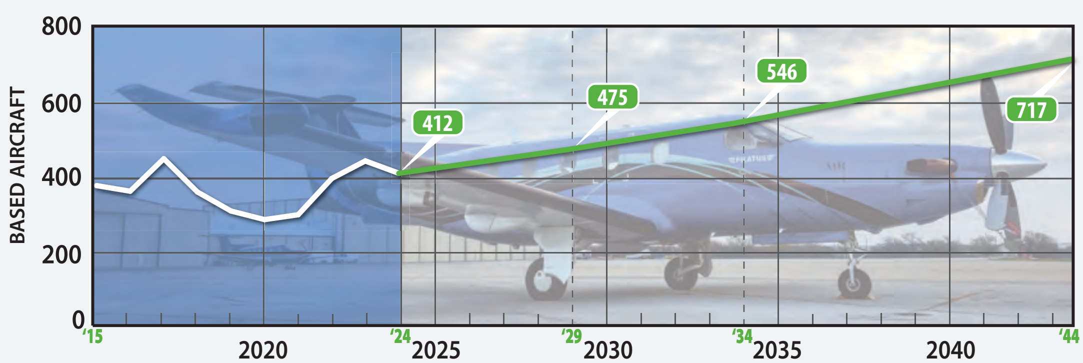
This chapter has outlined the various activity levels that might be reasonably anticipated over the planning period. **Exhibit 2E** presents a summary of the aviation forecasts prepared in this chapter. The base year for these forecasts is 2024, with a 20-year planning horizon to 2044. The primary aviation demand indicators are based aircraft and operations. The count of based aircraft is forecasted to increase from 412 in 2024 to 717 by 2044 (2.8 percent CAGR). Total operations at DTO are forecasted to increase from 221,487 in 2024 to 323,995 by 2044 (1.9 percent CAGR).

Projections of aviation demand will be influenced by unforeseen factors and events in the future; therefore, it is not reasonable to assume that future demand will follow the exact projection line, but over time, forecasts of aviation demand tend to fall within the planning envelope. The forecasts developed for this master planning effort are considered reasonable for planning purposes. The need

	Base Year	Forecast			
	2024	2029	2034	2044	CAGR
ANNUAL OPERATIONS					
Itinerant					
Air Carrier	14	14	14	14	0.0%
Air Taxi	3,075	3,400	4,300	6,100	3.5%
General Aviation	102,829	113,500	125,300	152,800	2.0%
Military	51	81	81	81	2.3%
Total Itinerant	***105,969***	***116,995***	***129,695***	***158,995***	***2.0%***
Local					
General Aviation	115,514	126,284	138,057	165,000	1.8%
Military	4	0	0	0	N/A
Total Local Subtotal	***115,518***	***126,284***	***138,057***	***165,000***	***1.8%***
TOTAL ANNUAL OPERATIONS	**221,487**	**243,279**	**267,752**	**323,995**	**1.9%**
OPERATIONAL PEAKING CHARACTERISTICS					
Peak Month	22,043	25,226	27,763	33,595	2.1%
Design Day	711	814	896	1,084	2.1%
Busy Day	898	1,028	1,131	1,369	2.1%
Design Hour	205	235	259	313	2.1%
BASED AIRCRAFT					
Single Engine Piston	306	351	401	520	2.7%
Multi-Engine Piston	58	68	79	105	3.0%
Jet	34	40	46	65	3.3%
Helicopter	14	16	19	25	2.9%
Glider/Other	0	0	1	2	N/A
TOTAL BASED AIRCRAFT	**412**	**475**	**546**	**717**	**2.8%**

N/A - Not Applicable *CAGR* - Compound annual growth rate





Sources: Coffman Associates analysis

for additional facilities will be based on these forecasts; however, if demand does not materialize as projected, implementation of facility construction can be slower. Likewise, if demand exceeds these forecasts, the airport may accelerate construction of new facilities.

FORECAST COMPARISON TO THE FAA TAF

Historically, forecasts have been submitted to the FAA to be evaluated and compared to the TAF. The FAA prefers that forecasts differ by less than 10 percent in the five-year period and less than 15 percent in the 10-year period. Where the forecasts differ, supporting documentation is necessary to justify the difference.

Table 2T presents a summary of the selected forecasts and a comparison to the FAA TAF for DTO. The master plan operations forecast is outside the TAF tolerance in the five- and 10-year periods, but only because the baseline count is 11.52 percent lower than the master plan baseline operations count, as established by tower counts. If the TAF baseline were adjusted to match tower data, the master plan forecasts would be well within TAF tolerances in the five- and 10-year periods.

TABLE 2T | Comparison of Master Plan Forecasts to FAA TAF

	2024	2029	2034	2044	CAGR
Total Operations					
Master Plan Forecast	221,487	243,279	267,752	323,995	1.92%
TAF	197,360	204,279	211,706	228,242	0.73%
% Difference from TAF	11.52%	17.43%	23.38%	34.68%	–
Adjusted FAA TAF	221,487	229,685	238,186	256,144	0.73%
% Difference from Adjusted TAF	0.00%	5.75%	11.69%	23.39%	–
Based Aircraft					
Master Plan Forecast	412	475	546	717	2.81%
TAF	474	540	612	768	2.44%
% Difference from TAF	14.00%	12.81%	11.40%	6.87%	–
Adjusted FAA TAF	412	465	524	668	2.44%
% Difference from Adjusted TAF	0.00%	2.16%	4.03%	7.14%	–

In terms of based aircraft, the TAF baseline count is 14 percent higher than the current FAA-validated count. Adjusting the TAF count to match the validated count results in the master plan forecast being within TAF tolerances in the five- and 10-year periods.

AIRCRAFT/AIRPORT/RUNWAY CLASSIFICATION

The FAA has established several aircraft classification systems that group aircraft types based on their performance (approach speed during landing operations) and design characteristics (wingspan and landing gear configuration). These classification systems are used to determine the appropriate airport design standards for specific airport elements, such as runways, taxiways, taxilanes, and aprons.

AIRCRAFT CLASSIFICATION

The selection of appropriate FAA design standards for the development and location of airport facilities is based primarily on the characteristics of the aircraft that are currently using, or are expected to use, an airport. The critical design aircraft is used to define the design parameters for an airport. The design aircraft may be a single aircraft type or a group of aircraft with similar characteristics. The design aircraft is classified by three parameters: aircraft approach category (AAC), airplane design group (ADG), and taxiway design group (TDG). FAA AC 150/5300-13B, *Airport Design*, Change 1, describes the following airplane classification systems, the parameters of which are presented on **Exhibit 2F**.

Aircraft Approach Category (AAC) | The AAC is a grouping of aircraft based on a reference landing speed (V_{REF}), if specified, or – if V_{REF} is not specified – 1.3 times the stall speed (V_{SO}) at the maximum certified landing weight. V_{REF}, V_{SO}, and the maximum certified landing weight are those values as established for the aircraft by the certification authority of the country of registry (the FAA in the United States).

The AAC refers to the approach speed of an aircraft in landing configuration and is depicted by a letter (A through E). The higher the approach speed (operational characteristic), the more restrictive the applicable design standards will be. The AAC generally applies to runways and runway-related facilities, such as runway width, runway safety area (RSA), runway object free area (ROFA), runway protection zone (RPZ), and separation standards.

Airplane Design Group (ADG) | The ADG is depicted by a Roman numeral (I through VI) and is a classification of aircraft that relates to aircraft wingspan or tail height (physical characteristics). When the aircraft wingspan and tail height fall in different groups, the higher (more restrictive) group is used. The ADG influences design standards for taxiway safety area (TSA), taxiway object free area (TOFA), taxilane object free area, apron wingtip clearance, and various separation distances.

Taxiway Design Group (TDG) | The TDG is a classification of airplanes based on certain undercarriage dimensions of the aircraft. Both outer-to-outer main gear width (MGW) and cockpit-to-main gear (CMG) distances are used in the classification of an aircraft. The TDG is depicted by an alphanumeric system (1A, 1B, 2, 3, 4, 5, 6, and 7). The taxiway design elements determined by the application of the TDG include the taxiway width, taxiway edge safety margin, taxiway shoulder width, taxiway fillet design and dimensions, and (in some cases) the separation distance between parallel taxiways/taxilanes. Other taxiway elements – such as the taxiway safety area (TSA); taxiway object free area (TOFA); taxiway/taxilane separation to parallel taxiway/taxilanes or fixed or movable objects; and taxiway/taxilane wingtip clearances – are determined solely based on the wingspan (ADG) of the design aircraft utilizing those surfaces. It is appropriate for taxiways to be planned and built to different TDG standards, based on expected use.

The reverse side of **Exhibit 2F** summarizes the classifications of the most common aircraft in operation today. Generally, recreational and business piston and turboprop aircraft will fall in AAC A and B, and ADG I and II. Business jets typically fall in AAC B and C, while larger commercial aircraft fall in AAC C and D.

AIRPORT AND RUNWAY CLASSIFICATIONS

Along with the previously defined aircraft classifications, airport and runway classifications are used to determine the appropriate FAA design standards to which the airfield facilities are to be designed and built.

Runway Design Code (RDC) | The RDC is a code that signifies the design standards to which the runway is to be built. The RDC is based on planned development and has no operational component.

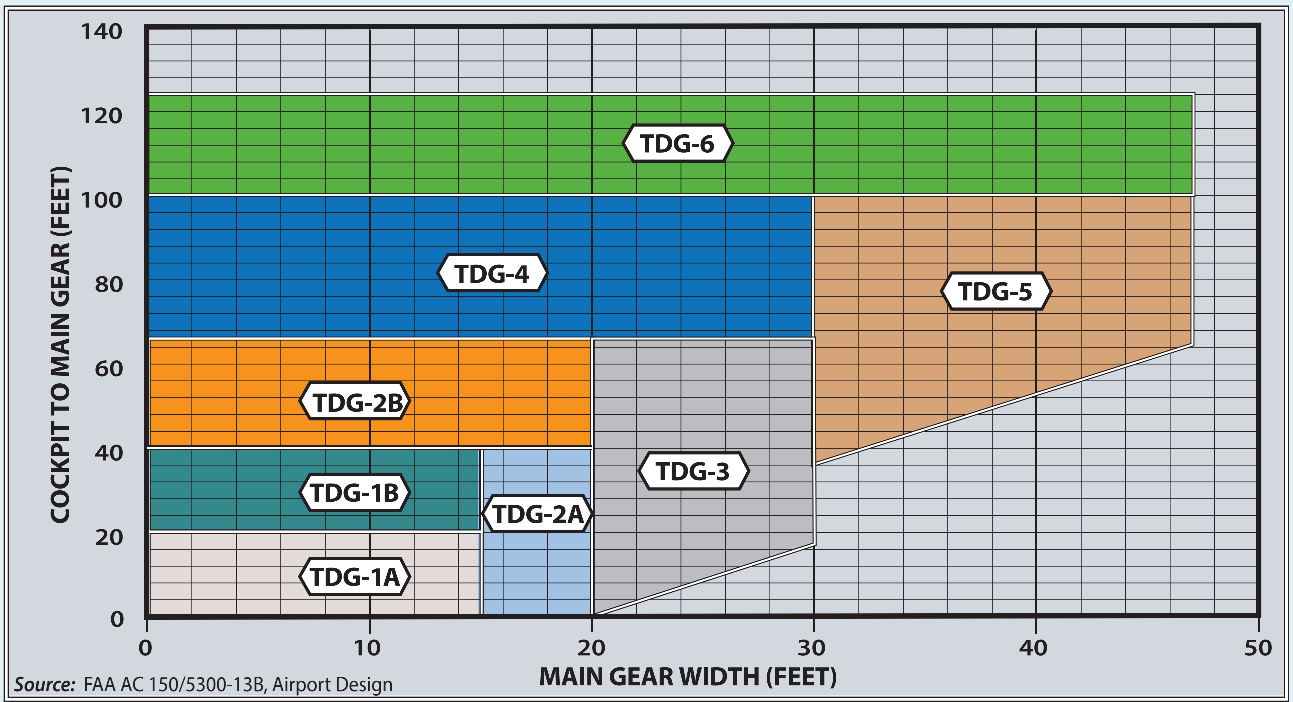
AIRCRAFT APPROACH CATEGORY (AAC)	
Category	**Approach Speed**
A	less than 91 knots
B	91 knots or more but less than 121 knots
C	121 knots or more but less than 141 knots
D	141 knots or more but less than 166 knots
E	166 knots or more

AIRPLANE DESIGN GROUP (ADG)		
Group #	**Tail Height (ft)**	**Wingspan (ft)**
I	<20	<49
II	20-<30	49-<79
III	30-<45	79-<118
IV	45-<60	118-<171
V	60-<66	171-<214
VI	66-<80	214-<262

VISIBILITY MINIMUMS	
RVR* (ft)	**Flight Visibility Category (statute miles)**
VIS	3-mile or greater visibility minimums
5,000	Not lower than 1-mile
4,000	Lower than 1-mile but not lower than ¾-mile
2,400	Lower than ¾-mile but not lower than ½-mile
1,600	Lower than ½-mile but not lower than ¼-mile
1,200	Lower than ¼-mile

***RVR**: Runway Visual Range

TAXIWAY DESIGN GROUP (TDG)



Source: FAA AC 150/5300-13B, Airport Design

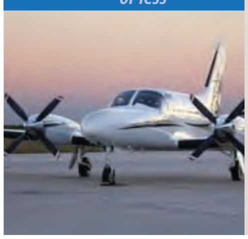
A-I

Aircraft	TDG
• Beech Bonanza	1A
• **Cessna 150**, 172	**1A**
• Piper Comanche, Seneca	1A

B-I

Aircraft	TDG
• Eclipse 500	1A
• Beech Baron 55/58	1A
• **Beech King Air 100**	**1A**
• Cessna 421	2A
• Cessna Citation M2 (525)	1A
• Cessna Citation 1(500)	1A
• Embraer Phenom 100	1A

A/B-II *12,500 lbs. or less*



Aircraft	TDG
• Beech Super King Air 200	2A
• Beech King Air 90	1A
• **Cessna 441 Conquest**	**1A**
• Cessna Citation CJ2	2A
• Pilatus PC-12	2

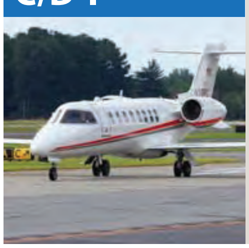
B-II *over 12,500 lbs.*

Aircraft	TDG
• Beech Super King Air 350	2A
• Cessna Citation CJ3(525B)	2A
• **Cessna Citation CJ4 (525C)**	**1B**
• Cessna Citation Latitude	1B
• Embraer Phenom 300	1B
• Falcon 20	1B
• Pilatus PC-24	2A

A/B-III

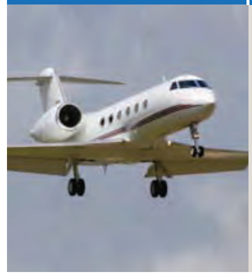
Aircraft	TDG
• Bombardier Dash 8	3
• **Bombardier Global 7500**	**2B**
• Falcon 7X, 8X	2A

C/D-I



Aircraft	TDG
• **Lear** 35, 40, **45**, 55, 60XR	**1B**
• F-16	1A

C/D-II



Aircraft	TDG
• Challenger 600/604	1B
• Cessna Citation III, VI,VII, X	1B
• Embraer Legacy 135/140	2B
• **Gulfstream IV** (D-II)	**2A**
• Gulfstream G280	1B
• Lear 70, 75	1B
• Falcon 50, 900, 2000	2A
• Hawker 800XP, 4000	1B

C/D-III *less than 150,000 lbs.*

Aircraft	TDG
• Gulfstream V	2B
• **Gulfstream** 550, 600, **650**	**2B**
• Global 5000, 6000	2B

C/D-III *over 150,000 lbs.*

Aircraft	TDG
• **Airbus** A319, **A320**, A321	3
• Boeing 737-800, 900	3
• MD-83, 88	4

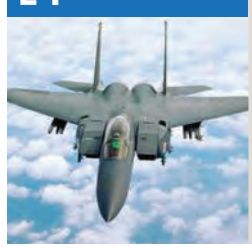
C/D-IV

Aircraft	TDG
• Airbus A300	5
• Boeing 757-200	4
• **Boeing 767**-300, 400	**5**
• MD-11	6

C/D-V

Aircraft	TDG
• Airbus A330-200, 300	5
• Airbus A340-500, 600	6
• Boeing 747-100 - 400	5
• Boeing 777-300	6
• **Boeing 787-8**, 9	**5**

E-I



Aircraft	TDG
• **F-15**	**1B**

Note: Aircraft pictured is identified in bold type.

The AAC, ADG, and runway visual range (RVR) are combined to form the RDC of a runway. The RDC provides the information needed to determine certain applicable design standards. The first component, depicted by a letter, is the AAC and relates to aircraft approach speeds (operational characteristic). The second component, depicted by a Roman numeral, is the ADG and relates to either the aircraft wingspan or tail height (physical characteristic), whichever is more restrictive. The third component relates to the available instrument approach visibility minimums, expressed by RVR values in feet of 1,200 (⅛-mile); 1,600 (¼-mile); 2,400 (½-mile); 4,000 (¾-mile); and 5,000 (1-mile). The RVR values approximate standard visibility minimums for instrument approaches to the runways. For a runway designed for visual approaches only, "VIS" is used in place of a numerical value for the RVR.

Approach Reference Code (APRC) | The APRC is a code that signifies the current operational capabilities of a runway and associated parallel taxiway regarding landing operations. Like the RDC, the APRC has the same three components: the AAC, ADG, and RVR. The APRC describes the current operational capabilities of a runway under meteorological conditions in which no special operating procedures are necessary, as opposed to the RDC, which is based on planned development with no operational component. The APRC for a runway is established based on the minimum runway-to-taxiway centerline separation.

Departure Reference Code (DPRC) | The DPRC is a code that signifies the current operational capabilities of a runway and associated parallel taxiway regarding takeoff operations. The DPRC represents those aircraft that can take off from a runway while any aircraft are present on adjacent taxiways, under meteorological conditions with no special operating conditions. The DPRC is like the APRC but is composed of only the AAC and ADG. A runway may have more than one DPRC, depending on the parallel taxiway separation distance.

Airport Reference Code (ARC) | The ARC is an airport designation that signifies the airport's highest runway design code (RDC) minus the third component (visibility) of the RDC. The ARC is used for planning and design only and does not limit the aircraft that may be able to operate safely at an airport. The current airport layout plan (ALP) for DTO identifies the ARC for Runway 18L-36R as D-II, with the Gulfstream G450 as the critical design aircraft. The parallel runway was originally planned to meet C-II standards with the Cessna Citation X as the design aircraft; however, the runway was built to B-II standards.

CRITICAL AIRCRAFT

The selection of appropriate FAA design standards for the development and location of airport facilities is primarily based on the characteristics of the aircraft that are currently using, or are expected to use, the airport. The critical design aircraft is used to define the design parameters for an airport. The design aircraft may be a single aircraft type or a group of aircraft with similar characteristics defined by the three parameters: AAC, ADG, and TDG.

The first consideration is the safe operation of aircraft likely to use an airport. Any operation of an aircraft that exceeds the design criteria of an airport may result in a decreased safety margin; however, it is not a usual practice to base the airport design on an aircraft that uses the airport infrequently.

The design aircraft is defined as the most demanding aircraft type, or grouping of aircraft with similar characteristics, that makes regular use of the airport, which is defined as 500 annual operations (excluding touch-and-go operations). Planning for future aircraft use is important because the design standards are used to plan separation distances between facilities. These future standards must be considered now to ensure short-term development does not preclude the reasonable long-range potential needs of the airport.

According to FAA AC 150/5300-13B, *Airport Design*, Change 1: "airport designs based only on existing aircraft can severely limit the ability to expand the airport to meet future requirements for larger, more demanding aircraft. Airport designs that are based on large aircraft never likely to be served by the airport are not economical." Selection of the current and future critical design aircraft must be realistic in nature and supported by current data and realistic projections.

AIRPORT DESIGN AIRCRAFT

There are three elements for classifying the airport design aircraft: the AAC, ADG, and TDG. The AAC and ADG are examined first, followed by the TDG.

The FAA's TFMSC database includes documentation of commercial (air carrier and air taxi), general aviation, and military aircraft traffic. Due to factors such as incomplete flight plans, limited radar coverage, and VFR operations, TFMSC data do not account for all aircraft activity at an airport by a given aircraft type; however, the TFMSC provides an accurate reflection of IFR activity. Operators of high-performance aircraft, such as turboprops and jets, tend to file flight plans at a high rate. According to TFMSC data for DTO, operations conducted by aircraft with an AAC/ADG of C-II have consistently exceeded 500 annual operations over the previous five years. As such, **the historical operational activity indicates DTO's existing ARC is C-II**. The C-II aircraft that operate most frequently at DTO are the Bombardier Challenger 600, Dassault Falcon 50, and Saab 340. The Challenger 600 conducts the most operations among this group, so it has been identified as the current critical aircraft.

To determine DTO's future ARC, annual operations by ARC were forecast through 2044 using a growth rate forecast based on industry growth trends within each ARC category. Historical and forecast operations by ARC are depicted in **Table 2U**. Operations levels within the higher B-III/C-III/D-III categories are anticipated to increase over the planning period, consistent with industry trends. The individual ADG III categories are not anticipated to exceed 500 annual operations alone, but collectively, ADG III operations are forecast to total 1,128 by 2044. As a national reliever airport, DTO needs to be planned to accommodate all general aviation aircraft, including ultra long-range business jets, such as the Gulfstream G550/G650/G700/G800, Bombardier Global 7500, and Boeing Business Jet (BBJ); therefore, DTO's future critical aircraft is within the C/D-III category and is identified as the Gulfstream G550/G650.

TABLE 2U | Historical and Forecast Operations by Airport Reference Code

Year	B-I	B-II	B-III	C-I	C-II	C-III	D-II	D-III
Historical								
2019	1,097	3,702	6	324	876	14	17	4
2020	643	3,693	5	250	763	30	4	4
2021	970	3,558	16	476	977	40	23	22
2022	1,095	4,419	25	425	1,003	41	12	14
2023	889	2,994	42	354	1,290	66	36	6
2024*	882	2,901	52	191	1,116	71	26	2
CAGR	-4.3%	-4.8%	54.0%	-10.0%	5.0%	38.4%	8.9%	-12.9%
Forecast								
2029	810	3,581	84	161	1,424	109	42	7
2034	743	4,420	135	135	1,818	168	67	28
2044	626	6,733	350	96	2,961	398	175	380
CAGR	-1.7%	4.3%	10.0%	-3.4%	5.0%	9.0%	10.0%	30.0%

*2024 data represent a 12-month period ending July 2024
A-I and A-II are not shown, as smaller/slower aircraft are unlikely to impact critical design aircraft.
C-IV through C-V and D-I and D-IV and above are not shown due to minimal activity at DTO.
Sources: FAA TFMSC; Coffman Associates analysis

TAXIWAY DESIGN GROUP (TDG)

The TFMSC also provides a breakdown of aircraft operations by TDG. According to DTO operations data, presented in **Table 2V**, the highest TDG that exceeds the threshold of 500 annual operations in 2024 is TDG 3 – represented by the Embraer 120 and Swearingen Merlin 4 turboprop aircraft, which are used primarily for air cargo operations. Business jets fall primarily within the 1B, 2, 2A, and 2B categories. These TDG categories should continue to experience growth; however, based on these TFMSC data, TDG 3 is considered the existing and ultimate critical design TDG for taxiway planning purposes.

TABLE 2V | DTO Operations by Taxiway Design Group

Year	1A	1B	2	2A	2B	3
2019	5,290	1,834	95	1,892	20	356
2020	5,462	1,565	141	1,278	49	342
2021	3,943	2,259	65	1,795	74	726
2022	4,287	2,166	117	2,331	58	1,358
2023	4,911	1,653	183	2,106	51	869
2024*	7,399	1,469	292	1,797	37	734

*Data represent a 12-month period ending July 2024
Source: TFMSC

RUNWAY DESIGN CODE

The RDC relates to specific FAA design standards that should be met in relation to a runway. The RDC takes the AAC, ADG, and RVR into consideration. In most cases, the critical design aircraft will also be the RDC for the primary runway.

The current runway design at DTO for primary Runway 18L-36R should meet the standards for the overall airport design aircraft, which has been identified as the Bombardier Challenger 600 – a C-II aircraft. The runway has an instrument landing system (ILS) precision approach with visibility minimums as low as ½-mile. The RVR value assigned to a runway with ½-mile minimums is 2400; therefore, **the applicable**

existing RDC for Runway 18L-36R is C-II-2400. The ultimate critical aircraft was identified as a grouping of ultra-long range business jets, including the Gulfstream G550 (ARC D-III) and G650 (ARC C-III); therefore, **the ultimate RDC for Runway 18L-36R is C/D-III-2400**.

Parallel Runway 18R-36L currently meets ARC B-II design standards and has published instrument approaches with visibility minimums down to ¾-mile. ARC B-II aircraft with the most frequent operations at DTO are the Beechcraft King Air series of turboprops, which are identified as the existing critical aircraft for the parallel runway. As a secondary runway, the parallel runway is intended to serve mid-size and smaller aircraft; therefore, **the existing and ultimate RDC for Runway 18R-36L is B-II-4000**.

CRITICAL AIRCRAFT SUMMARY

Table 2W summarizes the current and future runway classifications.

TABLE 2W | Airport and Runway Classifications

	Runway 18L-36R		Runway 18R-36L
	Existing	Ultimate	Existing/Ultimate
Airport Reference Code (ARC)	C-II	C/D-III	B-II
Critical Aircraft (Typ.)	Bombardier Challenger 600	Gulfstream G550/G650	Beechcraft King Air 90/200/300/350
Runway Design Code (RDC)	C-II-2400	C/D-III-2400	B-II-4000
Taxiway Design Group (TDG)	3	3	2A

Source: FAA AC 150/5300-13B, Airport Design, Change 1

POTENTIAL COMMERCIAL PASSENGER SERVICE ENPLANEMENTS

BACKGROUND

The Dallas-Fort Worth metroplex has grown to become the fourth largest metropolitan area in the United States, behind New York, Los Angeles, and Chicago. The Dallas-Fort Worth metropolitan area has an estimated population of 8,481,512 in 2024, according to the North Central Texas Council of Governments (NCTCOG), and is the fastest growing metropolitan area in the country.

Dallas Fort Worth International Airport (DFW) and Dallas Love Field (DAL) currently serve as the primary commercial airports for the region. DFW is one of the busiest airports in the world and handled over 73.3 million passengers (enplaned and deplaned) in 2023. DAL serves as a vital hub, particularly for Southwest Airlines, and handled almost 17.6 million passengers in 2023. Despite their capacity, both airports are experiencing increasing pressure due to rising passenger volumes; recent forecasts suggest DFW alone could exceed 100 million annual passengers in the coming years.

DFW is currently undergoing a $9.0 billion expansion and modernization program in its efforts to increase its capacity to accommodate over 100 million passengers. This involves an overhaul of Terminals A and C, with the addition of nine new gates, that is expected to be completed by 2030. A sixth terminal (Terminal F), which will add 15 new gates, is also under development, with scheduled completion by 2026.

DAL is constrained by federal law to 20 gates, 18 of which are controlled by Southwest Airlines. Southwest Airlines is barred from operating at DFW until 2025, and the airline has indicated that it is considering expanding operations at a second airport in North Texas. A master plan for DAL is currently ongoing and draft forecasts for the airport show enplanement levels exceeding 11 million by 2028.

The need for a third commercial service airport in the Dallas-Fort Worth metroplex is becoming increasingly critical. A market analysis study conducted for McKinney National Airport (TKI) in June 2022 identified that DFW and DAL are forecast to reach 72.1 million enplanements by 2040; however, the two airports will reach maximum capacity by 2038, at 64.5 million total enplanements. The existing airports face challenges such as congestion, longer wait times, and operational constraints, which can hinder both business travel and tourism. Additionally, the region's continued population growth, coupled with the expansion of various economic sectors, necessitates a more diversified air travel infrastructure.

A third airport would not only alleviate pressure on DFW and DAL but would also enhance connectivity and competition among airlines, potentially lowering fares and increasing flight options for passengers. Such an airport could be strategically located to serve underserved areas of the metroplex and improve access for residents in the growing suburban regions. Furthermore, it would bolster the states of the Dallas-Fort Worth metroplex as a leading global transportation hub, enhancing the region's appeal to businesses and travelers alike.

McKinney National Airport has a head start on all other airports in the area. Despite voters rejecting plans for $200 million in public funding for a new terminal building, the City of McKinney City Council is moving forward with the design of a passenger terminal to attract commercial service activity. If TKI is successful, it is unlikely that the market will support a fourth commercial service airport in the metroplex for the foreseeable future; however, if TKI is unsuccessful, the opportunity may be available to fill that role. The purpose of this discussion is to evaluate the current commercial passenger service market in the Dallas-Fort Worth metroplex and identify potential demand for these services at DTO. At present, DTO is a general aviation reliever airport with "on-demand" passenger service offered via a variety of CFR Part 135 operators utilizing all manner of business aircraft (turboprops and jets).

COMMERCIAL AIRLINE INDUSTRY

The commercial airline industry in the United States has been subject to ups and downs that are primarily related to the economy, but those changes are often volatile. For more than two decades after deregulation, commercial airlines were capital-intensive as they competed for market share, which left the airline industry cash-poor. While profits were evident in good economic times, the economic cycle (and the price of oil) would inevitably turn and airlines would suffer significant losses, sometimes resulting in bankruptcies or mergers.

The aftermath of the events of September 11, 2001 (9/11), prompted a new round of airline restructuring and consolidation as changes to airline business models began to take shape; however, the Great Recession that began in 2007 and carried into 2009 brought about perhaps the most deliberate change in how U.S. airlines manage their operations and finances. The commercial airlines' focus fully shifted from increasing market share to boosting returns on invested capital. The airlines worked to minimize losses by lowering operating costs, focusing on profitable routes and removing older and less fuel-efficient aircraft from their fleets. A key to this shift was capacity discipline, which became an industry buzz phrase. This discipline, combined with some airlines charging separately for certain services, resulted in 11 consecutive years of profits for the U.S. airline industry, extending through 2019.

The outbreak of the COVID-19 global pandemic brought an immediate end to the years of prosperity. While restrictions related to the pandemic nearly halted traffic overnight, airlines began to face a new reality. Because their business models emphasized capacity discipline, they were able to slash costs. With the balance sheets and credit ratings built up over the past decade, they were able to raise capital through borrowing and restructuring fleets.

These modifications will affect the airline industry for years. Airlines became smaller due to retiring aircraft and reducing the workforce through the encouragement of voluntary retirements/separations. The fleet is now younger and more fuel-efficient, but the higher levels of debt are likely to limit capital investment spending, thus restraining growth.

Domestic leisure traffic led to recovery; pent-up consumer demand due to travel restrictions was experienced, as predicted. Routes shifted somewhat to serve domestic vacation destinations, while business and international travel lagged. By the summer of 2022, leisure demand exceeded pre-pandemic levels, and business travel stood at about 70-80 percent of pre-pandemic demand by the end of 2022.

Over the long term, the airlines' business models developed during the past decade are expected to aid the recovery, demonstrating that the U.S. airline industry has left behind its capital-intensive/cyclical tendencies for the discipline that can better generate returns on capital and sustain profits. According to the report, "There is confidence that the U.S. airline industry as a whole has finally transformed from a capital intensive, highly cyclical industry to an industry that can generate solid returns on capital and sustained profits." The *2024-2044 FAA Aerospace Forecast* for U.S. domestic passengers projects an average growth of 2.4 percent annually over the next 20 years.

POTENTIAL SCHEDULED COMMERCIAL SERVICE

The likelihood of any traditional mainline legacy carrier (American Airlines, Delta Air Lines, United Airlines, and Southwest Airlines) moving into DTO is unlikely. These airlines are strong anchors at DFW and DAL and historical trends suggest that moving to an outlying, tertiary market is unlikely. These carriers (excluding Southwest) tend to favor the trappings of larger hub airports, as they depend on the ability to link their passengers via the "hub-and-spoke" system. Moreover, the opportunity to attract regularly scheduled commuter airline "feeder" service is equally dubious. The haul to DAL or DFW would not be equitable for these airlines, as most now utilize regional jet aircraft. Extremely short hauls to DAL and DFW could not be profitable, as these airlines already capture the same passengers via surface transportation modes.

Tertiary commercial service airports (which DTO would be if scheduled passenger service were implemented) tend to be built around origination and destination (O&D) passenger models. Hub and smaller regionalized commercial service airports served by the legacy carriers, including American Airlines, tend to build their networks around the hub-and-spoke system. As such, DTO's greatest opportunity is, and will likely continue to be, non-traditional and/or low-cost passenger airline options that currently have limited or no operations at DAL and/or DFW. Low-cost airlines, like Allegiant Airlines, utilize irregular schedules, unlike the daily departure schedules utilized by the legacy carriers. For example, Allegiant Airlines, which does not currently serve the metroplex, could serve a market departing Tuesday and returning on Saturday. Other low-cost options, like Frontier Airlines and Spirit Airlines (both of which operate out of DFW), may offer daily departures but very limited schedule options.

There are many non-traditional or low-cost carrier options, including Allegiant Airlines, Spirit Airlines, Frontier Airlines, Sun Country Airlines, Avelo Airlines, and Breeze Airways. The most likely option for DTO, based on market opportunities, could be Allegiant Airlines, which currently has the most proximate service out of Austin, Oklahoma City, Shreveport, San Antonio, and Houston (Hobby). Allegiant Airlines has been operating since 1998 and utilizes a fleet comprised of primarily Airbus A319 and A320 aircraft. Avelo Airlines (currently serving Houston [Hobby] and Brownsville/South Padre) could be a potential carrier for DTO, as it does not currently have a foothold in the metroplex. Avelo Airlines started operating in April 2021 and utilizes a fleet of Boeing 737 aircraft. Frontier Airlines, Spirit Airlines, and Alaska Airlines could also be options, but these airlines currently operate limited flights out of DFW and/or DAL.

It should be noted that these low-cost carriers tend to generate a demand of specific users, most commonly leisure travelers who desire low airfares. These users are willing to sacrifice certain features, such as schedule frequency and traditional perks associated with airline reward programs, in favor of low fares. Business travelers tend not to use these airlines, as they are less reliable and offer fewer connections. Generally, local passenger demand for these airlines is limited when compared to demand for a legacy carrier.

Given that there is no historical commercial passenger operating data for DTO, operational and enplanement forecasting is a function of the type(s) of aircraft in use, operational frequency, and load factors. In the following sections, the potential for passenger enplanements, commercial operations, and potential commercial service operators at DTO will be presented. **These forecasts are simply being conducted to offer long-term potential and will be considered separately from the planning forecasts presented earlier in this chapter. The primary purpose of this analysis is to provide the City of Denton with important facility planning information, should there be interest in starting commercial service at DTO.**

POTENTIAL PASSENGER ENPLANEMENTS

Tertiary Airport Methodology

Perhaps the most apt methodology for air service considerations for DTO is to evaluate other tertiary airports, or smaller commercial service airports near large metropolitan areas that are already served by one or more large hub airports. The following tertiary airports were considered:

- Orlando Sanford International Airport – Florida (26 miles northeast of Orlando)
- Westchester County Airport – New York (39 miles north of New York City)
- Phoenix-Mesa Gateway Airport – Arizona (36 miles southeast of Phoenix)
- Bellingham International Airport – Washington (94 miles north of Seattle and 52 miles south of Vancouver)
- Chicago Rockford International Airport – Illinois (85 miles northwest of Chicago)
- Stockton Metro Airport – California (80 miles east of San Francisco)
- Portsmouth International Airport at Pease – New Hampshire (58 miles north of Boston)

Table 2Y presents historical enplanement data for each of these airports.

TABLE 2Y | Secondary/Tertiary Commercial Passenger Airport Enplanements

Name	2003	2008	2013	2018	2023
Orlando Sanford – FL	619,894	927,188	971,522	1,504,888	1,446,884
Westchester County – NY	426,864	904,482	764,002	789,283	1,156,719
Phoenix-Mesa – AZ	218	190,281	725,048	778,972	964,132
Bellingham International – WA	66,437	277,281	596,142	368,186	311,234
Chicago Rockford – IL	16,982	110,151	109,384	106,710	120,494
Stockton Metro – CA	13,700	36,935	71,757	98,908	67,688
Portsmouth International – NH	27,096	49,962	22,540	92,836	57,448

Source: FAA Airport Enplanement Data

Orlando Sanford International Airport has the most successful enplanement model of all the airports examined. This airport is basically utilized as a hub by Allegiant Airlines for all Orlando flights, as well as for international charter airlines. There is no regularly scheduled service by legacy carriers or commuter airlines. Similarly, Phoenix-Mesa Gateway Airport has experienced strong passenger growth since Allegiant Airlines began operating in the early 2000s. Orlando, Florida, ranks at or near the top of most visited U.S. cities; as such, it is unlikely Allegiant Airlines or similar carriers could generate similar passenger demand at DTO.

Chicago Rockford International Airport is likely more comparable, as it has successfully transitioned from a general aviation airport to a primary commercial service airport. The airport offers several domestic destinations via Allegiant Airlines, as well as irregular international charter operations. As noted in the table, its airport enplanements reached a high of 120,494 in 2023. Chicago Rockford International Airport is farther from its core service area (85 miles northwest of Chicago, Illinois) compared to DTO, which is 42 miles northwest of Dallas and 34 miles north of Fort Worth.

Westchester County Airport and Bellingham International Airport are secondary/tertiary airports; however, both are also served by traditional carrier options, as well as ultra-low-cost/non-traditional carriers. As such, they offer a glimpse at enplanement levels for such markets. Portsmouth International Airport at Pease is a tertiary airport served by Allegiant Airlines and Breeze Airways.

As presented in the table, tertiary airports can generate a range of enplanements, from tens of thousands to over one million passenger enplanements. The upper end of the envelope is represented primarily by O&D markets.

Travel Propensity Factor Methodology

Due to a lack of passenger service history, it is challenging to develop a reasonable forecast of future passenger enplanements. Traditional trend line and regression analyses do not generate a reasonable forecast, as there is no history to examine. The method employed here is to examine comparable markets throughout the State of Texas with similar city populations and other similar characteristics, such as proximity to a regional and larger hub airport and regional airport enplanement levels. The relationship between a service area's population and enplanements is the travel propensity factor (TPF). TPF is calculated by dividing an airport's passenger enplanement count by the population of the service area.

The TPF is predominantly impacted by the proximity of an airport to other regional airports with higher levels of service, or "hub" airports. Regional airports with higher TPF ratios tend to be located farther from hub airports in relatively isolated areas. Such an airport generally has a service area that extends into adjacent, well-populated regions or has an air service advantage that attracts more passengers who might otherwise choose to drive to a more distant hub airport. Generally, the higher the TPF, the more likely air travelers are to utilize the local airport for commercial service.

Table 2Z presents eight Texas markets with limited commercial service options. Each is within a manageable driving distance to a larger hub airport but is the only commercial service option for the regional community. The table presents a comparison of the 2019 (prior to the COVID-19 pandemic) and 2023 TPFs at each small Texas market airport. The distance to the closest commercial service or hub airport is also considered. Generally, the farther a community is from a larger commercial service/hub airport, the higher the TPF will be.

In 2019, the average TPF of the airports serving the eight selected cities was 0.494. By 2023, the average TPF had decreased to 0.406, with only two of the eight cities (Longview and Beaumont/Port Arthur) increasing in TPF. This is indicative of the regional airport market, which has experienced reduced capacity (flight frequencies and nonstop destinations) in the aftermath of the COVID-19 pandemic.

TABLE 2Z | Small Texas Markets and Travel Propensity Factor

Texas Small Markets	2019			2023			Miles to Nearest Hub
	Population	Enp.	TPF	Population	Enp.	TPF	
Abilene Regional (ABI) – Abilene, TX	124,351	81,813	0.658	131,676	79,831	0.606	150 – Lubbock (LBB)
Easterwood Field (CLL) – College Station, TX	119,336	83,832	0.702	123,498	60,072	0.486	70 – Houston (IAH)
Waco Regional (ACT) – Waco, TX	137,223	62,907	0.458	145,192	51,867	0.357	90 – Dallas (DAL)
San Angelo Regional/Mathis Field (SJT) – San Angelo, TX	99,609	66,390	0.667	99,565	51,865	0.521	110 – Midland (MAF)
Tyler Pounds Regional (TYR) – Tyler, TX	105,174	59,807	0.569	110,734	50,155	0.453	95 – Dallas (DAL)
East Texas Regional (GGG) – Longview, TX	81,559	27,160	0.333	83,591	32,613	0.390	125 – Dallas (DAL)
Jack Brooks Regional (BPT) – Beaumont/Port Arthur, TX	171,884	29,068	0.169	168,064	32,150	0.191	70 – Houston (IAH)
Sheppard AFB/Wichita Falls Municipal (SPS) – Wichita Falls, TX	102,023	40,418	0.396	102,774	25,075	0.244	110 – Dallas/Ft Worth (DFW)

Enp. = passenger enplanements
TPF = travel propensity factor

Sources: Enplanements – FAA Passenger Boarding Data; Population – Texas Demographic Center, Texas Population Estimates Program

TPF has also been considered for the tertiary airports, as shown in **Table 2AA**. In 2023, Orlando had the highest TPF (0.513), which reflects the airport's high number of tourist travelers. The average tertiary airport TPF is 0.131.

TABLE 2AA | Tertiary Airports and Travel Propensity Factor

Airport	Market	2023		
		Market MSA Population	Enplanements	TPF
Orlando Sanford – FL	Orlando	2,817,933	1,446,884	0.513
Westchester County – NY	New York	11,864,322	1,156,719	0.097
Phoenix-Mesa – AZ	Phoenix	5,070,110	964,132	0.190
Bellingham International – WA	Seattle/Vancouver	4,044,837	311,234	0.077
Chicago/Rockford – IL	Chicago	9,262,825	120,494	0.013
Stockton Metro – CA	San Francisco	4,566,961	67,688	0.015
Portsmouth International – NH	Boston	4,919,179	57,448	0.012
TPF = travel propensity factor				

Sources: Enplanements – FAA Passenger Boarding Data; Population – U.S. Census Bureau Estimates

Table 2BB presents three different potential enplanement forecast approaches based on the TPF comparison analysis. The low range for small Texas markets, low-range tertiary airport TPFs, and average tertiary airport TPFs are applied to the population forecast of the DFW MSA. The first projection applies the lowest 2023 TPF from the small Texas markets (0.191), which results in an enplanement projection of over 2.0 million by 2044. The second projection applies the low TPF of the tertiary airports (0.012), which results in an enplanement projection of 124,000 by 2044. The third projection applies the average tertiary airport TPF (0.131), which results in an enplanement projection of almost 1.4 million by 2044.

TABLE 2BB | Travel Propensity Projections

Year	DTO Enplanements	DFW MSA Population	Travel Propensity Factor
Low Small Market Airport TPF			
2029	1,683,500	8,800,501	0.191
2034	1,797,700	9,397,522	0.191
2044	2,030,700	10,615,729	0.191
Low Tertiary Airport TPF			
2029	102,800	8,800,501	0.012
2034	109,700	9,397,522	0.012
2044	124,000	10,615,729	0.012
Average Tertiary Airport TPF			
2029	1,153,600	8,800,501	0.131
2034	1,231,800	9,397,522	0.131
2044	1,391,500	10,615,729	0.131
DFW MSA = Dallas-Fort Worth Metropolitan Statistical Area			

Sources: Population Projections – Woods & Poole Economics Inc. 2024; US Regional Carrier Domestic Enplanements – FAA Aerospace Forecasts 2024-2044

Potential Flight Scenario Methodology

Another methodology for forecasting potential enplanements and commercial operations is to consider potential flight schedules and aircraft fleets of the on-demand and scheduled charter operators. The potential enplanement and operations estimates are based on a potential flight schedule, as well as a limited set of factors – primarily population and distance to a hub airport. Factors that may positively affect enplanement levels include the reliability of the airline, frequency of the schedule, convenience, and advertising budget, as well as an unlimited number of community factors, such as industry, businesses, places of higher education, and recreational attractions.

The purpose is to identify multiple scenarios of potential enplanement and operational figures that can be refined later, if necessary. One additional factor to consider is the willingness of a passenger to drive a longer distance to a hub airport.

Table 2CC presents three different potential commercial passenger enplanement and operations scenarios based on potential operator types: passenger membership model carriers, regional jet operators, and irregularly scheduled carriers, such as Allegiant Airlines. The first scenario is strictly based on passenger membership models, such as Surf Air and similar operators. This scenario uses the eight-seat Pilatus PC-12 single-engine turboprop, at an estimated 80 percent boarding load factor (BLF). Weekly schedules considered 12, 24, and 48 weekly departures, which correlate to two, four, and eight departures daily, Monday through Friday, and one day (or halved each day) on the weekend. Under these scenarios, DTO could experience an estimated annual enplanement level ranging between 3,700 and 15,000 enplanements and an annual commercial aircraft operations level between 1,248 and 4,992.

TABLE 2CC | Enplanements and Operations Based on Potential Flight Schedules

Aircraft Type	ARC	Seats	BLF %	Occupied Seats	Departure Frequency	Total Enplanements	Total Operations
Passenger Membership Model Scenarios							
Pilatus PC-12	A-II	8	80%	6	12x Weekly	3,700	1,248
Pilatus PC-12	A-II	8	80%	6	24x Weekly	7,500	2,496
Pilatus PC-12	A-II	8	80%	6	48x Weekly	15,000	4,992
Regional Carrier Scenarios							
CRJ200	D-II	50	80%	40	6x Weekly	12,500	624
CRJ200	D-II	50	80%	40	12x Weekly	25,000	1,248
CRJ200	D-II	50	80%	40	24x Weekly	49,900	2,496
CRJ700	C-II	70	80%	56	6x Weekly	17,500	624
CRJ700	C-II	70	80%	56	12x Weekly	34,900	1,248
ERJ E175	C-III	76	80%	61	6x Weekly	19,000	624
ERJ E175	C-III	76	80%	61	12x Weekly	38,100	1,248
Irregularly Scheduled Charter Operator Scenarios							
A320	C-III	177	90%	159	2x Weekly	16,500	208
A320	C-III	177	90%	159	4x Weekly	33,100	416
A320	C-III	177	90%	159	8x Weekly	66,100	832
A320	C-III	177	90%	159	12x Weekly	99,200	1,248
A320	C-III	177	90%	159	16x Weekly	132,300	1,664
A320	C-III	177	90%	159	24x Weekly	198,400	2,496

Source: Coffman Associates analysis

The second set of scenarios assumed a regional carrier, such as SkyWest Airlines, which operates under contracts with Delta Air Lines, United Airlines, and American Airlines. The analysis offered three different aircraft models: the CRJ200 with 50 passenger seats, the CRJ700 with 70 passenger seats, and the Embraer E175 with 76 passenger seats. The daily departures considered were lower than the passenger membership scenarios, as the aircraft have higher seating capacities. Based on the analysis, the potential enplanements ranged from a low of 12,500 to a high of 49,900. Annual aircraft operations ranged from a low of 624 to a high of 2,496.

Finally, the third scenario assumed an irregularly scheduled airline, such as Allegiant Airlines. This model utilized the 177-seat Airbus A320 aircraft. As shown, the analysis considered a range of weekly departures, from two to 24. Based on the factors presented, the enplanement range was between 16,500 to 198,400. Annual operations ranged from 208 to 2,496.

Potential Enplanements Summary

The Dallas-Fort Worth metroplex is growing rapidly and capacity constraints at DFW and DAL will eventually necessitate a third commercial service airport to support growing air traveler demand. McKinney National Airport (TKI) has a head start, with plans to construct a passenger terminal building in the coming years; however, a 2023 ballot measure to fund a $200 million TKI expansion, including the construction of a 144,000-square-foot terminal, was defeated by voters. The McKinney City Council has continued to move forward with the design of the terminal while seeking new funding options. If TKI fails in its attempt to attract commercial service activity, other airports – such as Fort Worth Alliance Airport (AFW), which already serves significant commercial air cargo operations; Fort Worth Meacham International Airport (FTW), which has previously had commercial airline service; or DTO – may seek to fill the role. If TKI is successful, the market would not support a fourth commercial service airport, especially two located in the northern suburbs.

The analysis in this section presents various enplanement scenarios for DTO, as well as comparisons to enplanements in other similar markets. Due to the lack of recent historical context for commercial service activity, it is difficult to predict which of these scenarios is more likely to occur, and there is no guarantee that DTO will be able to develop and maintain consistent commercial service activity at all. For this reason, the enplanement projections are separate from the overall operations and based aircraft forecasts that will be submitted to TxDOT for review and approval. The purpose of preparing enplanement projections is to provide the City of Denton with the ability to begin preliminary planning for facilities and services to accommodate commercial activities, should the city decide to pursue commercial passenger operators at DTO in the future.

The enplanement projection scenarios resulted in a wide range of possibilities for DTO, from fewer than 10,000 annual enplanements to more than one million enplanements annually. The actual enplanement potential for DTO is somewhere in between these high and low figures. The TKI market analysis study identified a potential 2025 market range of between 178,000 and 888,000 annual enplanements, growing to a range of 273,000 to 1,367,000 annual enplanements by 2040. These ranges are similar to what was identified by the tertiary airport methodology. If DTO were to establish commercial service ahead of its competition, its enplanement levels would likely fall within a similar range. **Again, this enplanement scenario is not intended to serve as a forecast of activity. This information will be presented to airport staff, the planning advisory committee (PAC), and the public. Ultimately, any plan to move forward with identifying potential facility needs to accommodate commercial passenger activities at DTO will be based on feedback and guidance of the airport stakeholders.**

SUMMARY

This chapter has outlined the various activity levels that might reasonably be anticipated over the planning period, as well as the critical aircraft for the airport. Based aircraft are forecast to grow from 412 in 2024 to 717 by 2044. Operations are forecast to grow from 221,487 in 2024 to 323,995 by 2044. The projected growth is driven by the FAA's positive outlook for general aviation activity for the State of Texas and nationwide, as well as a positive outlook for socioeconomic growth (population, employment, and income/GRP) in Denton County and the broader Dallas-Fort Worth metroplex. Recent growth trends specific to DTO also factor into the projected growth.

The critical design aircraft for the airport was determined by examining the FAA TFMSC database of flight plans. The current critical design aircraft is represented by the Challenger 600, a twin-engine business jet typically utilized for business operations or air charters. The ultimate design aircraft is projected to fall within the C/D-III design category and is represented by ultra-long-range jets, such as the Gulfstream G550/G650.

Projections of aviation demand will be influenced by unforeseen factors and events in the future; therefore, it is not reasonable to assume future demand will follow the exact projection line, but forecasts of aviation demand tend to fall within the planning envelope over time. The forecasts developed for this master planning effort are considered reasonable for planning purposes. The need for additional facilities will be based on these forecasts; however, implementation of facility construction can be slower than planned if demand does not materialize as projected. Likewise, facility construction can be accelerated if demand exceeds these forecasts.

The next step in the planning process is to assess the capabilities of the existing facilities to determine what upgrades may be necessary to meet future demands. The range of forecasts developed here will be taken forward in the next chapter as planning horizon levels, which will serve as milestones or activity benchmarks in evaluating facility requirements.