



CHAPTER 3 - AVIATION FORECASTS

3.01 Forecast Overview

The first step in updating aviation forecasts at Cuyahoga County Airport is to define the standard indicators of aviation activity, and identify what data are available for these indicators. The next step is to review past studies of the airport to identify the forecasting processes that were employed. The findings of these studies are then compared to the actual activity to help identify which forecasting methodologies appear to be the most applicable to the airport. Local socioeconomic indicators are also reviewed to determine the applicability of national trends to the activity at Cuyahoga County Airport. Various forecasting resources are then used as the basis for preparing updated forecasts.

3.01-1 Existing Indicators of Aviation Activity

There are two primary measures of aviation activity at general aviation airports: based aircraft and annual operations. At Cuyahoga County Airport there are two types of “based aircraft.” The first type is the “traditional” based aircraft, which are those aircraft that are kept at the airport either in hangars or tied-down when not in use. The second type is the fractional ownership aircraft, which have a mailing address at the airport, but typically are not present at Cuyahoga County Airport between flights. Annual operations are the total of all types of operations that occur at the airport in a year. Data have been collected for existing and historic levels of all based aircraft and annual operations at Cuyahoga County Airport as the starting point for preparing updated forecast projections.

The historic based aircraft information is compiled from the Cuyahoga County Airport based aircraft reports that are prepared and submitted to the Ohio Department of Transportation (ODOT) each year. The contract tower at Cuyahoga County Airport operates from 7 A.M. to 11 P.M. and records the operations they handle. Historic airport records show there are additional operations not included in the tower records that are equal to approximately 11 percent of the operations recorded by the tower. The tower recorded operations, total operations and based aircraft are shown in **Table 3-1**.



**TABLE 3-1
CUYAHOGA COUNTY AIRPORT
HISTORIC OPERATIONS AND BASED AIRCRAFT**

	Tower Recorded Operations	Total Operations	Based Aircraft
1990	81,353	90,302	129
1991	84,564	93,866	122
1992	72,932	80,955	136
1993	72,973	81,000	120
1994	73,266	81,325	149
1995	65,736	72,967	145
1996	70,095	77,805	141
1997	72,285	80,236	148
1998	76,008	84,369	161
1999	74,518	82,715	139
2000	63,790	70,807	174
2001	64,106	71,158	198
2002	67,667	75,110	205
2003	62,649	69,540	301

Source: Cuyahoga County Airport Based Aircraft Records, various years, Cuyahoga County Airport Traffic Control Tower Records, various years.

The number of based aircraft attributed to Cuyahoga County Airport has grown tremendously in recent years, while annual operations have remained relatively flat. The majority of the based aircraft growth can be attributed to Flight Options, the second largest fractional ownership company in the country. Flight Options was founded in October 1998 as a subsidiary of Corporate Wings, a local fixed base operator (FBO), Flight Options and Raytheon Travel Air merged in December 2001, doubling the size of the company. Raytheon initially owned a minority share of the company. In June 2003, Raytheon re-capitalized Flight Options and now holds a majority share of the company.

As shown in **Table 3-2**, 192 of the 301 based aircraft in 2003 were fractional ownership aircraft of Flight Options. Flight Options acts as an unscheduled airline, with the aircraft routes planned based on the fractional owners’ flight needs. Flight Options operates out of 5,000 airports and has nine Centers for Excellence that provide maintenance support for the operations. When an aircraft completes a flight leg to one of the 5,000 airports, it remains at that airport until scheduled for its next flight. Cuyahoga County Airport is one of the Centers for Excellence, as well as the headquarters and scheduling center. As the headquarters, the address for all of the Flight Options aircraft is at Cuyahoga County Airport. However, it is estimated that only about 20 of the now 200+ Flight Options aircraft may be at Cuyahoga County Airport at a given time. The aircraft are generally at the airport for maintenance service, although some fractional owners use the airport to meet their flight needs.





Fractional ownership aircraft need to be considered differently for forecasting purposes, as their growth trends and facility requirements differ from a traditional based aircraft. The forecasts focus primarily on the growth potential for that proportion of the total fractional ownership aircraft that are likely to be at the airport at any given time for maintenance and fractional owner flights, because these aircraft will create demands on facilities at the airport.

For the owners of the traditional based aircraft, a number of factors go into deciding where to base an airplane. Location relative to the owner’s home or business is usually a strong consideration. Other factors include availability of hangar and/or tie-down space, rental rates for such space, and amenities available at the airport both in terms of airfield facilities and FBO services. Cuyahoga County Airport’s 5,100-foot runway, precision approach and control tower are well-suited to accommodate general aviation aircraft.

Within these traditional based aircraft are some managed corporate aircraft. Managed corporate aircraft are aircraft that are owned by a company and used for their flight needs; however, when not in use by the owner, the aircraft are leased or chartered by others through the management company, providing a source of revenue for the owner to help offset the costs of the aircraft.

The number of traditional based aircraft at Cuyahoga County Airport has been fairly stable, with some decline in recent years. Fluctuations are attributed to a number of transitions in commercial operators at the airport. Beckett, Mercury, Corporate Wings, and Eagles Wings are all FBOs that are currently, or have been, commercial operators at Cuyahoga County Airport. In 1992, Corporate Wings purchased Mercury and started operations at Cuyahoga County Airport. DeMille was a flight school operating under contract to Mercury. DeMille sold their operation and left the field when Corporate Wings purchased Mercury. Some of DeMille’s aircraft were sold to T&G Flying Club, which has operations at Cuyahoga County, Burke Lakefront and Lost Nation Airport. Beckett sold to Eagle Wings and these aircraft shifted operators. Corporate Wings then purchased Eagles Wings, again shifting the operator, but with most of the aircraft remaining at the airport.

In parts of the country with harsh winter conditions, the number of based aircraft at an airport tends to reflect the hangar capacity. At Cuyahoga County Airport there are 60 T-hangar units in four buildings. There are also 10 corporate/community hangar facilities with an additional hangar under construction.



**TABLE 3-2
CUYAHOGA COUNTY AIRPORT BASED AIRCRAFT**

	Corporate Hangars	County T-hangars Tie Downs	T&G Flying Club	T-hangar Tenants	Beckett	Eagle Wings	Mercury	DeMille	Corporate Wings	Traditional Total	Flight Options	Total
1990	16	17	9	27	29		21	10		129		129
1991	14	16	5	27	30		22	8		122		122
1992	10	19	6	30	28			8	35	136		136
1993	11	15	6	25	30				33	120		120
1994	12	17	6	39	37				38	149		149
1995	12	17	6	39	33				38	145		145
1996	13	18	5	39	36				30	141		141
1997	16	24	5	39	31				33	148		148
1998	16	23	7	45	34				36	161		161
1999	15	22	6	45	25				26	139		139
2000	16	21	6	43	21				12	119	55	174
2001	16	20	5	42		24			9	116	82	198
2002	15	21	5	41		24			7	113	92	205
2003	14	21	6	39					29	109	192	301

Source: Cuyahoga County Airport Based Aircraft Records, various years.



Table 3-3 shows the 2003 fleet mix of the Cuyahoga County Airport aircraft. The jet aircraft percentage is unusually high for a general aviation airport, and represents the high level of corporate activity at the airport. Flight Options accounts for 172 of the jet aircraft and 20 of the turboprop aircraft. The growing level of corporate activity at the airport could contribute to a decline in smaller based aircraft as some operators of smaller aircraft may be more sensitive to the level of corporate operations and operating costs than to proximity to home or business.

TABLE 3-3
CUYAHOGA COUNTY AIRPORT 2003 FLEET MIX

	All Aircraft	Traditional Based Aircraft	Percent of Traditional
Single Engine	63	63	58%
Multi-Engine	16	16	15%
Turboprop	25	5	5%
Jet	195	23	21%
Helicopter	2	2	2%
Total	301	109	100%

Source: Cuyahoga County Airport Based Aircraft Records 2003.

To address the differences between the fractional ownership aircraft and traditional based aircraft, each type of aircraft is forecast separately. The results are then combined for an overall airport forecast. Prior forecasts have also been reviewed with regard to their applicability to this forecasting process.

3.01-2 Prior Forecasts

CUYAHOGA COUNTY MASTER PLAN

The last master plan prepared for Cuyahoga County Airport was completed in 1977. Due to the age of this study and the overall changes in the general aviation environment, the forecasts from this study are no longer applicable.

CLEVELAND RELIEVER AIRPORT STUDY

Cuyahoga County Airport is one of five airports functioning as a reliever in the Cleveland area. Reliever airports provide alternatives for general aviation aircraft that might otherwise be based or operate at a busy commercial service airport. To be designated as a reliever airport by the Federal Aviation Administration (FAA), in addition to providing reliever functions, a general aviation (GA) airport must have at least 100 based aircraft. The FAA’s previous definition of a reliever airport in place at the time of the Cleveland Reliever Airport Study used a threshold of 50 based aircraft. Cleveland Hopkins International Airport is the primary airport. The other four airports providing reliever functions with their FAA designation are:



- Burke Lakefront (Reliever)
- Lorain County Regional (Reliever)
- Medina Municipal (GA)
- Willoughby Lost Nation (GA)

In a reliever system, occurrences at one airport can have an impact on general aviation activity at the other area airports. This is considered in the forecasting process.

A study of the Cleveland area reliever system was prepared for the Northeast Ohio Area wide Coordinating Agency in 1992, providing general aviation forecasts for the five relieving airports and Cleveland Hopkins International. Forecasts from existing data sources were used in most cases rather than creating totally new forecasts.

Forecasts were developed for the short term 1995 and intermediate term 2000. The forecasts identified future aircraft levels to be accommodated by the reliever system in an unconstrained demand scenario, and assumed that general conditions in the region and aviation industry would remain relatively consistent with current trends throughout the planning period. The Cleveland Reliever Study forecasts have not been used in this update of Cuyahoga County Airport forecasts because of the age of the reliever study (latest forecast was for 2000), its heavy reliance on other documents, and the change in operating conditions with the addition of significant levels of fractional ownership activity at Cuyahoga County Airport.

OHIO AVIATION SYSTEM PLAN

The Ohio Aviation System Plan, completed in December 1989, reviewed aviation activity in Ohio as a whole. The system plan divided the state into zones as part of its methodology for developing forecasts for the individual airports. Forecasts in the system plan were based on analysis of factors affecting aviation activity at the national and state level; those relationships were then applied by zone. Urban areas were divided into several zones corresponding to urban transportation planning zones. The system plan forecasts were completed for the entire state and then distributed to individual airports via the zones. Due to the age of this study and the change in operations at Cuyahoga County Airport, the forecasts from the Ohio Aviation System Plan have not been used in this forecast update.

FEDERAL AVIATION ADMINISTRATION FORECASTS

FAA Aerospace Forecasts

One resource commonly reviewed for aviation forecasting purposes is the FAA Aerospace Forecasts. The FAA uses the economic performance of the United States as an indicator of future aviation industry growth for these forecasts. The latest edition, released in March 2004, was used in preparation of this document and forecasts aviation activity for fiscal years 2004-2015.



After a decline that started in late 2001 and continued through 2003, general aviation activity is expected to continue to experience slow growth in 2004, before returning to more normal growth patterns beginning in 2005 as the U.S. economy reaches the peak of its recovery. This is due to a combination of a relatively weak economic recovery and lingering effects of the events of September 11th. The FAA Aerospace Forecasts anticipate an average annual increase of 1.2 percent over the 13 year forecast period in the active general aviation fleet. However, this growth incorporates a new aircraft category (light sport aircraft) that is expected to enter the active fleet in 2004, containing approximately 15,500 existing ultralights not currently included in the FAA's aircraft registry count. Excluding these aircraft and the new light sport aircraft that will enter the active fleet, the general aviation fleet growth averages only 0.5 percent over the 13 years.

There appear to be two segments of the market: the first segment, turbojet aircraft, has a higher growth rate forecast than the second segment, which includes piston, turboprop, rotorcraft, and experimental aircraft. The following summarizes the anticipated average annual growth in the fleets.

- Turbojets 4.9%
- Others
 - Single-engine piston 0.3%
 - Multi-engine piston –0.5%
 - Turboprop 1.3%
 - Rotorcraft 0.6%
 - Experimental 0.4%

General aviation hours flown, excluding light sport aircraft, are forecast to increase by 1.2 percent annually over the 13-year forecast period. The following summarizes the anticipated average annual growth in hours.

- Turbojets 1.1%
- Others
 - Single-engine piston 0.3% (excluding light sport aircraft)
 - Multi-engine piston flat
 - Turboprop -1%
 - Rotorcraft 1%
 - Experimental flat

As a part of their projections, the FAA prepared forecasts for the total general aviation fleet and total fleet less light sport aircraft through 2015. These forecasts can be used for individual airport forecasts based on market share of the national fleet. The national fleet, without light sport aircraft, is forecast to increase from 211,190 in 2003 to 225,500 in 2015.



FAA TERMINAL AREA FORECASTS

To address anticipated local levels of aviation activity, the FAA prepares and publishes Terminal Area Forecasts (TAF) for its use in budgeting and facility planning. The TAF provides information that is commonly used as a reference in the aviation industry for other planning purposes. Table 3-4 summarizes the operations and based aircraft records and forecasts for Cuyahoga County Airport from the TAF. In comparing the TAF data in Table 3-4 to the local tower records (Table 3-1), minor differences occur in the total numbers from years 1990 through 2000. This may be attributed to different sources, different fiscal years, or the time of year that a total count was conducted. In the most recent years of based aircraft numbers, the TAF does not reflect the increase in non-traditional based aircraft reported by Flight Options.

TABLE 3-4
2003 FAA TERMINAL AREA FORECASTS
FOR CUYAHOGA COUNTY AIRPORT

	TAF Operations	TAF Based Aircraft
1990	80,758	131
1991	84,042	136
1992	76,250	136
1993	71,289	136
1994	70,362	120
1995	71,554	142
1996	68,175	141
1997	69,735	141
1998	77,021	141
1999	74,973	185
2000	65,749	185
2001	65,331	186
2002	67,091	186
2003*	62,452	186
2004*	62,948	188
2005*	63,444	190
2010*	64,925	196
2015*	68,406	203
2020*	70,889	212

*Forecasts years

Source: FAA 2003 Terminal Area Forecast



3.02 Socioeconomic Indicators

Socioeconomic indicators are reviewed to determine whether state or national trends in aviation are applicable to the local airport service area. Cuyahoga County Airport is located in Richmond Heights, Highland Heights and Willoughby Hills, and serves the Cleveland metropolitan area, particularly the eastern portions. Cuyahoga County is part of the Cleveland-Elyria-Mentor Metropolitan Statistical Area (Cleveland MSA), which is part of the larger Cleveland-Akron-Elyria Consolidated Metropolitan Statistical Area (CMSA). It appears the Cleveland-Elyria-Mentor MSA, containing the counties of Cuyahoga, Geauga, Lake, Lorain, and Medina, best represents the area influencing operations at Cuyahoga County Airport. The CMSA containing Akron is larger than the area that is likely to influence operations at Cuyahoga County Airport. In addition, Cuyahoga County alone is considered in this forecasting process.

Data have been obtained from Woods & Poole Economics for this study process and have also been compared to data available from the State of Ohio. The Woods & Poole data are commonly used for forecasting since they are a consistent summary of historical and forecast data through 2030 for various socioeconomic indicators. State of Ohio data have been used primarily for reference purposes for comparisons to national trends.

Both the Woods & Poole and State of Ohio data show Cuyahoga County has a declining population trend since 1970 that is forecasted to continue. The MSA population has grown between 1990 and 2000. The Woods & Poole data shows the MSA declining in the early 2000s before returning to slow growth. The State of Ohio forecasts the MSA to decline slightly through 2010 before returning to slow growth. In general, both sources show a relatively flat population for the MSA. In comparison, both data sources show the population of the State of Ohio and United States as growing since 1980 and forecasted to continue.

While the population has been on a decline, both data sources show increasing per capita income. Cuyahoga County has the highest per capita income rate of the Cleveland MSA area. Overall, the per capita income in the Cleveland MSA counties exceeds the levels for the State of Ohio and United States.

While Cuyahoga County has the highest per capita income rate, it also has the highest unemployment rate per the Ohio Department of Job and Family Services, Bureau of Labor Market Information. This suggests that there is a great variation between the poorer and wealthier residents of the county. The unemployment rates for the counties in the Cleveland MSA vary above and below the rate for the State of Ohio and United States.

While there is some variation, overall, with the exception of population, the airport service area for Cuyahoga County is similar to the nation. Thus, national aviation growth rates should be applicable.



3.03 Based Aircraft Forecasts

To prepare forecasts for Cuyahoga County Airport, the future levels of traditional based aircraft will be considered separately from the nontraditional fractional ownership aircraft. Four types of forecasts are examined for Cuyahoga County Airport: trend, regression, market share, and national growth rates. For each type of forecast, the results need to be logical and statistically significant, where appropriate, to be considered as a viable forecast for the future activity at Cuyahoga County Airport. Given the different characteristics of the traditional and fractional ownership based aircraft, some types of forecasts may be appropriate for only one type of based aircraft. As a part of preparing the forecasts for based aircraft at Cuyahoga County Airport, consideration is also given to any changes that may occur in the Cleveland reliever system that could impact the levels of activity at the airport. Forecasts of the future levels of based aircraft are then translated into operations.

3.03-1 Trend Forecasts

TRADITIONAL BASED AIRCRAFT

Trends in historic traditional based aircraft levels are examined to see if they can be used to forecast future levels. Two time frames were examined: 1990 to 2003 from on-airport data, and 1980 to 2003 from a combination of airport and TAF data. The trend model for 1990 to 2003 is not statistically significant, thus there is no consistent trend for this time period. This is not surprising given the variations in number of traditional based aircraft since 1990. The trend model from 1980 to 2003 is statistically significant; however, the significance results primarily from the higher average levels in the 1980s as compared with the 1990s. Also, with the more recent time period lacking statistical significance, no clear trend in the number of based aircraft exists that can be used as the basis for forecasting.

FRACTIONAL OWNERSHIP AIRCRAFT

The same two time frames are also examined for all the aircraft. The time period from 1990 to 2003 is statistically significant for all the aircraft. This trend is driven by the recent rapid growth in fractional ownership aircraft. Given that this growth is over a very short time period, it also does not support the argument that a trend in the number of based aircraft exists that can be used as the basis for forecasting. The time period of 1980 to 2003 is not significant, lending further support to the argument that there is no trend in based aircraft that can be used as the basis for forecasting.

For airport planning purposes, the proportion of the fractional ownership fleet that is likely to be at the airport at any given time is the more important number for the airport to track and forecast. The introduction and growth of Flight Options activity is so new at Cuyahoga County Airport (and across the country) that historical data in



this area is not available for forecasting purposes. The airport may want to work with Flight Options to develop this set of historical data for future forecast processes.

3.03-2 Regression Analysis

TRADITIONAL BASED AIRCRAFT

Regression analysis was used to examine the relationship between population, employment and total income (per capita income multiplied by population) individually with based aircraft. It was examined for both time periods of 1990 to 2003 and 1980 to 2003 with both Cuyahoga County and Cleveland MSA data. None of the regression relationships are applicable to use as the basis for forecasting. One of two problems exists with the relationships between the independent or predictor variables and based aircraft. The first problem is that many of the relationships are not statistically significant, meaning one cannot conclude that there is a relationship between the independent variable and the number of based aircraft. Where there is a relationship, it is generally negative, with the exception of County population discussed below. Where the relationship is negative, it is illogical that the more growth that occurs in the independent variable such as employment or income, the more decline that occurs in the number of based aircraft.

With the County level data, the relationship between population and based aircraft is positive: As population declined, based aircraft declined. However, the relationship between population and based aircraft is much larger starting in 1980 where there is a larger decline in based aircraft than starting in 1990, even though the county population has steadily declined. Thus, it is difficult to believe that the observed changes in the number of based aircraft are actually related to population declines. Given the very different results for the models when using greater or fewer years of data, there appears to be no constant relationship between the independent variables and number of based aircraft. Thus, there are no viable regression relationships to use for forecasting future levels of traditional based aircraft at Cuyahoga County Airport.

FRACTIONAL OWNERSHIP AIRCRAFT

While the fractional ownership aircraft are attributed to Cuyahoga County Airport due to the location of Flight Options headquarters, the headquarters do not function as a hub. Because the fractional owners are located all over the country, the aircraft are located all over the country. In fact, when an aircraft completes a flight, it remains at the termination airport until needed to serve another fractional owner. Thus, there is no relationship between the population, employment, and income of Cuyahoga County or Cleveland MSA and the fractional ownership aircraft. Therefore, there are no local relationships for regression analysis for forecasting future levels of fractional ownership aircraft.



3.03-3 Market Share Forecasts

Table 3-5 shows the historic market share of the nation’s general aviation aircraft based at Cuyahoga County Airport. Since the number of general aviation aircraft in the country declined before returning to slow growth, the Cuyahoga County’s market share of traditional based aircraft is fairly steady, showing just a slight decline in more recent years.

**TABLE 3-5
CUYAHOGA COUNTY AIRPORT’S MARKET SHARE OF U.S. GENERAL AVIATION AIRCRAFT**

	National General Aviation Aircraft	All Based Aircraft Total	Traditional Based Aircraft Total	Market Share of All Based Aircraft	Market Share of Traditional Based Aircraft
1990	205,000	129	129	0.063%	0.063%
1991	198,000	122	122	0.062%	0.062%
1992	198,500	136	136	0.069%	0.069%
1993	177,119	120	120	0.068%	0.068%
1994	172,936	149	149	0.086%	0.086%
1995	188,089	145	145	0.077%	0.077%
1996	191,129	141	141	0.074%	0.074%
1997	192,414	148	148	0.077%	0.077%
1998	204,710	161	161	0.079%	0.079%
1999	219,464	139	139	0.063%	0.063%
2000	217,533	174	119	0.080%	0.055%
2001	211,244	198	116	0.094%	0.055%
2002	211,244	205	113	0.097%	0.053%
2003	211,190	301	109	0.143%	0.052%

Source: Cuyahoga County Airport based aircraft records, various years. FAA Aerospace Forecasts, 2004-2015.

With a return to production of light general aviation aircraft after the passage of the General Aviation Revitalization Act of 1994, slow growth is forecast for the national general aviation aircraft. The FAA Aerospace Forecasts identify anticipated levels of general aviation aircraft to 2015. This is extrapolated to 2025 by using the trend from the last five years of the forecast as a basis to extrapolate the forecasts to 2025.



TRADITIONAL BASED AIRCRAFT

Since 1990, the traditional based aircraft at Cuyahoga County Airport have accounted for 0.05% to 0.09% of the national general aviation fleet. Two methods are examined for estimating Cuyahoga County's future market share: trend analysis and historical level/average. With the variation in market share over the last 14 years, there is no clear trend. This is reflected in the fact that the market share trend analysis is not statistically significant.

Three scenarios of historical level/average market share are considered. The first scenario assumes that the 2003 market share remains constant into the future. This represents current conditions at the airport and is considered a viable alternative. The second scenario uses the average market share over the last five years. This scenario is considered viable as it averages out some of the fluctuation of the commercial operators. It also represents the time period since the start of Flight Options operations. It results in a slightly higher market share, which may be reasonable for the future, given the expansion of Corporate Wings operation. The third and final scenario considered as a part of this forecast process uses the average market share over the last 10 years. This scenario is rejected because there has been significant change in the type of operations at the airport over the last 10 years: Projecting those conditions into the future appears too optimistic given the overall declining level of traditional based aircraft. **Table 3-6** shows the forecast national general aviation aircraft and the resulting viable forecasts for Cuyahoga County Airport.



**TABLE 3-6
CUYAHOGA COUNTY AIRPORT’S MARKET SHARE FORECAST OF TRADITIONAL
BASED AIRCRAFT**

	U.S. General Aviation Aircraft (excluding light sport aircraft)	Current Market Share	Average of Last 5 years Market Share
2004	211,400	109	118
2005	212,050	109	118
2006	212,980	110	118
2007	214,280	111	119
2008	215,800	111	120
2009	217,310	112	121
2010	218,850	113	122
2011	220,370	114	123
2012	221,830	114	123
2013	223,140	115	124
2014	224,340	116	125
2015	225,500	116	125
2016	226,867	117	126
2017	228,144	118	127
2018	229,421	118	128
2019	230,698	119	128
2020	231,975	120	129
2021	233,252	120	130
2022	234,529	121	130
2023	235,806	122	131
2024	237,083	122	132
2025	238,360	123	133

Source: FAA Aerospace Forecasts 2004-2015 extrapolated to 2025, Aerofinity, Inc. 2004.

FRACTIONAL OWNERSHIP AIRCRAFT

An examination of the market share of all the aircraft at Cuyahoga County Airport (both traditional based aircraft and fractional ownership aircraft) reveals significant increases due to fractional ownership aircraft. Given the ongoing strong growth of fractional ownership, forecasting growth of the fractional ownership aircraft using historical market share, either the most recent or a five-year historical average, would



underestimate the future levels. However, using a trend in a case like this in which the number of fractional aircraft has doubled from 2002 to 2003, would likely overestimate the future levels, given that in the last year the Flight Options fleet has grown 25 percent.¹ Thus, given the significant variation and the anticipated continued growth, a market share forecast of the fractional ownership aircraft is not viable.

3.03-4 National Growth Rates

TRADITIONAL BASED AIRCRAFT

The traditional based aircraft at Cuyahoga County Airport includes all portions of the national fleet mix. While the population is declining in the county and holding relatively steady in the MSA, all of the other socioeconomic variables are increasing similar to national trends. Thus, it appears appropriate to apply national growth rates to the various types of traditional based aircraft in order to forecast future levels. The same national growth rates forecast in the FAA Aerospace Forecasts through 2015 have been used to extrapolate the forecast to 2025. **Table 3-7** shows the application of the growth rates per type of aircraft and the application of the growth rate for the overall fleet.

¹*Flight Paths, The sky's the limit for business operating out of county airport*, Mark Rollenhagen, Plain Dealer, May 7, 2004.



**TABLE 3-7
NATIONAL GROWTH RATE APPLIED TO CUYAHOGA COUNTY AIRPORT
TRADITIONAL BASED AIRCRAFT**

	Single Engine	Multi-Engine	Turboprop	Jet	Helicopter	Forecast Using Type of Aircraft Data	Forecast Using Overall Fleet Growth
Growth Rate	0.30%	-0.50%	1.30%	4.90%	0.60%		0.50%
2003 Total	63	16	25	195	2		301
2003 Traditional	63	16	5	23	2		109
2004	63	16	5	24	2	110	110
2005	63	16	5	25	2	112	110
2006	64	16	5	27	2	113	111
2007	64	16	5	28	2	115	111
2008	64	16	5	29	2	116	112
2009	64	16	5	31	2	118	112
2010	64	15	5	32	2	119	113
2011	65	15	6	34	2	121	113
2012	65	15	6	35	2	123	114
2013	65	15	6	37	2	125	115
2014	65	15	6	39	2	127	115
2015	65	15	6	41	2	129	116
2016	66	15	6	43	2	131	116
2017	66	15	6	45	2	134	117
2018	66	15	6	47	2	136	117
2019	66	15	6	49	2	139	118
2020	66	15	6	52	2	141	119
2021	66	15	6	54	2	144	119
2022	67	15	6	57	2	147	120
2023	67	14	6	60	2	150	120
2024	67	14	7	63	2	153	121
2025	67	14	7	66	2	156	122

Source: Cuyahoga County Airport 2003 based aircraft, FAA Aerospace Forecast growth rates, Aerofinity, Inc., 2004.



There is a significant difference between the two forecasts. The fleet growth is very similar to the existing market share forecast since they both rely on the growth of the national fleet. In fact, this forecast is mathematically equivalent to the market share forecast, assuming constant current market share, at least for 2015, the year to which the average growth rates are determined. Note that the forecast for 2015 is identical. The only reason that the other years may vary slightly are (1) before 2015, the growth rate forecast uses the average growth rate to 2015 and does not reflect the forecast year-to-year differences in the growth rate, and (2) after 2015, the market share forecast uses the five-year trend projection rather than the average growth rate to 2015.

The national share forecast using type of aircraft data appears questionable: A tripling of the traditional based jets is probably not reasonable since much of the growth in jets is occurring in fractional ownership jets. Unfortunately, the FAA Aerospace Forecasts do not differentiate the growth rate in turbojets by traditional versus fractional ownership. Thus, the national growth rate does not provide any additional viable forecasts for traditional based aircraft.

FRACTIONAL OWNERSHIP AIRCRAFT

In discussions with Flight Options, the company identified that as a publicly owned company they are unable to share their growth plan information. Given the lack of available company specific data, Flight Options concurred that the best course of action is likely to use related figures published by the FAA. In the FAA Aerospace Forecasts, according to data from Aviation Data Service, “fractional ownership aircraft increased 4.9 percent from 2002 to 2003. Despite this growth, it is believed that only a small percentage of this market has been developed. Also, corporate fleets and flight departments grew at annual rates of 5.6 percent and 4.6 percent respectively between 1993 and 2003.” The FAA Aerospace Forecasts projects the growth of turbojet aircraft to increase 4.9 percent annually from 2002 to 2015. Turbojet aircraft is a significant portion of the fractional ownership fleets.

Given that this is the most relevant information available, the fractional ownership aircraft attributed to Cuyahoga County Airport are forecast to increase 5 percent annually starting from the current level of 223 aircraft in 2004. **Table 3-8** shows the forecast fractional ownership aircraft attributed to Cuyahoga County Airport. While this appears to be significant growth, operations activity for these aircraft could well occur at Flight Options’ operations and maintenance centers spread across the county, rendering less significant the increase in the fractional ownership operations at Cuyahoga County Airport.



**TABLE 3-8
FORECAST FRACTIONAL OWNERSHIP AIRCRAFT
ATTRIBUTED TO CUYAHOGA COUNTY AIRPORT**

Fractional Ownership Aircraft	
2004	223
2005	234
2006	246
2007	258
2008	271
2009	285
2010	299
2011	314
2012	329
2013	346
2014	363
2015	381
2016	400
2017	420
2018	442
2019	464
2020	487
2021	511
2022	537
2023	564
2024	592
2025	621

Source: Aerofinity, Inc. 2004.

As mentioned previously, for airport planning purposes the more important figure to forecast is the number of fractional ownership aircraft anticipated to be present at Cuyahoga County Airport. It is the aircraft present, not the entire fleet, that drive facility requirements. The current ratio of Flight Options aircraft present at Cuyahoga County Airport on any given day to their fleet appears to be around 10% (approximately 20 out of about 220). If it is assumed the ratio remains constant, this implies that approximately 62 Flight Options aircraft could be at Cuyahoga County Airport on any given day by 2025.



In discussing this issue with Flight Options, the company stressed that the aircraft are located to serve the needs of fractional owners (origins and destinations), and directed to the Centers for Excellence for maintenance per the location of aircraft, type of work needed, and work load at each location. As identified in a recent newspaper article about the operations of Flight Options at Cuyahoga County Airport, “Much of the company’s growth has come outside of Northeast Ohio. It recently opened maintenance centers at airports in Teterboro, New Jersey; Fulton County, Georgia; and Dallas, Texas with Raytheon Airport. The busiest routes of Flight Options are between economic centers and vacation areas such as New York; Aspen and Vail, Colorado; Scottsdale, Arizona; and Palm Beach, Florida.”²

Lacking specific data, it is assumed that the number of Flight Options aircraft present at Cuyahoga County Airport at a given time will not decrease, since ownership needs and facilities are already present to accommodate those aircraft. The number may not, however, increase as a set percent of the overall fleet, since it may be more dependent on the overall capacity of the Flight Options system nationwide and the location of the ownership growth. If Flight Options continues its significant growth, it might make sense to expand the number of maintenance facilities around the country to reduce the costs of ferrying the planes to the existing maintenance facilities. If that were to happen, the ratio would decline and the numbers at the airport at any given time would not rise as rapidly. However, for worst-case facility requirements planning, it may be desirable to be able to accommodate up to 10 percent of the Flight Options fleet at Cuyahoga County Airport.

To provide a better estimate in future forecast updates, the proportion of fractional ownership aircraft using the Center for Excellence at the airport or other airport facilities may be forecast so long as a method for historical data tracking has been established. As discussed under the trend analysis, the airport may want to work with Flight Options to develop this set of historical data for future forecast processes.

²*Flight Paths, The sky’s the limit for business operating out of county airport*, Mark Rollenhagen, Plain Dealer, May 7, 2004.



3.03-5 Contingency Forecast

Cuyahoga County Airport is part of a reliever system for the Cleveland area. One unknown within this reliever system is the long-term future of Willoughby Lost Nation Airport. Lost Nation has not accepted any FAA grants since 1995 to allow the 20-year grant assurances to expire. Allowing the grant assurances to expire means that closing the airport could be an option. Although Lost Nation has not accepted grants, it has been growing. Lost Nation may continue to operate as an airport, potentially with a change in ownership structure, but its closure would have a significant impact on the Cleveland area airports. Since Cuyahoga County Airport is the airport in closest proximity to Lost Nation, it would be impacted by any significant change in operating conditions at Lost Nation.

This contingency forecast is prepared such that the planning process can identify a means to accommodate a potential migration of based aircraft from a closing Lost Nation to Cuyahoga County. This forecast of potential migration is an educated guess, in that there would be a number of factors involved in an aircraft owner's relocation decision that can only be estimated, and that may vary over time.

The FAA 5010 Form, Airport Master Record, shows 80 aircraft based at Lost Nation, with four of those being multiengine aircraft. Discussions with the airport in May 2004 identified that there are now approximately 97 aircraft based at the airport, of those three are jets and seven are turboprops, plus the four multiengine and three helicopters listed on the 5010 form. With general aviation experiencing only slow growth and the future of Lost Nation unsure, this analysis assumes that the number of based aircraft will remain constant until migration from the facility begins.

Lost Nation Airport has a 5,028-foot by 100-foot runway, with a non-precision approach. The first step in determining where aircraft may move if Lost Nation closes is identifying which of the surrounding airports can potentially accommodate the aircraft currently based at Lost Nation. **Table 3-9** shows the surrounding airports and their airfield facilities. It is recognized that all of these airports may need to add storage facilities in order to accommodate a significant influx of based aircraft. In addition to the public use airports listed in Table 3-9, there are a number of privately owned restricted use airports in the vicinity of Lost Nation Airport.

The FAA guidance recommends an airport facility be available within 30 minutes driving time of the aircraft owner's location. Without specific data showing the owners' locations, Lost Nation Airport has been used as the center for the 30 minutes driving time. Using this guidance Cuyahoga County, Burke Lakefront, Concord Airpark and Geauga County appear to be the most logical airports to which aircraft would migrate. However, if a Lost Nation based aircraft owner lives south or east of that airport, Portage County and Ashtabula County may still be potential options.



**TABLE 3-9
AIRPORTS SURROUNDING LOST NATION AIRPORT**

	Distance (miles)	Estimated Driving Time (minutes)	Runway	Best Instrument Approach	Based Aircraft
Cuyahoga County	8 miles	17 minutes	5,102' x 100'	Precision	109 traditional total 44 multi-engine
Concord Airpark	13 miles	20 minutes	2,181' x 38'	Visual	25 total 79 total
Burke Lakefront	21 miles	26 minutes	6,198' x 150'	Precision	17 multi-engine 47 total
Geauga County	30 miles	45 minutes	3,500' x 65'	Visual (circling approach only)	2 multi-engine 160 total
Portage County	43 miles	50 minutes	3,500' x 75'	Non-precision	10 multi-engine 40 total
Ashtabula County	44 miles	55 minutes	5,197' x 100'	Non-precision	6 multi-engine

Source: Map Quest (distance and driving time), FAA 5010 forms (based aircraft and runway data) and Jeppesen approach plates (instrument approach and runway data), June 2004.

Based on the estimation described in the following section, approximately 28 aircraft may relocate to Cuyahoga County if Lost Nation Airport closes, as summarized in **Table 3-10**. However, Cuyahoga County may be able to attract a higher number if hangar space is limited in the area and Cuyahoga County is aggressive in developing additional hangar space to accommodate the relocating aircraft.

If Lost Nation closes, it is assumed that a small percentage of the aircraft will leave the area. Generally, these aircraft belong to owners who are already contemplating selling their aircraft because of a change in their flying needs, and would rather sell than move. For this analysis, it is assumed that up to 5 percent of the aircraft will not relocate within the area. Also, since Lost Nation accommodates a large percentage of single engine aircraft, some of these aircraft may relocate to a private field rather than another public use airport. Again, this percentage is anticipated to be small, up to 5 percent, since Lost Nation has a 5,000-foot runway and non-precision approach; private/restricted use airports may not have a paved runway, and generally do not have an instrument approach. Based on these assumptions, 10 aircraft will not move to an area public use airport.

It is assumed that the multi-engine and larger aircraft based at Lost Nation will seek another facility with comparable or better airfield facilities (runway length and approach). Cuyahoga County Airport is the closest airport to offer comparable facilities. It is estimated that up to half of the larger aircraft at Lost Nation may migrate to Cuyahoga County, with the balance being shared between Burke Lakefront and Ashtabula County. This assumption results in 6 of the 12 large aircraft (excluding the two large aircraft operated by T&G Flying Club) moving to Cuyahoga County Airport.



T&G Flying Club has 14 of its 25 aircraft, including two multiengine aircraft, at Lost Nation.

**TABLE 3-10
MIGRATING AIRCRAFT FROM LOST NATION AIRPORT**

	Large Aircraft	T&G Flying Club	Other	Total
Cuyahoga County	6	7	15	28
Concord Airpark			10	10
Burke Lakefront	3	7	10	20
Geauga County	3		10	13
Portage County			8	8
Ashtabula County			8	8
Not moving to area public use airport			10	10

Source: www.lostnation.com/aircraft.htm, Aerofinity, Inc., 2004.

It is assumed that if Lost Nation closes, T&G will split its aircraft between its other two locations at Cuyahoga County and Burke Lakefront. For lack of other data, it is assumed the 14 aircraft will be evenly split between the other two locations, resulting in 7 T& G Flying Club aircraft moving to Cuyahoga County.

Of the 97 based aircraft, after accounting for the 12 larger aircraft (excluding the two T&G multiengine aircraft), 14 T&G Flying Club aircraft, and 10 aircraft that will move out of the area or to a private/restricted field, it is assumed that the remaining 61 single engine aircraft and helicopters will migrate to one of the area’s public use, general aviation airports.

With the exception of Concord Airpark that has a significantly shorter runway, the remaining airports are all fairly similar in their ability to meet the airfield facility needs of single engine aircraft. The balance of the single engine aircraft will likely select a replacement facility based on location, service, available storage facilities, and operating costs. Location will likely be the driving force if other factors are similar. Given that Cuyahoga County is the closest airport and it has space available to construct additional hangars, it is assumed that 25 percent or 15 of the 61 remaining engine aircraft will move to Cuyahoga County. It is also assumed that 50 percent of the remaining aircraft, 10 aircraft each, will be split between Burke Lakefront, Concord Airpark and Geauga County, the next closest airports to Lost Nation. It is assumed the remaining 25 percent, 8 aircraft each, will be split between Ashtabula County and Portage County, which are farther from Lost Nation.

Since Lost Nation Airport last accepted a grant in 1995, the 20-year grant assurances to continue to operate the facility as an airport expire in about 2015. If closing of the airport appears imminent, some owners will move their aircraft in advance of 2015 to ensure they can secure new facilities. It is assumed that this migration will begin about five years before the closing. For forecast purposes, it is assumed that 10 percent of the aircraft moving to Cuyahoga County will relocate in each of the five years leading up to an imminent closure of Lost Nation, starting in 2010. The balance



will move upon the actual closure in 2015. This results in 3 aircraft moving each year from 2010 through 2014 with the balance of 13 moving in 2015.

3.03-6 Summary of Based Aircraft Forecasts

Three forecasts have been developed for the traditional based aircraft: constant market share, five-year average market share, and contingency forecast if Lost Nation closes added to the five-year average market share. **Table 3-11** summarizes these forecasts along with the forecasts for fractional ownership aircraft.

**TABLE 3-11
SUMMARY OF BASED AIRCRAFT FORECASTS FOR CUYAHOGA COUNTY AIRPORT**

	Traditional Based Aircraft			Fractional Ownership Aircraft	
	Low (Current Market Share)	Baseline (Last 5 years Average Market Share)	Contingency (5-year Average plus Contingency Aircraft)	5% Annual Growth	Potential 10% at Cuyahoga County
2004	109	118	118	223	22
2005	109	118	118	234	23
2006	110	118	118	246	25
2007	111	119	119	258	26
2008	111	120	120	271	27
2009	112	121	121	285	29
2010	113	122	125	299	30
2011	114	123	132	314	31
2012	114	123	132	329	33
2013	115	124	136	346	35
2014	116	125	140	363	36
2015	116	125	153	381	38
2016	117	126	154	400	40
2017	118	127	155	420	42
2018	118	128	156	442	44
2019	119	128	156	464	46
2020	120	129	157	487	49
2021	120	130	158	511	51
2022	121	130	158	537	54
2023	122	131	159	564	56
2024	122	132	160	592	59
2025	123	133	161	621	62

Source: Aerofinity, Inc. 2004.

Baseline (Preferred) - The five-year market share forecast is in the middle and is identified as the baseline forecast. This baseline forecast assumes conditions similar to the last five years, with stability in the commercial operations serving the airport users. Through their acquisition of Eagle Wings, Corporate Wings now provides all the fixed base operator services, which should provide some stability. Also, Corporate Wings is in the process on building a new hangar and the County is examining



options to allow additional hangar development. Thus, the five-year average market share forecast is considered the most representative of potential future conditions and has been identified as the preferred forecast for facility planning.

Low - Current market share is the low forecast. It represents status quo conditions.

Contingency - The contingency forecast if Lost Nation closes added to the five-year average market share forecast, hereafter referred to as the contingency forecast, is the highest forecast. The contingency forecast will be realized only if Lost Nation closes.

The forecast envelope resulting from the low, baseline and contingency forecasts is used to recognize that there are a number of factors that can affect general aviation. The variation between the three forecasts attempts to account for those factors. Some of those factors, such as the economy, are outside the control of the airport; others, such as marketing, can be influenced by the airport. Increased marketing or education of potential users about airport services can influence certain activity levels, such as charter or flight training.

3.04 Fleet Mix Forecast

The next step in forecasting based aircraft is identifying the forecast fleet mix. The fleet mix for the traditional and fractional ownership aircraft are forecast separately. As shown previously in Table 3-2, the existing traditional based aircraft are comprised of:

- 58% single aircraft
- 15% multiengine
- 5% turboprop
- 21% jet
- 2 % helicopter

It is anticipated that the fleet mix will remain similar for the constant market share and last five-year market share forecasts. The fleet mix will change under the contingency forecast due to the migrating aircraft being primarily single engine.

The fractional ownership aircraft are 90 percent jets and only 10 percent turboprops. Growth in the fractional ownership aircraft is primarily jets, so it is assumed that the number of turboprops will remain constant. **Table 3-12** summarizes the forecast fleet mix.



**TABLE 3-12
FLEET MIX FORECAST FOR CUYAHOGA COUNTY AIRPORT**

	Single-Engine	Multi-Engine	Turboprop	Jet	Helicopter	Total
Existing						
Traditional	63	16	5	23	2	109
Fractional*	0	0	20	172	0	192
2010						
Low	65	17	5	24	2	113
Baseline	70	18	6	26	2	122
Contingency	73	18	6	26	2	125
Fractional*			20	279		299
2015						
Low	67	17	5	25	2	116
Baseline	72	18	6	27	2	125
Contingency	92	20	10	28	3	153
Fractional*			20	361		381
2020						
Low	69	18	6	25	2	120
Baseline	75	19	6	27	2	129
Contingency	95	21	10	28	3	157
Fractional*			20	467		487
2025						
Low	71	18	6	26	2	123
Baseline	77	20	6	28	2	133
Contingency	97	22	10	29	3	161
Fractional*			20	601		621

*Represents total fractional ownership aircraft in fleet; however, only up to 10% are anticipated to be present at Cuyahoga County at a given time.

Source: Aerofinity, Inc. 2004

3.05 Operations Forecast

The based aircraft forecast is used to forecast operations.

3.05-1 Operations per Based Aircraft

An operations per based aircraft (OPBA) figure is estimated to translate the based aircraft forecasts into operations forecasts. **Table 3-13** shows the historic operations per traditional based aircraft. In discussions with the ATCT personnel, it is estimated that the Flight Options aircraft conduct an average of 20-30 operations per week.

Given that this is a small portion of the total operations, they have just been included in the overall operations. A forecast of future operations is prepared by averaging the most recent five-year OPBA of 638 and the 2003 OPBA figure of 621, for an OPBA



of 630. This average represents a combination of historical trends over the last five years, as well as the most recent activity at the airport.

**TABLE 3-13
OPERATIONS PER BASED AIRCRAFT AT CUYAHOGA COUNTY AIRPORT**

	Total Operations	Total Based Aircraft	Traditional Based Aircraft	OPBA*
1990	90,302	129	129	700
1991	93,866	122	122	769
1992	80,955	136	136	595
1993	81,000	120	120	675
1994	81,325	149	149	546
1995	72,967	145	145	503
1996	77,805	141	141	552
1997	80,236	148	148	542
1998	84,369	161	161	524
1999	82,715	139	139	595
2000	70,807	174	119	595
2001	71,158	198	116	613
2002	75,110	205	113	665
2003	69,540	301	109	638
			most recent	638
			5-year avg	621

* OPBA for all operations

Source: Cuyahoga County Airport based aircraft and tower records, Aerofinity, Inc., 2004.

Multiplying the traditional based aircraft forecasts by the OPBA figure yields a future level of operations anticipated to range from 77,000 to 84,000, but is could exceed 100,000 if Lost Nation Airport closes, as shown in **Table 3-14**.

3.05-2 Local and Itinerant Operations

Operations at Cuyahoga County Airport can be divided into two types: local and itinerant. Local operations remain within the airport vicinity. Itinerant operations are flights between airports, usually at least 20 miles from the originating airport.

A review of the tower records indicates that approximately 30 percent of the operations are local and 70 percent are itinerant. Local flights are conducted primarily with single engine aircraft for training purposes. Itinerant operations are comprised of approximately 25 percent air taxi operations and 75 percent general aviation operations. The high level of itinerant operations reflects the high level of corporate activity at the airport. Because of the high level of corporate activity, some of the



training flights that originate from Cuyahoga County Airport may use other less busy airports for some of their training activity, reducing the level of local operations at Cuyahoga County.

**TABLE 3-14
FORECAST TOTAL OPERATIONS AT CUYAHOGA COUNTY AIRPORT**

	Low	Baseline	Contingency
2004	68,670	74,340	74,340
2005	68,670	74,340	74,340
2006	69,300	74,340	74,340
2007	69,930	74,970	74,970
2008	69,930	75,600	75,600
2009	70,560	76,230	76,230
2010	71,190	76,860	78,750
2011	71,820	77,490	83,160
2012	71,820	77,490	83,160
2013	72,450	78,120	85,680
2014	73,080	78,750	88,200
2015	73,080	78,750	96,390
2016	73,710	79,380	97,020
2017	74,340	80,010	97,650
2018	74,340	80,640	98,280
2019	74,970	80,640	98,280
2020	75,600	81,270	98,910
2021	75,600	81,900	99,540
2022	76,230	81,900	99,540
2023	76,860	82,530	100,170
2024	76,860	83,160	100,800
2025	77,505	83,510	101,150

Source: Aerofinity, Inc., 2004.

Examining the operations by type of aircraft from the months of March and April 2004 revealed that the majority of the operations are by single engine aircraft, with jets accounting for the next highest percent as shown below.

- 65% single engine
- 4% multiengine
- 5% turboprop
- 26% jet

The local and itinerant operations split is anticipated to remain similar through the forecasting period. It is anticipated that single engine aircraft will continue to comprise the largest percentage of the operations at Cuyahoga County, and jets the second largest percentage. There is the potential for some increase in the percentage of operations by jets if Flight Options fleet growth results in additional aircraft using their facilities at Cuyahoga County. There is also the potential for some increase in





single engine aircraft operations if Lost Nation closes and a significant portion of the Lost Nation aircraft migrate to Cuyahoga County. **Table 3-15** summarizes the operations forecast.

**TABLE 3-15
OPERATIONS FORECAST SUMMARY BY TYPE**

	Itinerant		Local GA	Total
	Air Taxi	GA		
Low				
2010	12,458	37,375	21,357	71,190
2015	12,789	38,367	21,924	73,080
2020	13,230	39,690	22,680	75,600
2025	13,563	40,690	23,252	77,505
Baseline				
2010	13,450	40,352	23,058	76,860
2015	13,781	41,344	23,625	78,750
2020	14,222	42,667	24,381	81,270
2025	14,614	43,843	25,053	83,510
Contingency				
2010	13,780	41,344	23,625	78,750
2015	16,868	50,605	28,917	96,390
2020	17,309	51,928	29,673	98,910
2025	17,700	53,104	30,345	101,150

Source: Aerofinity, Inc., 2004.

3.06 Comparison to Terminal Area Forecast

The forecast operations are comparable to the TAF forecast operations. Operations included in the TAF forecast represent only the operations in the tower records. The TAF forecast operations for 2020 are 70,889 as shown on Table 3-4. This is slightly below the forecasts for all operations; however, based on the information in this report, it is proposed the FAA include all operations instead of just the tower records in the next TAF update.

The based aircraft in the TAF and the aircraft anticipated at Cuyahoga County Airport differ significantly. The difference is in the fractional ownership aircraft. Because the fractional ownership aircraft serve many airports and do not return to a “home” airport between flights, they do not fit in the FAA’s typical based aircraft. However, eventually they will be included in the TAF as based aircraft since, for lack of a home base, the FAA appears to have used the mailing address of the aircraft to be sure they are accounted for in the national fleet. The growth in the TAF reflects the inclusion of the fractional ownership aircraft in the aircraft attributed to Cuyahoga County Airport in the past; however, the values in the TAF do not keep pace with the growth that has





occurred. The FAA should remain consistent in how the fractional ownership aircraft are attributed to an airport and update the TAF to reflect the recent growth of Flight Options.

3.07 Peak Operations

3.07-1 Purpose

Airports are similar to other facilities with fixed capacities, such as highways or parking facilities. An airport may be able to accommodate the overall annual operations demand, but may not be able to handle the peak hour traffic. The periods that will be used in developing facility requirements for this master plan include peak month, average day of the peak month (design day), busy day, and design hour operations. These terms are described as follows:

Peak Month - the calendar month when peak aircraft operations occur.

Design Day - the average day within the peak month. Dividing the peak month operations by the number of days in the month calculates this indicator.

Busy Day – the busy day in a typical week within the peak month. This indicator is used primarily for planning general aviation apron space.

Design Hour – the peak hour within the busy day. This indicator is used in airfield demand/capacity analysis and terminal building and access road requirements.

3.07-2 Findings

Monthly tower records from 1990 to 2003 were used for this analysis. Also daily traffic records for the months of March 2004 and April 2004, along with hourly traffic records from the week of Sunday, September 7, to Saturday September 13, 2003 were used to identify the peak times.

July was the most common peak month, with the peak month fluctuating between June and October. The peak month comprised an average of 12 percent of the annual operations.

The average day was calculated by dividing the peak month by 30. Reviewing the daily data for the months of March and April 2004, it is estimated that the busy day can be up to 15 percent over the average day.

The peak hour during the week of September 7-13, 2003 had two days exceeding 19 percent and the balance ranging from 9 to 12 percent. Both days exceeding 19 percent had significant local general aviation activity, likely touch-and-goes. Thus, it appears the 9 to 12 percent level is more representative, with the average of those five days



being approximately 11 percent. **Table 3-16** summarizes the forecast peak general aviation levels.

FAA Advisory Circular 150/5070-6A, Airport Master Plans provides typical peaking characteristics against which the forecast should be compared. The typical peaking characteristics are:

- The ratio of peak hour operations to average daily operations (for the busiest month) may range from 7% to 11%.
- The ratio of average daily operations to annual operations may range from 0.29% to 0.34%.

These ratios are directly related to the size and demand level of the airport, with lower percentages common to the busiest commercial service airports and higher percentages common to the lower activity airports. These ratios should not go below 6.25% (16 hour day) and 0.27% respectively, which represents a steady, no peak demand pattern. Comparing the forecast general aviation activity at Cuyahoga County Airport to the planning ratio, the representative peak hour operations averaged 11 percent.



**TABLE 3-16
FORECAST PEAK GENERAL AVIATION OPERATIONS LEVELS
CUYAHOGA COUNTY AIRPORT**

	Low	Baseline	Contingency
2010			
Annual Operations	71,190	76,860	76,860
Peak Month	8,543	9,223	9,223
Average Day	285	307	307
Busy Day	342	369	369
Peak Hour	31	34	34
2015			
Annual Operations	73,080	78,750	78,750
Peak Month	8,770	9,450	9,450
Average Day	292	315	315
Busy Day	351	378	378
Peak Hour	32	35	35
2020			
Annual Operations	74,600	81,270	83,160
Peak Month	8,952	9,752	9,979
Average Day	298	325	333
Busy Day	358	390	399
Peak Hour	33	36	37
2025			
Annual Operations	77,505	83,510	91,700
Peak Month	9,301	10,021	11,004
Average Day	310	334	367
Busy Day	372	401	440
Peak Hour	34	37	40

Source: Aerofinity, Inc., 2004.



The ratio of average daily to annual operations is 0.39%. This measure is slightly above the range in the FAA Advisory Circular, representing the fact that there are distinct periods of low and high aviation activity at the airport. This is not surprising given the peak month is more than double the least active month and in some years almost triple, a common occurrence at general aviation airports.

3.08 Instrument Activity Forecast

3.08-1 Purpose

Instrument approaches are a series of predetermined maneuvers for the orderly transfer of an aircraft under instrument flight conditions from the beginning of the initial approach to a landing, or to a point from which a landing may be made visually. The availability of several instrument approach procedures, including the precision Instrument Landing System (ILS) with approach minimums of ½-mile visibility and 200-foot ceiling, greatly enhance the utility of Cuyahoga County Airport. Forecasts of instrument approaches are used to document the need for and maintenance of the procedures at the airport.

3.08-2 Findings

The records compiled by the tower include instrument operations; however, only two months of actual tower data was provided during this study process. The tower provides copies of their records to the airport, which compiles them into annual operations records. These airport records do not include instrument operations. Since the tower records and FAA TAF records were comparable for operations, the FAA TAF records are used for this instrument activity forecast, as shown in **Table 3-17**.



**TABLE 3-17
TAF HISTORIC AND FORECAST INSTRUMENT
ACTIVITY LEVELS AT CUYAHOGA COUNTY AIRPORT**

	Operations	Approaches
1993	17,912	1,546
1994	17,163	1,277
1995	18,647	NA
1996	19,154	1,246
1997	19,576	2,229
1998	21,660	1,927
1999	20,133	1,057
2000	22,617	1,297
2001	22,225	1,489
2002	24,038	1,489
2003*	21,751	1,489
2004*	21,937	1,489
2005*	22,121	1,489
2010*	23,047	1,489
2015*	23,973	1,489
2020*	24,900	1,489

* forecast

Source: FAA Terminal Area Forecast, 2003.

Instrument operations are a record of the aircraft operating on an Instrument Flight Rules (IFR) flight plan filed with the FAA. Aircraft fly on an IFR flight plan in visual (good weather) or instrument (poor weather conditions). Instrument approaches are a record of the number of aircraft that conducted an instrument approach to land at the airport. In good weather conditions, an aircraft may fly on an IFR flight plan, but land visually at the airport. Instrument approaches also include practice instrument approach conducted as a part of training. Thus, the number of instrument operations greatly exceeds the number of instrument approaches.

From January to April 2004, 5,707 instrument operations had been conducted at Cuyahoga County Airport. Extrapolating this rate to a year, the historic data in the FAA Terminal Area Forecast (TAF) appears reasonable. The level of instrument approaches in the FAA Terminal Area Forecast is flat.



The FAA Aerospace Forecasts 2004-2015 forecast general aviation instrument operations to increase an average of 1.4 percent annually for the forecast period. To extrapolate the FAA Aerospace Forecast data to 2025, it is assumed this growth rate will continue through 2025. The instrument operations in the TAF have an average annual growth rate of 1.008 percent. The TAF forecast extrapolated to 2025 is used as a low growth forecast. The high growth forecast applies the FAA Aerospace Forecast instrument operations growth rate to the 2004 levels from the TAF. Since there is no forecast growth rate specific to instrument approaches, it is assumed that the instrument operations and approaches will increase at the same rate. A baseline instrument activity forecast is estimated as the average of the low and high instrument forecasts. **Table 3-18** summarizes the instrument operations forecast.

**TABLE 3-18
INSTRUMENT ACTIVITY FORECAST AT CUYAHOGA COUNTY AIRPORT**

	Operations			Approaches		
	Low	Baseline	High	Low	Baseline	High
2004	21,937	21,937	21,937	1,489	1,489	1,489
2010	23,047	23,446	23,845	1,489	1,554	1,619
2015	23,973	24,767	25,562	1,489	1,612	1,735
2020	24,900	26,151	27,402	1,489	1,674	1,860
2025	25,912	27,643	29,375	1,489	1,741	1,994

Source: Aerofinity, Inc., 2004.

3.09 Summary

Aviation forecasts are developed to provide a reasonable prediction of future unconstrained activity levels ranging from the status quo to the optimistic. The predictions allow the airport to assess its ability to meet future demands and allow time to plan future improvements. **Table 3-19** provides a summary of the low, baseline and high contingency forecasts developed for the next 20 years at Cuyahoga County Airport. The forecasts provide indicators of the approximate timing for developing additional airport facilities due to demand. A development made either too early or too late may lead to premature capital expenditures or lost revenues, so it is important to examine the actual demand at the time a new or expanded facility is being considered.





**TABLE 3-19
FORECAST SUMMARY FOR CUYAHOGA COUNTY AIRPORT**

	2010			2015			2020			2025		
	Low	Base	High	Low	Base	High	Low	Base	High	Low	Base	High
Based General Aviation Aircraft												
Traditional												
Single Engine	65	70	73	67	72	92	69	75	95	71	77	97
Multi Engine	17	18	18	17	18	20	18	19	21	18	20	22
Turboprop	5	6	6	5	6	10	6	6	10	6	6	10
Jet	24	26	26	25	27	28	25	27	28	26	28	29
Helicopter	2	2	2	2	2	3	2	2	3	2	2	3
Traditional Total	113	122	125	116	125	153	120	129	157	123	133	161
Fractional												
Turboprop		20			20			20			20	
Jet		279			361			467			601	
Fractional Total*		299			381			487			621	
Annual Aircraft Operations												
Air Taxi (Itinerant)	12,458	13,450	13,780	12,789	13,781	16,868	13,230	14,222	17,309	13,563	14,614	17,700
General Aviation (Itinerant)	37,375	40,352	41,344	38,367	41,344	50,605	39,690	42,667	51,928	40,690	43,843	53,104
General Aviation (Local)	21,357	23,058	23,625	21,924	23,625	28,917	22,680	24,381	29,673	23,252	25,053	30,345
Total Airport Operations	71,190	76,860	78,750	73,080	78,750	96,390	75,600	81,270	98,910	77,505	83,510	101,150
General Aviation Peaking Characteristics												
Peak Month	8,543	9,223	9,450	8,770	9,450	11,567	8,952	9,752	11,869	9,301	10,021	12,138
Average Day	285	307	315	292	315	386	298	325	396	310	334	405
Busy Day	342	369	378	351	378	463	358	390	475	372	401	486
Peak Hour	31	34	35	32	35	42	33	36	44	34	37	45
Instrument Activity												
Operations	23,047	23,446	23,845	23,973	24,767	25,562	24,900	26,151	27,402	25,912	27,643	29,375
Approaches	1,489	1,554	1,619	1,489	1,612	1,735	1,489	1,674	1,860	1,489	1,741	1,994

*Represents total fractional ownership aircraft in fleet; however, only up to 10% anticipated to be present at Cuyahoga County at a given time.

Source: Aerofinity, Inc., 2004