

APPENDIX A AVIATION DEMAND PROJECTIONS

Projecting aviation demand is a critical element in the planning process. This process examines and projects an airport's ability to accommodate aircraft and operations, providing a basis for determining the type, size, and timing of future airside and landside facility development. Projections of aviation demand were prepared for based aircraft, the based aircraft fleet mix, aircraft operations, and operational fleet mix for The Ohio State University Airport. This report describes the analysis and methodology used in the preparation of these projections.

This projection analysis includes methodologies that consider forecasted national aviation trends, projected employment for Franklin County, Ohio, as well as year to date activity in 2004 for the Airport. FAA Aerospace Forecasts, Fiscal Years 2004-2015, a publication of the U.S. Department of Transportation, Federal Aviation Administration, provides forecasts of national aviation trends. The Woods & Poole Complete Economic and Demographic Data Source (CEDDS) provided employment projections for Franklin County. Based aircraft and year to date traffic activity at the Airport was available from records maintained by Airport Management and the Airport's FAA Contract Tower.

The following sections discuss the methodology used to project based aircraft and operations for The Ohio State University Airport. The conclusion of this document presents current forecasts of based aircraft and operations that will assist Airport Management complete the ongoing Environmental Assessment, along with other efforts undertaken to ensure that the Airport has adequate facilities to accommodate demand. The projections of aviation demand are documented in the following sections:

- Existing Conditions
- Based Aircraft Projection
- Aircraft Operations Projections
- Summary

EXISTING CONDITIONS

Since the completion of the Master Plan Update for the Airport in early 2002, there has been a change in the reporting of based aircraft on the Airport. For example, the based aircraft being reported has increased by approximately 12 percent to 230 aircraft. This figure reflects the single- and multi-engine aircraft and helicopters owned by the State of Ohio and Medflight.

Since the completion of the Master Plan Update, there has been some significant fluctuation in operational levels. For example, total operations decreased significantly from 128,886 in 1999 to 107,000 in 2000. The number of operations at the Airport continued downward in 2001, when only 98,970 operations were recorded while in 2002 activity rebounded sharply, reaching nearly 118,000 by the end of the year. Operational activity declined again in 2003, when 101,832 operations were recorded. Year to date traffic counts at the Airport do not indicate a significant departure from 2003 activity levels.

A close examination of 2003 operational statistics for the Airport reveals the following fleet mix:

Piston (single & multi-engine)	89,209 ¹
Turbo Prop	4,260
<u>Jet</u>	<u>8,363</u>
Total	101,831

¹includes helicopters

In order to determine the maximum runway length requirements for aircraft currently operating at the airport, information from NetJets (See Attachment A), was combined with airport operations data. NetJets uses standard take-off criteria to determine runway length requirements for their fleet of aircraft during dry runway conditions. These lengths are modified when the pavement is contaminated during wet and slippery conditions. OSU Airport staff also prepared similar “contaminated runway length requirements” for aircraft currently in the operating fleet. A comparison of the jet operations at the airport in 2003 to industry requirements for contaminated runway length for various aircraft types is presented in **Table 1**.

**TABLE 1
 OPERATIONS BY AIRCRAFT TYPE FOR VARIOUS REQUESTED
 RUNWAY LENGTHS UNDER CONTAMINATED CONDITIONS**

5,000'		5,500'		6,000'	
Aircraft	Operations	Aircraft	Operations	Aircraft	Operations
Beech 1900	12	BeechJet	1,076	Astra	33
		Falcon 10	141	Citation VII	350
		G-II	30	Citation X	156
		MU30	17	Challenger	250
				Falcon 50	357
				Falcon 900	46
				Falcon 2000	235
				Galaxy	10
				G-III	57
				G-IV	82
				G-V	8
				Hawker 800	749
				Hawker 1000	28
				Lear 35	218
				Lear 36	3
				Lear 45	111
				Lear 55	50
				Lear 60	152
				Saberliner	6
				Westwind	35
Total:	12	Total:	1,264	Total:	2,936

Source: NetJets and Airport Data

This table highlights the number of operations by aircraft that potentially could benefit from a runway of 5,000 feet or greater in 2003. This information represents actual operations at the OSU Airport.

Although jet traffic currently comprises only eight percent of operations at the Airport, there is no indication that this level of activity will decrease during the planning period. In fact, letters of support from the industry confirm that the above-mentioned level of operation will continue into the future.

BASED AIRCRAFT PROJECTION

As mentioned, based aircraft at The Ohio State University Airport has increased since the completion of the Master Plan Update. The Airport now reports 230 based aircraft, an increase of 24 aircraft since 2000. To provide a more current projection of based aircraft to guide the decision-making process at the Airport, it is helpful to analyze socioeconomic forecasts, which can provide added insight into activity levels at the Airport by the end of the planning period.

Socioeconomic Trends

A practical means for projecting based aircraft is to develop forecasts that reflect a direct correlation between based aircraft and a primary socioeconomic variable such as employment. This method is a reliable means for projecting general aviation demand for near, mid, and long term planning periods. **Table 2** presents projections of total employment in Franklin County.

**TABLE 2
 EMPLOYMENT PROJECTIONS**

Year	Total	
	Employment	CAGR
1990	692,722	-
2000	862,839	2.2%
Projected		
2005	906,384	1.0%
2010	969,760	1.4%
2015	1,037,327	1.4%
2020	1,109,530	1.4%
2025	1,186,969	1.4%
2030	1,270,166	1.4%
Compound Annual Growth Rate (2000-2030) – CAGR		1.3%

Source: Woods & Poole, Complete Economic and Demographic Data Source (CEDDS)

As shown, employment in Franklin County is projected to increase at an annual rate of 1.3 percent through 2030.

National General Aviation Trends

To provide insight into understanding the factors that affect aviation-related activities at The Ohio State University Airport, a brief discussion of general aviation trends is helpful. Several key indicators measured annually by the FAA provide valuable information for understanding the national trends that may be affecting any particular airport throughout the national system of general aviation airports. Active aircraft are those registered aircraft that have flown at least one hour during a calendar year. Changes in the number of active aircraft in the national fleet are generally anticipated to be reflected in similar changes to based aircraft in local fleets throughout the country. Recent trends and growth forecasts for active aircraft are shown in **Table 3**.

**TABLE 3
 ACTIVE AIRCRAFT PROJECTIONS**

Year	Active Aircraft	CAGR
1998	204,711	-
1999	219,464	7.2%
2000	217,533	-0.9%
2001	211,447	-2.8%
2002	211,244	-0.1%
2003	211,190	0.0%
Projected		
2004	219,100	3.7%
2005	227,585	3.9%
2006	228,865	0.6%
2007	230,635	0.8%
2008	232,725	0.9%
2009	234,715	0.9%
2010	236,915	0.9%
2011	239,005	0.9%
2012	241,035	0.8%
2013	242,915	0.8%
2014	244,685	0.7%
2015	246,415	0.7%
Compound Annual Growth Rate (2003-2015) - CAGR		1.3%

Source: FAA Aerospace Forecasts, Fiscal Years 2004-2015, U.S. Department of Transportation, Federal Aviation Administration

As shown in Table 3, the total active general aviation aircraft fleet is forecasted to experience an average annual growth rate of 1.3 percent between 2003 and 2015 in spite of moderate decline between 2000 and 2003. It should be noted that one of the most significant trends identified by the FAA is the relatively strong growth anticipated in active general aviation jet aircraft. This trend illustrates a movement in the general aviation community towards higher-performing, more

demanding aircraft. Growth in general aviation jet aircraft is expected to outpace growth in all other segments of the general aviation aircraft fleet.

Summary

As described, projections of employment growth in Franklin County and active general aviation aircraft in the national fleet are projected to increase at the same annual growth rate through the planning period. In addition to this growth, the Airport has not undertaken the development of additional hangars for some time, and Airport records indicate that there is currently a high level of unmet demand for aircraft storage in the area. To accommodate this demand, the Airport has recently considered additional community and T-hangar space on the south side of the airfield. Should the proposal for additional hangars be approved through the Environmental Assessment process, Airport Management expects the hangar development project would be complete by 2008.

To consider this latent demand in the forecast, it was assumed that an additional 50 T-hangars would be constructed and fully occupied by based aircraft by 2008. From this point, based aircraft was projected for five-year increments through 2023 using a compound annual growth rate of 1.3 percent, the annual growth rate projected for employment in Franklin County and active general aviation aircraft in the national fleet. Using this methodology, an unconstrained forecast of based aircraft was formulated.

The based aircraft forecast is depicted below:

Year	Based Aircraft
2003	230
Projected	
2008	280
"Full Build"	340

Based Aircraft Fleet Mix Projections

The future based aircraft fleet mix for The Ohio State University Airport was projected using the current based aircraft fleet mix tempered with national trends. Approximately 72 percent (166 aircraft) of the total aircraft fleet estimated to be based at the Airport in 2003 is single-engine aircraft. Approximately 16 percent (36 aircraft) of this based fleet is comprised of multi-engine and turboprop aircraft. Jet aircraft accounts for eight percent (19 aircraft) of the based fleet and there are nine helicopters.

The future based aircraft fleet mix for the Airport is presented in **Table 4**. The percentage of based aircraft by type is projected to change slightly over the planning period, with expected increases and decreases fluctuating based upon national trends within these segments. For example, while the number of active single-engine aircraft will increase, their overall percentage of the fleet will decrease slightly. The FAA also asserts that the percentage of multi-engine and turboprop aircraft in the fleet will increase slightly. The FAA expects a slight decrease in single-

engine aircraft to be complemented by a slight increase in the jet fleet percentage. As stated previously, this growth trend illustrates a movement in the general aviation community toward higher performing, more demanding aircraft, which will impact the types of activities occurring at general aviation airports and the types of facilities that may be required.

Table 4 presents the existing and future based aircraft fleet mix for The Ohio State University Airport.

**TABLE 4
 BASED AIRCRAFT FLEET MIX PROJECTIONS**

Year	Single-Engine		Multi-Engine		Jet		Helicopter		Total
	No.	%	No.	%	No.	%	No.	%	
2003	166	72%	36	16%	19	8%	9	4%	230
2008	202	72%	45	16%	25	9%	8	3%	280
2013	214	72%	48	16%	31	10%	8	3%	300
2018	226	71%	51	16%	35	11%	8	2%	320
2023	237	70%	54	16%	41	12%	8	2%	340

As shown, it is projected that 237 single-engine aircraft will be based at the Airport by the end of the planning period. The number of multi-engine and turboprop based aircraft is projected to increase to 54 aircraft by 2023. It is projected that jet aircraft will increase to 41 while the number of based helicopters is forecasted to remain stable during this same timeframe.

AIRCRAFT OPERATIONS PROJECTIONS

In order to project future operations at The Ohio State University Airport, it is helpful to consider the existing conditions at the Airport and any significant changes since the completion of the Master Plan Update. Historical operations are presented in **Table 5**.

**TABLE 5
 HISTORICAL OPERATIONS**

Year	Annual	
	Operations	CAGR
1997	113,662	-
1998	128,474	13%
1999	128,886	0%
2000	107,028	-17%
2001	98,970	-8%
2002	117,992	19%
2003	101,832	-14%

Compound Annual Growth Rate
 (1997-2003) - CAGR -2.0%

Source: The Ohio State University Airport

As indicated in Table 5, the Airport most recently reported 101,832 operations by the end of calendar year 2003. This is down 14 percent from 107,028 operations in 2000. In 2002, the Airport reached nearly 117,992 operations; this level of operational activity was more common in the latter 1990s than in recent years. While this recent decline in operations is significant, it is not unique to the Airport. Local and regional general aviation airports throughout the country have experienced similar fluctuations in activity in recent years, which is most likely a reflection of sagging national economic conditions. Additionally, most key economic indicators point toward a steady recovery in the near term, and businesses are already enjoying moderate gains over previous years.

The remainder of this report presents five scenarios under which annual operations at the Airport were examined and projected. These scenarios are discussed in the following sections:

- Scenario One – “No Build”
- Scenario Two – South Side Hangar Development
- Scenario Three – Runway Extension
- Scenario Four – Runway Extension/South Side Hangar Development
- Scenario Five – “Full Build”

Scenario One – “No Build”

The “No Build” scenario projects the number of operations at the Airport through 2008, under the assumption that no capacity or operational improvement projects will be undertaken at the Airport in the near term. Under these conditions, changes in operational characteristics are still possible, however, this scenario assumes these changes are not caused by facility improvement projects on the Airport. Rather, increases or decreases in operational activities would be directly related to external factors such as the local, regional or national economy, in addition to national general aviation-related trends.

To develop a projection of operations in 2008 under the “No Build” scenario, operational changes are based on FAA projections of general aviation activity at towered airports and year to date activity provided by the Airport. This FAA forecast provides a broad indication of growth anticipated in general aviation activity throughout the country.

FAA projections for operations at towered airports are presented in **Table 6**.

**TABLE 6
 OPERATIONS AT TOWERED AIRPORTS
 PROJECTIONS**

Year	Operations at Towered Airports	
	Airports (000s)	CAGR
1998	38,046.5	-
1999	39,999.6	5.1%
2000	39,878.5	-0.3%
2001	37,627.0	-5.6%
2002	37,602.8	-0.1%
2003	35,493.6	-5.6%
Projected		
2004	36,630.2	3.2%
2005	38,174.9	4.2%
2006	38,677.4	1.3%
2007	39,160.4	1.2%
2008	39,672.8	1.3%
2009	40,180.8	1.3%
2010	40,714.9	1.3%
2011	41,255.7	1.3%
2012	41,803.8	1.3%
2013	42,334.2	1.3%
2014	42,845.8	1.2%
2015	43,423.3	1.3%

Compound Annual Growth Rate
 (2003-2008) - CAGR 2.3%

Source: FAA Aerospace Forecasts, Fiscal Years 2004-2015, U.S. Department of Transportation, Federal Aviation Administration

As shown, operations at towered airports have decreased in recent years as a result of the impact of the events of September 11, 2001. However, the FAA Aerospace Forecasts indicate a marked increase in the near term, with compound annual growth rates remaining just above one percent through the end of the planning period.

For the purpose of this scenario, the compound annual growth rate projected through 2008 is most pertinent. Applying the compound annual growth rate as listed in Table 6 to the number of operations recorded at the Airport in 2003 (101,832) yields a forecast of approximately 113,718 operations in 2008.

Table 7 shows the projected operational fleet mix under Scenario One.

TABLE 7
Scenario One - Operational Fleet Mix

Year	Single-Engine		Multi-Engine Turboprop		Jet		Total
	No.	%	No.	%	No.	%	
2003	82,267	81%	11,202	11%	8,363	8%	101,832
2008	92,112	81%	12,509	11%	9,097	8%	113,718

Scenario Two - South Side Hangar Development

This scenario projects the number of operations at the Airport through 2008, under the assumption that additional aircraft will be based at the Airport once the construction of hangars on the south side of the airfield has been completed. This scenario utilizes a ratio of operations per based aircraft (OPBA) to project the effect that additional based aircraft will have on the number of operations conducted at the Airport in 2008. As stated previously, additional based aircraft are expected at the Airport should the hangar development project on the south side of the airport be approved and then completed. While the exact number of hangars to be constructed is undetermined at this time, this scenario assumes that approximately 50 additional based aircraft would be based at the Airport as a result of this development.

Applying the existing ratio of operations per based aircraft (440) to the additional 50 based aircraft at the Airport under this scenario yields a forecast of approximately 135,718 operations in 2008. **Table 8** shows the projected operational fleet mix under Scenario Two.

TABLE 8
Scenario Two - Operational Fleet Mix

Year	Single-Engine		Multi-Engine Turboprop		Jet		Total
	No.	%	No.	%	No.	%	
2003	82,267	81%	11,202	11%	8,363	8%	101,832
2008	109,932	81%	14,929	11%	10,857	8%	135,718

Scenario Three - Runway Extension

This scenario projects the number of operations at the Airport through 2008, under the assumption that Runway 9L/27R would be extended to a length of 6,000 feet. The extension of Runway 9L/27R was proposed as part of the preferred alternative in the Master Plan Update, and is expected to accommodate a moderate increase in the number of jet operations. A major area operator of fractional owner aircraft, NetJets Incorporated, has indicated that the extension would

likely allow them to increase their activity up to 15 percent annually, for those aircraft most needing such a facility.

According to Airport data, approximately 3,000 operations occurred by jet aircraft types in 2003 that could benefit from a runway of 6,000 feet; therefore, it is anticipated that the extension of Runway 9L/27R will add approximately 450 jet operations per year (15 percent of 3,000). For this scenario, this additional jet traffic is added to the underlying growth projected in Scenario One, yielding a forecast of approximately 114,168 operations in 2008.

Table 9 shows the projected operational fleet mix under Scenario Three.

TABLE 9
Scenario Three - Operational Fleet Mix

Year	Single-Engine		Multi-Engine		Jet		Total
	No.	%	Turboprop No.	%	No.	%	
2003	82,267	81%	11,202	11%	8,363	8%	101,832
2008	92,112	81%	12,509	11%	9,547	8%	114,168

Scenario Four - Runway Extension/South Side Hangar Development

This scenario projects the number of operations at the Airport through 2008, under the assumption that Runway 9L/27R would be extended to a length of 6,000 feet. Additionally, this scenario assumes that an additional 50 aircraft will be based at the Airport should the construction of additional T-hangars on the south side of the airfield be completed.

For this scenario, the additional jet traffic stemming from an extended runway is added to the underlying growth caused by additional south side aircraft projected in Scenario Two, yielding a forecast of approximately 136,168 operations in 2008. **Table 10** shows the projected operational fleet mix under Scenario Four.

TABLE 10
Scenario Four - Operational Fleet Mix

Year	Single-Engine		Multi-Engine		Jet		Total
	No.	%	Turboprop No.	%	No.	%	
2003	82,267	81%	11,202	11%	8,363	8%	101,832
2008	109,932	81%	14,929	11%	11,307	8%	136,168

Scenario Five – “Full Build”

This scenario projects the number of operations at the Airport through 2008 and beyond, under the assumption that aviation activity will continue to grow and the Airport will continue to expand to accommodate this demand in an unconstrained environment.

The expansion in this scenario includes the extension of Runway 9L/27R, the development of additional hangars on the south side of the airfield, and the construction of additional corporate hangars on the north side of the airfield.

Applying the CAGR and other growth factors associated with the various projects yields a forecast of 136,168 operations in 2008 and 162,997 operations in the long term, when the Airport is operating at in a “Full Build” state. It is important to note that this scenario assumes Airport operating conditions will remain similar to what was experienced in 2003. A significant increase in flight training or other University-related activity could increase operations above the “Full Build” scenario.

Table 11 shows the projected operational fleet mix under Scenario Five.

TABLE 11
Scenario Five - Operational Fleet Mix

Year	Single-Engine		Multi-Engine Turboprop		Jet		Total
	No.	%	No.	%	No.	%	
2003	82,267	81%	11,202	11%	8,363	8%	101,832
2008	109,932	81%	14,929	11%	11,307	8%	136,168
Full Build	132,028	81%	17,930	11%	13,040	8%	162,997

SUMMARY

The aviation demand projections presented in the previous sections present a range of growth scenarios for the Airport. These scenarios consider several local and national trends in addition to the anticipated effects of proposed improvement projects on the Airport. The aviation demand forecasts prepared through the analyses described provide a range of future growth potentials. The projection scenarios are displayed in **Table 12**.

TABLE 12
COMPARISON OF OPERATIONAL
PROJECTION SCENARIOS

Year	Scenario 1 Operations	Scenario 2 Operations	Scenario 3 Operations	Scenario 4 Operations	Scenario 5 Operations
2003	101,832	101,832	101,832	101,832	101,832
2008	113,718	135,718	114,168	136,168	136,168
Full Build	-	-	-	-	162,997

Although these forecasts provide a meaningful guide to the future development of the Airport, it should be noted that there are often short-term fluctuations in an airport's activity due to a variety of factors. Additionally, while the forecast presented in this report is 15 percent less than the projection presented by the Master Plan Update, this is largely due to a decline in operations (a decrease of 20 percent) between 1999 and 2000. This decline in total activity, however, has not affected the size of the aircraft using the Airport, or the commitment by aircraft owners to utilize an improved Airport, if available.

ATTACHMENT 1

NETJETS AVIATION
 Airport Planning Guide

AIRCRAFT TYPE	RUNWAY CONDITION					DIMENSIONS					WEIGHTS		
	PRIST	DRY ABSOLUTE MINIMUM	MINIMUM RUNWAY WIDTH	MINIMUM TAXIWAY WIDTH	DRY APPROVAL PM APPROVAL	WET/CONTAMINA TED REQUIRES PM APPROVAL	MINIMUM RWY WEIGHT CAPACITY	MAIN GEAR SPACING	AIRCRAFT WING SPAN	AIRCRAFT TAIL HEIGHT	MAX ZERO FUEL WEIGHT	MAX LANDING WEIGHT	MAX TAKEOFF WEIGHT
CE-560	YES	3500'	50'	35'	< 4000'	< 5000'	9000 SW	17'	52' 6"	15'	12200	15200	16300
CE-560 E	YES	3500'	50'	35'	< 4000'	< 5000'	9000 SW	17'	52' 6"	15' 5"	12600	15200	16630
CE-560 XL	NO	3800'	50'/75'	30'	< 4500'	< 5000'	12000 SW	15'	55' 7"	17' 2"	15000	18700	20,000
CE-650/VI	NO	4300'	75'	TBD	< 4500'	< 5500'	12000 DW	9' 6"	53' 6"	16' 9"	16500	20000	23000
CE-750	NO	4600'	75'	TBD	< 5000'	< 6000'	18000 DW	11'	63' 5"	18' 4"	24400	31800	35700
HS-125/800 XP	NO	4500'	75'	50'	< 5000'	< 6000'	19000 DW	9' 2"	51' 5"	17' 7"	18450	23350	28000
BAE-1000	NO	4600'	75'	50'	< 5000'	< 6000'	21000 DW	9' 2"	51' 5"	17' 1"	20300	25000	31000
G-200	NO	4500'	50'	50'	< 5000'	< 5000'	30000 DW	12' 6"	58' 1"	21' 5"	24000	28000	34850 35450
DA-50	NO	4500'	50'	40'	< 5000'	< 6000'	25000 DW	15' 1"	61' 10"	22' 11"	TBD	35715	40750
DA-900	NO	4500'	50'	50'	< 5000'	< 6000'	25000 DW	14' 6"	63' 5"	24' 9"	TBD	42000	46500
DA-2000	NO	4500'	75'	60'	< 5000'	< 5500'	27000 DW	14' 6"	63' 5"	22' 9"	28660	33000	36500
GIV-SP	NO	4500'	75'	50'	< 5000'	< 6000'	PCN 23	16'	77' 10"	24' 5"	49000	66000	74600
GV	NO	4500'	75'	50'	< 5000'	< 6000'	PCN 23 60000 DW	17'	93' 6"	25' 10"	54500	75300	90500
BBJ	NO	5000'	100'	50'	N/A	N/A	110000 DW	23' 2"	117' 5"	41' 3"	126000	134000	171000

CE-560XL - Must have 75' wide if wet
 SW = Single Wheel gear configuration
 DW = Dual Wheel gear configuration
 * This document not valid for flight planning *