

AIRPORT BUSINESS PLAN

Hartford-Brainard Airport



Prepared for:



Prepared by:



THE Louis Berger Group, INC.

May 2012



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EXECUTIVE SUMMARY

The primary objective of this business plan for the Hartford-Brainard Airport (HFD) is to identify operational and economic development opportunities to assist the Connecticut Department of Transportation (ConnDOT) with optimizing the overall benefits of the Airport for the community it serves. By providing recommendations and steps for implementation, this plan aims to improve the Airport's financial performance and long term viability as a provider of aviation facilities and services to its users and customers.

A deliberate process was utilized for the development of this business plan which is described further in Section 1. The initial steps in the process looked to understand the facility's profile, existing characteristics, and the airport market area. Subsequent elements in the process included conducting a SWOT analysis, identifying lease opportunities and constraints, developing market valuations, and understanding the economic contributions, all of which contributed to the findings and recommendations which are presented on both a system-wide and airport specific levels.

This business plan effort initiated (October 2010) prior to the enactment of the Connecticut Airport Authority (CAA). During the course of developing the business plan, the CAA was created (July 2011) and as of May 2012 is transitioning the operation of the Airports from ConnDOT to CAA. Due to the timing of preparation and delivery, as the overall structure of CAA is finalized and put into place, the contents of this plan, including the recommendations should also be considered by the CAA, when and where applicable.

Airport Profile

The Hartford-Brainard Airport is a public-use, publically owned General Aviation (GA) airport on 201 acres, located three miles southeast of Hartford, CT in the county of Hartford. The Airport consists of two asphalt runways, one turf runway, and two helipads, and is operated by the State of Connecticut Department of Transportation (ConnDOT).

Landside facilities include a fixed based operator (FBO), two avionics repair stations, an aircraft maintenance facility that provides major airframe and power plant repairs, a flight training facility, and a restaurant.

The Airport is located three miles from the downtown Hartford business district and is designated as a Reliever airport in the FAA's National Plan of Integrated Airport Systems (NPIAS). As their name suggests, the purpose of reliever airports are to relieve congestion at Commercial Service Airports and to provide improved GA access to the overall community.

Existing Airport Characteristics

To a large degree, an airport's characteristics are directly related to the ability to achieve its mission, which for Hartford-Brainard is to provide an efficient, effective, convenient, and safe



aviation facility. The characteristics set the baseline understanding of the facility for the business plan effort and include documentation of physical characteristics, documents existing airport tenants, the existing management structure, as well as historical airport operational and baseline financial data.

Airport Market Area

For the purpose of this business plan, Hartford's market area is comprised of airports in the surrounding area that are comparable in size, function, or service level. In broader terms, Hartford's market area includes the surrounding airports from which Danielson draws business from and vice versa.

There are a total of 1,227 based aircraft within the market area of Hartford-Brainard Airport and the full business plan provides a comparison of based aircraft and operations data between Hartford-Brainard and the airports within its market. Also presented is a further comparison of the typical services/amenities offered within the market since a correlation can often be made between an airport's market share and the level of services it offers. The SWOT Analysis identified what participants considered some of the Airport's limiting factors in terms of weaknesses and constraints. A culmination of these factors was used to provide recommendations that are intended to guide and to improve the Airport's ability to attract business and increase its market share of based aircraft, operations, and services.

SWOT Analysis

Prior to the development of alternatives and recommendations regarding the operational and economic development opportunities at Hartford-Brainard Airport, it was necessary to bring airport stakeholders together to discuss various aspects of the Airport's existing operating and business environments. As mentioned, a SWOT Analysis (Strengths, Weaknesses, Opportunities and Threats) hosted in a workshop format was facilitated by the study's business planning team. The SWOT Analysis Workshop for Hartford-Brainard was conducted on December 16, 2010.

The information obtained by the team was used to define operational and economic development opportunities which will assist the Airport and the Airport Operator in optimizing the Airport's assets and achieving the Operator's mission. The results of the SWOT analysis provided a comprehensive and balanced description of the business environment the Airport is operating within and was used by the study team to help identify focus areas for the business plan and make recommendations to help the Airport capitalize on their strengths and identify potential opportunities.

The SWOT workshops were conducted at each of the State of Connecticut's five GA airports, and the results from each airport were generally guided by two common themes; those specific to the facility, and those concerning the entire system of airports owned and operated by the State.



Lease Opportunities and Constraints

Understanding the opportunities and constraints of a property can assist in determining its best possible use and value. Since even privately-developed facilities at HFD must meet state and national environmental requirements, it is important to understand the impacts any development may cause. Based on existing data available for the Airport, this section of the business plan identifies potential development sites and their characteristics in terms of opportunities and constraints. The information found in this section can be used as a marketing tool for potential developers as well as the Airport itself in meeting the challenges of long term airport facility planning.

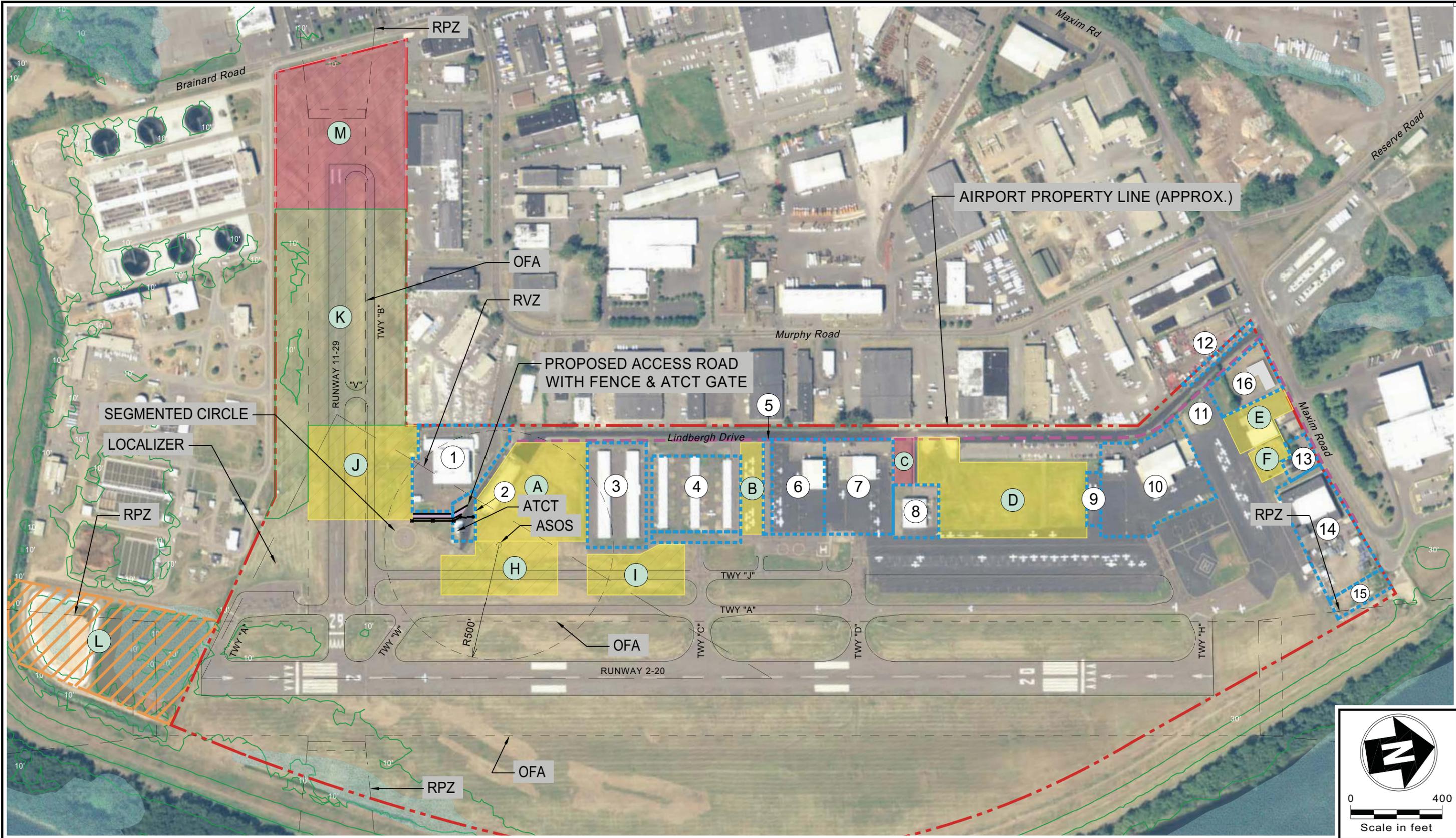
Several factors were used to assess each parcel for its development potential. These factors are discussed in depth in the report, and include: FAA Airport Design Standards; FAR Part 77 (Obstructions to navigation); Federal obligations; Site topography; Utility availability or constraints (e.g., buried gas lines); Ground and airside access; Compatible land use; and Environmental considerations. The summary figure of Lease Opportunities and Constraints for HFD can be found on the following page. Specific descriptions are in the full business plan.

ConnDOT is encouraged to promote any available development areas at the Airport using various outlets: online (ConnDOT website, CERC's Site Finder site (see Findings and Recommendations), local business associates websites, brochures, pamphlets etc.. This business plan provides individual summary sheets for the parcels identified, but it should be noted that the delineation of these parcels is not definite. Thus, flexibility should be given to proposals that may look to combine or reconfigure a given parcel to accommodate the needs of the proposer.

Airport Valuation

A summary airport valuation report was completed for Hartford-Brainard Airport as of January 1, 2011. (A copy of the complete report can be found in the Appendix of this business plan.) The function of the report, completed for each GA airport as part of the business plan development effort, pertains to all relevant classes of airside property in both improved and unimproved condition at Danielson, Hartford-Brainard, Waterbury-Oxford, Groton-New London, and Windham Airports. Information from the valuation was used to generally determine rates and charges, rental rates and other economic determinants which can be used to measure expected revenue in the context of the opportunities identified as part of this business plan.

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LEGEND	AVIATION DEVELOPMENT	A POTENTIAL DEVELOPMENT SITE	AIRPORT PROPERTY LINE	 2139 Silas Deane Highway, Suite 212 • Rocky Hill, CT 06067-2336 Main: (860) 257-4557 • www.chacompanies.com	POTENTIAL DEVELOPMENT AREAS PROJECT NO. 22337 DATE: JAN. 2012 CT Airport Business Plan - Hartford-Brainard Airport (HFD)	FIGURE 5-3
	NON-AVIATION DEVELOPMENT	1 EXISTING PROPERTY LEASE	EXISTING LEASE LINE			
	NOT READILY DEVELOPABLE	UTILITIES	GROUND CONTOUR			
	WETLANDS	ACQUIRE	TOWN LINE			
	METROPOLITAN DISTRICT COMMISSION					
	WOULD REQUIRE RUNWAY 11-29 CLOSURE					



Economic Contribution

GA airports constitute important assets for state and local economies. Not only do they provide on-airport jobs, they indirectly support additional employment throughout the State. A study by the Alliance for Aviation across America, a non-profit coalition of 5,500 members supporting GA interests, found that GA contributes \$2.4 billion total or \$726 per capita to Connecticut's economy. While the study's methodology is not fully documented, it asserts that the economic contribution is generated by 176 aviation-related businesses - fixed base operations (FBOs), repair stations, and charter operators – at 22 GA airports in Connecticut.

As part of the assessment of the economic contribution of HFD on the state and local economy, the on-airport effects, as well as the multiplier effects were quantified. Additional qualitative contributions are also reported. The overview of the economic contribution of the Hartford-Brainard Airport is presented below as well as the associated tax revenues.

Overview Economic Contribution, 2010

	Hartford MSA			CT		
	Jobs	Labor Income (\$000s)	Output (\$000s)	Jobs	Labor Income (\$000s)	Output (\$000s)
On-Airport Jobs	159	\$11,787	\$18,595	159	\$11,787	\$18,595
Operations and Maintenance Spending	5	\$254	\$720	10	\$489	\$1,374
Capital Spending	10	\$582	\$1,351	13	\$696	\$1,677
Airport Tenant Spending	101	\$5,084	\$13,647	105	\$5,406	\$14,602
Visitor Spending	79	\$2,876	\$8,266	81	\$2,976	\$8,609
Total	354	\$20,583	\$42,579	368	\$21,354	\$44,857

Overview Connecticut Tax Revenues

Tax Type	(\$000s)
Personal Income Tax	\$980
Sales Tax	\$398
Corporate Income Tax	\$78
Total	\$1,456

Findings and Recommendations

Consistent with the objective of this business plan, the culmination of the tasks completed throughout the business planning process provided a thorough understanding of the background and operational characteristics of the Hartford-Brainard Airport. That understanding identified strengths, weaknesses, including issues and opportunities on both facility specific and system-wide levels. In summary, this business plan was developed through a process that revealed issues and challenges, while identifying the benefits and opportunities of the Airport.



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The facility specific findings and recommendations are relative to the operational characteristics, circumstances and historical trends of the Airport in particular, while the system-wide recommendations are relative to the entire state-owned airport system and would require implementation on a state level.

Since ConnDOT owns and operates a system of airports it is important to review the financial activity and economic contributions of the GA airports as a whole. The following tables show the historical system financial performance and the Economic Benefits of the GA Airport System airport by airport. The findings and recommendations of this business plan look to enhance both the financial performance of each airport and their economic contribution.

Historical System Financial Performance

	<i>FY 06-07</i>	<i>FY 07-08</i>	<i>FY 08-09</i>	<i>FY 09-10</i>	<i>FY 10-11</i>
Danielson Revenues	\$61,647	\$40,881	\$19,486	\$29,397	\$39,012
Groton-New London Revenues	668,543	548,372	461,184	454,722	513,759
Hartford-Brainard Revenues	445,012	496,550	431,880	458,193	481,258
Waterbury-Oxford Revenues	567,859	574,098	526,600	658,008	608,610
Windham Revenues	59,979	63,786	64,225	63,842	69,232
Total System Revenues	\$1,803,040	\$1,723,687	\$1,503,375	\$1,664,162	\$1,711,871
Danielson Expenses	\$61,043	\$62,937	\$92,508	\$90,302	\$101,634
Groton-New London Expenses	758,790	797,904	1,040,271	849,067	798,766
Hartford-Brainard Expenses	419,579	445,527	689,405	848,803	728,642
Waterbury-Oxford Expenses	565,408	634,908	905,240	931,405	932,710
Windham Expenses	178,992	183,872	186,510	153,124	156,857
Total System Expenses	\$1,983,812	\$2,125,148	\$2,913,934	\$2,872,701	\$2,718,609
System Operating Surplus/(Deficit)	(\$180,772)	(\$401,461)	(\$1,410,559)	(\$1,208,539)	(\$1,006,738)

Source: Consultant Calculations



Summary of Economic Benefits of the GA Airport System

	<i>Jobs</i>	<i>Output</i>
Danielson Airport	25	\$2,000,000
Windham Airport	65	\$7,500,000
Hartford-Brainard Airport	368	\$44,800,000
Groton-New London Airport	909	\$119,500,000
Waterbury-Oxford Airport	1,675	\$235,400,000
Total System Economic Benefits	3,042	\$409,200,000

Source: Consultant Calculations

The system of GA airports assessed operated at an annual deficit of approximately \$1.0 million in FY10-11 and an average deficit of approximately \$842,000 over the last five years. A significant portion of the deficit can be attributed to a more accurate accounting allocation of fringe benefits. In 2010, the system of GA airports did however provide an estimated \$409 million in economic output activity and 3,042 jobs to the State of Connecticut.

Section 7 of this business plan provides the details on the findings and recommendations as well as a business plan summary. The following table provides a summary of the business plan recommendations.

Summary of Business Plan Recommendations

	<i>Recommendation</i>	<i>Priority</i>	<i>Impact</i>
System Wide Recommendations			
1	Complete the transition of the airports from ConnDOT to the Authority as soon as possible	In-progress	Efficiency in Governance
2	New or revised position, centralized role overseeing development opportunities at the airports	Immediate	Coordinated and Focused Efforts
3	Improve and shorten lease development process. This should be completed prior to soliciting for any airport development	Immediate	Reduce loss of development opportunities
4	Improve Airport operational recordkeeping and fully assess the financial reporting during the transition to the Authority	Near-term < 1 year	Better tracking of operational trends and market share
5	Track surrounding airports rates and charges and give the Authority full control for updating and setting rates and charges at each airport. Implement recommended rate increases	Near-term <1 year	Revenue increase



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6	Develop and coordinate State economic development initiatives to include Airport Development Zones, Available Parcel Marketing Sheets, and Upload Available Properties to CERC's Site Finder	Immediate and On-going	Increase development opportunities
7	Maximize participation with industry association marketing and partnerships	On-going	Increase airport activity
8	Establish Statewide Aviation Group	Mid-term < 3 years	Increase aviation awareness in CT
9	Active pursuit of prospective users and tenants	On-going	Increase airport activity and aviation awareness
Facility Specific Recommendations			
	Improve Airport operational recordkeeping and monitor based aircraft market share	Near-term < 1 year	Better tracking of operational trends and market share
	Staffing levels should be monitored to ensure that Airport needs are being met in a timely and cost efficient manner	Near-term < 1 year	Potential additional expense
	Pursue development of recommended parcels A, B, C, D, E & F	Mid-term < 3 years	Revenue increase
	Implement proposed rates and charges	Near-term < 1 year	Revenue increase
	Consider the pursuit of a GPS/Precision instrument approach for the Airport	Mid-term < 3 years	Increased reliability and aircraft operations
	Continue active local marketing and outreach	On-going	Increase airport activity and aviation awareness
	Solicit an RFP for an additional FBO	Near-term < 1 year	Revenue increase
	Review updated Master Plan for recommendations on closure of Runway 11/29	Near-term < 1 year	Prime Airside development potential /Revenue increase



1.0 INTRODUCTION

The primary objective of this business plan for the Hartford-Brainard Airport (HFD) is to identify operational and economic development opportunities to assist the Connecticut Department of Transportation (ConnDOT) with optimizing the overall benefits of the Airport for the community it serves. This business plan is intended to be consistent with the mission of ConnDOT's Bureau of Aviation, which is to provide the most efficient, effective, convenient and safe use of State Aviation facilities. This mission is also in line with FAA grant assurances since Airport owners or sponsors, such as ConnDOT who accept funds from FAA-administered airport financial assistance programs must agree to certain obligations which include maintaining and operating the Airport safely and efficiently. By providing recommendations and steps for implementation, this plan aims to improve the Airport's financial performance and long term viability as a provider of aviation facilities and services to its users and customers.



Note: This business plan effort initiated (October 2010) prior to the enactment of the Connecticut Airport Authority (CAA). During the course of developing the business plan, the CAA was created (July 2011) and as of May 2012 is transitioning the operation of the Airports from ConnDOT to CAA. Therefore, acknowledgement of the CAA is not found throughout this entire document.

Moreover, with limited references to the CAA, the findings and recommendations of this plan were in large part directed toward the ConnDOT Bureau of Aviation since they were deliberately based upon ConnDOT's structure and operation of the airports that was in place at the start of the business plan process.

Due to the timing of preparation and delivery, as the overall structure of CAA is finalized and put into place, the contents of this plan, including the recommendations should also be considered by the CAA, when and where applicable.

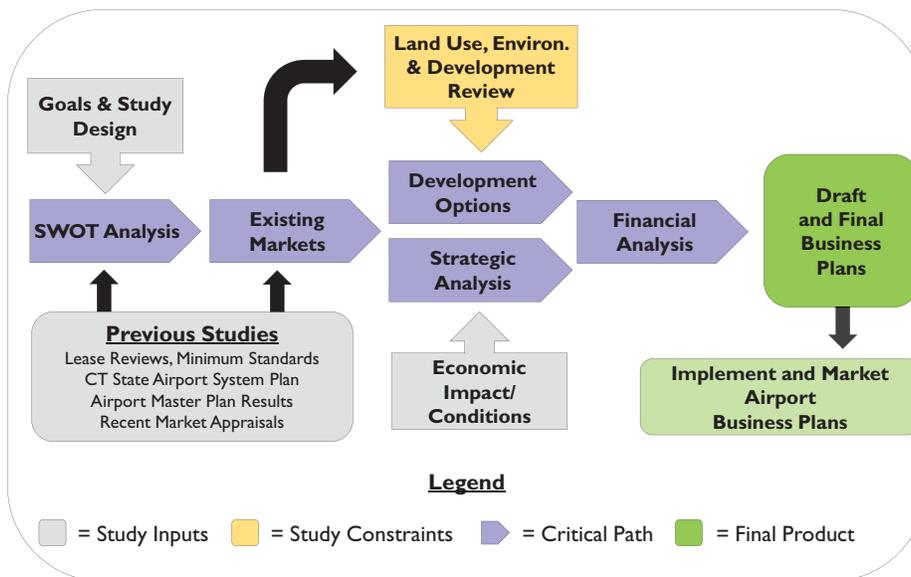


1.1 Business Plan Process

In order to meet the objective of this plan and ensure that it examines the entire field of airport issues at Hartford-Brainard, the following process was used in developing the business plan:

- Existing Airport Characteristics
 - Physical Characteristics
 - Airport Tenants
 - Management Structure
 - Historical Airport Data
 - Baseline Financial Data
- Airport Market Area
- SWOT Analysis
- Lease Opportunities and Constraints
- Economic Contribution
- Findings & Recommendations
 - System-wide
 - Facility Specific

Figure 1-1: Airport Business Planning Process





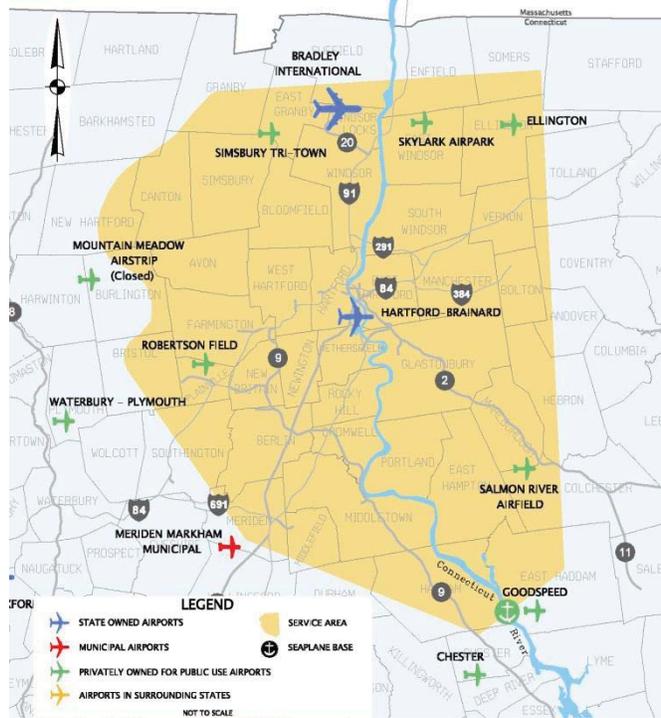
1.2 Airport Profile

Hartford-Brainard Airport is the premier general aviation facility serving central Connecticut. Located in the City of Hartford, just 3 miles from the downtown business district, the Airport is designated as a Reliever Airport in the FAA's National Plan of Integrated Airport Systems (NPIAS). The Airport is prepared to meet the demands of corporate jets, multi and single engine aircraft, and helicopters, and provides the full range of Fixed Base Operator (FBO) services.

The airport is home to two avionics repair stations, two aircraft repair facilities offering airframe and power plant services, three flight training organizations, Connecticut Aero Tech (a State vocational training school for aircraft mechanics), as well as numerous other aviation related businesses. The airport is a public use, publically owned airport situated on 201 acres centrally located in Hartford County. The Airport offers two paved and one turf runways, two helipads, and a complete connecting taxiway system along with an FAA contract tower operating from 6:00 am to midnight seven days a week.

As their name suggests, the purpose of reliever airports are to relieve congestion at Commercial Service Airports and to provide improved GA access to the overall community. As stated in the Connecticut Statewide Airport System Plan, the service area of Hartford-Brainard encompasses entirely or in part, approximately 50 towns. The general land use surrounding the Airport is primarily comprised of commercial and industrial uses to the west, north, and northeast. The Airport property is zoned industrial, as is the surrounding area.

Figure 1-2: Hartford-Brainard Service Area



Source: Connecticut State Airport System Plan (2006)



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2.0 EXISTING AIRPORT CHARACTERISTICS

To a large degree, an airport's characteristics are directly related to its ability to achieve its mission which for Hartford-Brainard is to provide an efficient, effective, convenient, and safe aviation facility. This section and associated subsections identify the existing characteristics of Hartford-Brainard Airport. Characteristics are divided into the following:

- Physical Characteristics
- Airport Tenants
- Management Structure
- Historical Airport Data
- Baseline Financial Data

2.1 Physical Characteristics

2.1.1 Runways & Taxiways

The runways at HFD consist of a primary runway (2/20) that is 4,418 feet long by 150 wide, and a secondary runway (11/29) that is 2,315 feet long by 70 feet wide. The NE/SW turf runway is 2,350 feet long by 150 feet wide and is available to GA aircraft on a seasonal basis. The turf runway is closed from November through April. The taxiway system is comprised of a full parallel taxiway that serves Runway 2/20, a partial parallel taxiway that serves Runway 11/29, and numerous exit taxiways that provide access from the runways to aircraft tie-downs, storage and aeronautical facilities. To accommodate helicopter operations, airport infrastructure also consists of two helipads. According to data gathered from the last FAA airport inspection in December of 2009, the runway pavements are reported to be in good condition.

2.1.2 Navigational Aids

Integral parts of an airport system are the visual and navigational aids (NAVAIDS) provided to assist pilots in navigating en route and on the airfield. As such, HFD is equipped with various NAVAIDS and airfield lighting equipment. LDA, GPS and VOR Instrument Approach procedures are available for Runway 2.

Runway 2/20 is equipped with a four light Precision Approach Path Indicator (PAPI) for Runway 2, and a four box Visual Approach Slope Indicator (VASI) for Runway 20. Runway End Identifier Lights (REILS) are installed at both ends of the main runway.

High Intensity Runway edge lights (HIRLs) are installed on both asphalt runways. Medium intensity lights are installed on both helipads.

The Airport is also equipped with a segmented circle, lighted wind cone, rotating beacon, and an air traffic control tower. Air traffic control services at HFD are offered seven days a week from 0600-2400.



2.2 Existing Airport Tenants

Hartford-Brainard Airport is home to several tenants who provide various amenities and services. Each airport tenant supports the economic welfare of the Airport and surrounding community. Airport tenants include:

- Atlantic Aviation
- Total Aircraft Services
- Premier Flight Center
- Connecticut Flight Academy
- Connecticut Aero Tech
- VIP Avionics
- Exxel Avionics
- Sutton James Aviation Insurance
- Connecticut State Police Aviation Unit
- Department of Emergency Management and Homeland Security (DEMHS) – CT Urban Search and Rescue
- Star base
- Wings Sports Bar & Grill
- Midwest ATC (Air Traffic Control Tower)

Atlantic Aviation

Offering a full range of aircraft services and amenities, Atlantic Aviation is the only full service fixed based operator (FBO) at the Airport.

Total Aircraft Services

Total Aircraft Services leases hangar space and provides aircraft maintenance services at the Airport on a part-time basis. This includes routine services, annual aircraft inspections, and general airframe and power plant repairs.

Premier Flight Center

Premier Flight Center (PFC) is an FAA approved flight school that offers a range of aircraft flight instruction, aircraft rentals, and flight school related services at HFD. PFC is also located at Windham Airport in Willimantic, CT.



Atlantic Aviation



Connecticut Flight Academy

As one of two flight schools at HFD, Connecticut Flight Academy is an FAA approved flight school that offers a various levels of flight instruction.

Connecticut Aero Tech

As part of the Connecticut Technical High School System, Connecticut Aero Tech (*pictured right*) has been located at HFD since 2010 and offers comprehensive programs in the Aviation Maintenance Technology (AMT) field.



Connecticut Aero Tech

VIP Avionics

VIP Avionics is a sales and service center for avionics, auto-pilot systems, and aircraft instrumentation. As an FAA certified instrument repair station, VIP conducts diagnostics, repair and overhaul. They also have a maintenance department that provides various general aircraft maintenance services, including oil changes and annual inspections.

Exxel Avionics

Established in 1994, Exxel Avionics is also an avionics sales and service center providing diagnostic, repair, overhaul, and upgrade services.

Sutton James Incorporated

Sutton James is an aviation insurance broker that assists customers in the purchase and use of aviation related insurance.

Connecticut State Police

The Emergency Services Unit, a subdivision of the Connecticut State Police, houses its Aviation Unit which includes aviation and non-aviation resources at the Hartford-Brainard Airport.

Department of Emergency Management and Homeland Security (DEMHS) – CT Urban Search and Rescue

The US&R Team is based out of Brainard Airport located in Hartford, Connecticut, and will have airborne capabilities by utilizing military helicopters, C-130s, C-141s and other aircraft. The Team utilize the best available resources possible.

It is the mission of the Urban Search and Rescue Team (US&R), Connecticut Task Force 1 (CT-TF1) to provide a coordinated effort of personnel and resources to locate, extricate and provide immediate medical treatment to victims trapped within collapsed structures. Members of CT-TF1 are expected to conduct search and rescue operations in a professional, ethical, and compassionate manner that will protect the dignity of the victims and the communities served.



Further, members of CT-TF1 are expected to develop and maintain the highest level of skills and capabilities required when deployed to natural or manmade disasters, including hurricanes, floods, conflagrations, explosions, earthquakes, or the use of weapons of mass destruction that result in events that are beyond the capability of local emergency service resources.

Star Base

CT Star Base is an educational program for youth that is funded by the Department of Defense. Star Base provides a program that focuses on science, technology, engineering, math, (STEM) personal development, and drug awareness and prevention. CT Star Base has been located at HFD for over 10 years.

Wings Sports Bar & Grill

Located in the Atlantic Aviation terminal, Wings Sports Bar and Grill is the Airport's only restaurant.



Midwest Air Traffic Control (ATC) Services

Located in the tower, Midwest ATC provides contracted air traffic control services at Hartford-Brainard Airport.



2.3 Management Structure

Hartford-Brainard Airport is owned by the Connecticut Department of Transportation (ConnDOT) and operated by the ConnDOT Bureau of Aviation. The current organizational structure for the management of the facility is shown below.

Figure 2-1: Hartford-Brainard Airport Organizational Structure





2.4 Historical Airport Data

2.4.1 Based Aircraft & Operations

Due to a number of factors, the GA industry often changes on National, State, and local levels. For this reason, it is important to look at historical data as it relates to based aircraft and operations to understand industry trends and to develop a realistic forecast for the future. Figure 2-2 identifies the historical based aircraft and operations data for the Airport.

Figure 2-2: Hartford-Brainard Historical Based Aircraft & Operations

Year	Total Operations	Based Single Engine	Based Multi Engine	Based Jet	Based Helicopter	Total Based Aircraft
2001	90,669	N/A	N/A	N/A	N/A	N/A
2002	97,176	N/A	N/A	N/A	N/A	N/A
2003	86,034	N/A	N/A	N/A	N/A	N/A
2004	101,451	155	12	3	2	172
2005	101,650	N/A	N/A	N/A	N/A	N/A
2006	80,170	155	12	3	2	172
2007	86,761	153	12	3	2	170
2008	79,482	152	11	2	2	171
2009	81,006	149	11	2	3	164
2010	71,030	146	11	2	3	162

Source: Air Traffic Activity System (ATADS), ConnDOT, and FAA 5010
Prepared: March 2011

2.4.2 Airport Studies, Plans, and Projects

The following table presents the studies, plans, and projects that have been conducted for the Airport in recent history.

Figure 2-3: Airport Studies/Plans/Projects

Study/Plan/Project	Year Conducted
Airport Master Plan	On-Going
Airport Minimum Standards	2008
State Airport System Plan	2006

Source: ConnDOT
Prepared: March 2011



2.5 Baseline Financial Data

In order to make recommendations to improve the financial vitality of Hartford-Brainard Airport it is necessary to examine historical airport revenue and expense data. Baseline financial information serves point of reference when measuring future airport financial performance and to some degree, provides an indication of financial trends at the Airport. Information concerning historical airport financial data was provided by ConnDOT for FY 2007-FY 2009 and is shown in Figure 2-4.

Figure 2-4: Historical Revenue and Expenses

<i>Hartford-Brainard Airport</i>	<i>FY 06-07</i>	<i>FY 07-08</i>	<i>FY 08-09</i>	<i>FY 09-10</i>	<i>FY 10-11</i>
Total Revenues	\$445,012	\$496,550	\$431,880	\$458,193	\$481,258
Expenses					
Personnel	\$264,668	\$314,789	\$307,405	\$397,897	\$274,582
Overtime	\$42,915	\$56,240	\$70,540	\$78,823	\$116,640
Fringe	-	-	221,265	\$290,630	\$253,009
Other Expenses	\$63,928	\$37,255	\$50,458	\$43,871	\$50,081
Building Expense	\$48,068	\$37,243	\$39,737	\$37,582	\$34,330
Total Expenses	\$419,579	\$445,527	\$689,405	\$848,803	\$728,642
Operating Surplus/Deficit	\$25,433	\$51,023	(\$257,525)	(\$390,610)	(\$247,384)

*Source: ConnDOT
Prepared: December 2011*



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3.0 AIRPORT MARKET AREA

For the purpose of this business plan, Hartford-Brainard's market area is comprised of airports in the surrounding area that are comparable in size, function, or service level. In broader terms, Hartford-Brainard's market area includes the surrounding airports from which Hartford-Brainard draws business from and vice versa. Figures 3-1 and 3-2 provide characteristics of the airports within Hartford-Brainard's market area. These airports include:

- Barnes Municipal Airport, MA (BAF);
- Bradley International Airport, CT (BDL);
- Chester Airport, CT (SNC);
- Danielson Airport, CT (LZD);
- Ellington Airport, CT (7B9);
- Goodspeed Airport, CT (42B);
- Meriden Markham Municipal Airport, CT (MMK);
- Robertson Field, CT (4B8);
- Simsbury Airport, CT (4B9);
- Skylark Airport, CT (7B6);
- Tweed-New Haven Airport, CT (HVN);
- Waterbury-Oxford Airport, CT (OXC);
- Westover Metropolitan Airport, MA (CEF); and
- Windham Airport, CT (IJD)

There are a total of 1,227 based aircraft within the market area of Hartford-Brainard Airport. Figure 3-1 provides a comparison of based aircraft and operations data between Hartford-Brainard and the airports within its market. Figure 3-2 provides a further comparison of the typical services/amenities offered within the market. Often, a correlation can be made between an airport's market share and the level of services it offers. However, due to various constraints at a particular facility, it may be difficult for a particular airport to compete for business in a specific service area. The SWOT Analysis and Constraints sections of this plan describe the Airport's limiting factors while the recommendations of this plan considers these factors and provides guidance to improve the Airport's ability to attract business and increase its market share of based aircraft, operations, and services.



AIRPORT BUSINESS PLAN

Figure 3-1: Airport Market Area Aircraft & Operations Comparison

Airport	ID	State	Primary RWY (L x W)	Secondary RWY (L x W)	Based Aircraft				General Aviation Operations* (est.)	Control Tower
					SE	ME	Jet	Total		
Hartford-Brainard	HFD	CT	4,417' X 150'	2314' x 71'	144	11	2	157	70,946	Yes
Barnes Municipal	BAF	MA	9,000' X 150'	5,000' x 100'	96	8	13	117	54,745	Yes
Bradley International	BDL	CT	9,510' X 200'	6,847' x 150'	2	9	33	44	46,927	Yes
Chester	SNC	CT	2,566' X 50'	-	116	6	0	122	15,827	No
Danielson	LZD	CT	2,700' x 75'	-	32	1	0	33	20,000	No
Ellington	7B9	CT	1,800' X 50'	-	20	0	0	20	29,120	No
Goodspeed	42B	CT	2,120' X 50'	Water RWY	29	1	0	30	6,230	No
Meriden Markham Municipal	MMK	CT	3,100' x 75'	-	63	2	0	65	16,208	No
Robertson Field	4B8	CT	3,612' X 75'	-	103	7	0	110	59,145	No
Simsbury	4B9	CT	2,205' X 50'	-	50	2	0	52	12,775	No
Skylark	7B6	CT	3,242' X 60'	-	60	1	0	61	16,900	No
Tweed-New Haven	HVN	CT	5,600' X 150'	3,626' x 100'	52	5	1	58	35,084	Yes
Waterbury-Oxford	OXC	CT	5,800' X 100'	-	189	7	61	257	46,241	Yes
Westover Metropolitan	CEF	MA	11,597 X 301'	7,082' x 150'	24	3	2	29	20,121	Yes
Windham	IJD	CT	4,271' x 100'	2,799' x 75'	63	4	5	72	20,617	No

*Source: FAA 5010 Data/Airnav.com, Consultant Calculations
Prepared: May 2011*



AIRPORT BUSINESS PLAN

Figure 3-2: Airport Market Area Services Comparison

<i>Airport</i>	<i>Fuel 100LL</i>	<i>Fuel Jet A</i>	<i>Aircraft Maintenance</i>	<i>Avionics Repairs</i>	<i>Aircraft Tie downs</i>	<i>Aircraft Hangars</i>	<i>Flight Instruction</i>	<i>Aircraft Rental</i>	<i>Aircraft Charter</i>	<i>Instrument Approach</i>	<i>ILS Approach</i>
Hartford-Brainard	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	No
Barnes Municipal	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Bradley International	Yes	Yes	Yes	Yes	Yes	Yes	No	No	Yes	Yes	Yes
Chester	Yes	Yes	Yes	No	Yes	Yes	Yes	Yes	Yes	Yes	No
Danielson	Yes	No	Yes	No	Yes	Yes	Yes	Yes	Yes	Yes	No
Ellington	Yes	No	Yes	No	Yes	Yes	Yes	Yes	Yes	No	No
Goodspeed	No	No	No	No	Yes	No	Yes	Yes	Yes	No	No
Meriden Markham Municipal	Yes	No	Yes	No	Yes	No	Yes	Yes	Yes	Yes	No
Robertson Field	Yes	Yes	Yes	No	Yes	Yes	Yes	Yes	Yes	No	No
Simsbury	Yes	No	Yes	No	Yes	No	Yes	Yes	No	No	No
Skylark	Yes	No	Yes	No	Yes	Yes	Yes	Yes	No	No	No
Tweed-New Haven	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Waterbury-Oxford	Yes	Yes	Yes	No	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Westover Metropolitan	Yes	Yes	No	Yes	Yes	Yes	No	No	Yes	Yes	Yes
Windham	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	No

*Source: FAA 5010 Data/Airnav.com, Consultant Calculations
Prepared: May 2011*



Figure 3-3: HFD Airport Advantages and Disadvantages

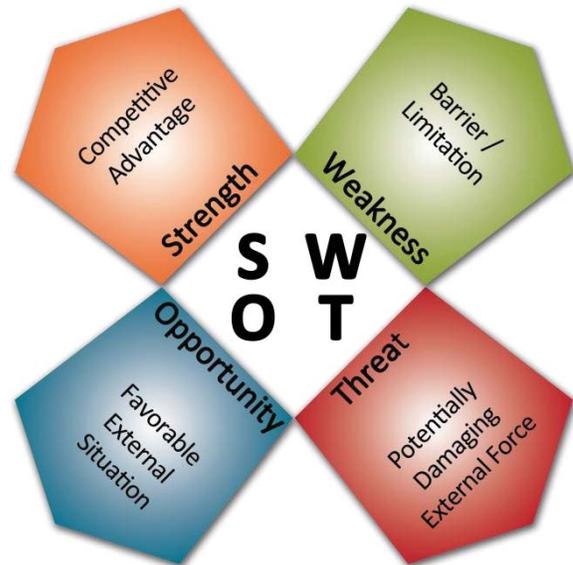
<i>Advantage</i>	<i>Disadvantage</i>
Host of AOPA Annual Convention	Existing runway length (4417 feet) with limited area for runway development
Provides 10 out of 11 services offered by other market area airports	No ILS Approach (5 of 15 market area airports provide an ILS)
One of 6 out of 15 market area airports with avionics repair services	
One of 6 out of 15 market area airports with a Control Tower	

*Source: The Louis Berger Group
Prepared: May 2012*



4.0 SWOT ANALYSIS FOR HARTFORD-BRAINARD AIRPORT

Prior to the development of alternatives and recommendations regarding the operational and economic development opportunities at Hartford-Brainard Airport, it was necessary to bring airport stakeholders together to discuss various aspects of the Airport's existing operating and business environments. A SWOT Analysis (Strengths, Weaknesses, Opportunities and Threats) hosted in a workshop format was facilitated by the study's business planning team. The results of the analysis were considered in this plan's recommendations and will help the Airport capitalize on their strengths and identify potential opportunities. Additionally, this process also identifies weaknesses and threats in the Airport environment. It is typical that the various items identified by any one participant in the SWOT workshop had the consensus of all participants. Therefore, the items identified were used to reinforce the SWOT summary contained herein.



For this effort, the participants in the SWOT workshop included Airport Management, Connecticut Department of Transportation Bureau of Aviation staff members, and a cross section of airport stakeholders. The primary goal of the workshop was to engage the stakeholders in what they believe are the Strengths, Weaknesses, Opportunities and Threats (constraints) facing the Airport.

The information obtained by the team was used to define operational and economic development opportunities which will assist the Airport and Connecticut Department of Transportation in optimizing the Airport's assets and achieving the Bureau's mission. The result of the SWOT analysis provides a comprehensive and balanced description of the business environment the Airport is operating within and was used by the study team to help identify focus areas for the Business Plan.

The following section describes the components of a SWOT analysis and presents the results of the analysis conducted for Hartford-Brainard Airport. Following the results of the SWOT analysis is a summary of findings.



4.1 SWOT Components

When using the SWOT model as an analytical management tool for an organization, Strengths and Weaknesses are evaluated from an internal perspective whereas Opportunities and Threats are generally external to the organization.

Strengths (internal) represent competitive advantages of the Airport. When evaluating the competitive advantages, participants were asked to think in terms of capabilities, marketing, quality, qualifications, business processes, and systems. For example, identifying the answers to the following:

- What are the Airport's advantages?
- What does the Airport do well?
- What do other people see as the Airport's strengths?

Weaknesses (internal) represent organizational barriers or limitations to the Airport. Participants were asked to think in terms of disadvantages, lack of competitive strength, reputation, morale/leadership, process, and systems. For example, identifying the answers to the following:

- What can be improved? What is done poorly?
- What should be avoided?
- What could be done more effectively /efficiently?
- If you could change one thing what would it be?

Opportunities (external) represent a favorable external situation. Participants were asked to think in terms of market developments, industry trends, partnerships, and competitor vulnerabilities. For example, identifying the answers to the following:

- What good opportunities are open to you?
- What trends could you take advantage of?
- How can you turn airport strengths into opportunities?

Threats or Constraints (external) represent potentially damaging external forces. Participants were asked to think in terms of the economic downturn, demographic shifts, and new regulations. For example, identifying the answers to the following:

- What obstacles do you face?
- Could weaknesses threaten your airport?
- What trends could harm the Airport business environment?



4.2 SWOT Analysis Workshop

The SWOT Analysis Workshop for HFD was conducted on December 16, 2010. To facilitate the session and ensure all participants understood the intent of the workshop, a SWOT workshop primer was presented. During this phase of the session the SWOT components as described earlier were discussed and the objective of the workshop was defined. After the primer session, the facilitator began the workshop and the results are as follows:

Strengths

1. The Airport's proximity to downtown as well as its central location in the State.
2. Air traffic control tower.
3. The Airport has easy access to I-91.
4. The State offers stability in owning the airfield, it is maintained well.
5. There is a vocational technical school located on-site.
6. Serves as a reliever for Bradley International Airport.
7. The Airport has an outstanding safety record.
8. Bradley International Airport serves as an alternate airport during inclement weather.
9. The State has a good working relationship with the Airport tenants.
10. Restaurant on site.
11. The existing tenants are protected by the Airport minimum standards.
12. The runway length and width are sufficient for the operations at the Airport.
13. The airspace has limited restrictions and is good for flight training.
14. State operated Airport is considered a strength by some for facilities maintenance such as runway repair and snow removal.

Weaknesses

1. Products and services for aviation training is taxed, these taxes do not include training in the classroom.
2. The river dyke poses a physical constraint limiting airport expansion.
3. The energy plant to the north has smoke stacks that are on the approach to the runway which create an obstacle for aircraft.
4. Independent training, maintenance, and other operators working at the Airport (through the fence operations) has a negative impact on the legitimate operators
5. There is some non-aeronautical activity use in the north end of the Airport.
6. The Airport has been mistaken for Bradley International Airport due to poor signage on the roadways and its close proximity.
7. Most of the facilities on the Airport are at capacity.
8. Runway length of 4,400 feet.
9. There are odors from the north and south related to the processing plants.
10. There is no real fuel competition as there is only one Fixed Base Operator (FBO).
11. There is only one way to enter and exit the Airport.



12. The entrance to the Airport is off a back alley and does not look inviting, should be a more of a “grand entrance”.
13. There is significant wildlife activity (primarily birds) in an around the Airport.
14. The runways do not have an instrument landing system or a precision approach.
15. The global positioning system for vehicles does not point people in the correct direction to get to the Airport. The Airport should be labeled properly to allow visitors to get to where they need to go on property.
16. There are limited opportunities for offsite transportation.
17. There is no bus stop.
18. Future and potentially more competition could water down or weaken the market.

Opportunities

1. Having a vocational technology school (VOTEC) on the Airport helps promote the Airport.
2. AOPA Convention this fall (2011) will have a positive impact on the Airport and City of Hartford as it did in 2007.
3. The change in the State Administration could potentially have a positive impact on aviation within the State (Possible development of a new Authority).
4. The convention center or City of Hartford itself could potentially be a draw for the local community and could increase airport usage.
5. Marketing and promotion by the City highlighting the ease of access of the Airport.
6. Investigate niche air services for air charter services out of HFD.
7. Population density of communities surrounding the Airport to include a population with median to higher income.
8. South Meadows Alliance; identifying what the City has to offer pilots within the local area.
9. MDC has future development plans.
10. Courtesy car for pilots flying into Airport to visit local activities.

Threats (Constraints)

1. Tax exemptions are good for businesses operating on the airfield; repeal would hurt business involved with aviation.
2. Town of Old Wethersfield has some historic areas which limits growth of the Airport.
3. One major leaseholder controls a large amount of the space for leasing (FBO).
4. New administration and the possible formation of an Authority.
5. Fuel prices.
6. Lack of a State tourism budget hinders promotion of the Airport.

While the lists of items identified above are not all inclusive, they are a general representation of the strengths, weaknesses, opportunities, and threats identified by the workshop participants.



4.3 SWOT Results and Summary

The primary objective of the SWOT Analysis Workshop was to facilitate an open and objective environment for airport stakeholders to have a meaningful discussion concerning the Strengths, Weaknesses, Opportunities, and Threats (constraints) of the Airport. This SWOT process yielded valuable insight and information which was used throughout the business planning process. The SWOT workshops were conducted at each of the State of Connecticut's five GA airports and the results from each airport were generally guided by two common themes; those specific to the facility, and those concerning the entire system of airports owned and operated by the State.

4.3.1 SWOT – System Summary

All stakeholders were in agreement that one competitive advantage they have in the State of Connecticut is the sales and use tax exemption that currently exists. It was acknowledged that this exemption acts as a catalyst in attracting business to the airports from surrounding states. Many aircraft owners and operators have made a conscious decision to base their aircraft at these airports based on this exemption. It was further expressed by the group that a repeal of the exemption could potentially lead the owners and operators seek new locations to base their aircraft and have them serviced.

The second item that was brought to the attention of the team by the stakeholders was the belief that the “system of government” currently in place which is responsible for the approval of projects is not as efficient as it could be. The stakeholders expressed that this creates significant delays in project approvals and prevents capitalistic ventures coming to fruition. Some examples cited were land use approvals which have delayed the continued design, development, and construction of hangars and other ancillary facilities used at the airports. Many attendees cited a lack of efficient turnaround and authorization by State Government for development project approvals as a major problem. They expressed that the inefficiencies have resulted in developers cancelling development plans after missing a “window of opportunity”.

4.3.2 SWOT – Facility Summary

SWOT workshop participants generally felt that the Hartford-Brainard Airport has many positive attributes and agreed that the Airport was well maintained. Consensus of the group was that the Airport's location in close proximity to downtown Hartford is a significant characteristic and has both positive and negative impacts on the facility. Being situated within a short drive from Hartford affords business travelers via corporate aircraft the ability to fly in and out of the city with relative ease. Participants also suggested that a niche air service company offering charter service to desirable destinations within New England could potentially thrive at Hartford-Brainard. The basis for this suggestion was the existing population density of communities surrounding the Airport with above average incomes who are likely to utilize such services.

Stakeholders agreed that the City of Hartford plays a critical role in identifying the Airport as a valuable resource. The convention center and the City could potentially increase the popularity



and overall usage of the Airport through publicizing the ease of access to downtown and the convention center. In 2007, the Aircraft Owners and Pilots Association (AOPA) held a successful pilot's convention in downtown Hartford and the event is scheduled to return in September 2011. This event attracts thousands of pilots and many of them use the Airport to fly to and from the event.

While the Airport's close proximity to downtown is viewed as a strength, it is also viewed as a weakness. The Airport is landlocked and the potential for future expansion is somewhat limited. The Connecticut River and dike system follows along the eastern border of the Airport; a water treatment plant lies to the south; and a large energy plant and other miscellaneous buildings are to the north. Due to required safety areas and protection zones, further expansion of the runways and other related hangars and buildings are restricted. This creates a demand for the facilities that are currently at the Airport. Without the possibility of expansion, the highest and best use of the property that is available becomes extremely important.

One problem identified by the group was the use of aircraft hangars for non-aeronautical purposes, and to store non-aviation related equipment. This is significant because the FAA requires airports that accept federal funding to abide by Grant Assurances to ensure that airports maintain their facilities to promote the highest and best use of the Airport for aeronautical purposes and ensuring the viability of the property as an airport. Furthermore, an aircraft stored in a hangar has a greater potential to generate revenue for the Airport community through fuel usage, maintenance repairs, and patronage at other airport based businesses. Non-aeronautical equipment or storage does not provide the added revenue to the other businesses on the airfield and therefore limits the potential for those businesses and ultimately the Airport to survive.

Access to the Airport is extremely important. There were firsthand accounts of passengers arriving at Hartford-Brainard Airport thinking they were at Bradley International Airport. Signage in and around the City could be improved to better differentiate the two and provide better direction to each of the airports. It was expressed that when the roads are entered into a global positioning system (GPS), there is confusion between Maxim Road and Lindbergh Drive. It was suggested that providing a distinction between the Airport and the surrounding mixed use properties would result in a much needed identifiable "gateway" to the Airport.

In conclusion, the input from this SWOT workshop provided guidance throughout the business planning process in the development of recommendations.



5.0 LEASE OPPORTUNITIES & CONSTRAINTS

Understanding the opportunities and constraints of a property can assist in determining its best possible use and value. Since even privately-developed facilities at Hartford-Brainard Airport must meet state and national environmental requirements, it is important to understand the impacts any development may cause. Based on existing data available for the Airport, this section identifies potential development sites and their characteristics in terms of opportunities and constraints. Opportunities generally include items such as available access and infrastructure, while constraints include items that will negatively impact the cost of potential development of a site to the degree that development is either logically infeasible, or the regulatory burdens on a particular site make the site unattractive from a development standpoint, at the present time. The information found herein can be used as a marketing tool for potential developers as well as the Airport itself in meeting the challenges of long term airport facility planning.

5.1 Airport Development Factors

Several factors were used to assess each parcel for its development potential; these factors are discussed below and include:

- FAA Airport Design Standards;
- FAR Part 77 (Obstructions to navigation);
- Federal obligations
- Site topography;
- Utility availability or constraints (e.g., buried gas lines);
- Ground and airside access;
- Compatible land use
- Environmental considerations.

FAA Design Standards - Airport design criteria set forth by the FAA include safety factors that must be incorporated into the siting parameters of an airport development area. Included in these safety factors are FAA defined surfaces (Figure 5-1) that must remain clear for the safety of the aircraft operating at the Airport, such as:

Runway Safety Area (RSA)

The RSA is a defined surface surrounding a runway prepared for reducing the risk of damage to airplanes in the event of an undershoot, overshoot, or excursion from the runway. This area must also support snow removal, aircraft rescue, and firefighting equipment. The RSA should be free of objects, except for objects that must be located in the area because of their function.



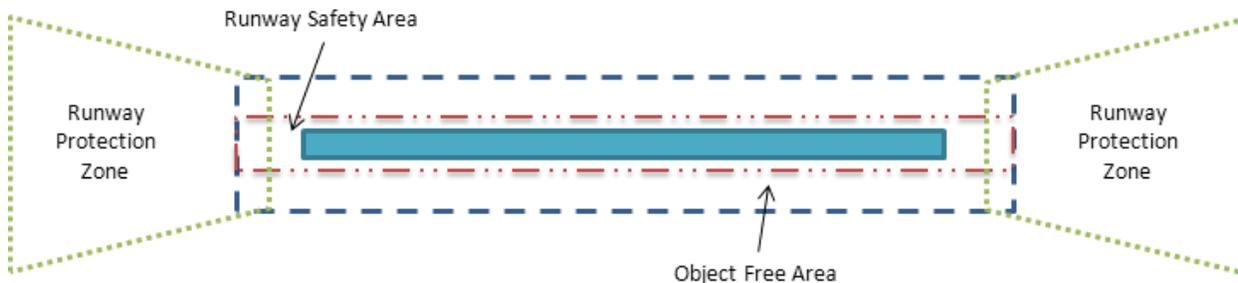
Runway Object Free Area (ROFA)

The ROFA is a ground area surrounding runways that should be clear of objects (e.g., roads & buildings), except for objects that need to be within the area due to their function.

Runway Protection Zone (RPZ)

Areas off the runway ends used to enhance the protection of people and property on the ground. The RPZ is ideally achieved through airport owner control, and the clearing of objects and undesired activities.

Figure 5-1: FAA Runway Surfaces



Source: CHA
Prepared: May 2011

Runway Visibility Zone (RVZ)

A defined area with a clear line-of-sight between two intersecting runways. The RVZ is created by imaginary lines between designated visibility points located on each runway. Terrain needs to be graded and permanent objects need to be designed so that there will be an unobstructed line of sight.

The RSA for the Runway 2 end does not adhere to FAA standards as the lagoons for the Metropolitan District Commission water treatment facility are within the safety area. The areas around the segmented circle, Automated Surface Observation System (ASOS), and localizer should remain clear to ensure proper operation of the equipment. Within 500-feet of the ASOS, any structures should be at least 15-feet below the tower height. While there are buildings currently within the 500-feet of the ASOS, coordination with the FAA should be conducted on any new structures.





FAR Part 77 (Obstructions to Navigation)

There are several Federal Aviation Regulations (FAR) Part 77 surfaces that protect the runway from airspace obstructions beyond the areas described above. The two surfaces that would potentially be affected by development are the Primary Surface and the Transitional Surface. The primary surface is similar to the OFA in size and function. The Transitional Surface extends outward and upward, at right angles to the runway centerline from the sides of the Primary Surface at a 7 to 1 slope. Coordination with the FAA, through an airspace and obstruction evaluation will typically resolve any minor penetrations of the transitional surface through the use of an obstruction light or applicable marking; thus adhering to FAA design standards.

Federal Obligations

Since Hartford-Brainard Airport has accepted federal funding, the Airport is considered federally obligated and any airport property described as part of an airport or defined by an Airport Layout Plan (ALP) is obligated for aeronautical purposes. Furthermore, the National Environmental Policy Act (NEPA) will be triggered by any development.

In situations where an approved ALP or Land Use Plan indicates that portion(s) of airport property are in excess to the Airport's present or future aeronautical needs, non-aeronautical development may occur. However, FAA Land Releases will most likely be required for any parcel that is recommended for non-aviation development, whether it is a long-term lease or an outright sell. A justification will be necessary for each parcel, detailing why the property is not needed for future aviation use and the benefit to the Airport of releasing the property from aeronautical use.

Topography

The ground must be reasonably level in order to be properly developed. Aprons and hangars have strict requirements, generally needing grades below two percent. The existing topography affects the cost of projects due to the amount of grading or filling that will be required to create level ground as well as proper drainage.

The airfield is relatively flat, thus it is not anticipated that the topography will restrict development.

Utilities Availability

Buildings may need electricity, water, sewer, and other utilities for their tenants. If not readily available, the utilities may be available to the parcel through an extension from existing infrastructure. Otherwise, they may require new laterals and service lines, which would increase development costs. Although not typically desired, local wells and septic systems may be feasible.



The Airport has access to all appropriate utility services, including: water, sewer, gas, and electric. These services are likely to be readily available and adequate to support any future buildings constructed to meet future airport demand.

Ground Access

Roads and parking lots for each of the parcels are essential. The development potential is generally low if such basic infrastructure must be provided by the tenant or developer.

Ground access is available along the west side of the Airport property via Lindbergh Drive and Maxim Road along the northern property line. Interstate 91 is located one mile to the west.

Airside Access

For aviation development, access to the airfield is imperative. Parcels may only need a small taxiway extension or apron to access the existing taxiway system. It is not considered feasible for aircraft to access the airfield by passing over roads, unpaved areas, or through an adjoining leased property.

Airside access is available to the west of Runway 2-20 and north of Runway 11-29 via the parallel taxiways. Airside access is not available to the east or south.

Zoning & Compatible Land Use

Development must be compatible with the Airport and its activities. The most common compatibility concern is noise. Therefore, additional residential development is not recommended near an airport and is prohibited on the Airport property. Any non-aviation development would also need to be compatible with the existing uses. This assessment assumes that the existing zoning will not be modified. Note that the state-owned airport property is not subject to municipal zoning or site plan approval regulations.

Airport property at HFD is bound to the north and east by the Clark Dike, which protects the Airport should the Connecticut River experience flooding. The Airport is also bound by Lindbergh Drive to the west, and the Metropolitan District Commission Water Treatment Facility to the south. Commercial and industrial properties surround the Airport to the west and north. The areas immediately east and south of the Airport are mostly residential, with undeveloped land that lies within the floodplain of the Connecticut River. The Old Wethersfield Historical District is in a 3.5 square mile area to the south of the Airport that includes residential, commercial, open space, and recreational areas.

The entire Airport property is zoned Industrial (I-2) which allows medium to heavy industry characterized by a minimum of noise, odor, glare, and pollution, and by moderate traffic on public streets. This zoning district is designed to encourage the maintenance and expansion of industry and to develop a more compatible relationship with surrounding residential areas. Although airports are not listed as an allowable use, the zoning regulations do not apply because the Airport is state-owned



Environmental Considerations

The impacts of development on the existing environment must be taken into consideration. While there are many considerations, the most common impacts are to wetlands, floodplains, cultural resources, and any sensitive habitat. When trees are removed, natural habitats, including: threatened or endangered species may get disturbed. For landside development, it is assumed that wetlands must be avoided, and permits would only be feasible for minor impacts (e.g., culvert of a minor stream). Since the Airport is State owned, wetland and other permits are regulated directly by the Connecticut Department of Energy and Environmental Protection (CT DEEP), not the local municipal wetland commission.

According to the United States Fish and Wildlife Service and Connecticut Natural Diversity Database, there have been several state-listed grassland birds spotted on the property, including the Upland Sandpiper, Grasshopper Sparrow, and Savannah Sparrow. There are no federally-listed threatened or endangered species or significant natural communities within the Airport property. However, a field survey may be required prior to any significant new development.

The Airport was delineated for wetlands in 1999, which identified a small area on the southeast corner of the Airport property, adjacent to the Clark Dike. There are no other known state or federally designated wetlands located within airport property.

Floodplains can be detrimental to development, as the property at one point may be flooded and new impervious surfaces increase flooding potential. For this review, development sites are not recommended within the 100-year floodplain.

Through a review of existing floodplain maps, the Airport's location is outside of the 100-year and 500-year floodplain and protected by the Clark Dike. Future development could potentially increase the quantity of stormwater runoff generated from an increase of impervious area. Whenever an increase of impervious surface is proposed, mitigation should be considered to minimize impacts.

The Connecticut State Historic Preservation Office (CTSHPO) ensures that any future development will not disturb any archaeological resources without mitigation. In addition, the Farmland Protection Policy Act (FPPA) preserves highly productive soils by requiring they be given proper consideration before they are converted to non-farming uses by federal programs.

Since the HFD is one of the State's earliest airports it is potentially rich in historical, architectural, archaeological, and cultural resources. Therefore, any indications of a crash site(s) on airport property may represent sites of historic aeronautical importance. Also, the floodplain and terraces of the Connecticut River often contain Native American archaeological sites, which apply to the entire airport property.

Two airport buildings, the Department of Aeronautics Headquarters and a circa 1935 hangar, are listed on the State of Register of Historic Places. While development within the Airport



property would seek to avoid impacting these resources, a review by CTSHPD should be completed prior to any significant new development. Additionally the Old Wethersfield Historic District, the largest historic district within the State, is located just to the south of the Airport.

5.2 Existing Leases and Recommendations

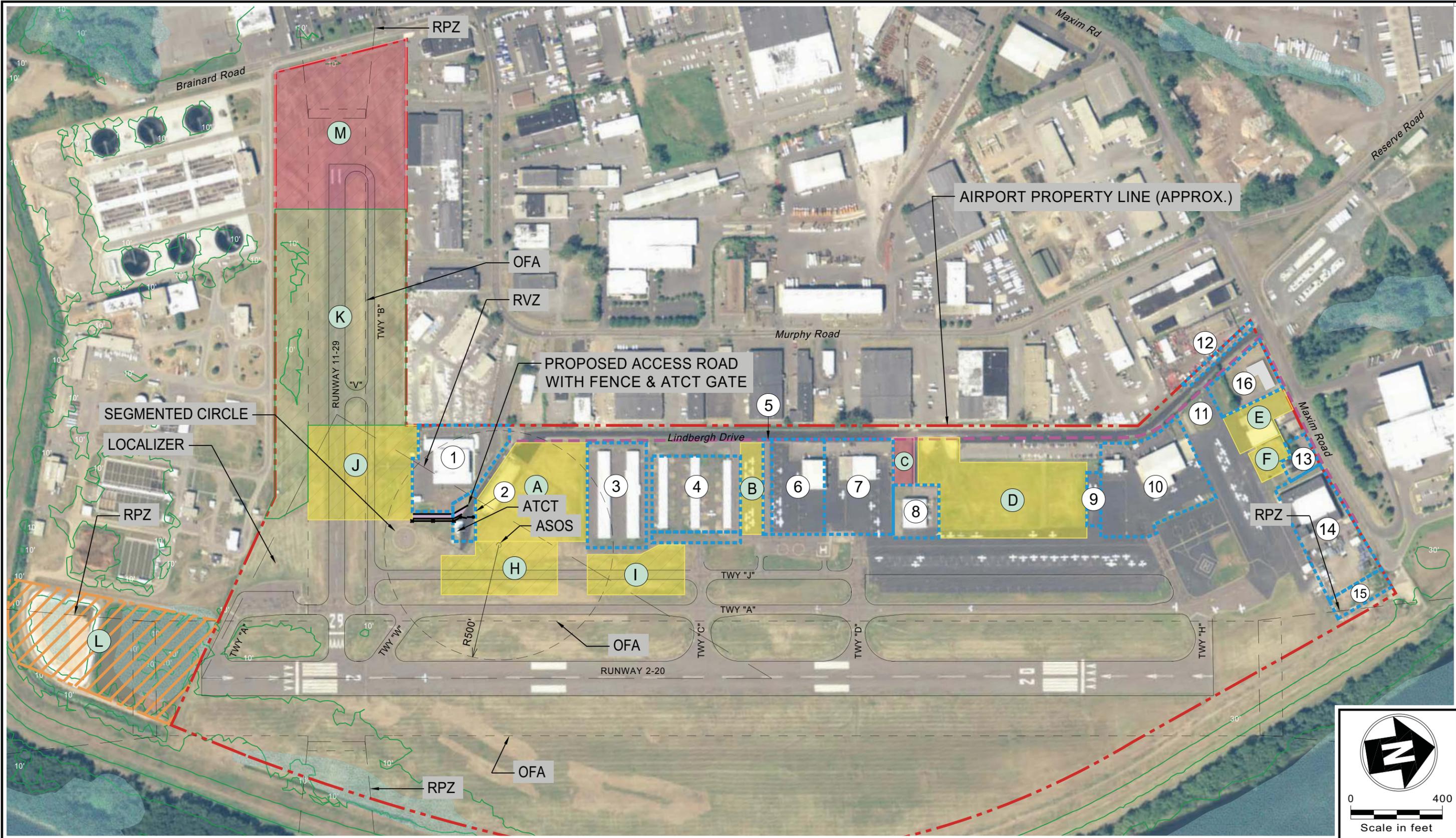
Figure 5-2 displays the existing leases on the Airport property. It is likely that those leases will be renewed when they expire; however, at that time, it is also a potential opportunity for a new tenant to provide the same or alternative service(s). Figure 5-3 on the following page provides a graphical representation of the property characteristics, existing lease areas and the potential development parcels at HFD.

Figure 5-2: Existing Airport Leases

<i>Parcel</i>	<i>Existing Tenant</i>	<i>Description</i>	<i>Lease Expires</i>
1	State Department of Education	Aviation School	2057
2	FAA	Control Tower	N/A
3	Connecticut T-Hangars Group	T-Hangars	2031
4	Hartford T-Hangars Group	T-Hangars	2023
5	State	Tie-downs	N/A
6	Atlantic Aviation (Sub-tenant – Executive Flight)	Hangar	2015
7	Atlantic Aviation (Sub-tenant – Premier Aviation & VIP Avionics)	Hangar	2015
8	Atlantic Aviation	Hangar	2015
9	State	Aircraft Ramp	N/A
10	Atlantic Aviation (Sub-tenants Wings Bar & Grill, Total Aircraft, CT Flight Academy, & Exxel Avionics)	Hangar	2020
11	Atlantic Aviation	Fuel Farm	2020
12	Vacant	Easement	N/A
13	CT Military Department	Offices	N/A
14	CT State Police Department / State Emergency Management	Office / Hangar	N/A
15	CT State Police Department / State Emergency Management	Parking / Storage	N/A
16	CTDOT Maintenance Facility	Maintenance	N/A

*Source: ConnDOT
Prepared: May 2011*

File: V:\PROJECTS\ANY\K2\22337\CADD\FIGURES\22337-HFD-5-3.DWG Saved: 1/23/2012 10:31:28 AM Plotted: --- User: Medina, Perry LastSavedBy: 976



LEGEND	AVIATION DEVELOPMENT	A POTENTIAL DEVELOPMENT SITE	AIRPORT PROPERTY LINE	 2139 Silas Deane Highway, Suite 212 • Rocky Hill, CT 06067-2336 Main: (860) 257-4557 • www.chacompanies.com	POTENTIAL DEVELOPMENT AREAS PROJECT NO. 22337 DATE: JAN. 2012 CT Airport Business Plan - Hartford-Brainard Airport (HFD)
	NON-AVIATION DEVELOPMENT	1 EXISTING PROPERTY LEASE	EXISTING LEASE LINE		
	NOT READILY DEVELOPABLE	UTILITIES	GROUND CONTOUR		
	WETLANDS	ACQUIRE	TOWN LINE		
	METROPOLITAN DISTRICT COMMISSION	WOULD REQUIRE RUNWAY 11-29 CLOSURE			



Figure 5-4 displays the most probable sites to be developed and their recommended use. Much of the Airport property is already developed or is utilized for the airfield. As the closure of Runway 11-29 may be considered by ConnDOT in this assessment provided development data for this area such that, the runway gets closed.

Figure 5-4: Recommended Parcel Usage

<i>Parcel</i>	<i>Current Use</i>	<i>Recommended Use</i>
A	Open Space	Hangars & Aviation Dependent Business
B	Tie-downs	Corporate or T-Hangar
C	Open Space	Non-Aviation Development
D	Turf Tie-downs	Hangars
E	Hangar	Hangar
F	Open Space	Aviation Dependent Business
G	Taxiway J	Apron / Tie-downs
H	Taxiway J	Apron / Tie-downs
I	Runway 11-29	Hangars
J	Runway 11-29	Aviation/Non-Aviation Development
K	MDC Lagoons	RSA & RPZ

*Source: CHA
Prepared: May 2011*

5.2.1 Airport Land Parcel Assessment

The undeveloped portions of the Airport property were evaluated using the listed factors and a set of potential parcels with proposed uses were generated. The parcel lines and uses are only guidelines and may be modified based on a tenant’s or developer’s desires. If interested, the State should encourage potential developers to create a larger development than shown by combining parcels.

As mentioned previously, utilities are available to each potential parcel on the property and the ground elevation is such that little to no grading or filling will be necessary for development.

Parcel A

Parcel A is currently a large open area that provides access to the Air Traffic Control Tower, but could be used for multiple conventional hangars and apron space. It is 4.3 acres and has access to both Lindbergh Drive and the airfield. If desired, this parcel could be subdivided and the area closer to the road used for non-aviation development or aviation dependent businesses. An FAA land release would be required for the parcel to be used for non-aeronautical use. Any hangar development in this area should avoid penetrating the transitional surface; otherwise



coordination with the FAA would be required. As the parcel is within 500 feet of the ASOS, it may also be affected by the ASOS height restriction.

Parcel B

Parcel B is a 0.9 acre site which is currently used for paved tie-downs and operated by the State. Since the Airport currently has an adequate quantity of aircraft tie-downs, Parcel B could be converted to provide t-hangars. Access to the taxiway on Parcel 5 would be needed. The parcel is along Lindbergh Drive which contains sufficient vehicle parking on its east side.

Parcel C

Parcel C is a small 0.4 acre open space along the driveway to Parcel 8 that could accommodate either an aviation dependent business, or non-aeronautical use, which would require FAA approval. The parcel is along Lindbergh Drive which contains sufficient vehicle parking on its east side. A drawback of Parcel C is that airfield access is not readily available without disrupting the activities of adjacent parcel operators. Parcel C may be combined with Parcel D, but an agreement would be needed with the Parcel 8 tenant, as their driveway would traverse the combined parcel.

Parcel D

Parcel D is currently a large open area that contains unused turf tie-downs. It could be used for multiple conventional hangars and apron space. It is 5.5 acres with access to Lindbergh Drive and the Airport vehicle parking lot. Any development on this parcel would require the markings on the adjacent tie-down ramp to be modified to allow taxiway access. This could be accomplished by removing the first row of tie-downs. This parcel may be subdivided if desired and the area abutting the road used for non-aviation development. However, that portion of the development would require an FAA land release. Any hangar development in this area should avoid penetrating the transitional surface; otherwise coordination with the FAA would be required. Parcel D may be combined with Parcel C, but an agreement would be needed with the Parcel 8 tenant, as their driveway would traverse the combined parcel.

Parcel E

Parcel E contains a large hangar along Maxim Road that was previously used for maintenance and office space. The site is 1.1 acres with both road and airfield access and a vehicle parking lot.

Parcel F

Parcel F is a one acre, open space at the corner of Lindbergh Drive and Maxim Road. In order to obtain access to the airfield, a small area of trees along the edge of the parcel would require removal. Should the site be used for aeronautical use, the site is suitable for one small hangar and vehicle parking. Depending on future demands of the Airport, this property could be used non-aviation use but would require an FAA Land Release.



5.2.2 Potential Redevelopment of Parcels

Parcel 6

The current leasers of Parcel 6 may consider constructing a t-hangar or small conventional hangars in place of the row of tie-downs on this parcel. This would still provide tie-downs for transient aircraft on their leased property, while increasing their potential hangar capacity.

5.2.3 Potential Closure of Runway 11-29

Should Runway 11-29 be taken out of service, along with the parallel Taxiway B, and Taxiway J, a sizeable area for development would result. Currently, Taxiways J is utilized for aircraft connecting to Taxiway B. If Runway 11-29 and Taxiway B were closed, the property occupied by Taxiway J may also be used for additional landside development. These parcels are shown as hatched on Figure 5-3.

Parcels G and H

Parcels G and H are currently part of Taxiway J, but could be used for tie-downs or as an apron. Parcel G is 2.5 acres and Parcel H is 1.9 acres. A site study that includes an evaluation of the Line of Sight from the tower would be required prior to the construction of any structure. While there is direct access to the taxiway system, vehicle access is limited. Any hangar development in this area should avoid penetrating the transitional surface; otherwise coordination with the FAA would be required.

Parcel I

Parcel I is currently part of Runway 11-29, and again, if the Runway were to close, this area would be suitable development, particularly aircraft hangars. Vehicle access could be provided from the ATCT access road. The existing gate on this road would be relocated closer to the tower and a fence installed to separate the road from the airfield. The 4.4 acre site would be inhibited from further development due to the segmented circle and localizer critical area. Any hangar development in this area should avoid penetrating the transitional surface; otherwise coordination with the FAA would be required.

Parcel J

Parcel J is currently part of Runway 11-29; however, if the Runway were to close, this property could be used by the MDC for the new treatment facilities. Covering 13.7 acres, discussions with the MDC regarding this parcel should happen prior to leasing any property in adjacent parcels to ensure there is adequate property available for the MDC. An FAA land release would be required if non-aviation development took place on this parcel. However, it is possible that a portion of this parcel may be suitable for aviation development.



Parcel K

Parcel K currently contains a pair of water treatment lagoons owned by the MDC on an 8.1 acre site. This property is within the RPZ & RSA for Runway 2-20 and should be acquired to ensure safe operations at the Airport. The lagoons may become unnecessary if a new treatment facility was constructed on Parcel J or I.

Parcel L

Parcel L is currently part of Runway 11-29, but could be used for non-aviation development if the runway closed. Estimated at 8.8 acres, this property could be subdivided as desired by developers. Discussions with the MDC should take place prior to leasing to ensure that adequate property is available for the MDC. Roadway access to this parcel could be provided along Brainard Road. An FAA land release would be required for the parcel to be used for non-aviation development.



5.3 Opportunities & Constraints Summary

The current airport property characteristics at Hartford-Brainard provide various parcels suitable for a range of aeronautical and potential non-aeronautical development. Notably, the closure of Runway 11-29 at HFD would greatly expand the Airport's development potential. Through the use of this section and Figure 5-3 in particular, ConnDOT is encouraged to promote the available development areas at the Airport using various outlets: online (ConnDOT website, CERC's Site Finder site...See Findings and Recommendations), local business associates websites, brochures, pamphlets etc. When used in conjunction with Figure 5-2, the following pages provide individual development parcel summary sheets that can be used to attract future development at the Airport.

The development parcels identified in this section were primarily based upon existing data and an existing Airport Layout Plan (ALP). The parcel limits as shown are generally intended for identification purposes. In some cases there may be an opportunity to combine adjacent parcels to meet the specific area needs and intended use of a potential developer. Furthermore, the primary limitation of a parcel's future use is whether or not the parcel has airside access. Typically, parcels with airside access are reserved for aeronautical use, while parcels separated from the airside such that an airside connection is not feasible or likely, are considered for non-aviation development. Therefore, the recommended uses identified herein are largely suggestions. The characteristics of future development including the parcel size and usage are ultimately agreed upon by the Airport Sponsor, the developer or interested party, and with approval by the FAA.



**Hartford-Brainard Airport
Development Parcel A**

Location: West of Runway 2 End

Access: Via Lindbergh Drive

Road Frontage: Approximately 310 Linear Feet

Approximate Area: 4.3 Acres, May be Subdivided

Predominant Soil Type: Udorthents-Urban Land Complex

Current Land Use: Open Space

Wetlands Present: None

Floodplains: None

Vegetation Cover: Approximately 85%

Topography: Relatively Flat

Public Sewer: Extend from Existing Infrastructure

Public Water: Extend from Existing Infrastructure

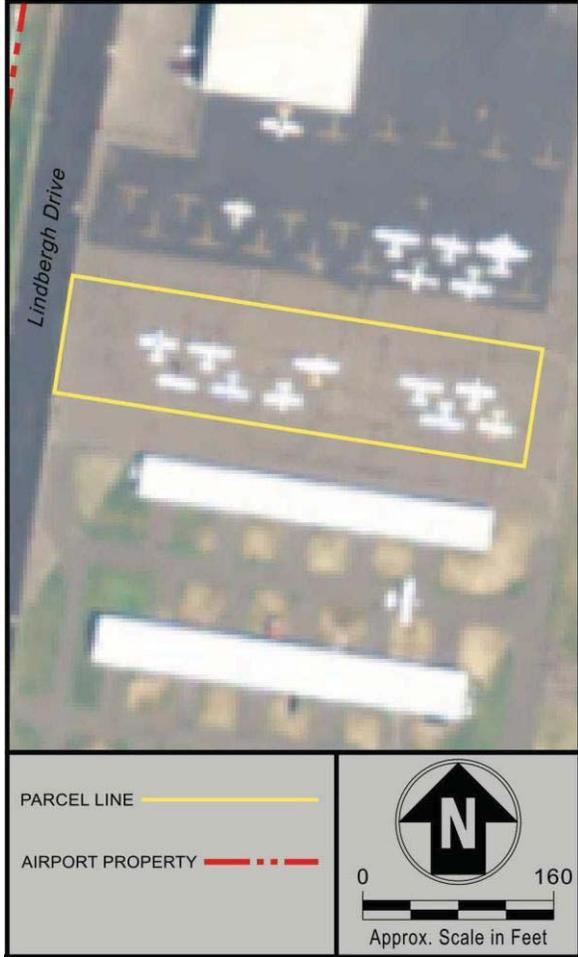
Electricity: Extend from Existing Infrastructure

Airside Access: Available with Taxilane Extension

Zoning: Industrial

Potential Obstruction: Coordinate with FAA if necessary

Comments: FAA Land Release required for non-aviation development.



**Hartford-Brainard Airport
Development Parcel B**

Location: Midfield, West of Runway 11-29

Access: Via Lindbergh Drive

Road Frontage: Approximately 130 Linear Feet

Approximate Area: 0.9 Acres

Predominant Soil Type: Udorthents-Urban Land

Current Land Use: Tiedowns

Wetlands Present: None

Floodplains: None

Vegetation Cover: 0% - Paved

Topography: Relatively Flat

Public Sewer: Extend from Existing Infrastructure

Public Water: Extend from Existing Infrastructure

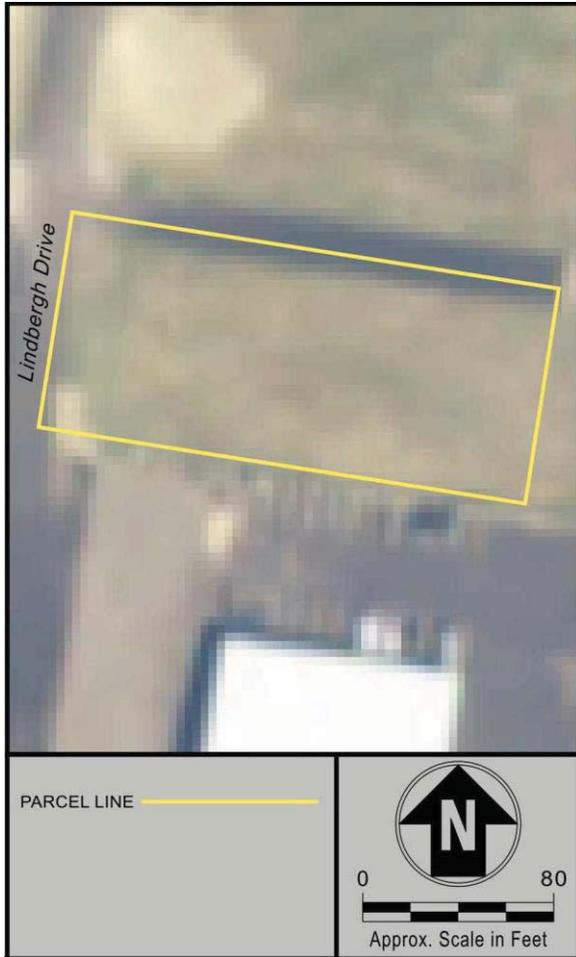
Electricity: Extend from Existing Infrastructure

Airside Access: Available

Zoning: Industrial

Potential Obstruction: Coordinate with FAA if necessary

Comments: None



Hartford-Brainard Airport Development Parcel C

Location: West of Runway 20 End

Access: Via Lindbergh Drive

Road Frontage: Approximately 80 Linear Feet

Approximate Area: 0.4 Acres

Predominant Soil Type: Udorthents, Smoothed

Current Land Use: Open Space

Wetlands Present: None

Floodplains: None

Vegetation Cover: 100% - No Pavement

Topography: Relatively Flat

Public Sewer: Extend from Existing Infrastructure

Public Water: Extend from Existing Infrastructure

Electricity: Extend from Existing Infrastructure

Airside Access: Limited

Zoning: Industrial

Potential Obstruction: Coordinate with FAA if necessary

Comments: FAA Land Release required for non-aviation development. Could be combined with Parcel D.



**Hartford-Brainard Airport
Development Parcel D**

Location: West of Runway 20 End

Access: Via Lindbergh Drive

Road Frontage: Approximately 730 Linear Feet

Approximate Area: 5.5 Acres, May be Subdivided

Predominant Soil Type: Udorthents, smoothed

Current Land Use: Turf Tiedowns

Wetlands Present: None

Floodplains: None

Vegetation Cover: Approximately 95%

Topography: Relatively Flat

Public Sewer: Extend from Existing Infrastructure

Public Water: Extend from Existing Infrastructure

Electricity: Extend from Existing Infrastructure

Airside Access: Available

Zoning: Industrial

Potential Obstruction: Coordinate with FAA if necessary

Comments: Tiedowns would need to be removed for taxiway access. FAA Land Release required for non-aviation development. Could be combined with Parcel C.



**Hartford-Brainard Airport
Development Parcel E**

Location: Northwest Corner of Airport Property

Access: Via Maxim Road

Road Frontage: Approximately 195 Linear Feet

Approximate Area: 1.1 Acres

Predominant Soil Type: Udorthents-Urban Land

Current Land Use: Hangar

Wetlands Present: None

Floodplains: None

Vegetation Cover: 0%

Topography: Relatively Flat

Public Sewer: Extend from Existing Infrastructure

Public Water: Extend from Existing Infrastructure

Electricity: Extend from Existing Infrastructure

Airside Access: Available

Zoning: Industrial

Potential Obstruction: None

Comments: None



**Hartford-Brainard Airport
Development Parcel F**

Location: Northwest Corner of Airport Property

Access: Not Readily Available

Road Frontage: None

Approximate Area: 0.5 Acres

Predominant Soil Type Udorthents-Urban Land Complex

Current Land Use: Open Space

Wetlands Present: None

Floodplains: None

Vegetation Cover: 100% - No Pavement

Topography: Relatively Flat

Public Sewer: Extend from Existing Infrastructure

Public Water: Extend from Existing Infrastructure

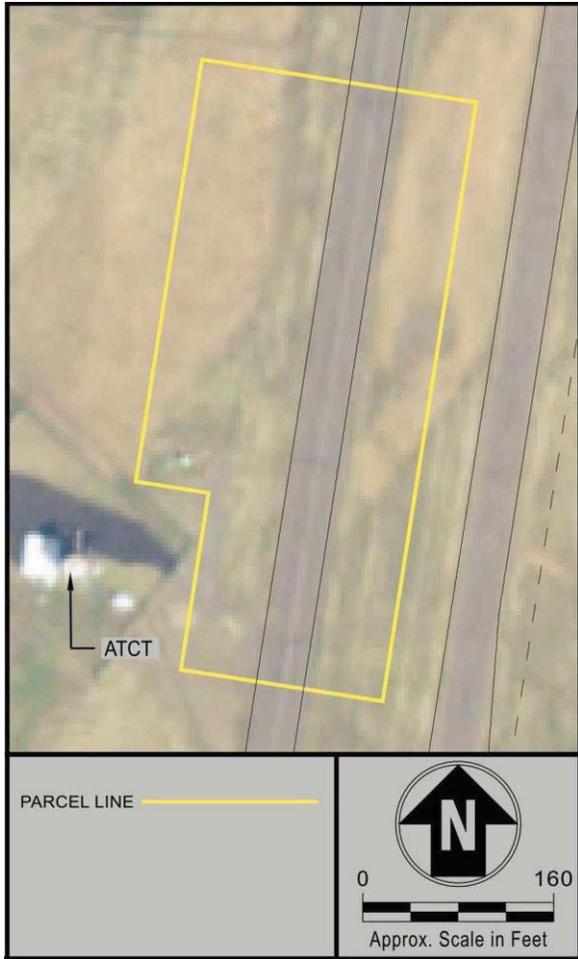
Electricity: Extend from Existing Infrastructure

Airside Access: Available

Zoning: Industrial

Potential Obstruction: Coordinate with FAA if necessary

Comments: Vehicle access would be required thru Parcel 13. Existing tie-downs will need to be removed to provide taxiway access.



**Hartford-Brainard Airport
Development Parcel G**

Location: West of Runway 2 End

Access: Not Readily Available

Road Frontage: None

Approximate Area: 2.5 Acres

Predominant Soil Type: Udorthents-Urban
Land Complex

Current Land Use: Taxiway J

Wetlands Present: None

Floodplains: None

Vegetation Cover: Approximately 75%

Topography: Relatively Flat

Public Sewer: Extend from Existing
Infrastructure

Public Water: Extend from Existing
Infrastructure

Electricity: Extend from Existing Infrastructure

Airside Access: Available

Zoning: Industrial

Potential Obstruction: Coordinate with FAA if
necessary

Comments: ATCT Line of Sight will need to be evaluated prior to any development. Not available unless Runway 11-29 is closed.



Hartford-Brainard Airport Development Parcel H

Location: West of Runway 2 End

Access: Not Readily Available

Road Frontage: None

Approximate Area: 1.9 Acres

Predominant Soil Type: Udorthents-Urban Land Complex

Current Land Use: Taxiway J

Wetlands Present: None

Floodplains: None

Vegetation Cover: Approximately 65%

Topography: Relatively Flat

Public Sewer: Extend from Existing Infrastructure

Public Water: Extend from Existing Infrastructure

Electricity: Extend from Existing Infrastructure

Airside Access: Available

Zoning: Industrial

Potential Obstruction: Coordinate with FAA if necessary

Comments: ATCT Line of Sight will need to be evaluated prior to any development. Not available unless Runway 11-29 is closed.



Hartford-Brainard Airport Development Parcel I

Location: Midfield Runway 11-29

Access: Road will need to be extended

Road Frontage: None

Approximate Area: 4.4 Acres

Predominant Soil Type: Udorthents-Urban Land Complex

Current Land Use: Runway 11-29

Wetlands Present: None

Floodplains: None

Vegetation Cover: Approximately 75%

Topography: Relatively Flat

Public Sewer: Extend from Existing Infrastructure

Public Water: Extend from Existing Infrastructure

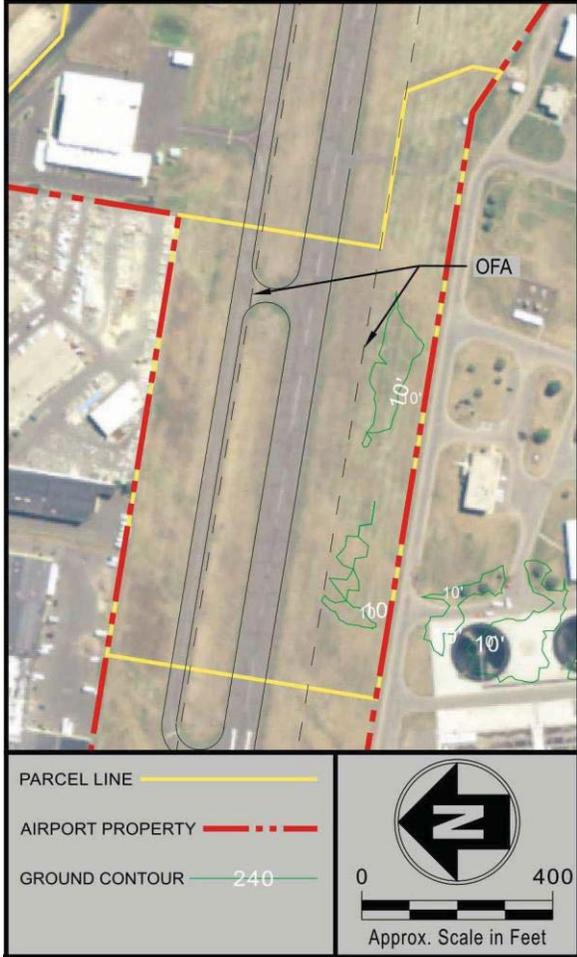
Electricity: Extend from Existing Infrastructure

Airside Access: Available

Zoning: Industrial

Potential Obstruction: Coordinate with FAA if necessary

Comments: Not available unless Runway 11-29 is closed.



**Hartford-Brainard Airport
Development Parcel J**

Location: Midfield Runway 11-29

Access: Via MDC Access Road

Road Frontage: Approximately 1,300 Linear Feet

Approximate Area: 15.8 Acres

Predominant Soil Type: Udorthents-Urban land Complex

Current Land Use: Runway 11-29

Wetlands Present: None

Floodplains: None

Vegetation Cover: Approximately 75%

Topography: Relatively Flat

Public Sewer: Extend from Existing Infrastructure

Public Water: Extend from Existing Infrastructure

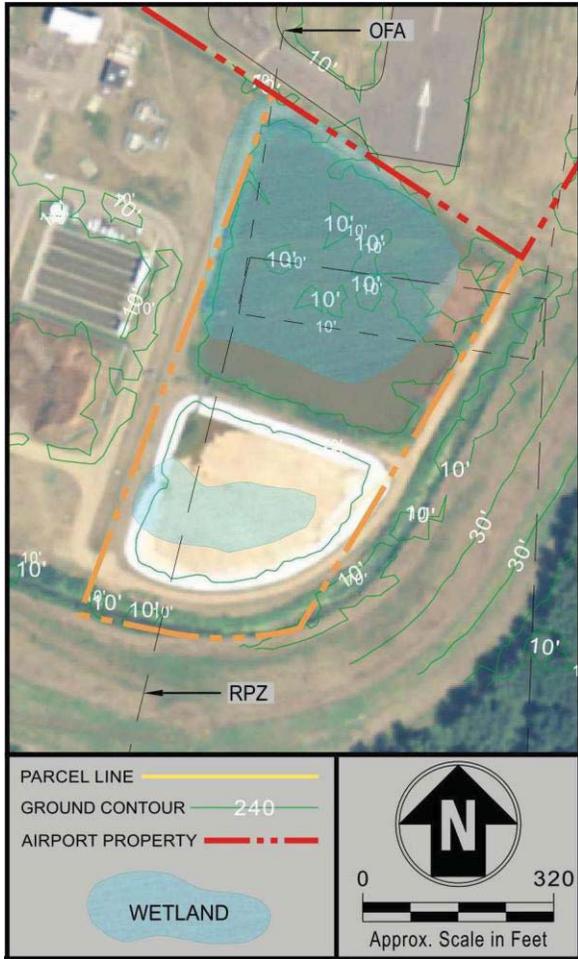
Electricity: Extend from Existing Infrastructure

Airside Access: Available

Zoning: Industrial

Potential Obstruction: Coordinate with FAA if necessary

Comments: FAA Land Release required for non-aviation development. Not available unless Runway 11-29 is closed.



**Hartford-Brainard Airport
Development Parcel K**

Location: End of Runway 2

Access: Via MDC Access Road

Road Frontage: Approximately 500 Linear Feet

Approximate Area: 8.1 Acres

Predominant Soil Type: Udorthents, smoothed

Current Land Use: MDC Lagoons

Wetlands Present: None

Floodplains: None

Vegetation Cover: 100% - No Pavement

Topography: Lower than Runway

Public Sewer: N/A

Public Water: N/A

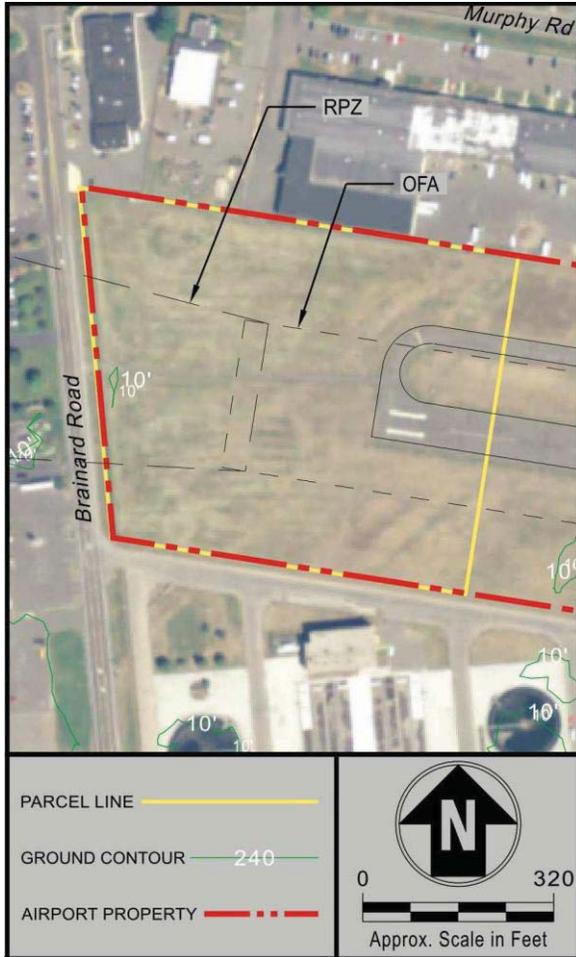
Electricity: N/A

Airside Access: N/A

Zoning: Industrial

Potential Obstruction: N/A

Comments: This property is not currently owned by the State, but could be acquired as part of a land swap with the MDC.



Hartford-Brainard Airport Development Parcel L

Location: Runway 11 End

Access: Via Brainard Road

Road Frontage: Approximately 570 Linear Feet

Approximate Area: 8.8 Acres

Predominant Soil Type: Udorthents-Urban land Complex

Current Land Use: Runway 11-29

Wetlands Present: None

Floodplains: None

Vegetation Cover: Approximately 85%

Topography: Relatively Flat

Public Sewer: Extend from Existing Infrastructure

Public Water: Extend from Existing Infrastructure

Electricity: Extend from Existing Infrastructure

Airside Access: Not Available if Parcel K Developed

Zoning: Industrial

Potential Obstruction: Coordinate with FAA if necessary

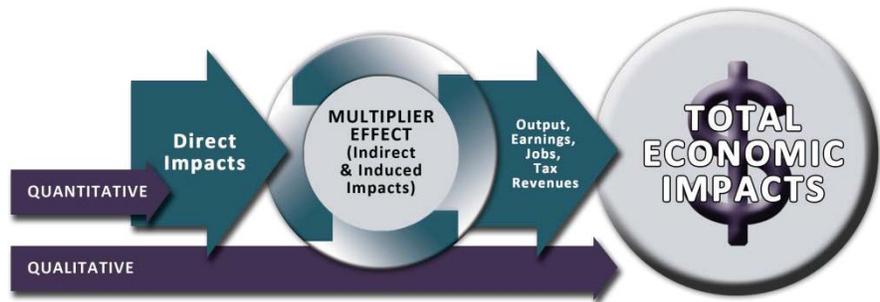
Comments: FAA Land Release required for non-aviation development. Not available unless Runway 11-29 is closed.



6.0 ECONOMIC CONTRIBUTION OF HARTFORD-BRAINARD AIRPORT

GA airports constitute important assets for state and local economies. Not only do they provide on-airport jobs, they indirectly support additional employment throughout the State. One of the most important benefits of GA is that it combines the flexibility of highway travel with the speed of air travel. Increasing highway congestion and time-consuming security screenings at commercial airports have made GA airports a welcome alternative for business travelers. In communities with a GA airport, many local businesses rely on the Airport to transport key personnel or clients and to ship goods. GA airports also serve visitors, including recreational pilots, flight school students, and visitors to local tourism attractions, who contribute to the region’s economy by purchasing goods and services from local businesses.

A study by the Alliance for Aviation across America, a non-profit coalition of 5,500 members that supports GA interests, found that GA contributes \$2.4 billion total or \$726 per capita to the Connecticut’s economy.¹



While the study’s methodology is not fully documented, it asserts that the economic contribution is generated by 176 aviation-related businesses - fixed base operations, repair stations, charter operators – at 22 GA airports in Connecticut.

Focusing on the Hartford-Brainard Airport in Hartford, Connecticut, this assessment starts with an overview of the demographic and economic characteristics of the City of Hartford and Hartford metro area, which will provide context for the economic contribution assessment that follows. Subsequently, the on-airport effects as well as the multiplier effects triggered by the four following activities are quantified: airport operation and maintenance expenditures; airport capital expenditures; airport tenant expenditures; and visitor spending by pilots and passengers. The economic effects are expressed in terms of jobs, labor income and output or sales revenue. In addition, the State tax revenues associated with the Airport are estimated using effective tax rates. Finally, additional benefits are discussed qualitatively.

A description of the methodology used to determine the economic contribution can be found in Appendix A.

¹http://www.aviationacrossamerica.org/States/Connecticut/Summary_of_Economic_Impact_of_General_Aviation_in_Connecticut.aspx; Accessed on August 18, 2011



6.1 Demographic and Economic Profile

To provide context for the economic contribution assessment, an overview of the municipality and larger metropolitan region in which the Airport is located is presented.

City of Hartford

The Hartford-Brainard Airport is located in the City of Hartford, Connecticut, three miles to the southeast of downtown Hartford. As the state capital and its third most populous city, Hartford counted 124,775 residents in 2010 according to the U.S. Census. Located in the heart of Hartford County, Hartford is the largest city in Greater Hartford Metro area and accounts for 10.3 percent its total population. In the past decade Hartford’s population increased by 2.6 percent from 121,599 in 2000.

Figure 6-1: Overview Map



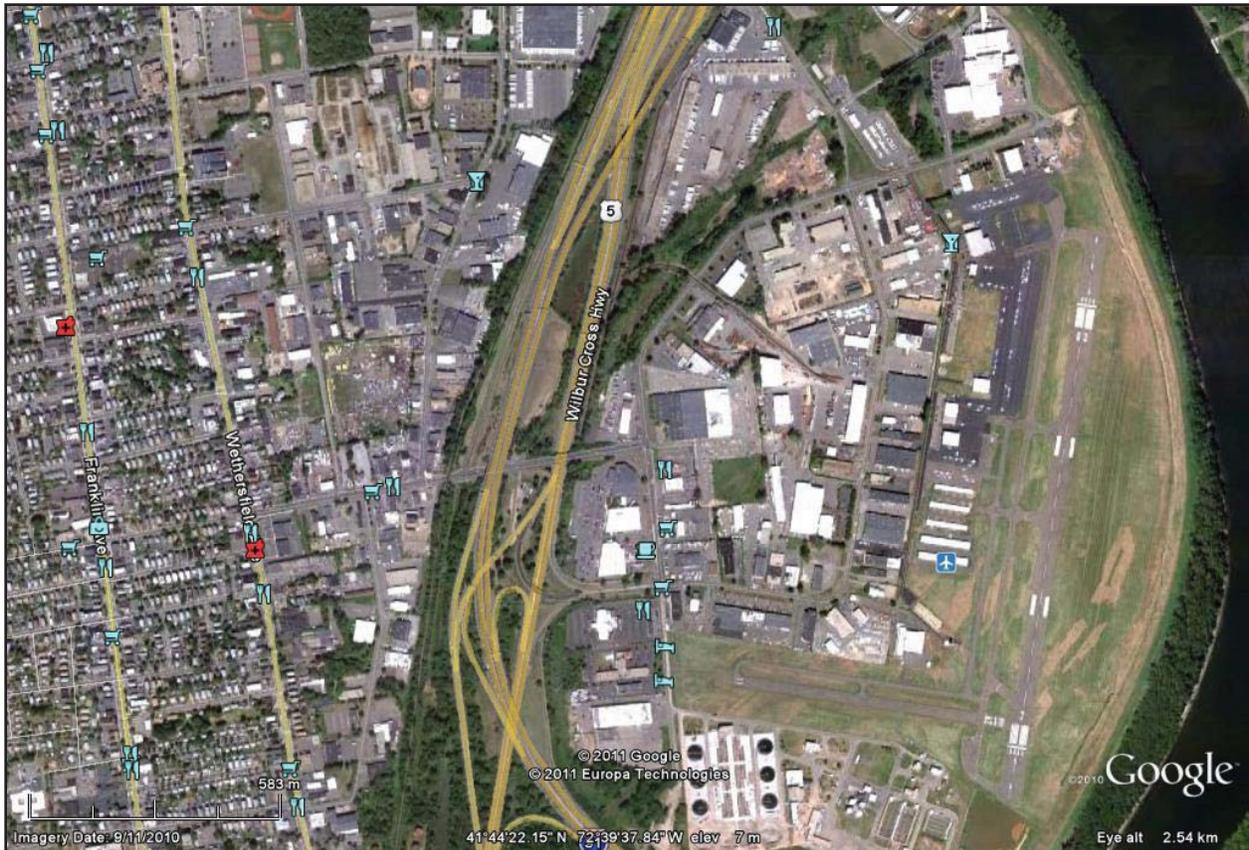
Total employment in Hartford totaled 108,005 in 2009. Nicknamed the “Insurance Capital of the World”, insurance companies are among the City’s largest employers. Firms such as The Hartford Financial Corporation, Aetna, and Traveler’s, are headquartered in Hartford. United Technologies, another large employer is headquartered in Hartford is the 16th largest manufacturer in the United States. Its divisions include key businesses in the aerospace industry, including Pratt & Whitney (aircraft engines), Hamilton Sundstrand (aerospace and industrial systems) and Sikorsky (helicopters). Other large employers in the city include the State of Connecticut, Hartford Hospital and St. Francis Hospital & Medical Center.

Dining and lodging near the Airport are convenient for visitors arriving by aircraft. The Airport is located three (3) miles to the southeast of downtown Hartford. Within one (1) mile of the



Airport, there are a total of 29 restaurants. These restaurants include 15 full-service and 11 limited-service restaurants, two (2) special food services places, and one bar.²

Figure 6-2: Area Surrounding Airport



Source: Google Earth

Hartford Metro Area

The Hartford metropolitan statistical area (MSA), as defined by the Office of Management and Budget, consists of Hartford County, Tolland County and Middlesex County. These three counties account for 34 percent of the State's population making this area Connecticut's most populous metro area with a total of 1,212,381 residents. The metro area population grew by 5.6 percent between 2000 and 2010. One third (33.7 percent) of the residents aged 26 and older have at least a bachelor's degree. As many as 40.0 percent of the workers³ who reside within the metro area have managerial, professional or related occupations. According to the 2005-2009 American Community Survey, median household income (in 2009 dollars) ranged from \$62,800 in Hartford County to \$76,500 in Tolland County. The metro area resembles the State of Connecticut as a whole in regard to occupations, education and income as shown in Figure 6-3.

² ESRI Community Analyst

³ "Workers" is defined here to include only employed civilians age 16 and over



Figure 6-3: Economic and Social Characteristics

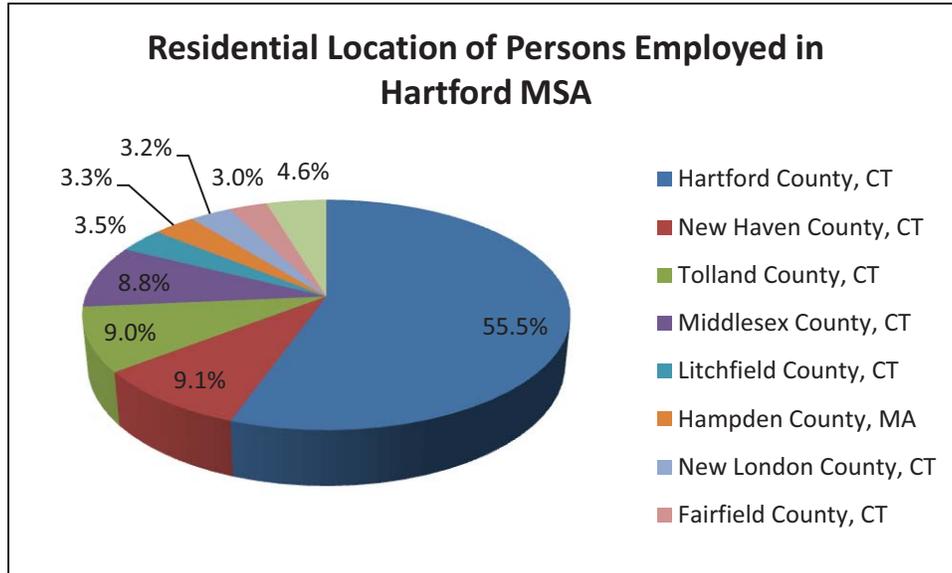
	Hartford County	Middlesex County	Tolland County	Metro Area	Connecticut
OCCUPATION					
Civilian employed population 16 years and over	432,283	86,437	79,331	598,051	1,745,261
Management, professional, and related occupations	38.9%	43.2%	42.2%	40.0%	39.6%
Service occupations	16.3%	14.2%	15.7%	15.9%	16.4%
Sales and office occupations	26.4%	24.9%	25.1%	26.0%	25.4%
Farming, fishing, and forestry occupations	0.1%	0.1%	0.2%	0.1%	0.2%
Construction, extraction, maintenance, and repair occupations	7.1%	8.1%	7.3%	7.3%	8.1%
Production, transportation, and material moving occupations	11.1%	9.5%	9.5%	10.7%	10.3%
EDUCATIONAL ATTAINMENT					
Population 25 years and over	590,432	114,706	91,213	796,351	2,344,192
Less than 9th grade	5.5%	2.7%	2.3%	4.7%	4.7%
9th to 12th grade, no diploma	7.7%	5.8%	6.3%	7.2%	7.1%
High school graduate (includes equivalency)	29.1%	28.2%	27.7%	28.8%	28.8%
Some college, no degree	17.4%	18.1%	18.9%	17.7%	17.1%
Associate's degree	7.5%	8.4%	8.9%	7.8%	7.3%
Bachelor's degree	19.0%	20.6%	19.9%	19.3%	19.9%
Graduate or professional degree	13.8%	16.3%	16.1%	14.4%	15.2%
INCOME					
Median household income (dollars)	62,829	74,965	76,498		67,721
Mean household income (dollars)	82,369	92,375	88,676		94,026

Source: 2005-2009 American Community Survey

In 2009 there were a total of 636,853 jobs in the three-county region according to the Bureau of Economic Analysis. The average income was \$54,000. According to “LED On the Map”, a tool from the U.S. Bureau of Census Longitudinal Employer-Household Dynamics Program, more than half (55.5 percent) of these workers reside within Hartford County. The two other counties in the metro area, Tolland and Middlesex, house 9.0 percent and 8.8 percent of the metro area workers, respectively. An additional 9.1 percent of persons employed in the Hartford metro area reside in New Haven County.



Figure 6-4: Employed Persons Location



Source: LED On the Map

Key Industries in the Hartford metro area include:

- ➔ Finance and insurance are leading industries in the City of Hartford as well as in the surrounding towns. Several insurance companies moved their offices out of the City of Hartford but remain in the suburbs of the Hartford metro area. Large employers in this industry outside of the City include Cigna in Enfield, and ING in Windsor.
- ➔ Medicine and research are also leading industries in the metro area. The 25 miles that separate the City of Hartford and the City of Springfield, Massachusetts is commonly referred to as the “Knowledge Corridor” due to high density of colleges and universities within this area. The Corridor includes 29 universities, 1.7 million residents, 1 million jobs and almost 40,000 businesses.
- ➔ The aerospace industry is another key industry in the Hartford metro area. Five of the eight largest companies in the State having operations within the region include: Barnes Aerospace in Windsor; EDAC Aero in Newington; Goodrich Corporation (Engine Control Systems) in West Hartford; Hamilton Sundstrand in Windsor Locks; and Kaman Aerospace Group, Inc. in Bloomfield.



6.2 Economic Contribution

As part of the assessment of the economic contribution of the Airport on the State and local economy, we quantified the on-airport effects (6.2.1) as well as multiplier effects (6.2.2). Additional contributions are discussed qualitatively (6.2.3).

6.2.1 On-Airport Effects

On-airport full- and part-time employment totaled 159 in 2010. The State of Connecticut employed four full-time persons at the Hartford-Brainard Airport to manage and maintain the facility. In addition to these permanent jobs, the State also supported two part-time seasonal jobs during winter. However, most of the on-airport employment was at the 16 airport tenant businesses, which collectively employed a total of 155 employees, including 91 full-time and 64 part-time employees. Tenants include the State of Connecticut, which has offices for the Aviation unit of the Connecticut State Police, the Department of Health's Disaster Medical Assistance Team and the Department of Emergency Management and Homeland Security. Other tenants include a full-service fixed base operator (FBO), which provides fuel and repair services, flight schools, aircraft insurance, aircraft repair, and avionics shops. One organization, Connecticut Aero Tech, part of the Technical High School System, offers an aircraft maintenance technician program. Figure 6-5 presents the tenant businesses. The combined employee compensation in 2010 including wages, salaries and benefits is estimated as \$13.3 million.

The jobs identified are directly dependent on the Airport and would not have been available in Hartford or in the Hartford Metro Area if not for the Airport.

6.2.2 Multiplier Effects

Jobs generated by the multiplier effect often account for a major part of the Airport's contribution to the region's economy. Multiplier effects are generated when spending at local businesses is re-circulated through the local economy because these businesses purchase inputs from other local businesses and their employees purchase household goods and services locally. In the case of the Hartford-Brainard Airport, the multiplier effects are triggered by four activities: (1) airport operation and maintenance expenditures; (2) airport capital expenditures; (3) airport tenant expenditures; and (4) visitor spending by pilots, passengers and students. These four types of spending generate additional jobs, income, sales and tax revenues in the Hartford metro area as well as throughout the State of Connecticut. These additional effects were estimated using input-output modeling techniques and the IMPLAN modeling system as described in Appendix A.

Airport Operation and Maintenance Expenditures

In 2010, non-labor operation and maintenance expenditures for the Hartford-Brainard Airport totaled \$81,453. Expenditures included building-related expenditures such as, electricity and maintenance, as well as non-building expenditures. In that same year, labor



expenditures, including fringe benefits, for the four (4) full-time permanent employees and the two (2) seasonal employees totaled \$767,350. Because vendors and employees use a portion of their income to make local purchases additional economic activity (i.e., multiplier effects) is generated.

Taking into account the multiplier effects, the estimated economic contribution of the Hartford-Brainard Airport management, operations and maintenance expenditures equals five (5) jobs, \$254,000 in labor income, and \$721,000 in output in the Hartford metro area. In the State of Connecticut, the economic contribution of these expenditures is estimated as 10 jobs, \$489,000 in labor income, and \$1,374,000 in output. State tax revenues associated with these expenditures, including personal income tax, corporate income tax and sales tax, total \$0.04 million.

Airport Capital Expenditures

In 2010 capital improvements at Hartford-Brainard Airport totaled \$770,000. Capital spending in 2009 was \$600,000.

Taking into account the multiplier effect, the total economic contribution of the Airport capital expenditures equals 10 jobs, \$0.6 million in labor income, and \$1.4 million in output in the Hartford metro area. In the State of Connecticut, the economic contribution of these expenditures is estimated as 13 jobs, \$0.7 million in labor income, and \$1.7 million in output. State tax revenues associated with these expenditures, including personal income tax, corporate income tax and sales tax, total \$0.5 million.

Airport Tenants

There are 16 on-airport tenant businesses that collectively employ 155 workers as previously outlined in this section. Of these employees, 91 are full-time and 54 are part-time. Using industry average wages, the estimated compensation for these employees is \$11.0 million. These tenants and their employees purchase goods and services at other local business, which generates additional economic activity through the multiplier effect. Taking into account the multiplier effect, the spending by the on-airport tenants and their employees is equivalent to 101 jobs, \$5.1 million in labor income, \$13.6 million in output in the Hartford metro area. In Connecticut as a whole, the economic contribution of these expenditures is estimated as 2105 jobs, \$5.4 million in labor income, \$13.6 million in output. State tax revenues associated with these expenditures, including personal income tax, corporate income tax and sales tax, total \$1.1 million.

Visitors

A small number of jobs are directly supported by non-resident airport users. This includes visitors who come to the region by aircraft and land at Hartford-Brainard as well as those who arrive by other modes of transportation to take training at on-airport schools. As these visitors purchase goods and services at off-airport businesses, they support jobs at



these businesses. Additional multiplier effects are generated as the vendors and vendor employees make additional local purchases.

Based on FAA data, there were a total of 34,600 GA itinerant operations at Hartford-Brainard Airport in 2010. An estimated 8,600 visiting aircraft landed at Hartford-Brainard in 2010, which corresponds an average of 24 aircraft per day.⁴

Based on a literature review of GA economic impact studies and data collected at this airport and other CT GA airports, LBG developed a series of assumptions that were used to estimate visitor spending. The following assumptions regarding visitors arriving by aircraft were used:

- Average of 2.7 visitors per aircraft.
- Twenty-five (25) percent of visitors stay overnight; the remainder are day trippers.
- Average off-airport visitor spending of \$231 per person per trip.

For students, the assumptions incorporate information obtained from the Hartford-Brainard flight schools on the number of out-of-state students and the duration of their stay. The following assumptions for students were used:

- About 3 out-of-state students per year who spend an average of two nights.
- Average spending off-airport spending for these short-term visitors is estimated at \$330 per student, per night.
- About 2 international students per year stay six months
- Average spending off-airport spending for these long-term visitors is estimated at \$165 per student, per night.

Based on the assumptions above, the total spending by visitors, including students, at Hartford metro area businesses was estimated at \$5.5 million. Assumptions regarding the number of visitors, average length of stay, and off-airport spending per aircraft used in this estimate are detailed in Appendix A.

The total economic contribution of visitor spending, taking into account the multiplier effect, equals 79 jobs, \$2.9 million in labor income, and \$8.3 million in output in the Hartford metro area. Statewide, the economic contribution of these expenditures is estimated as 81 jobs, \$3.0 million in labor income, and \$8.6 million in output. State tax revenues associated with these expenditures, including personal income tax, corporate income tax and sales tax, total \$0.2 million.

⁴ This estimate is calculated as follows 1) 34,563 operations divided by 2 equals 17,282 landings; 2) 17,282 times 50 percent equals ~ 8,600 visiting aircraft; This is based on the assumption that 50 percent of the arriving itinerant aircraft are based at the Airport and that the remaining 50 percent are not.



6.2.3 Other Effects

In addition to the economic effects listed previously, the Airport provides benefits to residents and businesses that are not easily quantifiable. Approximately 15 percent of the 86,200 annual operations at Hartford-Brainard in 2010 were for business purposes. Many businesses rely on the Airport for the transportation of goods or persons. The degree of dependency varies among businesses and is difficult to quantify. In some cases, this dependency may be so critical that the businesses would not be located in the region if the Airport were not there. For other businesses, the Airport may be responsible for cost savings or increases in market share and revenues, supporting an undetermined portion of the business's employees. Many local businesses use the Airport on a daily basis to transport key personnel and clients. The Airport also provides access to freight shipping including FEDEX. Other frequent airport users include Quest Diagnostics and AirNet Systems. Quest Diagnostics provides clinical laboratory testing. AirNet Systems provides delivery services for time-critical shipments in the United States. The company transports cancelled checks and related information for the banking industry. It also provides specialized delivery services to customers, primarily in medical testing laboratories, radioactive pharmaceuticals, medical equipment, controlled sensitive media, and mission critical parts industries. On weekdays, Wiggins Airlines flies a private shuttle for Northeast Utilities transporting employees between Hartford-Brainard and Manchester, New Hampshire.

The Airport is also frequently used by the Lifestar Helicopter of Hartford Hospital, a critical care helicopter service that provides air transport from accident locations and medical facilities to Hartford for Level I Trauma services. The Airport is also used for events such as air shows. While not during the study time period, the annual Aircraft Owners and Pilots Association (AOPA) Convention was held in Hartford in both 2007 and 2011. Among other reasons, Hartford was selected by the AOPA as the location for these three-day events because there are 30,000 pilots within 100 miles of the city and because pilots can fly their planes into Hartford-Brainard Airport.⁵ Furthermore, while the main event location was the Hartford Convention Center, AOPA hosted an AirportFest at the Hartford-Brainard Airport with aircraft on display. The event was attended by 7,000 persons in 2011.⁶ While no impact estimates were obtained for the 2011 event, the impact of the 2007 convention on the local economy was estimated at \$10 million.⁷

Additional non-quantifiable benefits include improvements in quality of life for residents by providing staging area for community events, access to recreational flying and flight training, and medical evacuation. Figure 6-6 presents the activities that are supported by the Airport and their frequency.

⁵ "Greater Hartford Gears Up for Return of AOPA Annual Convention to Meet September 22-24 at Connecticut Convention Center," The Airport News, September 19, 2011; Accessed at <http://theairportnews.wordpress.com/2011/09/19/greater-hartford-gears-up-for-return-of-aircraft-owners-pilots-association>; Accessed on November 30, 2011.

⁶ "Summit draws 7,000 to Hartford, 17,000 watch online," Press release AOPA Aviation Summit, September 28, 2011; Accessed at <http://www.aopa.org/summit/news/2011/110928summit-draws-seven-thousand.html#.TtU4ooRWriY.email>; Accessed on November 30, 2011.

⁷ "Hartford Flying High with Pilots," Hartford Business.com, June 13, 2011; Accessed at [http://www.hartfordbusiness.com/article.php?RF_ITEM%5B%5D=Article\\$0@18914](http://www.hartfordbusiness.com/article.php?RF_ITEM%5B%5D=Article$0@18914); Accessed on November 30, 2011.



Figure 6-6: Overview Activities at Airport

Activity	Daily	Weekly	Monthly	Occasional/ Seasonal	Never
Recreational flying	X				
Aerial agricultural spraying					X
Corporate/business activity	X				
Aerial inspections (pipeline, electric, etc.)		X			
Air cargo	X				
Flight training and instruction	X				
Police/law enforcement		X			
Military exercises/training		X			
Search & Rescue/Civil Air Patrol		X			
Emergency medical evacuation/patient transfer		X			
Forest/wildland firefighting					X
Aerial photography/surveying		X			
Aerial advertising/banner towing					X
Youth outreach (Young Eagles, scouting, etc.)				X	
Air shows				X	
AOPA annual meeting				X (2011)	

Source: Hartford-Brainard Airport

6.2.4 Conclusion

With full- and part-time employment totaling 159 in 2010, the Hartford-Brainard Airport is an economic asset to the City of Hartford, the Hartford metropolitan area, and the State of Connecticut. More than 8,600 visiting aircraft landed at Hartford-Brainard in 2010, carrying recreational pilots and business travelers. Indirectly, the Airport supports 209 jobs in Connecticut through multiplier effects triggered by airport operations, maintenance, capital spending and tenant and visitor spending. The total economic contribution of the Hartford-Brainard Airport in 2010 amounted to 368 jobs and \$44.9 million of output, including \$21.3 million of labor income, and \$1.4 million in state tax revenues in the State of Connecticut. Perhaps even more important are the less quantifiable impacts of the Airport. About 15 percent of the 86,200 operations at Hartford-Brainard in 2010 were for business purposes. The Airport



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contributes to the success of local businesses by meeting demand for time-sensitive cargo transportation and air transportation for key personnel and clients.

The overview of the economic contribution of the Airport is presented in Figure 6-7. The associated tax revenues are presented in Figure 6-8.

Figure 6-7: Overview Economic Contribution, 2010

	Hartford MSA			CT		
	Jobs	Labor Income (\$000s)	Output (\$000s)	Jobs	Labor Income (\$000s)	Output (\$000s)
On-Airport Jobs	159	\$11,787	\$18,595	159	\$11,787	\$18,595
Operations and Maintenance Spending	5	\$254	\$720	10	\$489	\$1,374
Capital Spending	10	\$582	\$1,351	13	\$696	\$1,677
Airport Tenant Spending	101	\$5,084	\$13,647	105	\$5,406	\$14,602
Visitor Spending	79	\$2,876	\$8,266	81	\$2,976	\$8,609
Total	354	\$20,583	\$42,579	368	\$21,354	\$44,857

Figure 6-8: Overview Connecticut Tax Revenues

Tax Type	(\$000s)
Personal Income Tax	\$980
Sales Tax	\$398
Corporate Income Tax	\$78
Total	\$1,456



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7.0 FINDINGS & RECOMMENDATIONS

Consistent with the objective of this Business Plan, this section provides the culmination of the tasks completed throughout the business planning process which provided a thorough understanding of the background and operational characteristics of the Hartford-Brainard Airport. Such understanding has identified strengths, weaknesses, including issues and opportunities on both facility specific and system-wide levels. Specifically, this Business Plan was developed through an intentional process that revealed issues and challenges, while identifying the benefits and opportunities of the Airport. As a recap, this process included the following:

- Section 1 – Introduction
- Section 2 – Existing Airport Characteristics
- Section 3 – Airport Market Area
- Section 4 – SWOT Analysis
- Section 5 – Lease Opportunities and Constraints
- Section 6 – Economic Contribution of Hartford-Brainard Airport

The facility specific findings and recommendations are relative to the operational characteristics, circumstances and historical trends of the Airport in particular, while the system-wide recommendations are relative to the entire state-owned airport system and would require implementation on a state level.

As mentioned in the Introduction to this Business Plan, when an Airport sponsor accepts a grant from the Federal Aviation Administration for an airport improvement project, the sponsor binds itself legally (federally obligated) to what are identified as sponsor assurances which effectively dictate the terms of the agreement between the sponsor and the FAA. Generally, these obligations require a prescribed use, operation, and maintenance of the Airport and remain in effect throughout the useful life of the assets developed under the improvement project, but do not exceed 20 years. Acquired property on the other hand is treated differently and all property acquired under the Airport improvement program with federal funds, remains obligated under this program in perpetuity. Release from the obligations for property acquisitions can prove to be a lengthy and expensive process. A copy of these assurances can be found in the Appendix of this Business Plan.

All recommendations found herein are intended to optimize the overall benefits and economic impact the Airport provides to the community and State, in a cost efficient and effective manner, while maintaining the need to meet the FAA's sponsor assurances. They are identified and provided in three primary categories which include:

- Operations and Management;
- Policy and Finance; and
- Marketing and Outreach.



7.1 System Wide Findings & Recommendations

The system-wide findings, recommendations and associated rationale can be found in the following subsections.

7.1.1 Operations and Management

Governance

During the development of this Business Plan the Governor of the State of Connecticut signed Public Act 11-84, *An Act Concerning the Connecticut Airport Authority* to govern Bradley International, Danielson, Groton-New London, Hartford-Brainard, Waterbury-Oxford, and Windham Airports. An excerpt from the Public Act is shown below:

PUBLIC ACT 11-84

AN ACT CONCERNING THE CONNECTICUT AIRPORT AUTHORITY

Sec. 2. Effective July 1, 2011. There is hereby established and created a body politic and corporate, constituting a public instrumentality and political subdivision of the state of Connecticut established and created for the performance of an essential public and governmental function, to be known as the Connecticut Airport Authority. The authority shall not be construed to be a department, institution or agency of the state.

In general, the governance of the State owned and operated GA airports has historically provided for safe, secure and efficient facilities. During the SWOT analysis, concerns from most airports regarding governance stemmed from the slow business process to implement development and lease opportunities at the facilities. Something that the CAA should be able to significantly improve by removing the multi-layered process that is currently in place (see also Leasing Policy and Capital Development section).

The existing structure with the Assistant Airport Administrator overseeing the system of GA airports is appropriate for the five GA airports. While this study did not include a review of Bradley International, the CAA should consider the continued sharing of resources for Administration, Financial and Project Management for all of their Airports under the CAA.

One additional position for the GA airports would be a centralized role overseeing lease and economic development opportunities at the GA airports. This position would report to the now called Assistant Airport Administrator. The CAA will ultimately need to decide on titles that fit within their overall organizational structure.

Centralized Role Overseeing Lease and Economic Development Opportunities at GA Airports

The GA airports could benefit from a dedicated economic development position. As ConnDOT transitions to the CAA, this position would allow a focused approach to business development at the GA airports to include the regular review of leases, rates, and charges. This person, in conjunction with the Airport Managers, would be the primary point of contact to initiate,



market, and develop new business opportunities including the development of relationships and a formalized plan to coordinate with state and local economic development agencies, local chambers, and tourism organizations in the promotion of the airports.

See also State and Local Economic Development Initiatives section.

Airport Recordkeeping

Like any business, financial and operations related data should be managed in an organized and professional manner. Under the present structure, operating budgets and expenditures for the GA Airports are spread across three State agencies and multiple financial systems including ConnDOT, and within ConnDOT they are spread across multiple bureaus including the Bureau of Aviation. This made construction of certain financial trends and allocations requested for the study challenging.

As part of standing up the CAA work is ongoing to pull all of this together under the same system as Bradley. The GA airports presently are integrated with the State transportation fund and not an enterprise fund but they are heading in that direction under CAA. The present structure is professional and in compliance with appropriate accounting standards.

In developing the business plan, gaps in historical airport operational data records were found that made trend analysis difficult to construct. Reporting on airport operational activity can be accomplished by setting up a standard reporting format. Standard reporting can be accomplished by identifying a limited number of areas to report on to include: total operations; total fuel gallons; based aircraft; revenues, expenses, and net income. This information should be reported for the reporting period (monthly basis) and then compared to the previous year's same period. A quarterly reporting cycle to present the historical data is adequate.

7.1.2 Policy and Finance

Tax Impacts and Proposals

Currently, the State of Connecticut does not impose a personal property tax on aircraft, or repair services for aircraft. This has had a positive effect on GA in Connecticut and has resulted in aircraft operators flying to Connecticut from other states to have aircraft repair work completed in order to benefit from the favorable tax treatment. This demonstrates that aviation taxes in New England are especially debilitating since aircraft owners can travel to nearby and bordering states with aviation tax exemptions to save money on aircraft related parts and maintenance services.

If the exemption were eliminated, repair stations in Connecticut would likely lose business to neighboring states such as Massachusetts, Rhode Island or New York that have more favorable tax policies. In fact, a survey sponsored by the National Business Aviation Association found



that 93 percent of operators with aircraft based in Connecticut would move their aircraft to neighboring states if an aircraft property tax proposal were passed.

To avoid the likeliness of aircraft owners moving their aircraft out of state, the likelihood of a subsequent reduction in fuel sales, and the possible loss of aviation related jobs in Connecticut, this Business Plan recommends that the State maintain the aviation tax exemptions currently in place in order to promote statewide GA initiatives, and to remain competitive in the market.

In addition, the State should continuously monitor all aviation related tax proposals at the federal, state and local levels, and any potential negative impact on the system and the economic benefits of the activities generated by the Airports. A current federal issue is the potential loss of the Contract Tower Program. This Program currently provides air traffic control services at Groton, Hartford and Waterbury Airports and the loss of this program would shift the cost to the State, or the airports becoming uncontrolled fields. The operational and economic impacts of such a loss would be significant for the State's system of GA airports.

Leasing Policy and Capital Development

Well planned airport development including leasing properties is extremely important to ensuring the viability and sustainability to today's airports. Encouraging positive growth and attracting businesses to develop on-airport projects can be a challenge but the rewards generally are commensurate to the effort put forward in the process. A key aspect of business development is consummating the negotiations between the Airport operator, which in this case is the State of Connecticut and prospective tenants. Ensuring the process is fair and equitable but will provide the Airport with enough revenue to maintain the facilities and provide the required services are important.

Currently, the existing process for executing a lease agreement from start to finish is extremely cumbersome and incorporates some twenty-two (22) separate steps in order to validate and execute a lease agreement. There are six (6) Departments within the State plus the potential lessee that must review the lease agreements in their entirety before the lease can be executed and signed. The current Departments within the State involved with the leasing process are as follows:

1. DOT Bureau of Aviation Leasing Unit
2. DOT Contract Administration
3. DOT Legal Unit
4. State Office of Policy and Management
5. State Properties Review Board
6. Attorney General's Office

The number of steps in the lease review and execution process can increase considerably if there are several points of the lease that are under negotiation between the State and the potential lessee. This can effectively tie up the lease in the review and approval process for



quite some time and there have been cases based on airport management accounts where during this period markets have changed and the opportunity for the potential investor has passed. It is for this reason minimizing the length of time for lease execution from start to finish is extremely important and why the leasing process needs to be unencumbered to ensure potential opportunities are not lost due to negotiation inactivity or a stalled process. Obviously, the complexity of the lease deal can play a role in the time it takes to execute, but an initial target should be 6 months or less.

Just as every airport is different, so are the needs for attracting new businesses. Drafting a lease that meets the particular needs of the Airport and its potential tenant is very important. It is recommended the State and airport management have a boiler plate lease prepared and in-place with draft language for standard aeronautical and non-aeronautical leases. The Airport should evaluate the different types of lease areas to meet the needs of the aeronautical and non-aeronautical leasing components as content for each lease will differ. Once the various types of boiler plate lease documents are established and as negotiations occur, additional language and specific provisions can be added but generally speaking the basis for the lease should remain unchanged. This will ensure the continuity of the leasing policy and expedite the leasing process to allow for an efficient negotiation and lease execution.

Each airport will be unique in the number and types of leases based on the diversity of the tenants. Below are some examples of different types of airport leases.

- Hangar Leases
- T-Hangar Leases
- Land Leases
- Fixed Base Operations (FBO) Lease
- Aeronautical or Non-Aeronautical

Additional areas of consideration for the Bureau of Aviation are the evaluation of the terms of the lease with respect to the amount of investment by the lessee and the type of area being leased. For example, long term leases should be reserved for investors willing to make significant improvements to the property including hangars, buildings, and aircraft parking aprons. Rent abatement for a given portion of improvements can be expected based on the level of investment made by the investor, but revenue such as land rent should be considered in order to assist the Airport in maintaining positive cash flow.

During a review of existing leases, it was noted that in many cases rent was being assessed at one or two rates which generally consisted of land rent or building rent. It is recommended that rent be charged based on the type of asset being leased. Some examples include:

- Hangar Space (T-hangar or convention box type hangars)
- Aircraft Parking Apron
- Office Space
- Unimproved Property



→ Improved Property

Given the significant number of lease agreements and tenants at each airport, keeping track of lease inception and termination dates, insurances, and other pertinent data can be time consuming. Ensuring this information is reviewed and updated as required is very important. While there are many components of an executed lease that are important, one of the most time-sensitive and critical is its termination date. In order to maximize the revenue airport facilities and property can produce it is important that leases set to expire within the next year are evaluated and given priority. Without having ample time to review the lease, gather market data, negotiate new terms with the lessee, or place the property out to bid via request for proposals can create problems and ultimately place the Airport at a disadvantage. In many cases exercising month to month terms, or multi-year options may not be in the best interest of the Airport depending on current market data and operational activity.

The leasing policies and the revenue these policies have the potential to generate, have a direct correlation with the capital improvement and development program for an airport. Capital development programs can be funded based on a number of factors to include:

Revenue Generation – The current or potential revenue the Airport can be expected to provide places the Airport higher on the list for funding when it competes with other airports within a single sponsor system such as the five GA airports in the State of Connecticut’s system. Simply stated the more revenue an airport can generate the more capital investment the Airport requires to sustain these revenues. (e.g., more aircraft operations results in higher pavement costs or higher passenger traffic require more facilities investment).

Safety of Aeronautical Areas – The safety conditions of the aeronautical areas such as runways, taxiways, and aircraft parking aprons are of significant importance when it comes to capital investment. Airport sponsors have a responsibility to ensure the safe operation of their facility and in many cases obligated through the FAA’s Airport Improvement Program. While participation in the Airport Improvement Program is voluntary, participation requires airports follow certain obligations as identified in the FAA grant assurance program.

Operational Capacity – The amount of aeronautical capacity an airport currently provides or has the potential to provide, are key factors in the level of capital development and investment the Airport should expect to receive. Trends in aviation and the local business climate can dictate the need for increased or decreased airport capacity.

The continuous improvement and streamlining of the leasing process over time will have a positive effect on the leasing of property and facilities at airports within the State of Connecticut’s aviation system. The results will be a quicker reaction time to investor and market demand; using staff more proactively to address lease issues; and charging rates that are market appropriate for the property or asset being leased (aeronautical vs. non-



aeronautical). **The leasing process should be improved prior to soliciting for lease development opportunities that are part of this business plan.**

Continuity of Rate Setting for Leases

The State should continue to utilize a consistent rate setting methodology by way of regularly conducting appraisals and valuations of property for lease development and renewals. This is a current practice and should be maintained. Airport valuations were completed for each Airport in this business plan and a copy is contained in the Appendix of this report.

Rates and Charges

Providing competitive rates and charges is key to maximizing airport revenue, and helps maintain existing based aircraft owners while attracting new business in the form of transient users. Incremental revenues can be generated through increases in certain regulated or contracted fees, such as fees for aircraft tie-downs, aircraft landing, and fuel flowage. In fact, a proposal was submitted by the Bureau that came as a result of a meeting with the Office of Policy and Management concerning revenue options for the Bureau of Aviation. At the time, the proposal indicated that a proposed adjustment to the rates and charges at the State owned GA airports would result in a \$218,000 annual increase in revenue for the entire system. However, complex external variables such as the fluctuating cost of aviation fuel, and the effect of economic uncertainty on GA makes quantifying forecasted revenues resulting from rate increases both difficult, and subjective. Nonetheless, improvements can still be made in this regard. The facility specific recommendations suggest that updating rates and charges would result in increased revenue for each Airport.

Due to the current protracted legislative procedure required to adjust airport rates and charges, it has been difficult for the Bureau of Aviation to maximize the revenues generated from typical airport related fees. During the course of this business planning process, it was brought to our attention that the rates were only increased once in the last twenty years. Anecdotal evidence also suggests that this may be suppressing the rates of airports in the market area.

To ensure that each of the system airports are remaining competitive, close monitoring of prevailing rates and charges are necessary. It is recommended that rates and charges at surrounding airports be tracked on a monthly or at least quarterly basis and a new, more timely, and less bureaucratic policy be adopted that allows the adjustment of airport rates and charges in a manner that is effective and reasonable. Granting the Connecticut Airport Authority full authority to amend and approve airport rates and charges is one solution that must be implemented.



Financial and Economic Contribution Review of the GA Airport System

Since ConnDOT owns and operates a system of airports it is important to review the financial activity and economic contributions of the GA airports as a whole. Figure 7-1 shows the historical system financial performance, and Figure 7-2 shows the Economic Benefits of the GA Airport System.

Figure 7-1: Historical System Financial Performance

	FY 06-07	FY 07-08	FY 08-09	FY 09-10	FY 10-11
Danielson Revenues	\$61,647	\$40,881	\$19,486	\$29,397	\$39,012
Groton-New London Revenues	668,543	548,372	461,184	454,722	513,759
Hartford-Brainard Revenues	445,012	496,550	431,880	458,193	481,258
Waterbury-Oxford Revenues	567,859	574,098	526,600	658,008	608,610
Windham Revenues	59,979	63,786	64,225	63,842	69,232
Total System Revenues	\$1,803,040	\$1,723,687	\$1,503,375	\$1,664,162	\$1,711,871
Danielson Expenses	\$61,043	\$62,937	\$92,508	\$90,302	\$101,634
Groton-New London Expenses	758,790	797,904	1,040,271	849,067	798,766
Hartford-Brainard Expenses	419,579	445,527	689,405	848,803	728,642
Waterbury-Oxford Expenses	565,408	634,908	905,240	931,405	932,710
Windham Expenses	178,992	183,872	186,510	153,124	156,857
Total System Expenses	\$1,983,812	\$2,125,148	\$2,913,934	\$2,872,701	\$2,718,609
System Operating Surplus/(Deficit)	(\$180,772)	(\$401,461)	(\$1,410,559)	(\$1,208,539)	(\$1,006,738)

Source: Consultant Calculations

Figure 7-2: Summary of Economic Benefits of the GA Airport System

	Jobs	Output
Danielson Airport	25	\$2,000,000
Windham Airport	65	\$7,500,000
Hartford-Brainard Airport	368	\$44,800,000
Groton-New London Airport	909	\$119,500,000
Waterbury-Oxford Airport	1,675	\$235,400,000
Total System Economic Benefits	3,042	\$409,200,000

Source: Consultant Calculations



The system of GA airports assessed operated at an annual deficit of approximately \$1.0 million in FY10-11 and an average deficit of approximately \$842,000 over the last five years. A significant portion of the deficit can be attributed to a more accurate accounting allocation of fringe benefits. In 2010, the system of GA airports did however provide an estimated \$409 million in economic output activity and 3,042 jobs to the State of Connecticut. The findings and recommendations of this Business Plan all look to provide the necessary resources to help reduce the System's annual deficit while increasing the economic contribution to the State.

7.1.3 Marketing and Outreach

While limited marketing and outreach efforts have historically fluctuated for the GA airports, the findings of this Business Plan indicate that a focus on the areas presented in this subsection will help increase the level of awareness and promote opportunities. This subsection has categorized the findings and recommendations into the following:

- State and Local Economic Development Initiatives
- Industry Association Marketing and Partnerships
- Establishment of a Statewide Aviation Group
- Statewide GA Airport Awareness
- Active Pursuit of Prospective Users and Tenants

State and Local Economic Development Initiatives

Specific initiatives with state and local economic development groups should be developed and coordinated on a regular basis. By bringing together both the public and private sectors to establish goals and objectives, investment opportunities involving the state owned airports can be more effectively realized and acted upon.

In an effort for the system airports to maximize their contribution in strengthening their local economies, it is recommended that airport representatives work with state and local economic development officials to manage existing and future development opportunities across the airport system. This should occur on a regular basis, not just when opportunities present themselves. This will allow better communication about opportunities in a progressive, proactive manner to maximize initiatives like those from the excerpted Public Act 11-1 below.

PUBLIC ACT 11-1

AN ACT PROMOTING ECONOMIC GROWTH AND JOB CREATION IN THE STATE.

Sec. 39. On or before October 1, 2012, and annually thereafter, the Connecticut Airport Authority shall report in accordance with the provisions of section 11-4a of the general statutes to the Commissioner of Economic and Community Development on airport development zones established pursuant to section 32-75d of the general statutes, as amended by this act. Such report shall include, but not be limited to, (1) information regarding traffic in and around such airports, impact of each zone on airport usage, and impact of each zone on employment within the airport and businesses located at the airport, (2) recommendations for any needed changes to an existing zone, and (3) recommendations for the establishment of any additional zones...



...b) Notwithstanding subsection (a) of this section, the Connecticut Airport Authority may establish additional airport development zones surrounding any of the general aviation airports, as defined in section 1 of public act 11-84, or any other airport within the duty, power and authority of the authority, as defined in section 3 of public act 11-84, upon receipt from the Commissioner of Economic and Community Development of a proposal recommending the establishment of such a zone.

It should be noted that the development of the Zones should not be a one size fits all approach. The regular interaction proposed above will provide for the dialogue to develop the specifics for each Airport's zone. Further, the lease opportunities and constraints section of this business plan identified potential development areas with recommended uses at each Airport. Individual marketing sheets summarizing the characteristics of each parcel are also provided. It is recommended that outreach efforts with private developers include the use of these marketing sheets, coupled with the market appraisal and market rent estimates provided within the valuation completed for each System Airport.

In working with economic development officials, this plan recommends that ConnDOT coordinate with the Connecticut Economic Resource Center (CERC) to upload the potential airport development areas to CERC's online database of available commercial properties called, SiteFinder (www.ctsitefinder.com). The use of all available tools, including SiteFinder, can help attract private development at the Airports and generate new revenue streams for ConnDOT while helping to grow businesses and jobs in Connecticut.

See Governance section for discussion on a centralized staffing role overseeing development opportunity at the GA airports.

Industry Association Marketing and Partnerships

At the core of the aviation industry are various organizations that represent the interests of a particular aviation function, from business users (NBAA) to private pilots (AOPA), aircraft manufacturers (GAMA) to experimental aircraft (EAA), among many others. The following are just some associations that ConnDOT should establish relationships with to allow for the promotion of the Connecticut GA airports. Existing relationships already exist in some cases, but have been identified here to point out the need for continued work to maintain the connections. Other unidentified industry partnerships should also be considered as they arise.

- **Aircraft Owners and Pilots Association (AOPA)** – AOPA's website (www.aopa.org) reports their Mission Statement as: *The Aircraft Owners and Pilots Association (AOPA), a not-for-profit individual membership association, effectively serves the interests and needs of its members as aircraft owners and pilots and establishes, maintains, and articulates positions of leadership to promote the economy, safety, utility, and popularity of flight in general aviation aircraft.*



Connecticut has an established relationship with AOPA in regard to hosting the AOPA Aviation Summit (www.aopa.org/summit/) at Hartford-Brainard Airport in 2007 and 2011. Each event has meant approximately \$10 million in economic impact activity and is a good example of the types of partnerships that can be established with these organizations to bring events, both large and small, to the State of Connecticut.

- **National Business Aircraft Association (NBAA)** – NBAA’s website (www.nbaa.org) reports their Mission Statement as: *To serve NBAA Members by promoting the aviation interests of organizations utilizing general aviation aircraft for business purposes in the United States and worldwide.* NBAA is involved in Connecticut through their support of the Connecticut Business Aviation Group (CBAG), but also holds events at various airports throughout the United States.
- **National Air Transportation Association (NATA)** – NATA’s website (www.nata-online.org/) reports that NATA is the national association of aviation business service providers. Their Mission is: *To be the leading national trade association representing the business interests of General Aviation service companies on legislative and regulatory matters at the Federal level, to provide education, services, and benefits to our members to help ensure their long-term economic success, and to provide for the well-being and continuity of the Association.*
- **Experimental Aircraft Association (EAA)** – EAA’s website (www.eaa.org/) EAA reports that: *EAA is a growing and diverse organization of members with a wide range of aviation interests and backgrounds. EAA was founded in 1953 by a group of individuals in Milwaukee, Wisconsin, who were interested in building their own airplanes. Through the decades, the organization expanded its mission to include antiques, classics, warbirds, aerobatic aircraft, ultralights, helicopters, and contemporary manufactured aircraft.*

One of many of their programs, the EAA offers is the EAA Young Eagles program. *This Program was launched in 1992 to give interested young people, ages 8 - 17, an opportunity to go flying in a general aviation airplane. These flights are offered free of charge and are made possible through the generosity of EAA member volunteers.* This program occurs at many GA airports including those in Connecticut.

There are various other aviation industry associations that can provide opportunities to promote aviation in the State of Connecticut. While sometimes these organizations may need to represent an interest that may not be in line with airport management, having an established relationship on a continual basis will help to foster positive support and benefits for aviation activity on the State.

ConnDOT should continue to work with regional representatives of these and other industry associations to identify initiatives, events and other types of activities that can be hosted at the State’s airports. This should be done on a regular basis and in a proactive manner to allow for the planning and promotion of the activity. This can bring economic activity to the airports in the form of fuel sales and local spending in the surrounding communities.



Establishment of a Statewide Aviation Group

In an effort to share ideas and events, as well as advocate for general statewide aviation related causes, many states have formed an airport management association, e.g. New York Aviation Management Association (NYAMA), and Massachusetts Airport Management Association (MAMA). Since the relatively small number of airports in Connecticut would make for a small state airport management association, it is recommended that the State support and advocate for the establishment of a similar state association comprised of airport managers and staff, government officials, aviation business representatives, advocates, professionals, and others, to advance the cause of GA in Connecticut.

The Connecticut Business Aviation Group (CBAG) is an organization that already exists within the State to promote business aviation aspects. Their website (<http://ctbag.org/default.aspx>) reports their Mission Statement as the following:

To serve the needs, and represent the interests of the Connecticut & greater New England business aviation community. To ensure that business aviation is considered as a vital and contributing segment in the overall aviation environment and economy.

And their objectives include:

- *To educate policy & decision makers of the group's existence; goals and contributions of business aviation in Connecticut*
- *Work with Transportation Security Administration (TSA) representatives to develop security policies that support business aviation*
- *Review & input into Part 150 noise study at BDL*
- *Review & input into northeast airspace redesign*
- *Establishment as a formal, continuing, active group*
- *Establishment of business aircraft friendly customs/immigration/agriculture support at Connecticut airports*
- *To provide a forum for the exchange of knowledge and ideas*
- *Invitation of high profile guest speakers*
- *Informal networking*

The recommendation of this Business Plan would provide for collective support of the various functions of aviation in Connecticut, not just business aviation.

To the extent permissible, this plan also recommends that ConnDOT (and the new CAA) work more closely with the Connecticut Legislative Aviation Caucus and the Connecticut Business Aviation Group (CBAG) to promote the quantitative and qualitative benefits of aviation to Connecticut.

A statewide aviation group can work to develop this relationship with the Caucus, CBAG and other industry associations.



Statewide GA Airport Awareness

Through direct employment, the support of local businesses, emergency services, safety programs, educational outreach, and environmental stewardship, GA airports boost local economies and serve communities. To facilitate airport and aviation awareness this business plan recommends that ConnDOT organize and host an annual aviation expo, and/or open house at each state-owned airport whereby the airports, their tenants and airport associated organizations open their doors to the public. It is anticipated that having such an event helps to inform the local communities of the vital role that the Airport and its tenants serve in providing aviation related services to the public. Airport open houses will also serve to promote the future vitality of aviation in Connecticut by providing an educational opportunity for the children and students within the local community to consider one of the many facets of aviation as a future career path.

Additionally, this plan recommends that in an effort to promote each of the facilities and build positive relationships with the communities they serve, that the airports encourage the use of any available meeting space and common areas (classrooms, conference rooms, etc.) to host various civic groups, clubs and community organizations (boy scouts, girl scouts, etc.). Offering the use of these areas to airport tenants can also foster cooperation among airport stakeholders.

Active Pursuit of Prospective Users and Tenants

While there are airport specific recommendations for lease development and opportunities, active pursuit of prospective airport users and tenants should be done continuously. In conjunction with the centralized role overseeing development opportunities at GA Airports, an annual plan that identifies targets for discussions should be established and implemented. This Plan should focus on the following areas:

- **National Promotion of Connecticut Airport System** – ConnDOT should promote the Connecticut Airport System as often as possible. This has been done by them in the past at NBAA annual events such as the Schedulers and Dispatchers Conference, but do to budget limitations, has not been done in the recent past. Other national events should also include: OshKosh Air Venture (www.airventure.org) and Sun-n-Fun (www.sun-n-fun.org). These events can be attended, provided advertising information on the system, or even host a joint State of Connecticut booth that promotes not only the airports, but Tourism and Business opportunities. The Statewide and airport specific brochures developed as part of this business plan will aide in this promotion.

ConnDOT and Airport Managers should seek discussions with local businesses with aviation interests, fractional aircraft ownership companies, and pilots in the region to promote the system of airports. The following provides just a few examples of what this would entail.



- **University of Connecticut** – Discussions from the research conducted in this Business Plan could not point to business development activity between the University and the GA system of airports. The University should be aware of the GA airports and their ability to support flight activities from the student, faculty and Board of Trustees as a means of transportation and also a resource to support the university establishment of a flight training program similar to Bridgewater State in Massachusetts.

- **Fractional Aircraft Ownership** – This type of aircraft ownership has become popular over the last decade and allows a user partial (fractional) access to an aircraft without the expenses of being a sole owner. While the destination airport is usually the customer's choice, discussions with fractional ownership firms can provide insight into the services that are required for them to use the Airport as well as a chance for ConnDOT to promote the Connecticut System of Airports. The Tri-State metropolitan area is a popular business destination, but the Airports in close proximity are at capacity for hangar storage. As can be seen with development activity at Waterbury and now Windham, aircraft management firms are utilizing outlying airports to store these aircraft and ferry them down to the metro airports when needed. This is a significant potential growth area for the Connecticut airport system and it should be marketed accordingly. Some fractional ownership firms include:
 - NetJets (www.netjets.com);
 - Citation Shares (www.citationair.com/Programs/JetShares);
 - Flex Jet (www.flexjet.com); and
 - Flight Options (www.flightoptions.com); among others.

- **Marketing to Pilots in the Region** – The type and level of services offered by any airport is often a contributing factor to the level of activity an airport experiences. As an example, Danielson's self-service fueling island now makes the Airport more attractive to pilots who would not otherwise use the Airport. To this end, each State Airport should identify services that can be marketed in order to make the Airport more desirable to potential users. This can be done relatively in expensively via a press release to local trade journals and aviation industry associations. This type of promotion can be done for various activities at the GA airports including events, new businesses, new services or promotions from an existing business, etc. Included in this should be regular review and updates to a website www.aimav.com that is used widely by industry users.

- **Joint Marketing with Tenants** – ConnDOT and each Airport Manager should work with existing airport tenants to understand their business plan targets and objectives, and support them when appropriate. This can include an understanding of their potential expansion plans where the State can look to identify economic development incentives that could improve the financial attractiveness of future investments at the Airport. This type of activity can work with the above two areas in identifying leads that could possibly be housed by an existing tenant.



7.2 Facility Specific Findings & Recommendations

Specific recommendations for the Hartford-Brainard Airport are based primarily upon the findings of the SWOT workshop conducted as part of this study, as well as existing and potential lease opportunities identified through an analysis of the Airport's current conditions, and a review of the Airport's historical revenues and expenses. The findings and recommendations that follow focus on strategies and methods that ConnDOT can use to maximize existing and future opportunities at HFD. Findings, recommendations, and associated rationale described below are provided in the categories previously outline.

7.2.1 Operations and Management

As mentioned in Section 3.0, for the purposes of this business plan, including Hartford-Brainard, there are 15 airports and 1,227 aircraft within the market area of HFD. Although varying in service level, the airports within the market area are home to based aircraft from which Hartford-Brainard receives air traffic, and can draw business from. Based on FAA data, local air traffic accounts for roughly half of the operations at the Airport, while the remaining is itinerant.

Based Aircraft

According to the information provided by the Airport, the number of based aircraft at HFD has declined slightly from 2004 to 2010 (172 to 162). Considering the effect of the economic downturn on GA across the country, although the based aircraft numbers have decreased, based aircraft levels at the Airport have been relatively stable. The Business Plan Alternatives, and Strategic Recommendations sections of this plan will look to provide scenarios and recommendations that can help the Airport sustain and increase the number of based aircraft into the future. Based on the market area identified in Section 3, Hartford-Brainard currently holds approximately 13% of the entire market share of based aircraft. ConnDOT should continually monitor the Airport's percentage of market share and look for ways to increase or at least maintain its market share percentage of based aircraft.

Fleet Mix

Typical of GA airports of similar size and function, over 90 % the fleet mix at HFD is made up of single-engine, piston driven aircraft. Due to historical based aircraft data, the fleet mix has been consistent over the past five years. If the Airport's physical characteristics (i.e., runway length) remain the same, unless a corporate flight department was to use HFD as a base of operations, no significant changes to the fleet mix, if any, are expected.

Aircraft Operations

Since HFD is a towered airport, records on aircraft activity are readily available. Based on prior year counts, operations since 2005 have declined by approximately 11% (80,170 to 71,030).



However, due to the economic downturn, compared to other GA airports who have seen their operations decline by 20% or more, the level of operations at HFD, although down, have remained relatively healthy. Based on historical tower data, the split between local and itinerant traffic has fluctuated over the years and has remained close to 40/60 since 2000. Contrary to a typical GA airport whose total operations are made up of mostly local air traffic from based aircraft and flight school activities, the fact that HFD experiences roughly 60% of non-local air traffic is representative of the value the Airport provides to the people who come to the Hartford area to visit or conduct business.

Instrument Operations

As previously mentioned, Hartford-Brainard offers instrument approaches in the form of LDA, GPS and VOR procedures. Historical counts of the number of instrument approaches at the Airport indicate that instrument operations have trended slightly upward since 2000 when instrument operations accounted for approximately 5% of total operations. In 2010, instrument operations accounted for nearly 8% of the total operations. Compared to airports without precision approach capabilities, airports that offer a precision approach generally provide greater benefits to its users since a precision approach makes an airport safer and more accessible during inclement weather conditions. GA airports with precision approach capabilities, such as HFD typically experience a greater number of aircraft operations as a result of instrument flight training activities and increased airport use during instrument weather conditions. Conversely, airports without precision instrument approach capabilities experience less activity comparatively and are generally less attractive to a potential tenant or based aircraft owner. Therefore, in order to sustain activity levels it is recommended that Hartford-Brainard maintain the existing approach capabilities of the Airport.

Fuel Sales

In many cases, fuel services at GA facilities provide the most important source of revenue for the Airport and FBO's that operate airport fuel farms. Piston engine aircraft in the GA fleet generally use 100 low lead AvGas, while the larger turbo-prop and jet aircraft use Jet A fuel, exclusively. Historical fuel records at Hartford-Brainard indicate that fuel volume has dropped roughly 11% since 2006 when the annual volume of fuel for the Airport was nearly 512,781 gallons, excluding exemptions. In 2010, annual fuel volume totaled 453,029 gallons. Airports with annual volumes of more than one million, typically sell jet A over AvGas at a ratio of 5 to 1 which suggests that a correlation between fuel volume and airport operations cannot always be made, however, since aircraft operations at the Airport have also dropped by roughly 11% from 2006 to 2010, historical airport records supports a possible relationship between fuel volume and airport operations at Hartford-Brainard.



Staffing

In order to meet the responsibility of assuring that the conveyance of all goods and services at the Airport are provided in a safe, sound, and efficient manner the Airport requires qualified and experienced aviation professionals.

The organization and staffing of an airport is as varied as the size of the facility and the community it serves. Large commercial airports require more complex organizational structures to support the activities associated with moving large volumes of people, cargo, and aircraft in and out of the facility. Conversely, the smaller the Airport the less complex the overall organization tends to be.

Hartford-Brainard Airport is a part of a larger system of airports that reports directly to ConnDOT management. Listed below, the ConnDOT system of airports includes one (1) large commercial airport and five (5) GA airports:

1. Bradley International Airport (BDL)
2. Groton-New London Airport (GON)
3. Waterbury-Oxford Airport (OXC)
4. Hartford-Brainard Airport (HFD)
5. Windham Airport (IJD)
6. Danielson Airport (LZD)

Having a system of airports has both positive and negative impacts on each airport within the system. This includes the ability to share resources with other airports within the system. The cross utilization of staff and equipment has the potential to save the State a substantial amount of money since some resources can be allocated across all system airports on an as needed basis. However, the ability to cross utilize staff resources does not necessarily ensure that staffing is adequate at each facility. Having adequate staffing goes beyond mere airport representation and allows the Airport to meet its goals most efficiently and effectively.

7.2.2 Policy and Finance

Minimum Standards/Rules and Regulations

As business operators are concerned, airport sponsors (ConnDOT) are encouraged to establish reasonable standards that are relevant to the aeronautical characteristics of the facility. Minimum standards are intended to ensure that a minimum level and quality of services offered to aircraft owners, pilots, and the general public are maintained at the Airport. Minimum Standards should be applied objectively and uniformly to all on airport commercial aeronautical activities, and should be tailored for an airport by examining the Airport's characteristics and how it differs from other airports.



Rules and Regulations adopted by airports are established to ensure the viability and safety of the Airport for its users. They should also be reasonable, non-arbitrary, and non-discriminatory, and apply to all airport users. All aeronautical activities, as well as the management operation, and control of the Airport shall be conducted in accordance with the established airport Rules and Regulations. Currently, each tenant must operate in accordance with their individual operating agreement with the State. However, ConnDOT is in the process of developing specific Rules and Regulations for the Airport that would apply universally to each tenant.

Existing Airport Leases

Well planned airport development including leasing properties is extremely important to ensuring the viability and sustainability to today's airports. Encouraging positive growth and attracting businesses to develop on airport projects can be a challenge but the rewards generally are commensurate to the effort put forward in the process. A key aspect of business development is consummating the negotiations between the Airport operator, which in this case is the State of Connecticut and prospective tenants. Ensuring the process is fair and equitable but will provide the Airport with enough revenue to maintain the facilities and provide the required services is important. Additionally, it is extremely important the leasing process be unencumbered by the bureaucratic process to ensure potential opportunities are not lost due to negotiation inactivity or a stalled process.

Overall the leases for the Airport were generally complete and accurate. The lease abstracts for the Hartford-Brainard Airport were reviewed and in some instances where additional questions remained regarding the content and terms of the lease, the complete lease agreement was referenced. Over the course of the lease review process there were some terms, rates, and charges that were identified as requiring further evaluation and discussion. The recommendations based on the results of this evaluation are as follows:

- During the lease terms review, it appeared that in many cases the leased areas owned by the Airport were only being charged one rate based on the number of square feet leased. The State should evaluate the implementation of tiered rates based on the type of space being leased. For example, the lease rates for offices, hangar space, aircraft parking aprons, and vehicle parking lots should be different as the maintenance and life costs for each asset differ and the market costs will vary as well. Additionally, these rates should be compared to the aviation appraisals and market information being submitted with the business plan. Updates to these documents are recommended on consistent basis to ensure current market value is being received by the Airport.
- The hangar located in the northwest portion of the airfield currently houses the Connecticut State Police Aviation Unit and some miscellaneous airport equipment could be a source of potential revenue. This hangar site and the associated apron space should be evaluated to determine to what degree the State Police or other tenants are serving the airports needs and meeting the highest and best use for the space for aeronautical purposes. If the market



demand is high for hangar and office space and the State has a suitable tenant it may be warranted to seek an alternate location and relocate the current tenants.

- The State allows the Experimental Aircraft Association (EAA) to host special events at the Airport at little or no cost to the organization. When the sponsor (State of Connecticut) accepted federal funding (Airport Improvement Grants) from the FAA they must agree to certain obligations or assurances. FAA Grant Assurance Number 24 requires leases, fees, and other charges must assist the Airport with making it as self sufficient as possible. While the State may be authorized to charge reduced rental rates to organizations, leases should be reevaluated to ensure compliance with FAA obligations and assurances.
- Over the past few years the management landscape at the Hartford-Brainard Airport has changed. Currently there is one large fixed based operator (FBO) at the Airport responsible for the operations management of a large portion of the property including the fuel farm at the Airport. Many of these properties have long term agreements and in most cases the property controlled have direct airfield access limiting the ability of new FBO development. This has been referred to as having a negative impact on the ability of other aeronautical operators to move in to the Airport and provide services similar to those being currently provided, and therefore create a more competitive environment.
- There exists an opportunity for Hartford-Brainard to attract additional development on new parcels of property. This potential development would require the State to move forward on two key initiatives before any development in the specific location are realized. The potential development site can be viewed in the future development drawing located in Section 5. This development area calls for the closure of Runway 11-29 and the acquisition of the aeration ponds off the end of Runway 2-20. This would allow the Airport to develop the property immediately adjacent to the facility for aeronautical purposes and non-aeronautical development could take place west the newly acquired property effectively bringing in additional revenue.
- Ensuring the State and the Airport are receiving appropriate compensation in accordance with the leases terms outlined is extremely important. Lost revenue due to errors in accounting or misrepresented sales number can create significant budgetary problems for the Airport. It is recommended that the lease terms be reviewed periodically along with insurances to ensure the minimum annual guarantees or percentage of sales due to the Airport and state are accurate.

The State and Airport Management should have a boiler plate lease in place with draft language for a standard lease. The Airport should also evaluate different types of leases as aeronautical and non-aeronautical leasing components and content will differ. Once the various types of boiler plate lease documents are established and as negotiations occur, additional language and specific provisions can be added but generally speaking the basis for the lease should remain unchanged. This will ensure the continuity of the leasing policy and expedite the leasing process to allow for an efficient leasing process and execution.



Airport Financial and Economic Contribution Review

Not unlike many GA airports, Hartford-Brainard Airport operated at an annual deficit of approximately \$247,000 in FY10-11 and an average deficit of approximately \$164,000 over the last five years. In FY06-07 and FY07-08, the Airport did have an operating surplus, but due to a more accurate accounting allocation of fringe benefits, the Airport is now operating at an annual deficit. In 2010, the Airport did however provide an estimated \$42 million in economic output activity and 368 jobs to the State of Connecticut. In order to reduce the Airport’s annual deficit while increasing the economic contribution to the State all efforts should be made to increase land lease revenue, airfield efficiency, hosting industry events and aeronautical activity levels.

It would not be practical for this business plan to make the assumption that all potential annual revenue from undeveloped land leases can be realized in the near future. However, based on the existing characteristics of available land parcels and as demand warrants, it is recommend that ConnDOT solicit requests for proposals (RFPs) for development, redevelopment, and expansion opportunities (e.g. Hangars, t-hangars, etc.) at the Airport in the short term. In addition, airfield efficiency improvements based on Master Plan recommendations should be made to increase the availability of the Airport; allowing for increased activity levels. Further, national industry events like AOPA’s Annual Summit brings a \$10 million economic impact. Events like this should be sought after and promoted. This activity, along with other recommendations to promote and coordinate the Airport facilities that are available to the public will make positive contributions to the Airport’s bottom line, as well as increase the economic output to the State of Connecticut.

Rates and Charges

As mentioned, one revenue enhancement strategy for Hartford-Brainard Airport includes monitoring and adjusting rates and charges to ensure the Airport is maximizing its revenue generating ability while remaining competitive in the market. Consistent with the Bureau’s previous proposal, current and suggested rates and charges are shown in the Figure 7-3. In regard to recommended rates and charges, the study team concurs with those presented in the Bureau’s proposal.

Figure 7-3: Current & Proposed Airport Rates and Charges

<i>Rate/Charge</i>	<i>Current</i>	<i>Proposed</i>
Aircraft Tie-Down Paved (Single/Multi-Engine)	\$55/\$55/month	\$90/\$105/month
Aircraft Tie-Down Grass (Single/Multi-Engine)	\$40/\$40/month	\$70/\$85/month
Fuel Flowage Fee	\$.08/Gallon	\$0.095/Gal –AvGas \$.11/Gal-Jet
Landing Fee (Up to 5,999 lbs.- 99,999 lbs.)	\$8-12	\$10-40

Source: ConnDOT

Prepared: December 2011



As leases at Hartford-Brainard expire, the State should continue to assure that the facilities being leased are done so at fair market value, in accordance with FAA grant assurances and in order to maximize airport revenue.

Lease Development Potential

The geographic location, close to downtown makes Hartford-Brainard a very attractive destination airport for corporate business type aircraft operators and the executives who prefer HFD over other regional airports with similar functions. However, since airside access is only currently available on the Westside of the airfield where development already exists, future development in the form of attracting aviation dependant businesses is limited. Section 5 provided recommendations for the existing parcels and considered uses for additional development that would be contingent upon the closure of Runway 11/29.

The professional valuation conducted as part of this effort suggested land lease rates between \$.40-\$.45/s.f. for primary airside parcels. Consistent with the parcels identified for aviation development in Section 5, Figure 7-4 provides the potential revenue gained through land leases if development was pursued, based upon the recommended rates. Non aviation development parcels were omitted since market rates were not prepared for those areas.

Figure 7-4: Potential Revenues from future land leases

Parcel	Size (Acres)	Rate	Potential Annual Revenue
A	4.3	\$.43/s.f	\$80,542.44
B	0.9	\$.40/s.f	\$15,681.60
D	5.5	\$.40/s.f	\$95,832.00
E	1.1	\$.40/s.f	\$19,166.40
F	.5	\$.40/s.f	\$8,712.00

*Source: LBG Calculations
Prepared: December 2011*

Based on the rates and parcels identified, development or re-development of parcels that would not require the closure of Runway 11/29 would yield nearly \$220,000 annually. Consistent with the recommended uses of these parcels in Section 5, it is recommended in the short term, ConnDOT solicit for private development on parcels A, B, E and F.

Promote Airport Competition – Solicit a second full service FBO

Section 5 identified a 4.4 acre site that would be well suited for an additional FBO if the Runway 11/29 were to close. However, considering the relative underutilization of the State Police hangar, it is recommended that the Airport consider a reuse for that space or potentially combine Parcel E & F to create a suitable location for a second FBO at the Airport. Considering that these areas are primary airside parcels with existing airside access, the attraction of an



additional FBO has real potential. As a business development strategy, it is recommended that ConnDOT solicit through an RFP process, the services of a privately operated full service FBO. In addition to revenues generated through charging fair market lease rates, ConnDOT could also realize increased revenue through charging the FBO a fuel flowage fee per gallon of aviation fuel sold. Contingent upon the volume of fuel sold at the Airport these revenues would likely increase as the number of based aircraft and aircraft operations increase.

Master Plan and Runway 11-29 Area Development

The on-going Master Plan that is being developed for the Airport is reviewing the potential closing of Runway 11-29. Section 5 provides options for the potential development of this area. Once complete, ConnDOT should move forward with the necessary steps to implement the recommendations concerning development and configurations of potential uses in this area.

Capital Program

Figure 7-5 identifies the projects included in the Airport's current 5 year Capital Improvement Plan (CIP) for Fiscal Year 2011 to Fiscal Year 2015. Most on airport, non-revenue generating projects are generally eligible to receive federal funding up to 95% of the project costs. Finally, although the projects listed on an airport's CIP represents a picture of the Airport's existing funding needs, the CIP is only a planning tool that gets updated regularly and doesn't necessarily mean that a project will occur or get funded.



Figure 7-5: Hartford-Brainard Airport Capital Program FY11 to FY15

<i>Projects</i>	<i>Total Project Cost</i>	<i>FAA Participation</i>	<i>State Participation</i>
FY11 Purchase Snow Blower	\$450,000	\$427,500	\$22,500
FY11 Master Plan Update	300,000	285,000	15,000
FY12 Construct ARFF & Maintenance Bldg	3,500,000	2,380,000	1,120,000
FY13 No Projects Planned	0	0	0
FY14 No Projects Planned	0	0	0
FY15 RWY 2/20 Rehab Design	300,000	285,000	15,000
Total Airport Capital Program	\$4,550,000	\$3,377,500	\$1,172,500

Source: ConnDOT

Nav aids/LPV/Precision Approach

Currently, the Airport only offers non-precision instrument approaches that provide horizontal guidance to a pilot approaching the Airport. The availability of an instrument approach that offers both horizontal and vertical guidance can greatly enhance the Airport’s safety, reliability, and overall value to the aviation community. Additionally, the access to an airport afforded by a more precise instrument flight procedure during inclement weather or instrument meteorological conditions (IMC) can precipitate increased aeronautical activities. Historically, most flight procedures have been based on terrestrial navigational aids (NAVAIDs) requiring a considerable investment in equipment and resources. However, recent advancements in aircraft navigational systems using Global Positioning System (GPS) technologies, is such that the infrastructure required to support traditional ground-based facilities is no longer necessary in obtaining an instrument approach. An LPV (Localizer approach with vertical guidance) is one such instrument approach that uses GPS technology to provide vertical guidance. It is recommended that the Airport consider the addition of an LPV approach to its capital plan. Although the necessary steps to implement this approach can be a lengthy process, it is important that ConnDOT include it on the Airport’s CIP. Upwards of around \$150,000 the cost associated with implementing an LPV approach can vary due to surveying and obstruction related costs however, 95% or more of the project is eligible to receive federal funds. Recently in some cases, as a result of FAA initiatives, the surveying component of these projects has been funded at 100% by the FAA.

7.2.3 Marketing and Outreach

Like the findings and recommendations for the System-wide components of this business plan for marketing and outreach, specific local efforts need to be focused on to further promote and enhance the Airport as a regional and local asset.



Some areas for Hartford-Brainard Airport to start were derived from the SWOT analysis workshop. This is not a comprehensive list and should be expanded as warranted from the outreach efforts, these initial areas include:

AOPA Aviation Summit

In 2007 and most recently in September 2011, Hartford, CT, and Hartford-Brainard Airport was host to the Aircraft Owners and Pilots Association (AOPA), three day, Annual Aviation Summit. Together with Hartford-Brainard Airport, and the Connecticut Convention Center, AOPA brought together its members and aviation enthusiasts to take part in various aviation related activities, and educational seminars focused on GA. Throughout the event, AOPA promotes the Airport Support Network (ASN) and meets with existing volunteers to discuss strategies to promote, protect, and defend community airports. In addition to a promotional event for GA, the event has a positive economic impact on the local community. This business plan encourages ConnDOT and HFD to continue to work closely with AOPA staff members to bring the AOPA Aviation Summit to HFD, again, sometime in the future.

Airport Entrance/GPS Automobile Navigation Issues

The SWOT Workshop conducted as part as the data collection effort of this plan identified an issue with the inability of automobile GPS units to identify with the Airport based on the Airport's published address. This plan recommends that ConnDOT adopt a tri-fold approach to this issue that includes improving the Airport signage such that the Airport's entrance is easier to understand, as well as contact GPS map source providers such as Tele Atlas and Navteq who provide maps for portable automobile GPS devices in an effort to improve the effectiveness of GPS navigation into the Airport. Third, this plan recommends that ConnDOT look at the feasibility of improving airport access by connecting Lindbergh Drive to Murphy Road such that the entrance and exit to and from the Airport makes one continuous loop as opposed to the one way in, one way out, roadway situation that currently exists.

Host Local Organization Meetings

One way to promote public outreach and improve community relations for GA airport operators is to provide airport facilities that can be utilized to host local organization meetings like Boy/Girl Scout Troop meetings, Young Eagles, etc. These will generate traffic to and from the Airport and have been known to result in a flight lesson, etc. for the Airport tenants. Among others, coordination should occur with:

- Local Governments and Communities
- Hartford Convention Center
- Technical School Promotion
- Host Aviation Days/Open Houses
- Market the Industrial Park



7.3 Business Plan Summary

As with any plan, whether it is a master plan or business plan, the need to be flexible is paramount since today's business climate is ever changing at a fast pace. Therefore, an organization that can effectively manage, monitor, and make adjustments to its business plan on a regular basis is more likely to realize achievements and obtain measurable outcomes. Overall, this Business Plan has identified system-wide and facility-specific recommendations for the State to implement based on the findings and information available at the time it was prepared. Again, it is important to remember that a business plan should be treated as a living document and updates should be made regularly. These recommendations seek to maximize the steps needed for the Airport's to reach their full potential and economic contributions to the State but were also developed with the need to be flexible. The recommendations of this Business Plan are summarized below:

SYSTEM-WIDE SUMMARY:

Governance Structure and Efficiencies

The governance by the new Authority should look to improve the efficiency of the business/leasing process for the GA Airports. This would also look to the continued sharing of resources for Administration, Financial and Project Management, and the GA Airports would be managed by an Administrator – GA Airports

Centralized Role Overseeing Development Opportunities

This would be a new or revised position. A specialized economic development position that focuses on all five GA airports.

Airport Recordkeeping

Improve the airport operational recordkeeping and fully assess the financial reporting during the transition of the Airports to the Authority.

Tax Impacts and Proposals

Continue to monitor and assess all proposals that change the tax structure in the State to include local, state and federal taxes and programs.

Leasing Policy and Capital Development

The current length of time to complete the lease process and the twenty-two steps must be reduced in order to meet with the dynamics of the business climate and close lease deals. All approvals should start and end with the new Authority. The improvement of the leasing process will have a positive effect on the leasing of property and facilities at airports within the State of



Connecticut's aviation system and should be a priority prior. The results will be a quicker reaction time to investor and market demand; using staff more proactively to address lease issues; and charging rates that are market appropriate for the property or asset being leased (aeronautical vs. non-aeronautical).

Rates and Charges

To ensure that each of the system airports are remaining competitive, close monitoring of prevailing rates and charges are necessary. It is recommended that rates and charges at surrounding airports be tracked on a monthly or at least quarterly basis and a new, more timely, and less bureaucratic policy be adopted that allows the adjustment of airport rates and charges in a manner that is effective and reasonable. Granting the Connecticut Airport Authority full authority to amend and approve airport rates and charges is one solution that must be implemented. In addition, the State should continue to utilize a consistent rate setting methodology by way of regularly conducting appraisals and valuations of property for lease development and renewals.

State and Local Economic Development Initiatives

Specific initiatives with state and local economic development groups should be developed and coordinated on a regular basis. By bringing together both the public and private sectors to establish goals and objectives, investment opportunities involving the state owned airports can be more effectively realized and acted upon. Initial initiatives should include:

- Airport Development Zones; these should be custom to each Airport.
- Utilize Available Parcel Marketing Sheets.
- Upload Available Properties to CERC's Site Finder site.

Industry Association Marketing and Partnerships

The State needs to maximize participation and coordination with national groups like AOPA, NBAA, and NATA among others. Events like AOPA's Aviation Summit are important from an economic perspective, but also look to promote the GA facilities in the State.

Establishment of a Statewide Aviation Group

The State should support and advocate for the establishment of an association comprised of airport managers and staff, government officials, aviation business representatives, advocates, professionals, and others, to advance the cause of GA in Connecticut. This would provide for collective support of the various functions of aviation in Connecticut, not just business aviation. To the extent permissible, this plan also recommends that ConnDOT (and the new CAA) work more closely with the Connecticut Legislative Aviation Caucus and the Connecticut Business Aviation Group (CBAG) to promote the quantitative and qualitative benefits of aviation to Connecticut.



Active Pursuit of Prospective Users and Tenants

While there are airport specific recommendations for lease development and opportunities, active pursuit of prospective airport users and tenants should be done continuously. In conjunction with the centralized role overseeing development opportunities at GA Airports, an annual plan that identifies targets for discussions should be established and implemented. This Plan should focus on three main areas:

- National Promotion of Connecticut Airport System.
- Active Pursuit of Prospective Users and Tenants.
- Joint Marketing with Existing Tenants.

FACILITY-SPECIFIC SUMMARY:

Based Aircraft

Utilizing more accurate operational record keeping, the State should monitor based aircraft market share for Hartford-Brainard Airport.

Staffing

The adequacy of staffing levels at HFD should be monitored regularly to ensure that the Airport's needs are being met in a timely and cost efficient manner.

Leases, Development Opportunities and Rates

The State should pursue the development of recommended parcels (Parcels A, B, C, D, E and F), Review Master Plan recommendations with regard to Runway 11-29, RFP for an additional FBO, assure existing leases meet federal obligations, and implement recommended rates and charges.

Capital Program

The capital program should consider pursuing a GPS/precision based approach for the Airport.

Local Marketing and Outreach

In coordination with System-wide efforts, local marketing and outreach should occur on a regular basis by the Airport Manager overseeing the facility.

In addition, a system-wide brochure and a facility-specific brochure were developed as part of this effort to summarize key aspects of the Business Plan including: facility information, the economic benefits of the facility, and lease development opportunities to be marketed by the State.



APPENDIX A: ECONOMIC IMPACT ASSESSMENT METHODOLOGY

This Appendix presents the methodology for estimating the economic contribution of the Hartford-Brainard Airport to the State and local economies in 2010.

The economic contribution of the airport includes two components that are quantified as part of this study.

- **On-Airport Effect** – The on-airport effect includes airport management jobs as well jobs at airport tenant businesses.
- **Off-Airport Effect** – The off-airport effects are triggered by off-airport spending by airport management, other on-airport businesses and visiting pilots, passengers, and students. As this spending is circulated throughout the regional economy, multiplier effects are generated. These additional jobs were estimated using input-output modeling techniques and the IMPLAN modeling system.

In addition to the economic effects listed above, the airport provides benefits to residents and businesses that are not easily quantifiable. Many businesses rely on the airport for the transportation of goods or persons. The degree of dependency varies and is difficult to quantify. For some of these businesses, the dependency may be so strong that they would not be located in the region if the airport were not there. For other businesses, the relationship may be less pronounced; the airport may responsible for cost savings or increases in market share and revenues, supporting an undetermined portion of the business' employment. Additional non-quantifiable benefits include improvements in quality of life for residents who enjoy flying, the availability of community space for events and the Airport as a means for emergency passenger transport.

What follows is an overview of input-output modeling and the IMPLAN system, the delineation of the study areas (regions), the methodology to estimate tax revenues, data collection efforts, and the detailed results of the economic impact assessment.

Input-Output Modeling

Input-output modeling techniques were used to quantify the multiplier effect triggered by regional spending by the airport management, tenants, employees and visitors. Input-output models are developed using region-specific data on inter-industry linkages, trade flows, and relationships between businesses and consumers and generate multipliers that can be used to

APPENDIX A

Economic Methodology



assess the contribution of a specific event or operation on a region's economy. A brief overview is presented below.

Multiplier Effect

The multiplier effect consists of three distinct effects presented below.

- The direct impact is the initial change in final demand resulting from the project, investment, or business operation under study. The direct effect is the economic activity that triggers the rest of the multiplier effect. An aviation-related example would be the purchase of an aircraft.

- The indirect impact is the change in economic activity in those sectors that supply services, materials, and machinery necessary to support the directly affected industries. In our example, an increase in orders for aircraft will result in an increased demand for aircraft parts. This increase in demand for aircraft parts will generate additional activity involved in providing raw materials, energy, and transportation for manufacturing parts, which in turn provides stimulus to the industries supplying those industries. This ripple effect stemming from a change in final demand for products and services in the directly affected industry is multiplied throughout the economy and can account for a significant amount of the total effect.

- The induced impact is the effect of increased consumer spending by wage earners in the directly and indirectly affected industries. The ripple effect from this spending can also be followed through the economy.

Together, the direct, indirect and induced impacts constitute the multiplier effect. Expressed numerically, a multiplier of 2.5 indicates that for every dollar directly generated by the industry under study, an additional \$1.50 of ripple effects are felt within the region, for a total impact of \$2.50 ($\$1.00 + \$1.50 = \2.50).

Region or Study Area

Only spending that takes place within the region will generate a multiplier effect. Spending that takes place at vendors located outside the region is termed "leakage," and does not generate an effect in the study area. The multipliers generated with the IMPLAN system are specific to the study area, taking into account its industrial composition and trade flows.



The regional economic impact is defined for the following study areas:

- 1) Hartford-West Hartford-East Hartford, CT Metropolitan Statistical Area
- 2) State of Connecticut

The Hartford-West Hartford-East Hartford, CT Metropolitan Statistical Area as defined by the U.S. Office of Management and Budget is composed of three counties.

Figure AA1: Study Area

Hartford-West Hartford-East Hartford CT Metropolitan Statistical Area
Hartford County
Middlesex County
Tolland County

Measures

The multiplier effect is expressed in terms of the following measures:

- Number of jobs;
- Labor income, which includes both employee compensation (i.e., wages, salaries and benefits) and proprietor's income (i.e., self-employment income and benefits);
- Output, which is defined here as total sales revenue which equals the sum of labor income, other property type income (e.g., corporate profit), indirect business taxes (e.g., sales tax) and the cost the intermediary inputs; and
- State tax revenue associated with increased economic activity, which includes sales, personal income and corporate income tax.

Tool

The modeling system used in this study was IMPLAN, an input-output modeling system that was originally created by the US Forest Service to help it gauge the effects of its policies on regional economies and is currently owned by Minnesota IMPLAN Group (MIG). The model has since grown in popularity for use in economic impact studies for a wide range of economic sectors. IMPLAN has undergone several rounds of refinements since its inception. The latest version was released in 2009 and includes the ability to conduct multi-regional analysis.



Tax Methodology

To estimate state tax revenues generated by the Airport, effective tax rates were developed for personal income tax, corporate income tax and sales tax.

Personal Income Tax

Connecticut residents are subject to a state personal income tax, which constitutes the largest source of tax revenue for the State. Since there is no single tax rate - CT has a tiered personal income tax system with different tiers depending on the filer's status – personal income tax associated with the General Aviation activity was estimated using an effective personal income tax rate. The effective rate was estimated based on the historical relationship between labor income and personal income tax revenue. More specifically, it was calculated by dividing (1) the average of FY2009 and FY2010 Connecticut personal income tax revenue as reported by the Connecticut Office of Policy and Management by (2) the 2009 Connecticut labor income included in the IMPLAN system.

The resulting effective personal income tax rate is 4.8 percent. This rate is applied to the direct, indirect and induced economic effect to estimate the total personal income tax revenue.

Figure AA2: Personal Income Tax Effective Rate

Personal Income Tax Revenue (in \$M)	6,486
Labor Income (in \$M)	136,245
Effective Personal Income Tax Rate	4.8%

Sales tax

Sales and use tax is the second largest source of tax revenue in Connecticut. In 2010, state sales tax equaled 6 percent and applied to retail sales, leasing and rental of most goods as well as lodging.¹ Certain goods were taxed at different rates included hotel room (12 percent) and motor vehicle rental (6.35 percent). An effective sales tax rate was estimated based on the historical relationship between total output or sales revenue and sales tax revenue. More specifically, the effective tax rate was calculated by dividing (1) the average of FY2009 and

¹ In 2011 the General Assembly made legislative changes that affect sales and use tax, including an increase in sales and use tax which took effect on July 1, 2011. As of this date, general sales and use tax was increased to 6.35 percent, room occupancy tax to 15 percent, and sales tax on short-term rental and leasing on passenger motor vehicles to 9.35 percent. These increased rates were not applicable during the study time period, which is 2010, and are therefore not incorporated in this analysis.



FY2010 Connecticut sales tax revenue as reported by the Connecticut Office of Policy and Management by (2) the 2009 output in Connecticut included in the IMPLAN system.

The resulting effective sales tax rate is 0.9 percent. This rate is applied to the direct, indirect and induced economic effect to estimate the total sales tax revenue.

Figure AA3: Sales Tax Effective Rate

Sales and Use Tax Revenue (in \$M)	3,261
Output (in \$M)	361,242
Effective Sales Income Tax Rate	0.9%

Corporate Income Tax

There is a 7.5 percent flat corporate income tax rate in Connecticut, the third largest source of state tax revenue. An effective income tax rate calculated based on the historical relationship between output (or sales revenue) and corporate income tax revenues takes into account exemptions and deductions. The effective tax rate was calculated by dividing (1) the average of FY2009 and FY2010 Connecticut corporate income tax revenue as reported by the Connecticut Office of Policy and Management by (2) the 2009 output in Connecticut included in the IMPLAN system.

Figure AA4: Corporate Income Tax Effective Rate

Corporation Tax Revenue (in \$M)	642
Output (in \$M)	361,242
Effective Corporate Income Tax Rate	0.2%

The resulting effective corporate tax rate is 0.2 percent. This rate is applied to the direct, indirect and induced economic effect to estimate the total corporate income tax revenue.

Data Collection and Assumptions

When conducting an input-output analysis, the inputs that drive the analysis are typically based on spending data such as payroll records, sales revenue data, capital improvement spending, visitor spending or on job counts that are specific to the operation under study. The spending and/or jobs data are mapped to IMPLAN sectors and drive the input-output analysis. When data specific to the operation under study is not available, the inputs are created using a mix of sources (including data from external data sources, other studies) and assumptions. This



section describes the data collection efforts and assumptions that were made to obtain inputs that drive the input-output modeling.

Airport Data

At the start of the project, LBG provided the Airport with a detailed data request.

Requested data items included:

- Number of Employees, including full- and part-time employees
- Employee Compensation, which includes salaries, wages and benefits
- Airport operation and maintenance expenditures in 2010, broken down by good/service
- Airport capital expenditures in 2008, 2009 and 2010
- List of on-airport businesses
- List of major airport users and off-airport dependent businesses
- Airport activities

Airport Tenant Survey

To supplement the airport tenant employee counts provided by Airport Management, a survey of airport tenants was conducted. The primary purpose of the survey was to gain a better understanding of the specific characteristics of on-airport businesses in terms of revenues, payroll, and employment relative to the average business in the same industries to accurately model the economic impact of the airport.

Unfortunately, the number of responses was insufficient to generalize the survey responses to all tenants. Therefore, the survey responses were only used for the tenant that provided the response while alternative methods were used to define assumptions for those who did not respond.

IMPLAN includes region-specific employment, employee compensation, proprietor's income and sales revenue for up to 440 sectors. The count of employees included in IMPLAN consists of both full and part-time employees. A job-driven IMPLAN analysis will apply the average employee compensation and average sales revenue per employee specific for the sector and region.



Figure AA4 shows relevant sectors from the IMPLAN model, selected corresponding industries according to the North American Industry Classification System (NAICS) and examples of aviation-related activities that fall under these industries.

Figure AA4: Selected IMPLAN industries

IMPLAN Industry	Examples of NAICS Sectors included	Activities
IMPLAN 332 - Air Transportation	NAICS 481211 - Non Scheduled Air Passenger Chartering	Charter operations, air taxi services, non-schedule air passenger service
IMPLAN 338 - Scenic and sightseeing transportation and support activities for transportation	NAICS 48811 - Airport operations; NAICS 488111 - Air traffic control; NAICS 488119 - Other Airport Operations; NAICS 48819 - Other support activities for air transport	Aircraft hangar rental; aircraft parking service; aircraft maintenance and repair, fueling aircraft; air traffic control services; airport cargo handling services.
IMPLAN 393 - Other private education facilities	NAICS 611512 - Flight training	Flight training

Depending on the tenant’s industry, we used one of the two methodologies below to analyze the contribution of tenants who did not provide data:

- ➔ For tenants who are classified in industries that are aviation-specific but that are mapped to a broader IMPLAN industry, such as air traffic control, airport operations, flight training, we adjusted employment compensation incorporated in the IMPLAN tool based data collected from the Bureau of Labor Statistics. Employee compensation consists of pay and benefits. Figure AA5 presents average annual pay (wages and salaries) in selected, aviation-specific, industries in Connecticut. The table shows annual pay for both federal and private sector air traffic control; the airport control tower at Hartford-Brainard is staffed by private contractors. Figure AA6 shows that benefits account for 30.4 percent of total employee compensation with the largest share for medical insurance. As expected, access and therefore participation rates are lower for part-time employees. Taking into account participation rates, benefits account for 18 percent of total employee compensation of full-time employees and 10 percent of employee compensation of part-time employees.

- ➔ For other tenants who did not provide data, a job-driven economic impact analysis driven by the number of jobs reported by Airport Management was conducted.



Figure AA5: Average Annual Pay Selected Industries, Connecticut, 2010

	Average Annual Pay
NAICS 481211 Nonscheduled air passenger chartering (Private Sector)	\$95,681
NAICS 4881 Support activities for air transportation (Private Sector)	\$50,135
NAICS 48811 Airport operations (Private Sector)	\$41,017
NAICS 488111 Air traffic control (Federal)	\$113,854
NAICS 488111 Air traffic control (Private Sector)	\$64,046
NAICS 48819 Other support activities for air transport (Private Sector)	\$56,679
NAICS 611512 Flight training (Private Sector)	\$24,356

Note: Average pay for federal air traffic control is for 2006.

Source: Bureau of Labor Statistics

Figure AA6: Benefits Full and Part-time Employees, U.S., 2011

	% of Total Employee Compensation	% Participation Full time	% Participation Part-time
Retirement	4.5	65	22
Medical Insurance	8.4	67	14
Life Insurance	0.5	74	14
Paid Leave*	7.0	87	35
Legally required	7.8	100	100
Other	2.2		
Total	30.4	18	10

Note: Paid leave is included in the average wage

Source: Bureau of Labor Statistics

Visitor Surveys and Review of Other Studies

Airport-related visitors are defined as persons not residing in the Hartford metro area who either arrive at the Hartford-Brainard Airport by aircraft or who are visiting the on-airport training facilities, which include a flight school and a survival training center. To estimate the jobs that are supported by these visitors, estimates need to be developed of (1) the number of visitors; (2) the average length of stay; (3) the average spending per day; and (4) type of spending (e.g., lodging, retail, etc). Two survey instruments were created to collect data to support these efforts. The first survey was provided to the airport managers and to selected airport tenants with the request to distribute the survey to visiting pilots and passengers. The second survey was distributed to on-airport training providers to provide information about their students. In addition, we reviewed the assumptions used in other general aviation economic impact studies. The studies were related to airports throughout the U.S. including New York, Virginia, Indiana, Ohio, Idaho and South Carolina.



Based on the limited number of survey responses received and the information obtained during the review of other studies, a series of assumptions were developed as presented below.

Number of Visitors

- To estimate the number of visitors arriving by aircraft, the number of visiting aircraft was estimated. It was assumed that 50 percent of the 34,600 civilian itinerant operations at HFD in 2010 were landings and that 50 percent of the landings were by non-based aircraft. The resulting 8,600 visiting aircraft translates into an average of 24 visiting aircraft arriving each day. This number was deemed reasonable by airport management.
- It was assumed that each aircraft carried 2.7 visitors. This number is the average of visitors per aircraft reported in the reviewed studies presented in Figure AA7.² An insufficient number of responses on the survey question regarding the average number of persons per aircraft prohibited the use of survey data as a basis for this assumption.
- Based on the above assumptions, the total number of visitors arriving in 2010 was estimated at approximately 23,300 persons. This includes tourists, recreational pilots, business visitors, as well as those flying in for aircraft repair and maintenance.
- Based on conversations with on-airport flight schools very few students traveled to Connecticut to attend training facilities led by Hartford-Brainard tenant businesses. More specifically, it was estimated that three out-of-state U.S. students and two international students attend the flight schools each year.

² New York State Department of Transportation, New York Statewide Airport Economic Impacts Study, May 2011; SH&E et al., Virginia Airport System Economic Impact Study, August 2011; Aviation Association of Indiana, 2005 Economic Impact Study; Wilbur Smith & Assoc., Regional Airports Economic Impact Study, January 2005; Wilbur Smith & Assoc., South Carolina The Economic Impact of Aviation (presentation), January 2006.



Figure AA7: Number of Visitors per Aircraft Other Studies

Airports	Average Number of Visitors per Aircraft	Spending per Person per trip*
All Upstate Urban and Rural GA Airports in NY	2.5	\$357
All Local and Community GA Airports in VA	2	\$ 95
Indiana Statewide	2.5	\$ 112
Five airports in Ohio**	3.9	\$86
Idaho Airport System	2.1	\$90
Grand Strand Airport South Carolina	3	\$ 70
Average	2.7	\$ 135
Average without New York		\$91

*Note: *Adjusted to 2010 dollars. **Ohio airports are Port Columbus, Rickenbacker, Bolton Field, OSU Airport and Fairfield County Airport*

Average Length of Stay

- ➔ Based on the limited number of survey responses about the length of stay of visitors arriving by general aviation aircraft, it was assumed that 25 percent of the visitors stayed overnight for an average of three nights and the remaining 75 percent were day trippers.
- ➔ Using specific information obtained from the on-airport training facilities, it is estimated that the U.S. students stay about 2 nights and that the international students stay 6 months.
- ➔ Most reviewed studies did not provide a breakdown between overnight visitors and day trippers.

Average Daily Spending

- ➔ Using the limited number of survey responses on visitor spending and data from other studies presented in Figure AA7, it was assumed that an overnight visitor who rented a car at an off-airport location spent an average of \$330 per day at off-airport businesses. This spending includes lodging, food and beverages, retail and entertainment, rental car and fuel. The spending patterns are presented in Figure AA8.
- ➔ It was assumed that 30 percent of overnight visitors arriving by aircraft rented a car off-airport and that the remainder rented a car from the airport tenant, thus failing to generate any additional economic contribution.
- ➔ It was assumed that daytrippers spent \$30 per person on food, beverages and retail at off-airport stores. However, this assumption is not based on survey data. See Figure AA8 for the breakdown.



Figure AA8: Assumptions Average Daily Spending

	Overnight	Daytrippers
Lodging (per party)	\$135	
Food and Beverage (per person)	\$50	\$20
Retail Entertainment (per person)	\$50	\$10
Rental Car (per party)	\$70	
Fuel (per party)	\$25	
Total (one person party)	\$330	\$30

- For comparison purposes, the spending by overnight visitors and daytrippers was converted into an average for all visitors, taking into account the 25/75 distribution between the two segments. The resulting overall average spending per visitor was \$231. The value is roughly midway between the average spending amount used in the New York study of \$357 (which is the average of \$425 for Upstate urban airports and \$289 for rural airports) and the average spending amount of \$91 in the other studies.
- Further supporting and illustrating that the assumptions used in this study were reasonable, Figure AA9 includes an overview of hotel rates in the Airport vicinity. The lodging cost included in the spending pattern of \$135 falls about midway between the average low price of \$99 and average high price of \$173.
- Based on information obtained from training facilities at other CT GA airports, it was assumed that students who are visiting for two days spent an average of \$308 per day. It was assumed that long-term visitors (i.e., those who stay 6 months) spent half that amount each day.



Figure AA9: Typical Rates at Hotels near Airport

	Miles from Airport	Price (\$)
Marriott Hartford Downtown	2.1	159-320
Hilton Garden Inn Hartford South/Glastonbury	1.9	109-176
Hilton Hartford	2.6	109-270
Days Inn Hartford	0.6	54-118
Comfort Inn Wethersfield	3.7	91-120
Holiday Inn Express Hartford Convention Center Area	0.5	102-129
Courtyard By Marriott Hartford Cromwell	9.5	129-130
Clarion Suites Manchester	4.6	90-150
Hampton Inn Rocky Hill	4.0	71-129
Econo Lodge	1.4	54-120
Homewood Suites By Hilton® Hartford South-Glastonbury	2.0	87-229
Sheraton Hartford Hotel	2.2	89-149
Residence Inn By Marriott Hartford Downtown	2.5	191-239
Crowne Plaza Hartford Downtown	2.6	90-179
Homewood Suites Hartford Downtown	2.6	87-199
Holiday Inn East Hartford	2.7	79-111
Average		99-173

Source: <http://www.airnav.com/airport/KHFD>

Economic Contribution Assessment Results

In addition to on-airport employment, additional multiplier effects are triggered by four activities: (1) airport operation and maintenance expenditures; (2) airport capital expenditures; (3) airport tenant expenditures; and (4) visitor spending by pilots, passengers and students. The detailed results of the analysis are presented below.

Operations and Maintenance Expenditures

Figure AA10 and AA11 present the multiplier effect, and associated tax revenues, of operations and maintenance expenditures by the airport management, including both their labor and non-labor expenditures.



Figure AA10: Economic Contribution of Operations and Maintenance Expenditures, 2010 (\$000s)

Impact Type	Hartford MSA			Connecticut		
	Jobs	Labor Income	Output	Jobs	Labor Income	Output
Direct Effect	0.3	\$24	\$76	0.3	\$24	\$76
Indirect Effect	0	\$7	\$19	0	\$8	\$21
Induced Effect	5	\$223	\$626	9	\$457	\$1,277
Total Effect	5	\$254	\$721	10	\$489	\$1,374

Figure AA11: 2010 State Tax Revenue generated by Operations and Maintenance Expenditures, (\$000s)

Personal Income Tax	\$23
Sales Tax	\$12
Corporate Income Tax	\$2
Total	\$38

Capital Expenditures

Figure AA12 and AA13 present the multiplier effect, and associated tax revenues, of capital expenditures by the airport.

Figure AA12: Economic Contribution of Capital Expenditures, 2010 (\$000s)

Impact Type	Hartford MSA			State		
	Jobs	Labor Income	Output	Jobs	Labor Income	Output
Direct Effect	6	\$ 363	\$ 770	6	\$ 363	\$ 770
Indirect Effect	2	\$ 90	\$ 219	2	\$ 97	\$ 245
Induced Effect	3	\$ 129	\$ 361	5	\$ 237	\$ 662
Total Effect	10	\$ 582	\$ 1,351	13	\$ 696	\$ 1,677



Figure AA13: State Tax Revenue generated by Capital Expenditures, 2010 (\$000s)

Personal Income Tax	\$33
Sales Tax	\$15
Corporate Income Tax	\$3
Total	\$51

Airport Tenants

Figure AA14 and AA15 present the multiplier effect, and associated tax revenues, generated by the airport tenants. The direct effect is the on-airport activity at the airport tenant businesses. The indirect and induced effect is the result of labor and non-labor operation and maintenance expenditures by the tenants.

Figure AA14: Economic Contribution of Airport Tenants, 2010 (in \$000s)

Impact Type	Hartford MSA			State		
	Jobs	Labor Income	Output	Jobs	Labor Income	Output
Direct Effect	159	\$11,787	\$18,595	159	\$11,787	\$18,595
Indirect Effect	28	\$1,551	\$3,725	30	\$1,681	\$4,120
Induced Effect	73	\$3,532	\$9,922	75	\$3,725	\$10,482
Indirect and Induced Subtotal	101	\$5,084	\$13,647	105	\$5,406	\$14,602
Total Effect	260	\$16,871	\$32,242	264	\$17,193	\$33,197

Figure AA15: State Tax Revenue generated by Airport Tenant Spending, 2010 (\$000s)

Personal Income Tax	\$782
Sales Tax	\$293
Corporate Income Tax	\$58
Total	\$1,132



Visitors

Figure AA16 and AA17 present the multiplier effect, and associated tax revenues, generated by visiting pilots, passengers and students.

Figure AA16: Economic Contribution of Visitor Spending, 2010 (\$000s)

Impact Type	Hartford MSA			State		
	Jobs	Labor Income	Output	Jobs	Labor Income	Output
Direct Effect	55	\$ 1,606	\$ 4,708	55	\$ 1,606	\$ 4,708
Indirect Effect	11	\$ 639	\$ 1,785	12	\$ 696	\$ 2,004
Induced Effect	13	\$ 631	\$ 1,773	14	\$ 674	\$ 1,896
Total Effect	79	\$ 2,876	\$ 8,266	81	\$ 2,976	\$ 8,609

Figure AA17: State Tax Revenue generated by Visitor Spending, 2010 (\$000s)

Personal Income Tax	\$ 142
Sales Tax	\$ 78
Corporate Income Tax	\$ 15
Total	\$ 235

APPENDIX B

Airport Valuation

Airport & Aviation Appraisals, Inc.



THE LOUIS BERGER GROUP, INC.
SUMMARY VALUATION REPORT
AS OF JANUARY 1, 2011
OF
HARTFORD-BRAINARD AIRPORT
HARTFORD, CONNECTICUT

Airport & Aviation Appraisals, Inc.



THE LOUIS BERGER GROUP, INC.

SUMMARY VALUATION REPORT

AS OF JANUARY 1, 2011

OF

HARTFORD-BRAINARD AIRPORT

HARTFORD, CONNECTICUT

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The Aviation Professional & Flight Training Center

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May 18, 2011

The Louis Berger Group, Inc.
20 Corporate Woods Boulevard
Albany, NY 12211-2370

Attn: Marc C. Champigny
Senior Aviation Planner

Gentlemen:

In accordance with your request, we submit herewith our Summary Valuation Report concerning airside land and improvements at Hartford-Brainard Airport in Hartford Connecticut.

We hereby certify to no present or contemplated financial interest in the property and that our employment and compensation are in no way contingent upon the value estimate.

Respectfully submitted,

Winthrop D. Perkins

Winthrop D. Perkins, CRE
President



Airport & Aviation Appraisals, Inc.

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Glossary of Airport & Aviation Terminology	



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SALIENT FACTS AND CONCLUSIONS

Location: Hartford-Brainard Airport
Hartford, Connecticut

Owner of Record: State of Connecticut

Lessee of Underlying Sites: Various

R.E. Tax Assessment: NA

Airport Size: 201 Acres

Zoning: Airport District

Highest and Best Use:
As Vacant and Improved: General Aviation Airport

Indications of Market Value:

Parcel A

Overall Site Size:	<u>Acres</u>	
	4.29	
Site Size:	<u>Acres</u>	<u>Per Sq. Ft.</u>
	1 - 2	\$.43- \$.45
Site Size:	<u>Acres</u>	<u>Per Sq. Ft.</u>
	3 - 4.3	\$.40- \$.43

Parcel B

Overall Site Size:	<u>Acres</u>	
	4.96	
Site Size:	<u>Acres</u>	<u>Per Sq. Ft.</u>
	1 - 2	\$.43- \$.45
Site Size:	<u>Acres</u>	<u>Per Sq. Ft.</u>
	3-4.9	\$.40- \$.43



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Parcel C

	<u>Acres</u>	<u>Per Sq. Ft.</u>
Site Size:	2.26	\$0.40
Supporting Proprietary Ramp Rental:		<u>\$0.00</u>
Adjusted Land Rental:		\$0.40
Overall Annual Rental:		\$39,378

T Hangar Rental Rates

	<u>Monthly Rent.</u>
T- Unit	\$400.00
End Unit	\$450.00

Open Bay Hangar

	<u>Sq. Ft.</u>	Rent <u>Per Sq. Ft.</u>
Hangar Bay Size:	Varies	\$5.00-\$7.00

Date of Market Value:

January 1, 2011



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IDENTIFICATION OF THE SUBJECT PROPERTY

The properties which are the subject of this appraisal are land and hangars located on the airside property inventory at Hartford-Brainard Airport in Hartford, Connecticut.

The subject properties are land and structures which have been optimized for aviation, and are situated on the airside at Hartford-Brainard Airport on leasehold estate parcels of land.

SCOPE OF THE APPRAISAL

In undertaking and developing this appraisal report we have engaged in the following activities which are by no means all inclusive.

- * The physical inspection of the subject property and improvements.
- * We reviewed various technical data, site plans and any other pertinent structural information available with regard to land and improvements on the subject property.
- * We examined various documents pertaining to the subject property and reviewed general data relating to the airport itself and the general aviation environment which surrounds the subject property's immediate area.
- * Researched and analyzed the market for airport real estate in the vicinity of the subject property, and interviewed various real estate, airport and aviation personnel regarding current market conditions, current pricing practices and the specific costs relating to the subject property and its position within the market place. In addition, we have evaluated the subject property for specific physical items of wear and tear, depreciation, and valued the competitive position of the subject within the specific local market for related properties.
- * We have uncovered and confirmed pertinent market data with relation to the sale and/or lease of relevant comparable property which we believe are similar to and are useful in estimating a value for the subject.
- * Engaged in a methodical and systematic analysis of all the data collected and placed it within proper context for related properties in order to develop an estimate of market value for the subject property.



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FUNCTION OF THE REPORT

The function of the report contained herein will pertain to all relevant classes of air side property in both improved and unimproved condition at Danielson, Hartford- Brainard, Waterbury Oxford, Groton-New London and Windham Airports. Information will be used to generally determine rates and charges, rental rates and other economic determinants which can be used to measure viability of the facilities in the context of a study which is to be performed for the State by The Louis Berger Group.

PURPOSE OF THE APPRAISAL

The purpose of this appraisal is to estimate the value of the property rights held by the State of Connecticut in fee simple estate as of January 1, 2011.

For purposes of this appraisal, Market Value can be stated as follows:

The most probable price which a property brings in a competitive and open market under all conditions requisite to a fair sale; the buyer and seller each acting prudently and knowledgeably, and assuming the price is not affected by undue stimulus. Implicit in this definition is the consummation of a sale as of a specified date and the passing of title from seller to buyer under conditions whereby:

- buyer and seller are typically motivated;
- both parties are well informed or well advised, and each acting in what he considers his own best interest;
- a reasonable time is allowed for exposure in open market;
- payment is made in terms of cash in U.S. dollars for in terms of financial arrangements comparable thereto; and
- the price represents the normal consideration for the property sold unaffected by special or creative financing or sales concessions granted by anyone associated with the sale.



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Source: *Uniform Standards of Professional Appraisal Practice* as promulgated by the Appraisal Standards Board of the Appraisal Foundation, published by the Appraisal Foundation, 2010.

PROPERTY RIGHTS APPRAISED

The Dictionary of Real Estate Appraisal published by the Appraisal Institute defines Fee Simple as follows:

absolute ownership unencumbered by any other interest or estate;
subject to the limitations of eminent domain, escheat, police power,
and taxation.

APPRAISAL PROCEDURES USED

The appraised value as set forth in this report is supported with consideration and the use of standard accepted appraisal practices and valuation procedures. Three methods are considered in estimating value for real property, namely, the Cost Approach, the Income Approach, and the Market Data Approach. If applicable, before valuing the property by these three approaches, a separate value for the land is estimated from a comparative analysis of the most recent airport land sales, along with leases suitable for comparability.

The Cost Approach is a procedure whereby the depreciated reproduction cost of the improvements is added to the land value for a total estimate of the Market Value of the real property. The Marshall Valuation Service, a nationally recognized cost service, has been used as one source, but not the only one, in developing the reproduction cost. Total depreciation accrues from physical deterioration and obsolescence from all causes. Due to the nature of the improvements which comprise the subject property, and particular market that exists for it, the cost approach is not reflective of the best indication of value for profit center operations under the current stipulations which apply to the subject's occupancy for the improvements as of the date of the appraisal.

The Income Approach is a method whereby anticipated net income attributable to the property is capitalized at an appropriate rate to indicate the present worth or current value of the property.



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A comparison and analysis of rental rates are used as a basis for the subject's stabilized economic rent. Expenses are deducted to arrive at a stabilized net income ready for capitalization. Capitalization is the process through which income is converted into value.

The Market Data Approach is an appraisal procedure whereby comparisons between prices paid for comparable facilities are made with the subject. The Market Data Approach was the primary methodology utilized in the appraisal.

ASSUMPTIONS AND LIMITING CONDITIONS

This appraisal is subject to the following assumptions and limiting conditions.

1. No responsibility is assumed for matters of a legal nature affecting title to the property nor is an opinion of title rendered. The title is assumed to be good and merchantable.
2. No survey of the property has been made by the appraiser and no responsibility is assumed in connection with such matters. Sketches in this report are included only to assist the reader in visualizing the property.
3. Public information and industry and statistical information are from sources we deem to be reliable; however, we make no representation as to the accuracy or completeness of such information, and have accepted the information without further verification.
4. All mortgages, liens, encumbrances, leases, and servitudes have been disregarded unless so specified within the report. The property is appraised as though under responsible ownership and competent management.
5. The forecasts, projections, and operating estimates contained in this report are based upon current market conditions, anticipated short term supply and demand factors, and a continued stable economy. These forecasts are, therefore, subject to changes in future conditions.
6. It is assumed that there are no hidden or unapparent conditions of the property, subsoil, or structures which would render it more or less valuable. No responsibility is assumed for such conditions or for engineering which may be required to discover such factors.



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7. It is assumed that there is full compliance with all applicable federal, state, and local environmental regulations and laws unless non-compliance is stated, defined, and considered in the appraisal report.

It is further assumed that any mechanical and electrical equipment, which is considered part of the real estate, is in proper operating condition except when noted herein. These include, but are not limited to, such items as the heating, air conditioning, plumbing, sprinkler, and electrical systems.

8. While it is believed the information, estimates, and analyses given and the opinions and conclusions drawn from them are correct, Airport & Aviation Appraisals, Inc. does not guarantee them. We believe the information which was furnished to us by others is reliable, but we assume no responsibility for its accuracy.

9. In the event this appraisal is used for a sale price, financing, or tax purposes, no responsibility is assumed for the inability to negotiate favorably on the basis of the values expressed herein.

10. It is assumed that all applicable zoning and use regulations and restrictions have been complied with, unless a non-conformity has been stated, defined, and considered in the appraisal report.

11. It is assumed that the utilization of the land and improvements is within the boundaries or property lines of the property described and that there is no encroachment or trespass unless noted within the report.

12. The distribution of the total valuation in this report between land and improvements applies only under the reported Highest and Best Use of the property. The allocation of value for land and improvements must not be used in conjunction with any other appraisal and is invalid if so used.

13. Neither all nor any part of the contents of this report should be conveyed to the public through advertising, public relations, news, sales, mail, direct transmittal, or other media without the prior written consent and approval of Airport & Aviation Appraisals, Inc.

14. In accordance with recognized professional ethics, the professional fee for this service is not contingent upon our conclusion of value, and neither Airport & Aviation Appraisals, Inc. nor any of its employees has a present or intended financial interest in the Property.

15. The opinion of value expressed herein is valid only for the stated purpose and date of the appraisal.



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16. Financial statements and other information provided by the Client or its representatives in the course of this investigation have been accepted, without further verification, as correctly reflecting the property's business conditions and operating results for the respective periods, except as specifically noted herein.

17. The conclusions are based upon the assumption that present management would continue to maintain the character and integrity of the enterprise through any sale, reorganization, or diminution of the owners' participation.

18. Future services regarding the subject matter of this report, including, but not limited to, testimony or attendance in court, shall not be required of Airport & Aviation Appraisals, Inc., unless previous arrangements have been made therefore in writing.

19. This report and the conclusions arrived at herein are for the exclusive use of our client. Furthermore, the report and conclusions are not intended by the author, and should not be construed by the reader, to be investment advice in any manner whatsoever. The conclusions reached herein represent the considered opinion of Airport & Aviation Appraisals, Inc., based upon information furnished to them by the Client and other sources. The extent to which the conclusions and valuations arrived at herein are relied upon should be governed and weighed accordingly.

20. The Americans with Disabilities Act (ADA) became effective January 26, 1992. We have not made a specific compliance survey and analysis of this property to determine whether or not it is in conformity with the various detailed requirements of the ADA. It is possible that a compliance survey of the property, together with a detailed analysis of the requirements of the ADA, could reveal that the property is not in compliance with one or more of the requirements of the Act. If so, this fact could have a negative effect upon the value of the property. Since we have no direct evidence relating to this issue, we did not consider possible noncompliance with the requirements of ADA in estimating the value of the property.

21. This appraisal is predicated on the assumption that hazardous substances do not exist at the subject property. Hazardous substances cover any material within, around, or near a property that may have a negative effect on its value, including, without limitation, hazards that may be contained within the property, such as friable asbestos, and external hazards, such as toxic waste or contaminated ground water. No apparent evidence of contamination or potentially hazardous materials was observed on the date of inspection. Members of this appraisal office are not qualified to determine the existence of, nor is any certification made as to the presence or absence of, any hazardous substances. No responsibility is assumed for any such conditions, nor for any expertise or engineering knowledge required to discover them.



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22. No survey was available to the appraiser, however unless such a survey indicated significant variations with the site as represented by other technical documentation, the value contained herein would not be affected.

23. This Summary Appraisal Report is governed by the Uniform Standards of Appraisal Practice regulations that apply to Summary Appraisal Reports under Standards Rule 2, Subparagraph B. Supporting data which may help the reader more fully understand the conclusions which are presented in this summary report is present in the appraiser's files. This report cannot be fully understood without reference to this material.



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AREA AND NEIGHBORHOOD DESCRIPTION

Hartford is the capital city of the U.S. state of Connecticut. It is located in Hartford County on the Connecticut River, north of the center of the state, 24 miles south of Springfield, Massachusetts. Its 2006 population was 124,512. Hartford ranks as the state's third-largest city, after Bridgeport and New Haven, and the sixth largest in New England. Greater Hartford is also the largest metro area in Connecticut, and 45th largest in the country (2006 census estimate) with a metropolitan population of 1,188,841.

With 30 percent of the population living below the poverty line, Hartford's rate of poverty is second in the United States only to Brownsville, Texas. The median income for a household in the city was \$24,820, and the median income for a family was \$27,051. Males had a median income of \$28,444 versus \$26,131 for females. The per capita income for the city was \$13,428.

Hartford is the historic international center of the insurance industry, with companies such as Travelers, Aetna, The Hartford, The Phoenix Companies, Uniprise and Hartford Steam Boiler based in the city. The area is also home to Colt Firearms, U.S. Fire Arms and United Technologies. Nineteenth- and early-20th-century Hartford was a major manufacturing and publishing city. Among these was the pioneer bicycle automobile maker Pope. As in many northern industrial cities, many factories have been closed, relocated, or reduced operations.

Despite the city's lengthy history with the insurance industry, various insurers have recently left Hartford and moved their operations to other locations, including to some of Hartford's suburbs. Citing the tax structure in the city and parking shortages, MetLife recently vacated several floors in CityPlace, Connecticut's largest office building, and joined CIGNA in a large suburban campus in Bloomfield, Connecticut. Lincoln Financial has recently cut its Hartford workforce, while Travelers elected to construct a sprawling training complex in Windsor, Connecticut, just north of the city. Originating from the acquisition of the travel protection division of Travelers, Travel Insured International operates out of East Hartford, Connecticut.



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Additionally, MassMutual recently relocated its Hartford operations to Enfield, Connecticut, to be closer to its headquarters in Springfield, Massachusetts, and the insurance giant The Hartford has relocated some of its employees to nearby Simsbury, Connecticut.

Bradley International Airport, in Windsor Locks, Connecticut, is twenty minutes north of downtown and serves Hartford and Springfield with over 100 daily departures to 30 destinations on nine airlines. Hartford-Brainard Airport, located in Hartford off I-91 and close to Wethersfield, serves charter flights and local flights. I-84, which runs from Scranton, to its intersection with I-90 in Sturbridge, just over the Massachusetts border, and I-91, which runs from New Haven along the Connecticut River to Canada, intersect in downtown Hartford. In addition to I-84 and I-91, two other highways service the city: Route 2, an expressway that runs from downtown Hartford to Westerly, passing through Norwich and past Foxwoods Resort Casino, and the Wilbur Cross Highway portion of Route 15 that skirts the southeastern part of the city near Brainard Airport. A short connector known as the Conlin-Whitehead Highway also provides direct access from I-91 to the Capitol Area of downtown Hartford.



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AIRPORT AND PROPERTY DESCRIPTIONS

Facility Name: Hartford-Brainard
 City Name: Hartford
 County: Hartford
 State Name: Connecticut

Geographic Data

Latitude: N4144.2
 Longitude: W07239.0 (Estimated)
 Arpt Elevation: 18ft (Surveyed)
 Magnetic Variation: 15W
 3 miles SE of Hartford

Aircraft Data

Operations (reported) Yearly Avg.
 General Aviation Transient: 39,927
 General Aviation Local: 40,227
 Air Taxi: 5,522
 Commercial: 0
 Commuter: 0
 Military: 525

Aircraft based on Field

General Aviation Singles: 125
 General Aviation Multi: 6
 Jet Aircraft: 4
 General Aviation Helicopters: 4
 Military Aircraft: 0
 Gliders: 1
 Ultralights: 0

Runway & Approach Info for KHFD

Rwy	Length	Land Dist Avail	Approach*	Rwy	Length	Land Dist Avail	Approach
02	4,417x150	4,006'	LDA 109.70 - 002°	20	4,417x150	3,857'	
11	2,314x71	2,314'		29	2,314x71	2,049'	
NE	2,309x150	2,309'		SW	2,309x150	2,309'	

Airport Facilities

Airport Attendance Schedule: Mon-Fri All, Sat-Sun 0600-2300
 Airport Status: Operational
 Airport Lighting Schedule: Dusk-Dawn



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Airport Storage Available:	Tie Downs, Hanger
Extra Services Available:	Air Freight, Avionics, Charter, Flight Instruction, Aircraft Rental, Aircraft Sales
Wind Indicator:	Yes - (lighted)
Control Tower:	Yes

Federal Agreements

National Plan Of Integrated Airport Systems (NPIAS)
Grant Agreements Under FAAP/ADAP/AIP
Assurances Pursuant To Title VI, Civil Rights Act Of 1964
Agreement Under DLAND Or DCLA Has Expired.



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Aerial View Of Hartford-Brainard Airport



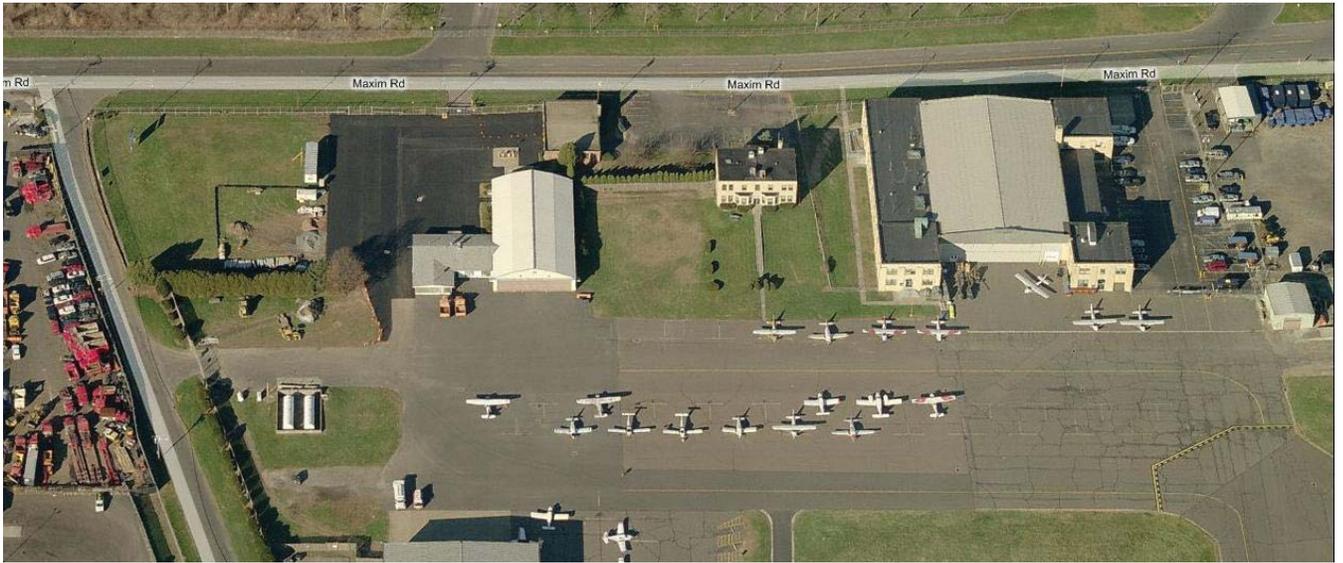
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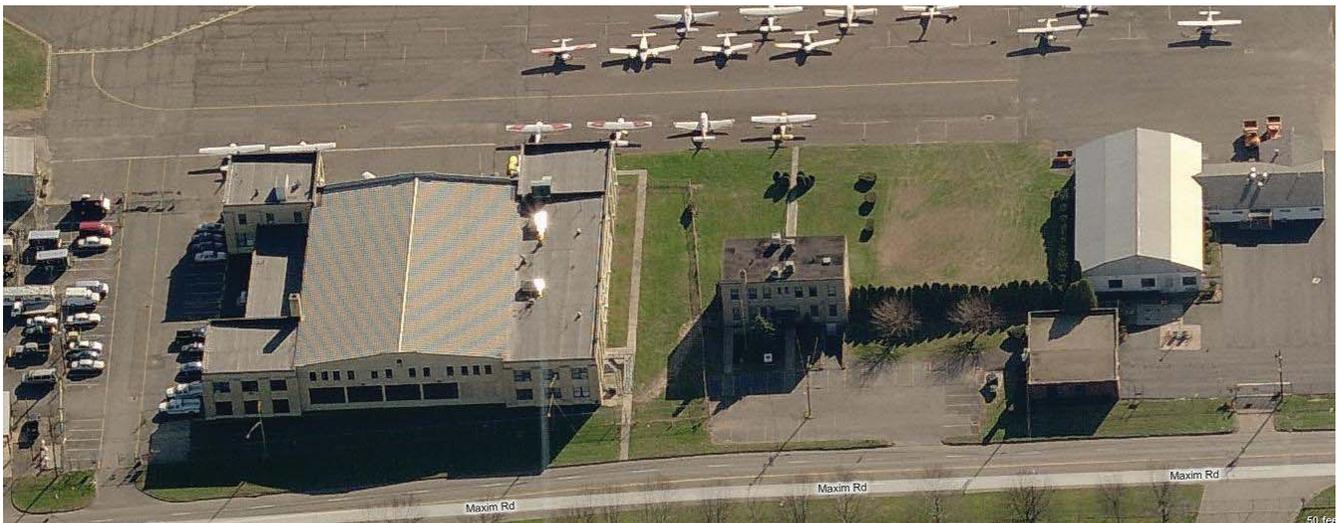
Aerial View Of The Airport



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Aerial View Of Northern Portion Of The Property



Northern Portion Of Property Looking To The South



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Main Terminal Building And Adjacent Open Bay Hangar Of Atlantic Aviation



Additional Open Bay Hangars Operated By Atlantic



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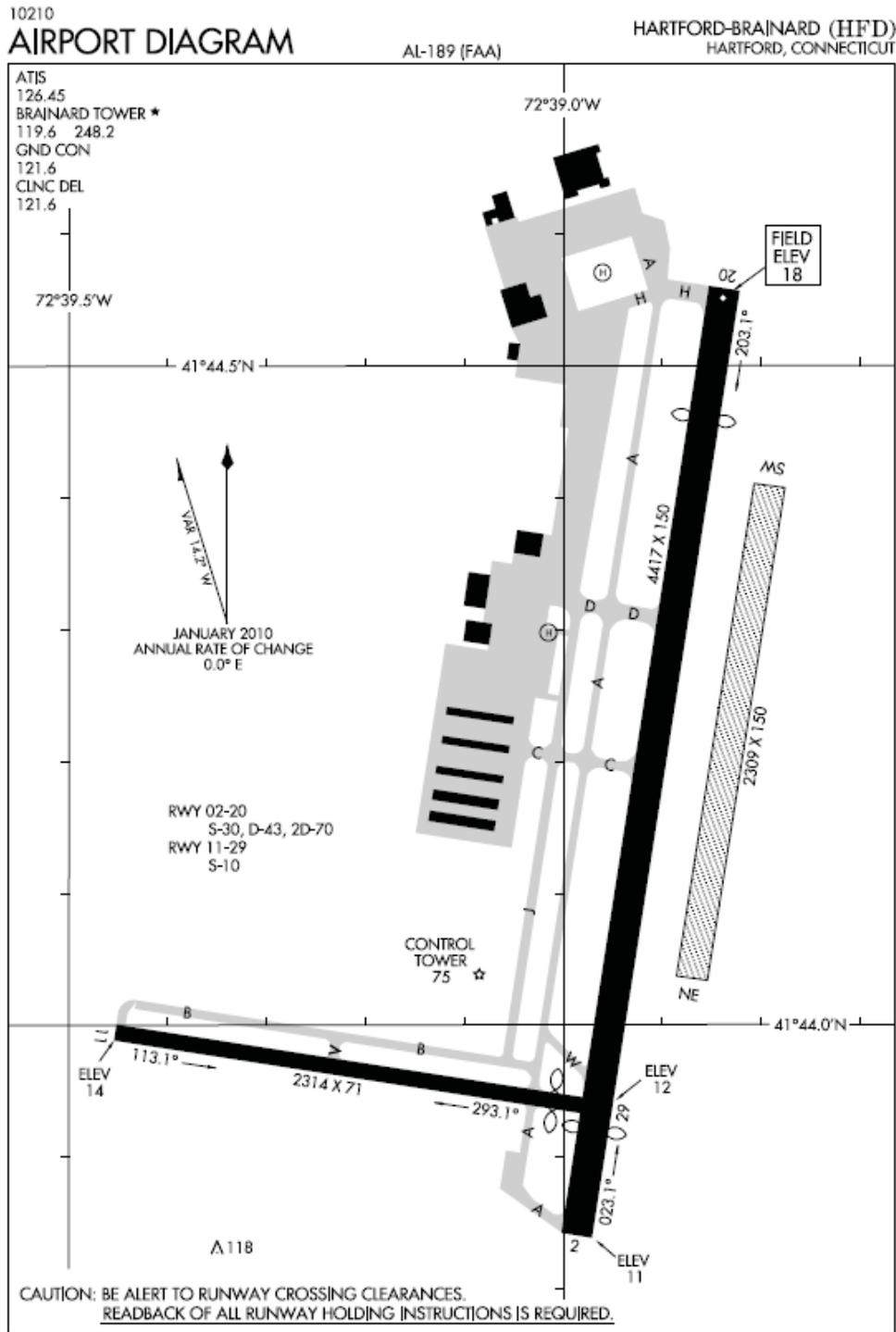
T Hangar Development To The South Of The Fixed Base Operation



Overview Of Airport Property



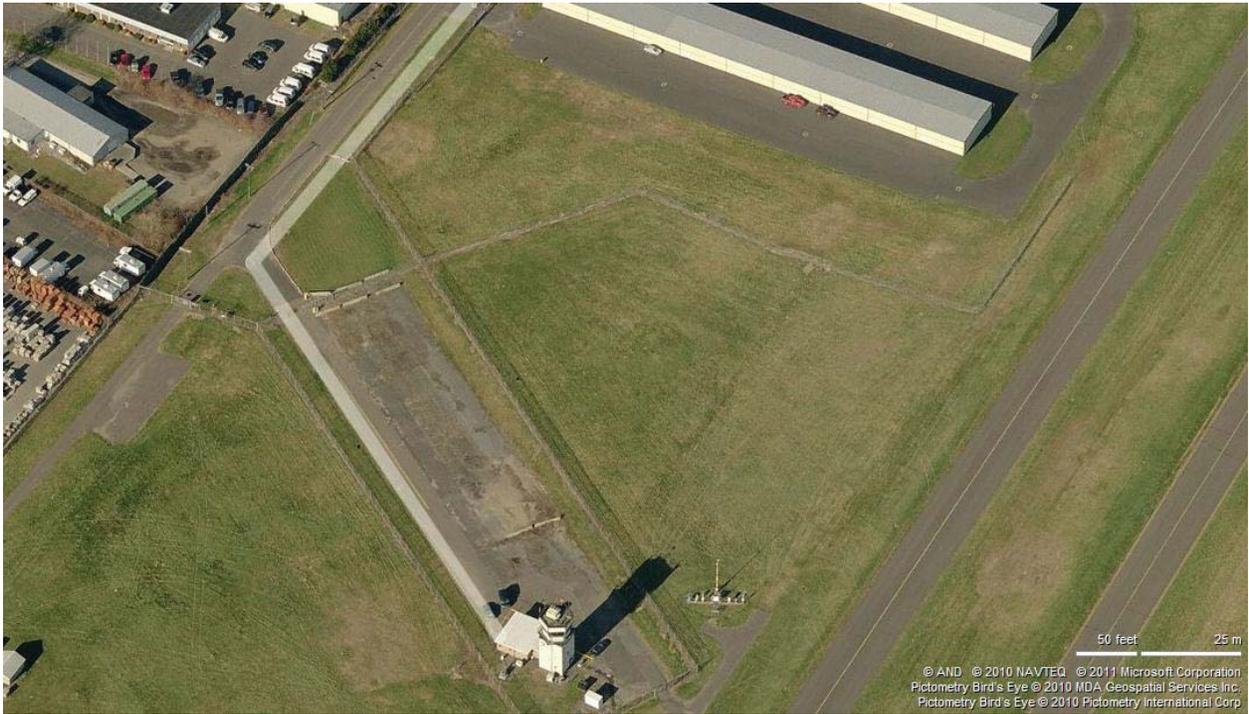
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Brainard Airport Diagram



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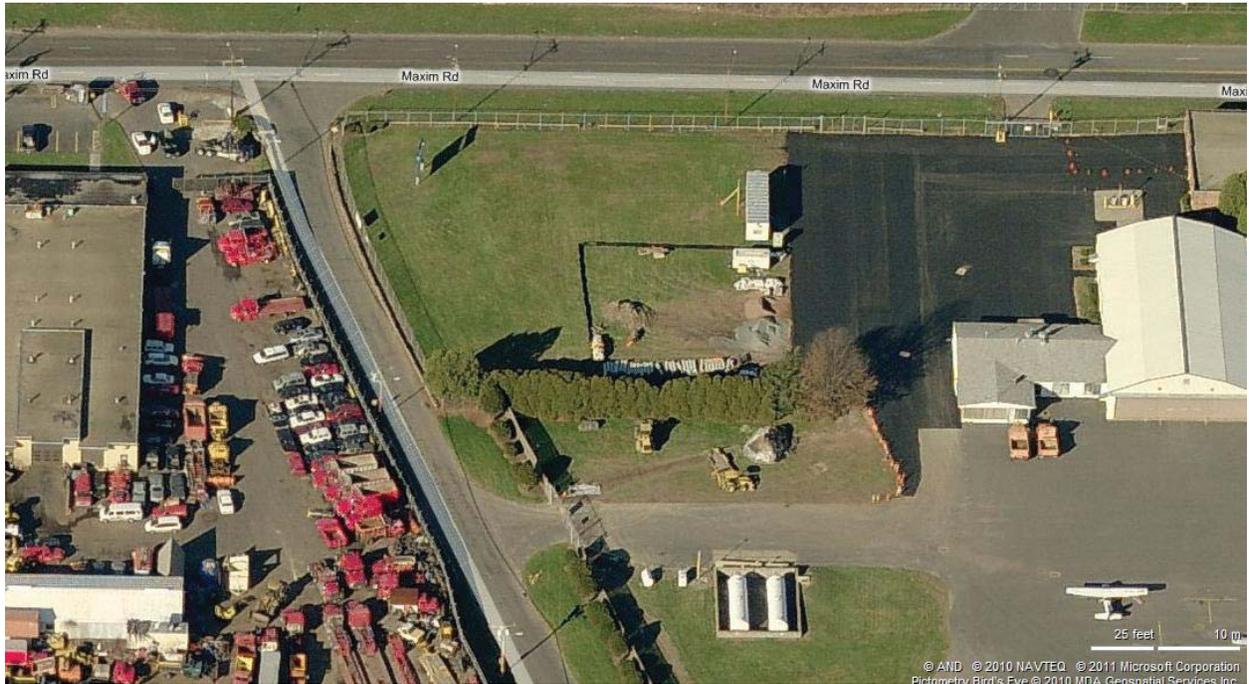
Parcel A



Parcel B



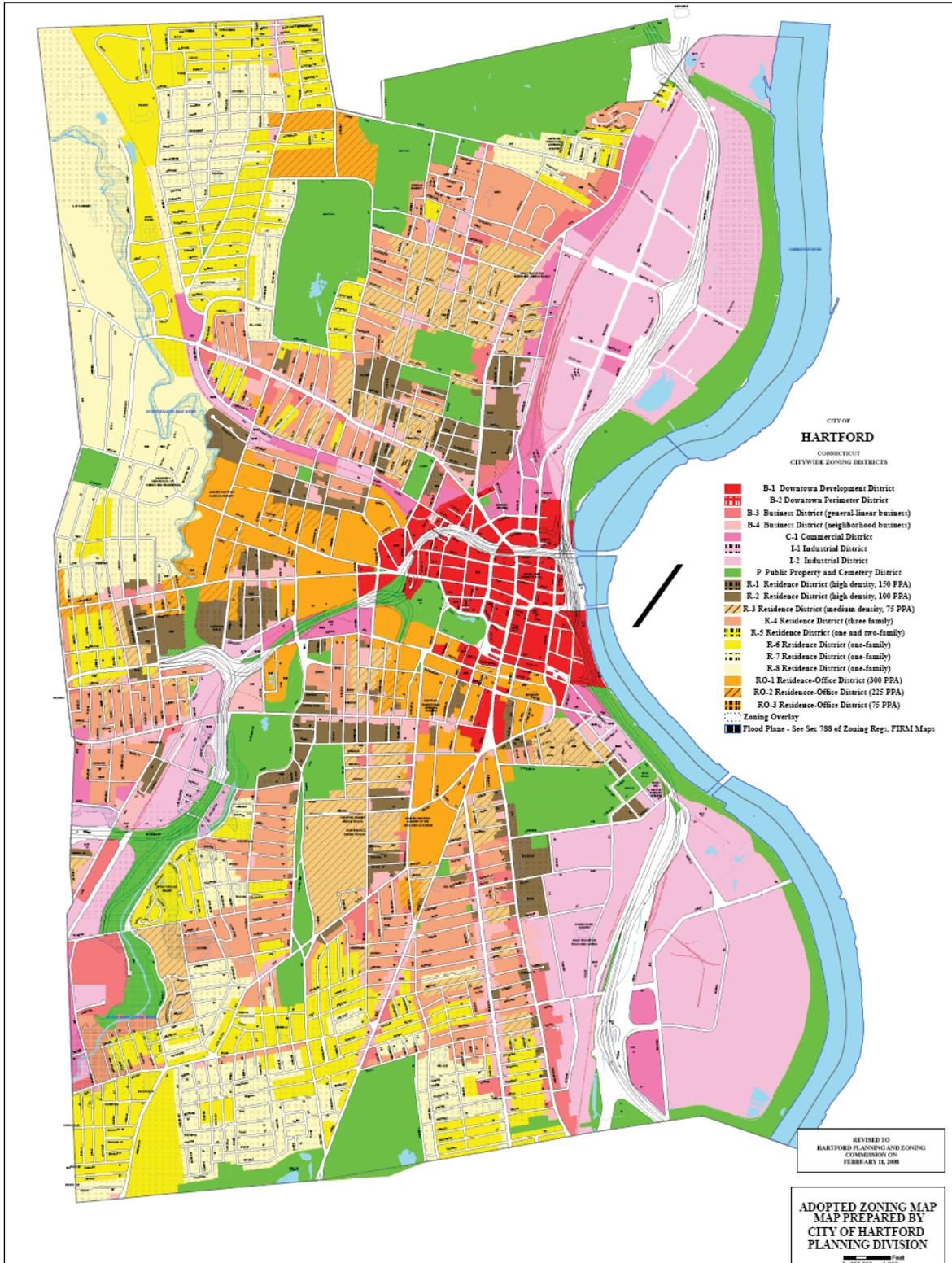
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Parcel C



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Hartford Zoning Map



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ZONING

According to the Town of Hartford zoning map, the Hartford-Brainard Airport falls entirely within the Industrial I-2 District. The principle intended uses in this zone include a full range of industrial, warehousing, and manufacturing activities. Airports are a permitted use in this district. The legal restraints which apply to the subject properties are primarily related to the Sponsor's Assurances which have been made by the state of Connecticut to the FAA due to the airport's participation in the Airport Improvement Program. The considerations which apply to airside property on airports which participate in the Airport Improvement Program are considerably more complicated than those which apply to properties earmarked for non-aeronautical purposes. A unified, aviation oriented, zoning code is on record for the airport as of the date of the appraisal, and this is not uncommon on airports similar to the subject. The more critical and important legal issues beyond the zoning, are those which relate to the site, are those which result from the Sponsor's Assurances which pertain to the Airport Improvement Program. This particular relationship involves specified contractual obligations, which limit airside property for aeronautical purposes.

Participants in the Airport Improvement Program must develop also develop airside property in conformance with the guidelines delineated by the FAA's regulations under Part 77. Part 77 specifies the proper positioning of structures with regard to Runway Protection Areas, Runway Centerlines, and Taxiway Centerlines. We are informed that the subject property is in conformance with the provisions of Part 77.

ASSESSMENT AND REAL ESTATE TAX

As is consistent with the policy which is followed by the State of Connecticut on airport which it owns, neither the land or the improvements which are contained within the subject property's leasehold is subject to ad valorem taxes.



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VALUATION

Hartford Brainard Airport has traditionally served the general aviation community in the area as a secondary location which provides service to aircraft that can comfortably operate off its limited sized runway system. The proximity that it enjoys to the downtown Hartford area is a distinct advantage, and the location is very good with regard to access to the other transportation infrastructure that surrounds it. In many ways, it is comparable to Essex County Airport in Fairfield, New Jersey, in that it possesses operational capabilities that fall just short of the most lucrative turbine constituents that drive airside development and airside operators desire most.

The enhanced runway lengths and the navigational aids which are present at Bradley International Airport, have ensured that the very top end of the general aviation aircraft spectrum is concentrated at both fixed base operators who have substantial facilities at that airport, and also in standalone corporate type hangars that exist on the facility. The smaller jets and the turboprop aircraft that can operate off the 4,400 foot runway at Brainard are certainly desirable tenants, however attracting sufficient numbers to the facility to effectively drive the demand for all forms of airside property is a challenge.

The overall size of Hartford-Brainard airport is just over 200 acres, and this is a relatively small facility and therefore creates a de facto scarcity of airside land. The aforementioned Essex County Airport in New Jersey has approximately 275 acres of land. The net effect of the size and configuration of this type of airport, is that it tends to be heavily populated with piston engine aircraft. This creates a certain ceiling on the overall values that can be attributed to airside property, due to the nature of this segment of the general aviation aircraft ownership population. Conversely, in an area like Hartford, the demographic characteristics of the owners of these aircraft tends to be favorable. This is particularly true in the northeast. Because of the favorable characteristics relating to the per capita income, and the overall age and level of capability exemplified by these aircraft, there is a good demand for airside property to provide shelter, services and other support necessary to keep these aircraft functioning at an optimum level.



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It is unlikely that there will be a significant expansion of the runway system at the airport, so the limitations inherent in the 4,400 foot runway will be a definitive factor for the foreseeable future. If at some point, the operational profile of the airport changes to the extent possible, it may be desirable to create additional airside land for development by eliminating the shorter crosswind runway system. This would free up acreage for development, and if demand warrants it, would ensure a greater supply of available airside land for aviation utilization.

As of the date of the appraisal, the planners for Hartford-Brainard have earmarked approximately 11.3 acres as suitable for airside development. Given the density of the existing property inventory at the facility, this is a reasonable assumption, and is reflective of the overall size of the airport, and the existence of a crosswind runway.

The balance of the property which exists on the facility is generally allocated to three other general categories. The first relates to governmental utilization embodied in the hangars occupied by the National Guard and the State of Connecticut maintenance training facility at the south end of the airport. The second category relates to the properties which are allocated for fixed base operation utilization, and are now entirely controlled by Atlantic Aviation. The third element relates to the development which has occurred involving T hangar units which have been constructed in a fashion that allows for individual ownership by purchasers of the rights to utilize the facility over an extended period of time. The overall acreage dedicated to the existing airside improvements is approximately 23 acres.

This type of development is typical for an airport of the size, and so long as the operational parameters embodied in the existing runway systems and navigational aids that are available to users remain as they are, in our opinion this will not change significantly. Organizations and entities which utilize the turbine aircraft found at the top of the general aviation food chain will continue to prefer to locate at Bradley International. Given the capabilities that exist at the facility, this is a desirable bifurcation of general aviation demand.

Land



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The existing range of ground rentals which pertain to property on the airport range from per square foot lease rates as low as \$.22 a square foot, to \$.78 per square foot in isolated instances. There is a median rental rate which pertains to large parcels that are occupied by the fixed base operation and specialty entities like T hangars development which range from \$.48 a square foot to \$.55 a square foot. In the case of a portion of the property leased to the fixed base operator, this involves the inclusion of improvements which are not owned by the properties original tenant. In the late 1990's, the two fixed base operators which competed at Brainard effectively merged and created one FBO. This was a response to the limitations of the marketplace. It also reflected the fact that Air One, the newer entrant to the airport, built and owned facilities, and was also paying a higher ground rent. The merger of the two entities is not surprising given the limitations of the airport.

In the context of the specific valuation pertinent to land at Brainard Airport, we will address three parcels that are currently earmarked for future development at the airport. The location and other characteristics of these airside lots will be specifically addressed, however, if it is deemed desirable in the future to remove existing buildings due to their age and functionality, the general valuation parameters will also apply to any parcels that may be cleared for the development of new airside property.

Parcel A is located at the southernmost portion of the airside property and is adjacent to the state operated school for aircraft mechanics. The parcel has good visibility with regard to the runway systems, and is located at the intersection of the main runway and the crosswind runway. The parcel is slightly irregularly shaped, but it's clear, and its development process would be relatively straightforward. To the north of this parcel are T hangars that have been developed by third parties. The site would probably be most appropriate for activities which can function somewhat independently of the services provided around the main terminal area of the fixed base operation, which is located further to the north. The main adjustment pertinent to Parcel A is applicable to size, and would require a larger user to utilize all of it. We have developed a valuation which recognizes that this parcel could be potentially subdivided for several users, and



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have estimated a graduated series of rental rates in this instance. The valuation for Parcel A is presented below:

Parcel A

Overall Site Size:	<u>Acres</u>	
	4.29	
Site Size:	<u>Acres</u>	<u>Per Sq. Ft.</u>
	1 - 2	\$.43- \$.45
Site Size:	<u>Acres</u>	<u>Per Sq. Ft.</u>
	3 - 4.3	\$.40- \$.43

Parcel B is another large parcel just under five acres, located to the north of Parcel A. This property is better suited with regard to its location to the general terminal area utilized by the fixed base operator. This advantageous location would be more attractive to development which anticipated some interaction with the fixed base operator, and the services that could be provided for users on the parcel. The site is rectangular, and also presents few pre-existing problems for development. As is the case with Parcel A, the site has the potential to be subdivided for several users, due to the fact that it has excellent frontage on the taxiways that lead to the runway, and is also well positioned with regard to Lindbergh Drive, and a pre-existing parking lot. This parking lot would have additional appeal for users due to the fact that it could possibly be used in conjunction with future development, and would relieve the lessee of the need to develop part of the site for automobile parking.

Our valuation that considers this parcel in the context of the particular sizes and demand for is presented below:

Parcel B

Overall Site Size:	<u>Acres</u>	
	4.96	
Site Size:	<u>Acres</u>	<u>Per Sq. Ft.</u>
	1 - 2	\$.43- \$.45
Site Size:	<u>Acres</u>	<u>Per Sq. Ft.</u>
	3-4.9	\$.40- \$.43



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Parcel C is located at the northernmost portion of the airside property inventory along Maxim Road. It is a small corner lot, which is adjacent to the existing maintenance facility utilized for rolling stock which operates on the airport. There is possible airside access via a taxiway which runs to the south of all of the hangars and facilities located on this section of the airport. This lot is 2.5 acres, and the options which are available for development are relatively small compared to Parcel A and Parcel B. We understand that there are plans to possibly utilize this parcel in conjunction with the construction of the maintenance facility for airport equipment. If the property is determined to be suitable for airside development, we feel that it has a good location with regard to the airport road system and the airside access is acceptable. The parcel is somewhat limited by its location at the intersection of Maxim Road and Lindbergh Drive, but this visibility may be deemed desirable by certain types of airport users. Based on the adjustment that has been applied to airside land for size, we've determined that its overall annual rental is as follows:

Parcel C

	<u>Acres</u>	<u>Per Sq. Ft.</u>
Site Size:	2.26	\$0.40
Supporting Proprietary Ramp Rental:		<u>\$0.00</u>
Adjusted Land Rental:		\$0.40
Overall Annual Rental:		\$39,378

T hangars

As is the case in most airports in the northeast, T hangar development at Brainard has been confined to projects which involve selling units and the right to occupy the space housed within them upfront, much in the manner that condominiums are sold in the conventional real estate market. This is due to the expense which is associated with building T hangars, and the market's general reluctance to pay the high rents which are required to amortize the investment and provide a desirable return on investment for whoever the developer may be. This is a situation which is mirrored at other airports owned by the state where a demand for T hangars is exhibited.

The comparable rental rates which are exhibited for units which are leased to aircraft owners by individuals who have purchased the long-term occupancy rights. These rental rates are reflective



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of what the market will pay for this type of space, given the limitations of the airport, and the nature of the aircraft which can fit in the T hangars. As is the case in the general area that surrounds Brainard airport, these rental rates reflect a slight premium which is normally attributed for location and the relatively affluent demographic of its pilot population, but still do not under the present economic circumstances, support new construction. Rental rates which are applicable to the various size T hangars at Brainard are as follows:

T Hangar Rental Rates

	<u>Monthly Rent.</u>
T- Unit	\$400.00
End Unit	\$450.00

Open bay Hangars

The open bay hangar market at Brainard is largely dominated by the fixed base operation which, as previously mentioned, is a result of the merger between Air One and Million Air in the late 1990s. The southern open bay hangars are on parcels which are leased from the State of Connecticut, and the rental is expressed as a per square foot ground rental. This is a hybrid situation since the hangars are also owned by the State of Connecticut and this rental can be converted to a per square foot unit number which roughly corresponds to the norm in the marketplace.

The comparable rentals which are presented are reflective of the general characteristics of the New England marketplace, and also are impacted by the fact that most of the major fixed base operations at airport in the vicinity of Brainard have built their own hangars and terminals, and only pay ground rent to the State. This is reflective of both the general desire by the FBOs to build an optimum facility which reflects modern conveniences and amenities that are expected by today's general aviation users. Older hangars which have less utility, are in demand, but often are constrained by their physical characteristics, and cannot accommodate larger turbine aircraft which are important to the revenue stream important to the fixed base operators in the area.

Brainard has a number of older hangars which are on the north end of the airport which reflect the airports creation during the Second World War. These facilities are mostly utilized by the



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Air Guard, or have been adapted by airport management to support the operational demands involved in maintaining and operating the airport. The overall rental range for these hangars if they were to be offered to general aviation oriented users is reflective of the age and condition of the units, and that there may be operational limitations to the size and character of the aeronautical operations which could feasibly fit within them.

The more modern hangars which are utilized by the fixed base operation exhibit or rental rage which we feel is reflective of the realistic market for fixed base operation property at this airport. Older hangars which may be adaptable for aviation related commercial use, would command lower rental rates, and would be most likely targeted at specialized aviation operations such as smaller avionics shops and aircraft maintenance facilities which may wish to avail themselves of the good-sized general aviation piston community which already exists at Brainard. The overall rental rates most appropriate are presented as follows:

Open Bay Hangar

	<u>Sq. Ft.</u>	Rent <u>Per Sq. Ft.</u>
Hangar Bay Size:	Varies	\$5.00-\$7.00



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CERTIFICATION OF THE APPRAISER

The undersigned does hereby certify that, to the best of my knowledge and belief:

1. The statements of fact contained in this report are true and correct.
2. The reported analyses, opinions, and conclusions are limited only by the reported assumptions and limiting conditions, and are my personal, unbiased professional analyses, opinions, and conclusions.
3. I have no present or prospective interest in the property that is the subject of this report, and I have no personal interest or bias with respect to the parties involved.
4. My compensation is not contingent upon the reporting of a predetermined value or direction in value that favors the cause of the client, the amount of the value estimate, the attainment of a stipulated result, or the occurrence of a subsequent event.
5. My analyses, opinions, and conclusions were developed, and this report has been prepared, in conformity with the Uniform Standards of Professional Appraisal Practice.
6. I have made a personal inspection of the property that is the subject of this report.
7. No one provided significant professional assistance to the person signing this report.

Winthrop D. Perkins

Winthrop D. Perkins, CRE



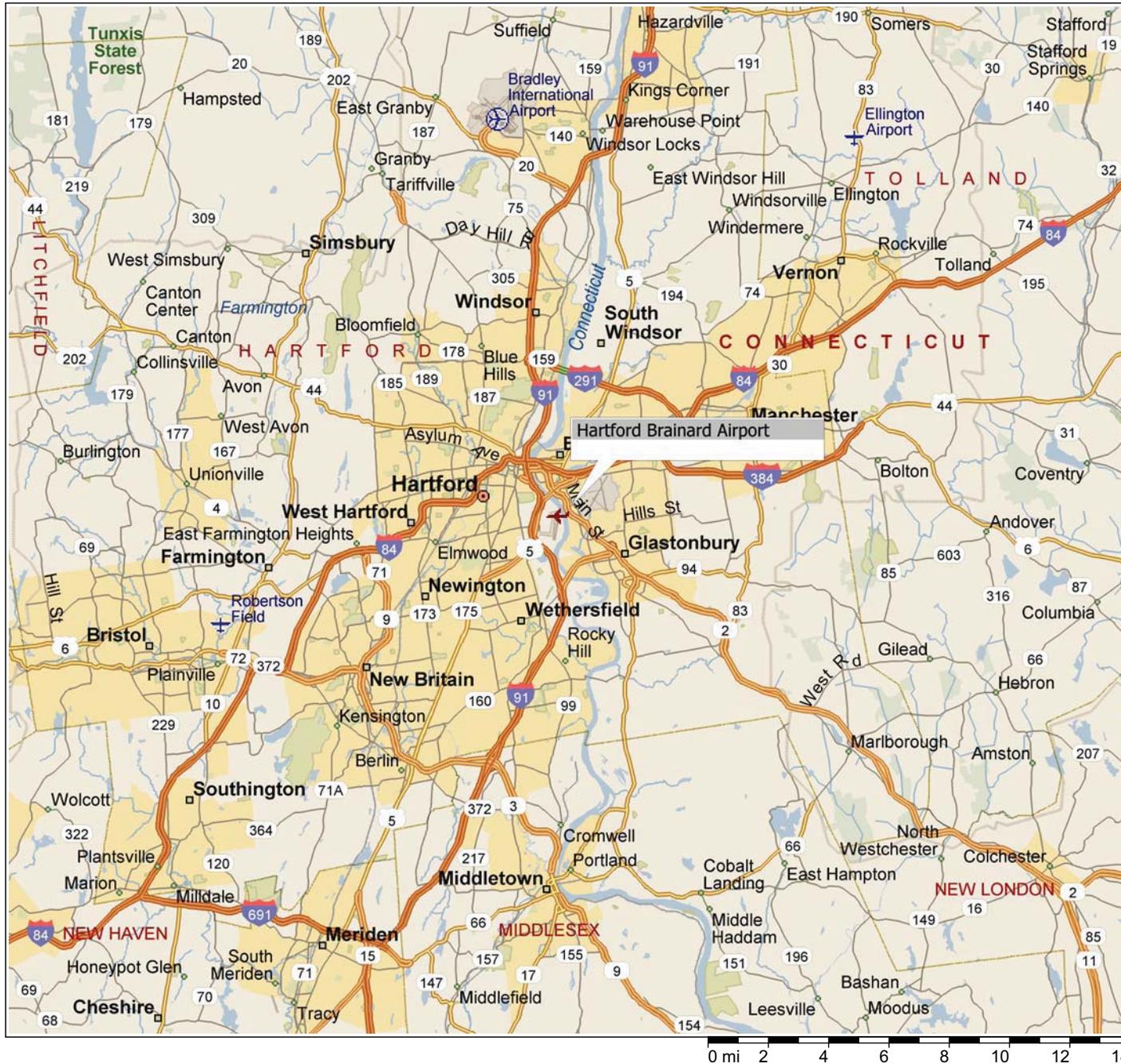
Airport & Aviation Appraisals, Inc.

ADDENDA

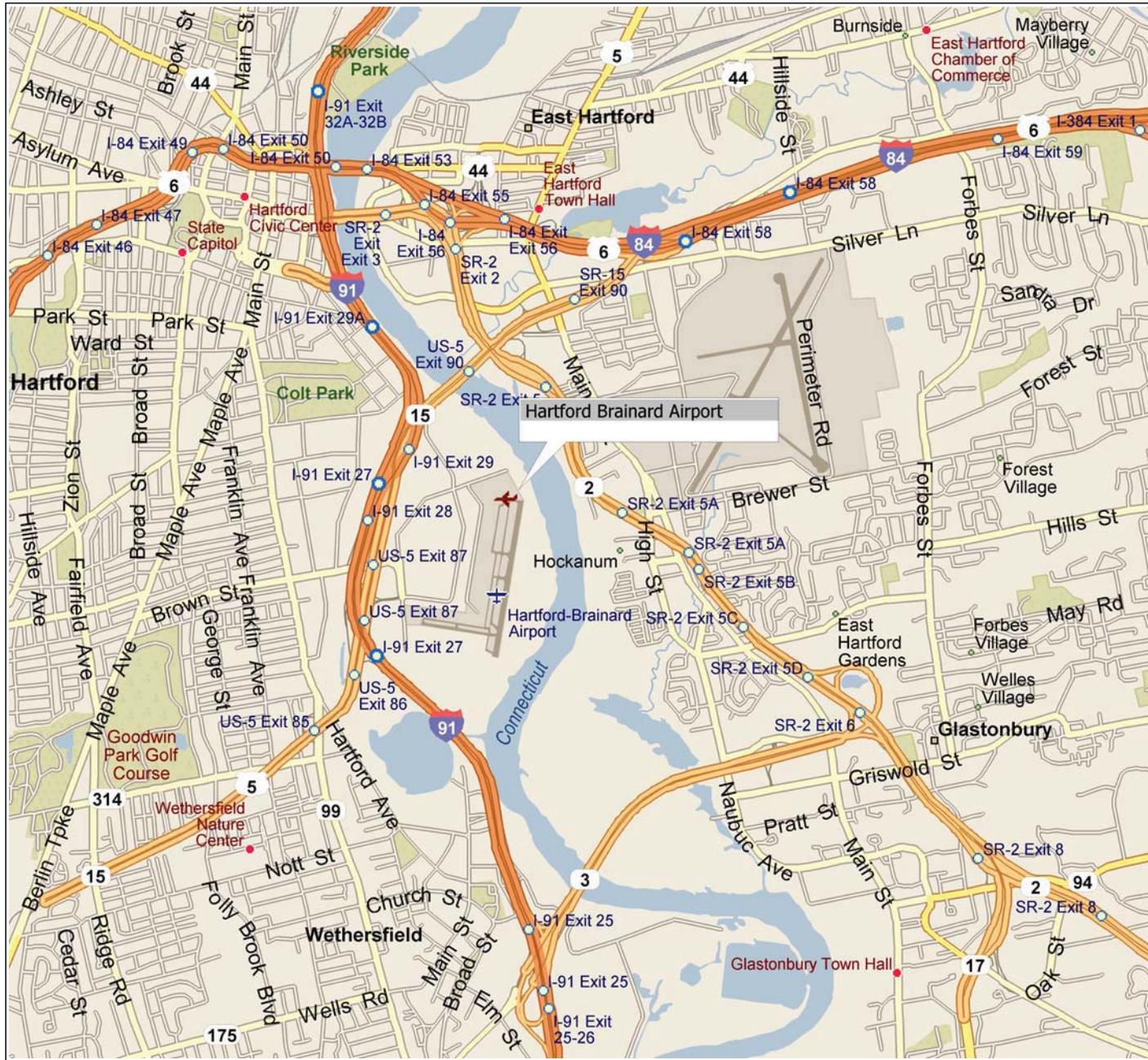
Connecticut, United States, North America



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Connecticut, United States, North America



Comparable T Hangar Rental Rates

KBAF Barnes Muni Westfield/Springfield, MA- Longest Runway: 9,000 CT

T hangar Rental Rate: \$250.00 per month for older units.

Comments:

K7B2 Northampton Northampton, MA -Longest Runway: 3,365

T hangar Rental Rate: \$200 a month for older units. Newer hangars built in 2005 lease for \$325 per month. T hangars built in 2010 lease for \$375 per month.

Comments:

KHFD Hartford-Brainard Hartford, CT- Longest Runway: 4,417 CT

T hangar Rental Rate: T. hangars on the airport are mostly owned condo style. Rental rates for the few units that do lease range from \$350-\$400 a month.

Comments:

KBDL Bradley Intl Windsor Locks, CT- Longest Runway: 9,510, CT

T hangar Rental Rate: No T hangars available on airport.

Comments:

KOXC Waterbury-Oxford Oxford, CT- Longest Runway: 5,800, CT

T hangar Rental Rate: T. hangars on the airport are mostly owned condo style. Rental rates for the few units that do lease range from \$300-\$400 a month.

Comments:

K7B9 Ellington Ellington CT- Longest Runway: 1,800

T hangar Rental Rate: No T hangars

Comments:

KSNC Chester, Chester CT- Longest Runway: 2,566

T hangar Rental Rate: Many T hangars for built for lease in 1990. Rental rates are \$255 per month for single engine type units, to \$475 per month for units with 48 foot door.

Comments:

KHVN Tweed-New Haven, New Haven CT- Longest Runway: 5,600

T hangar Rental Rate: No Rental T hangars available on airport.

Comments:

KBDR Igor I Sikorsky Memorial, Bridgeport CT- Longest Runway: 4,761 CT
T hangar Rental Rate: T hangars are largely older portable units which are installed in the 1970s and 1980s. These structures are mostly owned by individual aircraft owners on a long-term lease. Hangars that lease range from \$300 per month to \$500 per for larger units.

Comments:

KDXR Danbury Muni, Danbury CT- Longest Runway: 4,422 CT
T hangar Rental Rate: New T hangars are being built by Business Aircraft Center. At this time, rental rates have not been determined. Asking rentals for units at other operators range from \$500 to \$750 per month.

Comments:

K4B8 Robertson Field, Plainville CT- Longest Runway: 3,612
T hangar Rental Rate: No T hangars available on airport.

Comments:

KLZD Danielson Danielson Ct- Longest Runway: 2,700
T hangar Rental Rate: T. hangars on the airport are mostly owned condo style. Rental rates for the few units that do lease range from \$200-\$350 a month.

Comments:

KIJD Windham, Willimantic CT- Longest Runway: 4,271
T hangar Rental Rate: T. hangars on the airport are mostly owned condo style. Rental rates for the few units that do lease range from \$270-\$350 a month.

Comments:

Unimproved Airside Land Rental Rates

KBAF Barnes Muni Westfield/Springfield, MA- Longest Runway: 9,000 CT

Unimproved Airside Land Rental Rate: Asking rental rates and recent transactions indicate land lease rates from \$.15 per square foot to \$.20 per square foot.

Comments:

K7B2 Northampton Northampton, MA -Longest Runway: 3,365

Unimproved Airside Land Rental Rate: \$.10 per square foot.

Comments:

KCEF Westover/Metropolitan Springfield/Chicopee, MA -Longest Runway: 11,597 CT

Unimproved Airside Land Rental Rate: No recent leases but asking rates are from \$.20-\$.30 per square foot

Comments:

KISP Long Island Mac Arthur New York NY- Longest Runway: 7,600 CT

Unimproved Airside Land Rental Rate: Current rental rates range from \$.27 per square foot to \$.32 per square foot.

Comments: Full-service FBOs are charged 2% of gross revenues. Specialized aviation service operations are not.

KORE Orange Muni Orange, MA-Longest Runway: 5,000

Unimproved Airside Land Rental Rate: Smaller sites under executive type hangars lease for \$.25 per square foot

Comments:

KHFD Hartford-Brainard Hartford, CT- Longest Runway: 4,417 CT

Unimproved Airside Land Rental Rate: land rental rates range from approximately \$.26 per square foot for a site supporting T hangar development to just over \$.22 per square foot for airside development supporting an aviation trade school. Some portions of the FBO leaseholds are at \$.55 per square foot.

Comments:

KOXC Waterbury-Oxford Oxford, CT- Longest Runway: 5,800, CT

Unimproved Airside Land Rental Rate: Land prices range from as low as \$.06 per square foot for large assemblages to up to \$.34 a square foot depending on the size and location of the parcel.

Comments:

KHVN Tweed-New Haven, New Haven CT- Longest Runway: 5,600 CT
Unimproved Airside Land Rental Rate: Smaller sites under executive type hangars would lease for \$.20 to \$.25 per square foot, depending on the location.

Comments:

KSWF Stewart Intl Newburgh NY- Longest Runway: 11,817 CT
Unimproved Airside Land Rental Rate: Current land rental rates average approximately \$.37 per square foot.

Comments:

KBDR Igor I Sikorsky Memorial, Bridgeport CT- Longest Runway: 4,761 CT
Unimproved Airside Land Rental Rate: New land rental rates range from \$.27 to \$.30 per square foot.

Comments:

KDXR Danbury Muni, Danbury CT- Longest Runway: 4,422 CT
Unimproved Airside Land Rental Rate: Current rental rates are \$.15 per square foot.

Comments:

KGON Groton-New London Groton CT- Longest Runway: 5,000 CT
Unimproved Airside Land Rental Rate: Current land rental rates average approximately \$.30 per square foot for a fixed base operator, with lower rates applicable to the T hangar parcel.

Comments:

KLZD Danielson Danielson Ct- Longest Runway: 2,700
Unimproved Airside Land Rental Rate: land prices range from as low as \$.13 per square foot for a skydiving drop zone to up to \$.38 a square foot for the parcel supporting the condo T hangars.

Comments:

KIJD Windham, Willimantic CT- Longest Runway: 4,271
Unimproved Airside Land Rental Rate: Land prices range from as low as \$.16 per square foot to \$.27 a square foot in the main terminal area.

Comments:

Comparable Open Bay Hangar Rental Rates

KHFD Hartford-Brainard Hartford, CT- Longest Runway: 4,417 CT
Open Bay Hangar Rental Rate: \$5.50 PSF

Comments: Rent applicable to a fixed base operation which has as a part, 27,000 square feet of open bay hangars.

KBAF Barnes Muni Westfield/Springfield, MA- Longest Runway: 9,000 CT
Open Bay Hangar Rental Rate: \$1.50 to \$2.00 PSF

Comments: Rental rate applies to older, less capable hangars

KISP Long Island Mac Arthur New York NY- Longest Runway: 7,600 CT
Open Bay Hangar Rental Rate: \$4.35 to \$9.00 PSF

Comments: Recent deals were concluded for a large hangar facility once occupied by Garrett Aviation. It was leased by an aircraft charter and management operations directly from the airport. In addition to the basic rental, there is a provision to collect a percentage of gross revenues by the landlord (2%). There are also exceptions with regard to aircraft sales provisions. The higher rental rates relate to subleased space from one of the main fixed base operations on the airport. Percentage agreements are not pertinent to subleases.

K7B2 Northampton Northampton, MA -Longest Runway: 3,365
Open Bay Hangar Rental Rate: \$2.90 to \$5.00 PSF

Comments: Rents are for smaller, less capable hangars

K7B9 Ellington Ellington CT- Longest Runway: 1,800
Open Bay Hangar Rental Rate: \$3.23 PSF

Comments: Small hangar.

KSWF Stewart Intl Newburgh NY- Longest Runway: 11,817 CT
Open Bay Hangar Rental Rate: \$7.50 PSF

Comments: This is the current rental rate pertinent to the main FBO structure occupied by Atlantic. This was formally the W.R. Grace corporate hangar and was converted for fixed base operation use 10 years ago.

KMGJ Orange County Montgomery NY- Longest Runway: 5,002 Open Bay
Hangar Rental Rate: \$5.25 PSF

Comments: Smaller hangar of limited function.

KCEF Westover/Metropolitan Springfield/Chicopee, MA -Longest Runway: 11,597 CT
Open Bay Hangar Rental Rate: \$2.00 to \$3.00 PSF

Comments: Asking rent for older units not suitable for fixed base operations.

Comparable Terminal/Office Space Rental Rates

KBAF Barnes Muni Westfield/Springfield, MA- Longest Runway: 9,000 CT
Office Space in Terminal: \$10.00 PSF

Comments:

KHFD Hartford-Brainard Hartford, CT- Longest Runway: 4,417 CT
Office Space in Terminal: \$12.00 to \$14.00 PSF

Comments:

K7B9 Ellington Ellington CT- Longest Runway: 1,800
Office Space in Terminal: \$11.83 PSF

Comments: Rent applicable to a parachute club.

KLZD Danielson Danielson Ct- Longest Runway: 2,700
Office Space in Terminal: \$12.00 PSF

Comments: Small area

KHVN Tweed-New Haven, New Haven CT- Longest Runway: 5,600
Office Space in Terminal: \$11.50 to \$15.00 PSF

Comments:

KBDR Igor I Sikorsky Memorial, Bridgeport CT- Longest Runway: 4,761 CT
Office Space in Terminal: \$25.00 PSF

Comments: Space in new FBO facility when built out.

KDXR Danbury Muni, Danbury CT- Longest Runway: 4,422 CT
Open Bay Hangar Rental Rate: \$10.00 PSF

Comments:

KGON Groton-New London Groton CT- Longest Runway: 5,000 CT
Office Space in Terminal: \$12.50 to \$15.00 PSF

Comments: Rent would apply to Hangar 1 or Hangar 2 at FBO (Columbia).

Airport & Aviation Appraisals, Inc.

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QUALIFICATIONS OF

WINTHROP D. PERKINS, CRE

PROFESSIONAL POSITION

Founder and Principal of:

- a.) Airport & Aviation Appraisals, Inc. (1984-Present). Specialists in the appraisal of aviation-related real estate and businesses.
- b.) MMU-FTC, LLC (1984-Present). Developers and owners of 75,000 sq. ft. of hangar space for corporate jets and a 23,000 sq. ft. flight training center at Morristown Airport, Morristown, NJ. Developers and owners of 40 T-hangars at Morristown Airport, Morristown, NJ
- c.) MMU Fuels, Inc. (1998-Present) Suppliers of Exxon aviation fuels at Morristown Airport, Morristown, NJ

AFFILIATIONS AND SPECIAL CERTIFICATION

Member, The Counselors Real Estate
Certified General Appraiser (#RG 01130), State of New Jersey
Member, New Jersey Aviation Association
Member, Morristown Aviation Association
Member, Morris County Aviation Advisory Board

EDUCATION

Noble & Greenough School, Dedham, Massachusetts 1971
B.A., Harvard University, Cambridge, Massachusetts 1974

Courses conducted by the Appraisal Institute: Real Estate Appraisal Principles, Basic Valuation Procedures, Standards of Professional Practice Parts A & B, Capitalization Theory and Techniques Parts A & B, Advanced Applications, Report Writing & Valuation Analysis.



Airport & Aviation Appraisals, Inc.

EXPERT TESTIMONY

Mr. Perkins has appeared as an expert witness in the valuation of aviation properties in courts in Ohio, Kentucky, New Hampshire and North Carolina.

EXPERIENCE – CLIENTS SERVED

Mr. Perkins has completed nearly 250 aviation real estate appraisal assignments.

Previous Experience on Similar Projects **List of Previous Experience**

Airport & Aviation Appraisals, Inc. has performed over +250 aviation real estate appraisal assignments. The following is a partial listing of recent engagements which all involved the value of aviation property.

Spirit of St. Louis Airport, Chesterfield, Missouri- Appraisal of a hangar, office and shop facility located on the midfield area of the airside. The aggregate property consists of approximately 9 acres of fee simple land and 100,170 square feet of improvements,

Lakeland-Lindner Regional Airport, Lakeland, Florida- Appraisal of hangar and office facility located on the west side of the airside property inventory. The property consisted of approximately 33,142 square feet (0.76 acres) of land and 8,830 square feet of improvements.

Driggs- Reed Memorial Airport, Driggs, Idaho - Appraisal of hangar and office facility located on the southwest side of the airside property inventory. The property consisted of approximately +/- 1.043 Acres (45,440 Square Feet) of land and 11,020 square feet of improvements. (2008)

Orlando International Airport (Aeroterm.) – Appraisal of 9.1 acres of airside land for air cargo operation. (2003)

Toledo Express International Airport, Toledo, OH– Appraisal a structure of approximately 34,021 square feet located on 2.51 acres on the north side of Toledo Express International Airport (2005).

Woodbine Airport, Woodbine, NJ – Appraisal of a number parcels of airside land for future development by the airport sponsor. (2005).



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Cape Girardeau Regional Airport, Cape Girardeau, Missouri - Valuation of a 52,000 square foot hangar and supporting site. (2005)

Atlantic City International Airport, Egg Harbor, New Jersey - Valuation of one parcel of land, consisting of 123,750 square feet (2.84 acres) improved with a 50,000 square foot hangar. (2006)

Lane Aviation, Columbus, OH - Appraisal of Lane Aviation Facility to determine market rental rate upon reversion of the structure to the Columbus Airport Authority. (2005)

Bismarck Airport, Bismarck, North Dakota - Appraisal of a complex of hangars, terminal and airside land, pieces of equipment and a fuel farm (2006)

Reese Airpark, Lubbock, Texas - Appraised entire 1,766 acre /military/industrial airport in aggregate, for potential privatization. Airport property included vacant airside and industrial/commercial land, hangars, auto parking facility, garages, office buildings, vehicle maintenance structures, farm, control tower, aircraft parking ramps and industrial park. (2003)

Teterboro Airport, Teterboro, NJ (Port Authority NY & NJ) Appraisal of all airside land and improvements totaling over ½ million sq. ft of buildings on a 800 acre general aviation airport (largest and busiest in the world) to determine new lease rates. (1998)

Solberg Airport, Reddington, NJ – Appraisal of an entire 597 acre privately owned public airport, for possible sale. (2002)

David Wayne Hooks Memorial Airport, Spring, Texas – Appraisal of an entire 718 acre privately owned public airport, with 430,00 square feet of improvements for possible sale. (2004)

Princeton Airport - Valuation of entire airport. (2008)

Randall Airport, Middletown, New York - Valued entire 229 acre airport in aggregate and evaluated the development potential of the facility. (2006)

Spirit of St. Louis Airport, Chesterfield, Missouri – Appraisal of a complex of hangars, offices and shop facility consisting of approximately 5.19 Acres of land and 32,800 square feet of improvements (2007).

North Las Vegas, Nevada (Nevada State Bank)– Appraisal of approximately 3.4 acres improved as a heliport with three structures totaling approximately 22,460 square feet. (2004)

Du Page Airport, Chicago, Ill. – Appraisal of vacant airside parcels for future development (2004).



Airport & Aviation Appraisals, Inc.

Salem Air Park, Salem, OH – Appraisal of Salem Air Park consisting of +/- 35 Acres airside improvements such as a terminal structure, T hangars and a variety of other operationally necessary aeronautically related improvements (2004).

Bismarck Airport, Bismarck, North Dakota - Appraisal of Corporate Hangar (Building 45) at 2301 University Drive. Analyzed the value in the context of the existing supporting ground lease, and also with a new 20-year ground lease at the current market ground rental. (2008)

Hobby Airport, Houston, TX (HCC Service Company)– Market Value of corporate hangar of approximately 38,588 square feet located on 2.34 acres on the south side of William P. Hobby Airport. (2007)

Norwood Airport, Norwood, Massachusetts– Appraisal, for financing purposes, of a large FBO facility consisting of contiguous parcels of underlying land with aeronautically related improvements constructed upon them. (2002 and 2005).

Driggs- Reed Memorial Airport, Driggs, Idaho (Anheuser-Busch Companies) – Appraisal of /corporate hangar facility (2008).

Oakland International Airport, Oakland, California. (Bank of Texas) – Appraisal, for financing purposes, of an existing and proposed new FBO facility (2003).

North Central Airport, Smithfield, Rhode Island (CommerceBank) – Appraisal of charter/corporate hangar facility (2004).

Allaire Airport, Belmar, NJ - Retained by owner to appraise entire airport, in aggregate for potential sale. This 670 acre general aviation airport is one of the largest privately owned, public use airports in the United States. (1997, 2000 and 2006)

Morristown Municipal Airport, Morristown, NJ (D.M. Airport Developers) – Appraisal of an entire 637 acre privately leased public airport, for financing purposes. (1997-98)

Youngstown Municipal Airport, Youngstown, OH (City of Youngstown). Valued entire 1,400 acre airport in aggregate and evaluated potential "privatization" and sale of facility. Additionally, was also retained by Western Reserve Port Authority to negotiate leases and airport use agreements with fixed base operator, all airlines and United States Air Force Reserve. (1989-95)

South Jersey Regional Airport, Lumberton, NJ (Fleet Bank) Appraisal of an entire 689 acre privately-owned public airport facility in aggregate. Included land improvements and going concern value of fixed base operation for financing purposes, and sale to public sponsor (1996, 2002 and 2003)

Bismarck Airport, Bismarck, North Dakota - review appraisal report concerning the Building 2 at Bismarck Airport and the appraisal performed in connection with it.



Airport & Aviation Appraisals, Inc.

Eagles Nest Airport, Eagleswood, New Jersey. Appraisal of entire airport in aggregate, for potential sale. (2004)

Bult Field, Monee, Ill. (Illinois Department of Transportation) Appraisal of entire general aviation airport for potential acquisition by public sponsor. (2007)

Hilton Head Airport, Hilton Head, South Carolina Valuation of business, airside land and improvements occupied by a fixed base operation. (2005)

Bayport Aerodrome, Bayport, New York.– Appraisal of concerning an office structure and supporting airside property along with a T hangar complex. (2006)

Sussex County Airport, Georgetown, Delaware - Valuation of six separate parcels of vacant and improved land. (2007)

George Bush Intercontinental Airport, Houston TX/(BankOne)-- Valuation of an air cargo facility of 169,010 sq. ft. on 8.398 acres of land. (2003)

Northampton Airport, Northampton, Mass - Appraisal of entire airport for purchase by third party. (2004)

Fort Lauderdale-Hollywood International Airport, Fort Lauderdale, Florida (BankOne)- Appraisal of complex of buildings located on the northern airside land inventory at Fort Lauderdale-Hollywood International Airport. The complex is an amalgam of pre-existing aviation related structures such as an open bay hangar, and a now abandoned motel, and more modern, dedicated airside cargo buildings used for cargo sortation. The complex is located on 22.55 acres of airside property, and also includes a large ramp area on which large air carrier type aircraft can be parked while cargo is enplaned and deplaned. (2002)

Groton-New London Airport, Groton, Connecticut (Salem Five Bank) -Appraisal of fixed base operation's real estate assets. (2004)

Flying M Aerodrome, Germansville, Pennsylvania. – Appraisal of a facility, which consists of +/- 62.5 acres and a variety of other operationally necessary aeronautically, related improvements (2006).

Spitfire Aerodrome, Pedrickstown, NJ – Appraisal of privately owned public airport consisting of +/- 41 Acres and airside improvements such as a terminal structure, T hangars and a variety of other operationally necessary aeronautically related improvements (2002).

Summit Airpark, Middletown, DE- Appraisal of entire 520 acre airport and fixed base operation/maintenance business under the ownership of Summit Aviation, located at Summit Airport in Middletown Delaware (2006)



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North Central Airport, Smithfield, Rhode Island– Appraisal of vacant airside parcels for future development and airside improvements on the airport for leasing (2006).

Harrisburg International Airport, Harrisburg, PA -Appraisal of a corporate hangar of approximately 12,000 square feet located on 1.3 acres on the north side of Harrisburg International Airport. (2002)

Stewart Int'l Airport, Newburgh, NY (DM Airports Int'l) - Appraised entire 2,000 acre air carrier/air cargo/military/industrial airport in aggregate, for potential privatization. Airport property included vacant airside and industrial/commercial land, a new 100,000 sq. ft. airline terminal, cargo buildings, corporate hangars, FBO hangars, auto parking facility, garages, FBO hangars, office buildings, vehicle maintenance structures, airport rolling stock, Crash-Fire-Rescue equipment, 260 acre C-5A/C-130 military leasehold, fuel farm, control tower, aircraft parking ramps and 700,000 square foot industrial park. Assignment also included extensive analysis of lessees' property tax burden after consummation of lease with State of New York. (1997-98)

Stennis International Airport, Bay Saint Louis, Mississippi -Market rental relating to real estate comprising two open bay hangars, and a T hangar complex to be constructed at Stennis International Airport. Developed recommendations regarding contractual stipulations pertaining to land lease extensions for lessee constructed improvements. Analyzed though-the-fence possibilities at this facility, and provide a variety of approved documentation relating to similar agreements at other airports subject to Sponsor's Assurances. (2007)

St. Louis Regional Airport, Alton, Illinois- Appraisal of entire real estate assets including through the fence land of a heavy maintenance/ fixed base operations in order to determine market rental rates. (2005)

Camden County Airport, Berlin NJ – Appraisal of entire airport (in aggregate) for potential sale and financing (2000 and 2003).

New Castle County Airport, Wilmington, DE (Delaware Skyways.) – Appraisal of leasehold interests, fixed assets, inventory, and intangibles; also including all equipment, machinery, and aircraft located at New Castle County Airport, Wilmington, Delaware. (2004)

Chester County Airport, Coatesville, Pennsylvania- Market Rental Value for various T-hangars (2003),

Rutland State Airport, Clarendon, Vermont - Valuation of leasehold interests in hangar. (2003)

Boulder City Airport, Boulder City, Nevada - Market rent analysis report concerning two vacant airside land areas. (2004)



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Bar Harbor Airport, Trenton, Maine - Valuation of fixed base operation consisting of approximately 24,130 square feet of existing hangar, office and terminal area and a large ramp and tie down area. (2003)

Lakeland Linder Regional Airport, Lakeland, Florida - Valued fixed base operation consisting of approximately 7,178 square feet of existing hangar, office and terminal area and a large ramp and tie down area. (2005)

JFK Int'l Airport, New York, NY (Japan Airlines). Age life study of Hangar 14. Appraisal conducted for rehabilitation and reconstruction of 700,000 square foot maintenance hangar to state of the art cargo facility/office building. (1991)

Various airports (Federal Express) Appraisal of air cargo facilities at, Hartsfield-Atlanta Int'l Airport, Anchorage Int'l Airport and Chicago O'Hare Airport totaling 250,000 square feet. Provided valuation and consulting services with regard to disposition of airport cargo properties in three key metropolitan locations. (1990)

Various airports (Trans-World Airlines) - Appraisal of TWA hangars, terminals, flight kitchens, cargo buildings and maintenance structures totaling 1.5 million square feet at JFK Int'l Airport, Chicago O'Hare Airport, Philadelphia International Airport and Boston Logan Airport. (1989-90)

Rickenbacker Int'l Airport, Columbus, OH - Provided valuation and consulting services to Turner Construction Company with regard to Flying Tigers' 275,000 sq. ft. air cargo hub and valuation of entire 5,000 acre all cargo/military use airport in aggregate. (1989-94)

T.F. Green State Airport, Providence, RI (Rhode Island Airport Corp). Valued leasehold interest of air-carrier's position in Old Terminal Building as a part of a buyout leading to the construction of a New Terminal of 200,000 sq. ft. on the same site. (1995)

San Jose International Airport, San Jose, CA - Market Value appraisal of underlying site of Hewlett Packard Corporate Hangar to update and escalate lessee's ground rent payments. (1994)

New Castle County Airport, Wilmington, DE – Appraisal of all vacant parcels of airside land for future development by the airport sponsor. (1999)

Trenton-Mercer County Airport, Trenton, NJ – Appraisal of all vacant parcels of airside land for future development by the airport sponsor. (2001)

Millville Municipal Airport, Millville, NJ – Appraisal of all vacant parcels of airside land for future development by the airport sponsor. (2000)

Lambert-St. Louis Int'l Airport, St. Louis MO (St. Louis Air Cargo Services, Inc.) – Appraisal of 31 acres of airside land for air cargo operation. (1999)



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Francis S. Gabreski Airport, Westhampton Beach, NY (Suffolk County) Valuation of all airside land and improvements plus landside industrial land and improvements on 1,500 acre general aviation/military airport. Valuation used to determine market rental rate. Valuation included feasibility study and analysis of absorption and Highest and Best Use analysis for all airside real estate. (1996)

Roanoke Regional Airport, Roanoke, VA – Appraisal of a heavy maintenance operation, an FBO, a Charter Operation, and a corporate aviation hangar. (1997 and 1999).

Queen City Municipal Airport, Allentown, PA – Appraisal of a large maintenance hangar (1998).

Missoula International Airport, Missoula, MT - Valuation of on airport parcel to determine market value as a part of a transaction involving a land swap between the airport and another governmental agency. (1997)

Cape May Airport, Cape May, NJ – Appraisal of all vacant parcels of airside land for future development by the airport sponsor. (1996).

Midway Airport, Chicago, IL - Valuation of a large stand alone corporate aviation facility and a small maintenance hangar to determine market rental rate for land and improvements. (1996)

Colorado Springs Airport, Colorado Springs, CO - Market Value of corporate hangar to assist airport during negotiations after the reversion of the facility upon expiration of the underlying ground lease. (1996)

Davenport Municipal Airport, Davenport, IA - Valuation of three separate vacant parcels of general aviation land to determine market rental rates. (1996)

Reading Regional Airport, Reading PA - Valuation of three older open bay hangar facilities to determine Fair Market Rental Rates by fixed base operators. (1996)

Lancaster Airport, Lancaster, PA - Appraisal of Armstrong World Industries hangar to determine market rental rate upon reversion of the structure to the Lancaster Airport Authority. (1996)

Lakefront Airport, New Orleans, LA (Orleans Levee Board/MillionAir) - Appraisal of leasehold to determine fair market rental rate. (2000)

Tinticum Fuel Farm, Philadelphia International Airport, Philadelphia, PA - Valuation of airline consortium's leasehold interest of a 1,000,000 gallon fuel farm to determine market rental rates. (1993)

Cape May Airport, Cape May, NJ – Appraisal of FBO's leasehold (1999).



Airport & Aviation Appraisals, Inc.

Westfield-Barnes Airport, Westfield MA – Appraisal of fueling rights and unexpired leasehold interest advantage of multi-hangar FBO facility (2000)

Trenton Mercer Airport, West Trenton, NJ – Appraisal of vacant airside parcel for development with a corporate flight department (1999).

Wilkes County Airport, North Wilkesboro, NC (Tyson Foods) – Appraisal of corporate flight department hangar (1998).

New Castle County Airport, Wilmington, DE (Hercules)– Market Value of corporate hangar. (2000)

Manchester Airport, Manchester, NH (BankBoston/Wiggins Airways) – Appraisal, for financing purposes, of a large proposed new FBO facility (1998).

Palm Beach Int'l. Airport, Palm Beach, FL (BankBoston) – Appraisal, for financing purposes, of an existing and proposed new FBO facility (1999).

Sikorsky Airport, Bridgeport, CT (BankBoston) – Appraisal of charter/corporate hangar facility (1998).

Rentschler Airport, East Hartford, CT (United Technologies). Appraisal of entire 800 acre airport in aggregate, for potential sale. This was a major airport facility that was owned and operated by United Technologies. (1993)

Braden Airport, Easton, PA (Leigh-Northampton Airport Authority) Appraisal of entire general aviation airport for potential acquisition by public sponsor. (1994)

Luton Int'l Airport, Luton, England (Garrett Turbine Engines/Allied-Signal) Valuation of market rental rate for airside land and improvements occupied by a fixed base operation. (1991)

Cape May Airport, Cape May, NJ – Appraisal of an FBO for buyout by the airport sponsor. (2000)

Lakefront Airport, New Orleans, LA (Orleans Levee Board) - Valuation of all airside improvements on the airport. (1999)

Rickenbacker Int'l Airport, Columbus, OH - Provided valuation and consulting services to Turner Construction Company with regard to Flying Tigers' 275,000 sq. ft. air cargo hub and valuation of entire 5,000 acre all cargo/military use airport in aggregate. (1989-1996)

New Castle County Airport, Wilmington, DE (MBNA)– Market Value of corporate hangar. (2000)



Airport & Aviation Appraisals, Inc.

Delaware Airpark, Dover, DE - Appraisal of entire airport for purchase by the State of Delaware. (1999)

Colorado Springs Airport, Colorado Springs, Colorado - Appraisal of land and buildings to determine market rental rate for a fixed base operation. (2001)

Business Jet Center, Love Field, Dallas, Texas (Wells Fargo Bank) -Appraisal of fixed base operation's real estate assets (150,000 sq. ft. – 17 Acres) and business enterprise value for Wells Fargo Bank. (2001)

Summit Airpark, Middletown, DE- Appraisal of entire 520 acre airport for Commerce Bank. (2001)

Lancaster Airport, Lancaster, PA -Appraisal of 7,000 square foot corporate hangar to determine market rental rate. (2001)

St. Louis Regional Airport, Alton, Illinois- Appraisal of entire real estate assets of a heavy maintenance/ fixed base operations in order to determine market rental rates. (2002)

Sikorsky Airport, Bridgeport, CT - Appraisal of entire airport, in aggregate, for possible privatization (1999).

New Castle County Airport, Wilmington, DE (Krapf, Inc.) – Appraisal of unexpired leasehold estate and leasehold interest advantage of three hangar complex (corporate and FBO) for potential purchase (2000)

Monroe Municipal Airport, Monroe, NC (W.F. Harris Development LLC) – Appraisal of a 13 acre airside adjacent parcel for a potential “thru-the-fence” operation (1999).

Austin-Bergstrom Intl'l Airport, Austin, TX – Appraisal and market rental rate study of unexpired leasehold estate of a heavy maintenance operation (1999).

Long Island Mac Arthur Airport, Islip, NY (Chase Manhattan Bank) – Appraisal of a charter operation hangar (1998) and an FBO facility (1999) for financing purposes.

Allentown Airport, Allentown, PA - Valued fixed base operation for airport authority. Ascertained impact of fuel flowage, tie-down rentals, hangar rentals, concessions and other income-producing components to develop a value for the facility. (1987)

Port Columbus Int'l Airport, Columbus, OH – Valuation consulting services of vacant airport-related land (1999).

New Castle County Airport , Wilmington, DE (Atlantic Aviation/DuPont) - Valuation of leasehold interests in hangar. (1996)



Airport & Aviation Appraisals, Inc.

Lancaster Airport, Lancaster, PA - Valuation of corporate hangar facility for purchase by fixed base operator. (1991)

Lakefront Airport, New Orleans, LA (Orleans Levee Board) - Evaluation of all airside improvements on the airport. (1999)

GLOSSARY OF AIRPORT AND AVIATION TERMINOLOGY

A - in the phonetic alphabet is Alfa (al-fah)

AAWS - automatic aviation weather service.

Abort - To terminate a preplanned aircraft maneuver; e.g., an aborted takeoff.

ADF - automatic direction finder.

ADIZ - air defense identification zone.

Advisory service - advice and information provided by a facility to assist pilots in the safe conduct of flight and aircraft movement.

Aerodrome - A defined area on land or water (including any buildings, installations, and equipment) intended to be used either wholly or in part for the arrival, departure, and movement of aircraft.

(FAA) Aeronautical Activity - any activity which involves, makes possible, or is required for the operation of aircraft, or which contributes to or is required for the safety of such operations, For example:

(1) The following are aeronautical activities:

- (a) Air taxi and charter operations.
- (b) Scheduled or nonscheduled air carrier services.
- (c) Pilot training.
- (d) Aircraft rental and sightseeing.
- (e) Aerial photography.
- (f) Crop dusting.
- (g) Aerial advertising and surveying.
- (h) Aircraft sales and service.
- (i) Aircraft storage.
- (j) Sale of aviation petroleum products.
- (k) Repair and maintenance of aircraft.
- (l) Sale of aircraft parts.
- (m) Parachute activities.
- (n) Ultralight activities.

(2) The following are not aeronautical activities: ground transportation (taxis, car rentals, limousines); restaurants; in flight food catering; barber shops; and auto parking lots.

Aeronautical beacons - rotating lights which indicate a landing place, landmark, or hazard. The usual color and color combinations of the rotating lights are:

white and green - lighted land airport (double white and green - military airport)

white and yellow - lighted water airport

white and red - landmark of navigational point

red alone - hazard.

Aeronautical Chart - A map used in air navigation containing all or part of the following: topographic features, hazards and obstructions, navigation aids, navigation routes, designated airspace, and airports. Commonly used aeronautical charts are:

1. Sectional Charts, 1:500,000 - Designed for visual navigation of slow or medium-speed aircraft. Topographic information on these charts features the portrayal of relief and a judicious selection of visual checkpoints for VFR flight. Aeronautical information includes visual and radio aids to navigation, airports, controlled airspace, restricted areas, obstructions, and related data.
2. VFR Terminal Area Charts, 1:250,000 - Depict terminal control area (TCA) airspace which provides for the control or segregation of all the aircraft within the TCA. The chart depicts topographic information and aeronautical information which includes visual and radio aids to navigation, airports, controlled airspace, restricted areas, obstructions, and related data.
3. World Aeronautical Charts (WAC), 1:1,000,000 - Provide a standard series of aeronautical charts covering land areas of the world, at a size and scale convenient for navigation by moderate-speed aircraft. Topographic information includes cities and towns, principal roads, railroads, distinctive landmarks, drainage, and relief. Aeronautical information includes visual and radio aids to navigation, airports, airways, restricted areas, obstructions, and other pertinent data.
4. Enroute Low-altitude Charts - Provide aeronautical information for enroute instrument navigation (IFR) in the low altitude stratum. Information includes the portrayal of airways, limits of controlled airspace, position identification and frequencies of radio aids, selected airports, minimum enroute and minimum obstruction clearance altitudes, airway distances, reporting points, restricted areas, and related data. Area charts, which are a part of this series, furnish terminal data at a larger scale in congested areas.
5. Enroute High-altitude Charts - Provide aeronautical information for enroute instrument navigation (IFR) in the high-altitude stratum. Information includes the portrayal of jet routes, identification and frequencies of radio aids, selected airports, distances, time zones, special-use airspace, and related information.
6. Instrument Approach Procedures (IAP) Charts - Portray the aeronautical data which is required to execute an instrument approach to an airport. These charts depict the procedures, including all related data, and the airport diagram. Each procedure is designated for use with a specific type of electronic navigation system including NDB, tacan, VOR, ILS/MLS, and RNAV. These charts are identified by the type of navigational aid(s) which provide final approach guidance.
7. Standard Instrument Departure (SID) Charts - Designed to expedite clearance delivery and to facilitate transition between takeoff and enroute operations. Each SID procedure is presented as a separate chart and may serve a single airport or more than one airport in a given geographical location.
8. Standard Terminal Arrival (STAR) Charts - Designed to expedite air traffic control arrival procedures and to facilitate transition between enroute and instrument approach operations. Each STAR procedure is presented as a separate chart and may serve a single airport or more than one airport in a given geographical location.
9. Airport Taxi Charts - Designed to expedite the efficient and safe flow of ground traffic at an airport. These charts are identified by the official airport name, e.g., Washington National Airport.

Affirmative - yes.

AID - airport information desk.

Aileron - a hinged control surface on the wing which aids in producing a bank or rolling about the longitudinal axis.

AIM - Airman's Information Manual.

AIP - The Airport Improvement Program of the Airport and Airways Improvement Act of 1982. Under this program, the FAA provides funding assistance for the design and development of airports and airport facilities.

Air Carrier - A commercial operator engaging in the carriage of persons or property in air commerce for compensation or hire. Air carriers are certificated in accordance with FAR Parts 121 and 127, and generally operate aircraft having a seating capacity of more than 30 passengers or a maximum payload capacity of more than 7,500 pounds.

Air Carrier District Office (ACDO) - An FAA field office serving an assigned geographical area, staffed with Flight Standards personnel serving the aviation industry and general public on matters related to the certification and operation of scheduled air carriers and other large aircraft operations.

Air Defense Identification Zone (ADIZ) - The area of airspace over land or water, extending upward from the surface, within which the ready identification, the location, and the control of aircraft are required in the interest of national security.

1. Domestic Air Defense Identification Zone - An ADIZ within the United States along an international boundary of the United States.
2. Coastal Air Defense Identification Zone - An ADIZ over the coastal waters of the United States.
3. Distant Early Warning Identification Zone (DEWIZ) - An ADIZ over the coastal waters of the State of Alaska.

Air Taxi - Scheduled and/or nonscheduled aircraft operations carrying passengers and/or cargo for compensation. The capacity of air taxi aircraft is limited by Part 135 of the Federal Aviation Regulations.

Aircraft Approach Category - A grouping of aircraft based on a speed of 1.3 times the stall speed in the landing configuration at maximum gross landing weight. An aircraft shall fit in only one category. If it is necessary to maneuver at speeds in excess of the upper limit of a speed range for a category, the minimums for the next higher category should be used. For example, an aircraft which falls in Category A, but is circling to land at a speed in excess of 91 knots, should use the approach Category B minimums when circling to land. The categories are as follows:

1. Category A - Speed less than 91 knots.
2. Category B - Speed 91 knots or more but less than 121 knots..
3. Category C - Speed 121 knots or more but less than 141 knots.
4. Category D - Speed 141 knots or more but less than 166 knots.
5. Category E - Speed 166 knots or more.

Aircraft Classes - For the purposes of wake turbulence separation minima, ATC classifies aircraft as heavy, large, and small as follows:

1. Heavy - Aircraft capable of takeoff weights of 300,000 pounds or more whether or not they are operating at this weight during a particular phase of flight.
2. Large - Aircraft of more than 12,500 pounds, maximum certificated takeoff weight, up to 300,000 pounds.
3. Small - Aircraft of 12,500 pounds or less, maximum certificated takeoff weight.

Aircraft radio receiving frequencies - en route communications from 112.0 through 117.9 MHz received on the VOR receiver or the localizer receiver; air traffic control communications from 118.0 through 121.3 MHz ; emergency frequency, 121.5 MHz; ground control uses 121.6 to 121.9 MHz; aeronautical advisory stations (UNICOM) use 122.8 and 123.0 MHz.

Aircraft radio transmitting frequencies - private aircraft to airport towers, 118.0 through 121.3 MHz (where the pilot can receive and transmit both); plus 122.5, 122.7, and 122.9 MHz where the pilot transmits on this frequency but receives on the published frequency for the tower; private or commercial aircraft to Federal Aviation Administration communications stations, 122.1, 123.6, and 126.7.

Airman's Information Manual (AIM) - A primary FAA publication whose purpose is to instruct airmen about operating in the National Airspace System of the United States. It provides basic flight information, ATC procedures and general instructional information concerning health, medical facts, factors affecting flight safety, accident and hazard reporting, and types of aeronautical charts and their use.

Airplane Design Group (Physical Characteristics) - The airplane design group subdivides airplanes by wingspan. The airplane design group concept links an airport's dimensional standards to aircraft approach categories or to airplane design groups or to runway instrumentation configurations.

(FAA) Airport - an area of land or water which is used, or intended for use, for the landing and takeoff of aircraft, and any appurtenant areas which are used, or intended of use, for airport buildings or other airport facilities or right-of-way, together with all airport buildings and facilities located thereon; and includes any heliport.

Airport advisory area - the area within 5 statute miles of an uncontrolled airport on which is located a flight service station so depicted on the appropriate sectional aeronautical chart.

Airport Approach Safety Zone - An element of either an Airport Impact Zone or an Airport Overlay Zone which consists of a portion of the Airport Approach Surface as defined in FAR Part 77. The actual boundaries and land-use provisions are determined by the local jurisdiction.

Airport Development Zone - A zone which replaces the existing zoning for the airport property encompassing the land presently owned by the airport and, if feasible, areas identified for future purchase, clear zones, and areas with noise levels greater than Ldn 70.

Airport Elevation/Field Elevation - The highest point of an airport's usable runways measured in feet from mean sea level.

Airport Hazard - Any structure or natural object located on or in the vicinity of a public airport, or any use of land near such airport, that obstructs the airspace required for the flight of aircraft in landing or taking off at the airport or is otherwise hazardous to aircraft landing, taking off, or taxiing at the airport.

Airport Impact Zone - A zone used to place land-use conditions on land impacted by airport operations. It establishes a new zone and provisions which replace an existing zone and standards.

(FAA) Airport Layout Plan (ALP) - shows the orientation and location of key facilities, such as runways and navigational aids, must be planned with consideration for approach zones, prevailing winds, airspace utilization, land contours and many other special factors. The dimensional relationships, even within the airport boundaries, between operational and support facilities and allocation of reasonable space to allow for orderly expansion of individual functions must be clearly established in advance. This is essential if such facilities are to be subsequently positioned where they can best serve their intended purposes while conforming to applicable safety and construction criteria.

Airport Lighting - Various lighting aids that may be installed on an airport. Types of airport lighting include:

1. Runway Lights/Runway Edge Lights - Lights having a prescribed angle of emission used to define the lateral limits of a runway. Runway lights are uniformly spaced at intervals of approximately 200 feet, and the intensity may be controlled or preset.
2. Touchdown Zone Lighting - Two rows of transverse light bars located symmetrically about the runway centerline normally at 100-foot intervals. The basic system extends 3,000 feet along the runway.

Airport Marking Aids - Markings used on runway and taxiway surfaces to identify a specific runway, a runway threshold, a centerline, a hold line, etc. A runway should be marked in accordance with its present usage, such as:

1. Visual.
2. Nonprecision instrument.
3. Precision instrument.

Airport Master Plan - An assembly of appropriate documents and drawings covering the development of a specific airport from a physical, economical, social, and political jurisdictional perspective. The airport layout plan is a part of this plan.

Airport surface detection equipment (ASDE) - radar equipment specifically designed to detect all principal features on the surface of an airport, including vehicular traffic, and to present the entire picture on a radar indicator console in the control tower. ASDE has a maximum range of 4 miles, through its 16-inch-diameter scope usually displays an area within only a 1-mile radius about the control tower.

Airport traffic area - unless otherwise specifically designated (Federal Aviation Regulations, Part 93), this refers to the airspace within a horizontal radius of 5 statute miles from the geographical center of any airport at which a control tower is operating, extending from the surface up to, but not including, an altitude of 3,000 feet above the elevation of the airport.

Airport traffic control service - air traffic control service provided by an airport traffic control tower for aircraft operating on the movement area and in the vicinity of an airport.

Airport traffic control tower (TOWER) - a facility providing airport traffic control service.

Airports of entry - specific airports where a Customs office is nearby and no special permission is needed to land on arriving from outside the United States. However, one-hour advance notice must be furnished to United States Customs. (This can be included in your flight plan filed in Canada or Mexico, for example.) For a list of the airports of entry, see Part 1 of the Airman's Information Manual.

Air route surveillance radar (ARSR) - long-range radar which increases the capability of air traffic control for handling heavy en route traffic. An ARSR site is usually located at some distance from the air route traffic control center it serves. Range, approximately 200 nautical miles.

Air route traffic control center (ARTCC) - a facility established to provide air traffic control service to aircraft operating on an IFR flight plan within controlled airspace and principally during the en route phase of flight.

Airside - Portion of the airport directly related to the arrival and departure of aircraft, including such airfield facilities as runway, taxiways, navigational aids, marking, and lighting.

Air traffic clearance (CLEARANCE) - an authorization by air traffic control for an aircraft to proceed under specified traffic conditions within controlled airspace for the purpose of preventing collision between known aircraft.

Air traffic control radar beacon system (ATCRBS) - this system, sometimes referred to as secondary surveillance radar, consists of three main components:

1. Interrogator. Primary radar relies on a signal being transmitted from the radar antenna site and being reflected, or "bounced back," from an object (such as an aircraft). This reflected signal is then displayed as a "target" on the controller's radarscope. In the ATCRBS the interrogator, a ground-based radar beacon transmitter-receiver, scans in synchronism with the primary radar and transmits discrete radio signals which repetitiously request all transponders on the mode being used to reply. The replies received are then mixed with the primary returns and both are displayed on the same radarscope.
2. Transponder. This airborne radar beacon transmitter-receiver automatically receives the signals from the interrogator and selectively replies with a specific pulse group (code) only to those interrogations being received on the mode to which it is set. These replies are independent of, and much stronger than, a primary radar return.
3. Radarscope. The radarscope used by the controller displays returns from both the primary radar system and the ATCRBS. These returns, called target, are what the controller refers to in the control and separation of traffic.

Air traffic controller - the Federal Aviation Administration employee responsible for directing movement of planes either on the ground or in the air at or near an airport which has a control tower.

Airway beacons - used before today's electronic airway system. Rotating beacons spaced 10 to 15 miles apart along the airways between airports formed a "lighted" pathway with Morse-coded flashes corresponding to sites marked on the sectional map. A few still remain in remote Western locations.

Airway/Federal Airway - A control area or portion thereof established in the form of a corridor, the centerline of which is defined by radio navigational aids.

Airways, Victor - preestablished flight routes between VOR omni-stations as shown on sectional charts.

Alert area - any area indicated on aeronautical charts to inform the private pilot that a high volume of pilot training or other unusual aerial activity takes place there, so that he should be especially alert.

Amber light - an amber light flashing at an airport indicates that a Right traffic pattern is in effect at the time. The light is usually on top of the control tower or on an adjoining building or may be installed near the center of the segmented circle on the airport.

Approach and Clear Zones Plan - The Approach and Clear Zones Plan is compiled from the criteria in FAR Part 77, Objects Affecting Navigable Airspace. It shows the area affected by the Airport Obstructions Zoning Ordinance and includes layout of runways, airport boundary, elevations, and area topography. Applicable height limitation areas are shown in detail.

Approach Clearance - Authorization by ATC for a pilot to conduct an instrument approach. The type of instrument approach for which a clearance and other pertinent information is provided in the approach clearance and other pertinent information is provided in the approach clearance when required.

Approach control service - air traffic control service, provided by a terminal area traffic control facility, for arriving and departing IFR aircraft and on

occasion VFR aircraft.

Approach Gate - An imaginary point used within ATC as a basis for vectoring aircraft to the final approach course one mile from the outer marker (or the fix used in lieu of the outer marker) on the side away from the airport for precision approaches and one mile from the final approach fix on the side away from the airport for nonprecision approaches. In either case, when measured along the final approach course, the gate will be no closer than five miles from the landing threshold.

Approach procedures - all airports (unless specifically noted otherwise because of nearby obstructions, multiple use of airspace, etc.) use a left-hand (counterclockwise) pattern approach to the landing runway. On an airport with dual runways of the same heading, the left runway uses a left pattern, the right runway a right pattern.

Approach Slopes - The ratios of horizontal to vertical distance indicating the degree of inclination of the Approach Surface. The various ratios include:
20:1 For all utility and visual runways extended from the primary surface a distance of 5,000 feet.
34:1 For all nonprecision instrument runways other than utility extended from the primary surface for a distance of 10,000 feet.
50:1/40:1 For all precision instrument runways extending from the primary surface for a distance of 10,000 feet at an approach slope of 50:1 and an additional 40,000 feet beyond this at a 40:1 Approach Slope.

Apron/Ramp - A defined area on an airport or heliport intended to accommodate aircraft for purposes of loading or unloading passengers or cargo, refueling, parking, or maintenance. With regard to seaplanes, a ramp is used for access to the apron from the water.

Area navigation (RNAV) - a system utilizing a small on-board electronic computer to help the pilot of an equipped aircraft fly the shortest distance between two points rather than from VOR (very high frequency omnirange) station to VOR station.

ARSR - air route surveillance radar.

ARTCC - air route traffic control center.

ATC - air traffic control.

ATC clearances - when air traffic clearance has been obtained under either the visual or instrument flight rules, the pilot in command of the aircraft must not deviate from the provisions thereof unless an amended clearance is obtained.

ATIS - automatic terminal information service.

Autoland Approach - An autoland approach is a precision instrument approach to touchdown and, in some cases, through the landing rollout. An autoland approach is performed by the aircraft autopilot which is receiving position information and/or steering commands from on-board navigation equipment.

Automatic direction finder (ADF) - sometimes called the radio compass, this instrument has an azimuth dial with the 0 or 360 degree representing the nose of the aircraft. When the pilot tunes the receiver to the frequency of the nearest low or medium frequency radio transmitter, a pointer automatically shows him its position relative to his aircraft. For example, if he tuned into a commercial broadcast station at 700 kc and the pointer settles at 60 degrees, he knows the station is 60 degrees off to the right of his aircraft.

Automatic terminal information service (ATIS) - to reduce radio frequency congestion caused by many pilots requesting the same information, the Federal Aviation Administration established a system of broadcasting the following information for incoming aircraft: (a) traffic pattern information; (b) type of instrument approach to be expected; (c) runway in use; (d) surface wind; and (e) ceiling and visibility. The pilot is expected to have listened to such broadcasts before approaching a terminal which has ATIS. An alphabetical code word, such as information Alfa, info Bravo, or info Charlie is appended to the end of the broadcast.

(FAA) Aviation Use of Real Property (Aeronautical Property) - all property comprising the land, airspace, improvements and facilities used or intended to be used for any operational purpose related to, in support of, or complementary to the flight of aircraft to or from the landing area. It is not confined to land areas or improvements eligible for development with Federal-aid (FAA/ADAP/AIP) or to property acquired from Federal sources. In addition to the areas occupied by the runways, taxiways, and parking aprons, aeronautical property includes any other areas used or intended to be used for supporting services and facilities related to the operation of aircraft. It also includes property normally required by those activities which are complementary to flight activity such as convenience concessions serving the public including, but not limited to shelter, ground transportation, food and personal services.

Avigation and Hazard Easement - An easement which provides right of flight at any altitude above the approach surface, prevents any obstruction above the approach surface, provides a right to cause noise vibrations, prohibits the creation of electrical interferences, and grants right-of-way entry to remove trees or structures above the approach surface.

B - in the phonetic alphabet is Bravo (pronounced bra-voh).

Based Aircraft - An aircraft permanently stationed at an airport.

Below Minimums - Weather conditions below the minimums prescribed by regulation for the particular action involved; e.g., landing minimums, takeoff minimums.

Blast Fence - A barrier that is used to divert or dissipate jet or propeller blast.

Breaking Action-Good, Fair, Poor, or Nil - A report of conditions on the airport movement area providing a pilot with a degree/quality of braking that he might expect, Braking action is reported in terms of good, fair, poor, or nil.

Building Restriction Line (BRL) - a line shown on the Airport Layout Plan beyond which airport buildings must not be positioned in order to limit their proximity to aircraft movement areas.

C - in the phonetic alphabet is Charlie (pronounced char-lee)

Capacity - Capacity (throughput capacity) is a measure of the maximum number of aircraft operations which can be accommodated on the airport or airport component in an hour. Since the capacity of an airport component is independent of the capacity of other airport components, it can be calculated separately.

Category II Operation - With respect to the operation of aircraft, means a straight-in ILS approach to the runway of an airport under a Category II ILS

instrument approach procedure issued by the Administrator or other appropriate authority.

Category III Operation - With respect to the operation of aircraft, means an ILS approach to, and landing on, the runway of an airport using a Category III ILS instrument approach procedure issued by the Administrator or other appropriate authority.

Category A - With respect to Transport category rotorcraft, means multiengine rotorcraft designed with engine and system isolation features specified in FAR Part 29 and utilizing scheduled takeoff and landing operations under a critical engine failure concept that assures adequate designated surface area and adequate performance capability for continued safe flight in the event of engine failure.

Category B - With respect to Transport category rotorcraft, means single-engine or multiengine rotorcraft that do not fully meet all Category A standards. Category B rotorcraft have no guaranteed stay-up ability in the event of engine failure, and unscheduled landing is assumed.

Caution area - airspace within which military activities are conducted that are not hazardous but are of interest to nonparticipating pilots.

Ceiling - (in meteorology) the height above the earth's surface of the lowest layer of clouds or obscuring phenomena that is reported as "broken," "overcast," or "obscuration" and not classified as "thin" or "partial." The ceiling is classified in several ways and shown by a letter in weather reports preceding the ceiling height. Some of the more important of these letters are M (measured), E (estimated), A (aircraft-obtained), W (indefinite), B (balloon). If one of these letters does not precede the cloud symbol or if thin, broken, or overcast clouds exist, there is no official ceiling.

Central altitude reservation facility (CARF) - an air traffic service facility established to conduct the volume of coordination, planning, and approval of special user requirements under the altitude reservation concept.

Charted VFR Flyways - Charted VFR Flyways are flight paths recommended for use to by-pass areas heavily traversed by large turbine-powered aircraft. Pilot compliance with recommended flyways and associated altitudes is strictly voluntary. VFR Flyway Planning charts are published on the back of existing VFR Terminal Area charts.

Circle-to Land Maneuver/Circling Maneuver - A maneuver initiated by the pilot to align the aircraft with a runway for landing when a straight-in landing from an instrument approach is not possible or is not desirable. This maneuver is made only after ATC authorization has been obtained and the pilot has established required visual reference to the airport.

Civil use of military fields - United States Army, Air Force, Navy, and Coast Guard fields are open to civil fliers only in emergency or with prior permission.

Clearway - An area beyond the takeoff runway under the control of airport authorities within which terrain or fixed obstacles may not extend above specified limits. These areas may be required for certain turbine-powered operations, and the size and upward slope of the clearway will differ depending on when the aircraft was certificated.

Closed Traffic - Successive operations involving takeoffs and landings or low approaches where the aircraft does not exit the traffic pattern.

Commercial Operator - A person who, for compensation or hire, engages in the carriage by aircraft in air commerce of persons or property, other than as an air carrier or foreign air carrier or under the authority of FAR Part 375. Where it is doubtful that an operation is for compensation or hire, the test applied is whether the carriage by air is merely incidental to the person's other business or is, in itself, a major enterprise for profit.

Compass Locator - A low-power, low or medium frequency (L/MF) radio beacon installed at the site of the outer or middle marker of an instrument landing system (ILS). It can be used for navigation at distances of approximately 15 miles or as authorized in the approach procedure.

1. Outer Compass Locator (LOM) - A compass locator installed at the site of the outer marker of an instrument landing system.
2. Middle Compass Locator (LMM) - A compass locator installed at the site of the middle marker of an instrument landing system.

Compass Rose - A circle, graduated in degrees, printed on some charts or marked on the ground at an airport. It is used as a reference to either true or magnetic direction.

(FAA) Compatible Land Use - compatibility of land use is attained when the use of adjacent property neither adversely affects flight operations from the airport nor is itself adversely affected by such flight operations. For all practical purposes the adverse effect of flight operations on adjacent land is attributable to noise and vibration (residential, schools, etc.). Land usage which adversely affects flight operations is that which creates or contributes to a flight hazard. For example, any land use which might block the line of sight from the control tower to all parts of the landing area, inhibits pilot visibility (such as glaring lights, smoke, etc. produces electronic aberrations of navigational guidance systems, or which tends to attract birds must be considered an incompatible land usage. Similarly under certain circumstances an exposed garbage dump may not only attract birds but, if open incineration is regularly permitted, can create a smoke hazard.

Compulsory Reporting Points - Reporting points which must be reported to ATC. They are designated on aeronautical charts by solid triangles or filed in a flight plan as fixes selected to define direct routes. These points are geographical locations which are defined by navigation aids/fixed. Pilots should discontinue position reporting over compulsory reporting points when informed by ATC that their aircraft is in "radar contact".

CONSOLAN - a low frequency, long-distance NAVAID used principally for transoceanic navigation. Two stations are now operating within the United States - Nantucket (TUK) 194 kHz and San Francisco (SFI) 192 kHz.

Continental control area - the airspace of the United States and Alaska (excluding the Alaska peninsula west of longitude 160 degrees W) at and above 14,500 feet MSL.

Continental United States - the forty-nine states located on the continent of North America, and the District of Columbia.

Control area - the airspace designated as colored federal airways. VOR federal airways, additional control areas, and control area extensions.

Control tower - Towers have been established to provide for a safe, orderly, and expeditious flow of traffic on, and in the vicinity of, an airport. When the responsibility has been so delegated, towers also provide for the separation of IFR aircraft in the terminal areas. (See also APPROACH CONTROL SERVICE.)

Control zone - controlled airspace which extends upward from the surface to the base of the continental control area (14,500 feet) in a radius 5 miles from the airport, and approach corridors for ILS systems.

Controlled airspace - airspace designated as continental control area, control area, control zone, or transition area, within which some or all aircraft may be

subject to air traffic control. Controlled airspace is shown on aeronautical charts through color-coded blue and magenta tinted bands. It may be made up of an airport traffic area, continental control area, control area, control zone, or federal airway. (See the individual listings for the first four terms.)

Conventional Hangar - A large building used to store more than one aircraft and/or to conduct aircraft maintenance.

Coupled Approach - A coupled approach is an instrument approach performed by the aircraft autopilot which is receiving position information and/or steering commands from on-board navigation equipment. In general, coupled nonprecision approaches must be discontinued and flown manually at altitudes lower than 50 feet below the minimum descent altitude, and coupled precision approaches must be flown manually below 50 feet agl.

Crash locator beacon - an electronic device attached to the aircraft structure as far aft as practicable in the fuselage, or in the tail surface, in such a manner that damage to the beacon will be minimized in the event of crash impact. It may be automatically ejectable or permanently mounted. If it is automatically ejectable, it will also have provision for manual removal and operation. The beacon operates from its own power source on 121.5 MHz and/or 243 MHz, preferably on both emergency frequencies, transmitting a distinctive downward swept audio tone for homing purposes, and is designed to function without human action after an accident.

Critical Aircraft - In airport design, the aircraft which controls one or more design items such as runway length, pavement strength, lateral separation, etc., for a particular airport. The same aircraft may not be critical to all design items.

D - in the phonetic alphabet is Delta (dell-tah).

Departure control - a function of approach control providing service for departing IFR aircraft and, on occasion, VFR aircraft.

DEP CON - departure control.

DEWIZ - distant early warning identification zone.

Displaced Threshold - A threshold that is located at a point on the runway other than the designated beginning of the runway.

Distance measuring equipment (DME) - airborne or ground equipment - UHF standard (TACAN compatible) - used to measure, in nautical miles, the distance of an aircraft from a navigational aid (NAVAID).

Distant early warning identification zone (DEWIZ) - an identification zone of defined dimensions extending upwards from the surface, in the DEW Line in Canada and around the entire coastal area of Alaska.

E - in the phonetic alphabet is Echo (eck-oh).

Easement - The legal right held by one party to make use of the land of another for a limited purpose.

Elevation - is given in feet above mean sea level and is based on highest usable portion of the landing area. When sea level, elevation will be indicated as "00"; when below, a minus sign (-) will precede the figure.

Emergency locator transmitter (ELT) - a radio transmitter attached to the aircraft structure, operating from its own power source on 121.5 MHz and 243 MHz, transmitting a distinctively downward-swept audio tone for homing purposes, and designed to function without human action after an accident.

En route air traffic control service - air traffic control service provided aircraft on an IFR flight plan between departure and destination terminal areas.

En route weather advisory service (EWAS) - provided from selected flight service stations controlling one or more remote communications outlets covering a large geographical area. All communications will be conducted on the EWAS frequency, 122.0 MHz, and will serve aircraft 5,000 feet and up along heavily traveled flyways.

Environmental Assessment (EA) - A concise public document, prepared under the guidelines of the National Environmental Policy Act of 1969, and for which a federal agency is responsible that serves to:

1. Briefly provide sufficient evidence and analysis for determining whether to prepare an environmental impact statement or a finding of no significant impact.
2. Aid an agency's compliance with the Act when no environmental impact statement is necessary.
3. Facilitate preparation of a statement when one is necessary.

It includes brief discussions of the need for the proposal, of alternatives as required, of the environmental impacts of the proposed action and alternatives, and a listing of agencies and persons consulted.

(FAA) Exclusive Right - a power, privilege, or other right excluding or debaring another from enjoying or exercising a like power, privilege, or right. An exclusive right may be conferred either by express agreement, by the imposition of unreasonable standards or requirements, or by any other means. Such a right conferred on one or more parties but excluding others from enjoying or exercising a similar right or rights would be an exclusive right.

Execute Missed Approach - Instructions issued to a pilot making an instrument approach which means to continue inbound to the missed approach point and execute the missed approach procedure as described on the Instrument Approach Procedure Chart or as previously assigned by ATC. The pilot may climb immediately to the altitude specified in the missed approach procedure upon making a missed approach. No turns should be initiated prior to reaching the missed approach point. When conducting an ASR or PAR approach, execute the assigned missed approach procedure immediately upon receiving instructions to "execute missed approach".

F - in the phonetic alphabet is Foxtrot (foks-trot).

Federal Aviation Administration - establishes regulations for the safe operation of private, business, commercial, and military aircraft in the United States. Washington address is Federal Aviation Administration, Department of Transportation, Washington, D.C. 20590.

Federal Aviation Regulations (FAR), Part 36 - FAR Part 36 contains noise certification standards for most airplane types, generally requiring newly designed and manufactured aircraft to be significantly quieter than older aircraft.

(FAA) Federal Funds - any airport which consists in whole or in part of property, improvements, or other assets conveyed by the United States Government without monetary consideration for airport purposes, or which was acquired, developed or improved with Federal assistance must be considered as an airport upon which Federal funds have been expended.

Fix - a geographical position determined by visual reference to the surface by reference to one or more radio navigational aids, by celestial plotting, or by another navigational device.

(FAA) Fixed-Base Operator (FBO) - an individual or firm operating at an airport and providing general aircraft services such as maintenance, storage, ground and flight instructions, etc.

FL - flight level.

Flameout - Unintended loss of combustion in turbine engines resulting in the loss of engine power.

Flight altitudes - (phraseology in communications) 1. Up to but not including 18,000' MSL - the separate digits of the thousands, plus the hundreds, if appropriate. Examples: 12,000 - ONE TWO THOUSAND; 12,500 - ONE TWO THOUSAND FIVE HUNDRED. 2. At and above 18,000' MSL (FL 180) the words "flight level" followed by the separate digits of the flight level. Examples: FL 190 - FLIGHT LEVEL ONE NINER ZERO; FL 275 - FLIGHT LEVEL TWO SEVEN FIVE.

Flight level (FL) - a level of constant atmospheric pressure related to a reference datum of 29.92 inches of mercury. Each is stated in three digits representing hundreds of feet; for example, FL 250 represents a barometric altimeter indication of 25,000 feet, FL 255 indicates 25,500 feet.

Flight plan (VFR) - to obtain maximum benefits of the flight plan program, flight plans should be filed directly with the nearest flight service station. Although position reports are not required for VFR flight plans, periodic reports to Federal Aviation Administration flight service stations along the route are good practice.

Flight service stations (FSS) - facilities operated by the Federal Aviation Administration to provide flight assistance service. They are within the National Airspace System and have the prime responsibility for preflight pilot briefing, en route communications with VFR flights, assisting lost VFR aircraft, originating NOTAMs, broadcasting aviation weather information, accepting and closing flight plans, monitoring radio NAVAIDS, participating with search and rescue units in locating missing VFR aircraft, and operating the national weather teletypewriter systems. In addition, at selected locations, FSS take weather observations, issue airport advisories, administer airmen written examinations, and advise Customs and Immigration of transborder flight.

FSS - flight service station.

Flight Standards District Office (FSDO) - An FAA field office serving an assigned geographical area and staffed with Flight Standards personnel who serve the aviation industry and the general public on matters relating to the certification and operation of air carrier and general aviation aircraft. Activities include general surveillance of operational safety, certification of airmen and aircraft, accident prevention, investigation, enforcement, etc.

G - in the phonetic alphabet is Golf, pronounced like the sport.

Gate Hold Procedures - Procedures at selected airports to hold aircraft at the gate or other ground location whenever departure delays exceed or are anticipated to exceed 15 minutes. The sequence for departure will be maintained in accordance with initial call-up unless modified by flow control restrictions. Pilots should monitor the ground control/clearance delivery frequency for engine startup advisories or new proposed start time if the delay changes.

General Aviation (GA) - That portion of civil aviation which encompasses all facets of aviation except air carriers holding a certificate of public convenience and necessary from the Civil Aeronautics Board and large aircraft commercial operators.

(ICAO) General Aviation - All civil aviation operations other than scheduled air services and nonscheduled air transport operations for remuneration or hire.

General Aviation Airport - General Aviation airports are either publicly or privately owned airports which serve general aviation aircraft users.

General Aviation District Office (GADO) - An FAA field office serving a designated geographical area and staffed with Flight Standards personnel who have the responsibility for serving the aviation industry and the general public on all matters relating to the certification and operation of general aviation aircraft.

Go Around - Instructions for a pilot to abandon his approach to landing. Additional instructions may follow. Unless otherwise advised by ATC, a VFR aircraft or an aircraft conducting visual approach should overfly the runway while climbing to traffic pattern altitude and enter the traffic pattern via the crosswind leg. A pilot on an IFR flight plan making an instrument approach should execute the published missed approach procedure or proceed as instructed by ATC; e.g. "Go Around" (additional instructions if required).

Green, flashing - light signal from the tower meaning (on ground) cleared to taxi or (in flight) return for landing (to be followed by steady green at proper time).

Green light - alternating with red, general warning signal from tower; exercise extreme caution.

Gross Weight - Empty weight plus useful load is the gross weight of the airplane at takeoff. When an airplane is carrying the maximum load for which it is certificated, the takeoff weight is called the maximum allowable gross weight.

Ground Controlled Approach (GCA) - A radar approach system operated from the ground by air traffic control personnel transmitting instructions to the pilot by radio. The approach may be conducted with surveillance radar (ASR) only or with both surveillance and precision approach radar (PAR). Usage of the term "GCA" by pilots is discouraged except when referring to a GCA facility. Pilots should specifically request a "PAR" approach when a precision radar approach is desired or request an "ASR" or "surveillance" approach when a nonprecision radar approach is desired.

Ground control radio communications - pilots of departing aircraft should communicate with the control tower, on the appropriate ground control frequency, for taxi and clearance information and, unless otherwise advised, should remain on that frequency until they are ready to request take-off clearance. A pilot who has just landed should not change from the tower frequency to the ground control frequency until he is directed to do so by the controller. Ground control frequencies are provided in the 121.6-121.9 MHz band. The controller may omit the frequency, or the numbers preceding the decimal point in the frequency, when directing the pilot to change to a VHF ground control frequency if, in the controller's opinion, this usage will be clearly understood by the pilot; e.g., 121.7 - "Contact ground" or "Contact ground point seven."

Ground station call signs - shall comprise the name of the location or airport, followed by the appropriate indication of the type of station: OAKLAND TOWER (airport traffic control tower); MIAMI GROUND (ground control position in tower); DALLAS CLEARANCE DELIVERY (IFR clearance delivery position); KENNEDY APPROACH (tower radar or nonradar approach control position); ST. LOUIS DEPARTURE (tower radar departure control position); WASHINGTON RADIO (Federal Aviation Administration flight service station); NEW YORK CENTER (Federal Aviation Administration air route traffic control center).

H - in the phonetic alphabet is Hotel, pronounced (hoh-tel).

Handoff - An action taken to transfer the radar identification of an aircraft from one controller to another if the aircraft will enter the receiving controller's airspace and radio communications with the aircraft will be transferred.

(FAA) Height above airport (HAA) - indicates the height of the decision height or minimum descent altitude above the highest elevation in the touchdown zone. This is published in conjunction with IFR straight-in minimums.

Height Above Landing (HAL) - The height above a designated helicopter landing area used for helicopter instrument approach procedures.

Height above touchdown (HAT) - indicates the height of the minimum descent altitude (MDA) above the published airport elevation. This is published in conjunction with IFR circling minimums.

Helicopter/Copter - Rotorcraft that, for its horizontal motion, depends principally on its engine-driven rotors.

(ICAO) Helicopter - A heavier-than-air aircraft supported in flight chiefly by the reactions of the air on one or more power-driven rotors on substantially vertical axes.

Helipad - A small designated area, usually with a prepared surface, on a heliport, airport, landing/takeoff area, apron/ramp, or movement area used for takeoff, landing, or parking of helicopters.

Heliport - An area of land, water, or structure used or intended to be used for the landing and takeoff of helicopters and includes its buildings and facilities, if any.

High-Speed Taxiway/Exit/Turnoff - A long-radius taxiway designed and provided with lighting or marking to define the path of aircraft traveling at high speed (up to 60 knots) from the runway center to a point on the center of a taxiway. Also referred to as long-radius exit or turnoff taxiway. The high-speed taxiway is designed to expedite aircraft turning off the runway after landing, thus reducing runway occupancy time.

HIRL - high intensity runway lights.

Holding - a predetermined maneuver which keeps an aircraft within a specified airspace while awaiting further clearance.

Holding fix - a specified fix used as a reference point in establishing and maintaining the position of an aircraft while holding.

I - in the phonetic alphabet is India (in-dee-ah).

ICAO - international civil aviation organization.

IFR - instrument flight rules.

IFR Aircraft/IFR Flight - An aircraft conducting flight in accordance with instrument flight rules.

IFR conditions - are those weather conditions below the minimum for flight under visual flight rules (in a control zone, less than 3 miles visibility and 1,000-foot ceiling).

IFR Takeoff Minimums and departure procedures - FAR Part 91 prescribes standard takeoff rules for certain civil users. At some airports, obstructions or other factors require the establishment of nonstandard takeoff minimums, departure procedures, or both to assist pilots in avoiding obstacles during climb to the minimum enroute altitude. Those airports are listed in NOS/DOD Instrument Approach Charts (IAPs) under a section entitled "IFR Takeoff Minimums and Departure Procedures". The NOS/DODIAP chart legend illustrates the symbol used to alert the pilot to nonstandard takeoff minimums and departure procedures. When departing IFR from such airports, or from any airports where there are no departure procedures, SIDs, or ATC facilities available, pilots should advise ATC of any departure limitations. Controllers may query a pilot to determine acceptable departure directions, turns, or headings after takeoff. Pilots should be familiar with the departure procedures and must assure that their aircraft can meet or exceed any specified climb gradients.

ILS - Instrument Landing System - A precision instrument approach system which normally consists of the following electronic components and visual aids:

1. Localizer
2. Glideslope
3. Outer Marker
4. Middle Marker
5. Approach lights

ILS Categories -

1. ILS Category I - An ILS approach procedure which provides for approach to a height above touchdown of not less than 200 feet and with runway visual range of not less than 1,800 feet.
2. ILS Category II - An ILS approach procedure which provides for approach to a height above touchdown of not less than 100 feet and with runway visual range of not less than 1,200 feet.
3. ILS Category III
 - a. IIIA - An ILS approach procedure which provides for approach without a decision height minimum and with runway visual range of not less than 700 feet.
 - b. IIIB - An ILS approach procedure which provides for approach without a decision height minimum and with runway visual range of not less than 150 feet.
 - c. IIIC - An ILS approach procedure which provides for approach without a decision height minimum and without runway visual range minimum.

Imaginary surfaces - Those areas established in relation to the airport and to each runway consistent with FAR Part 77 in which any object extending above these imaginary surfaces is, by definition, an obstruction.

Inner Marker (IM) Inner Marker Beacon - A marker beacon used with an ILS (CAT II) precision approach located between the middle marker and the end of the ILS runway, transmitting a radiation pattern keyed at six dots per second and indicating to the pilot, both aurally and visually, that he is at the designated decision height (DH), normally 100 feet above the touchdown zone elevation, on the ILS CAT II approach. It also marks progress during a CAT III approach.

In-runway lighting - touchdown zone lighting and runway centerline lighting are installed on some precision approach runways to facilitate landing under adverse visibility conditions. Taxiway turnoff lights may be added to expedite movement of aircraft from the runway.

1. Touchdown Zone Lighting - two rows of transverse light bars disposed symmetrically about the runway centerline in the runway touchdown zone. The system generally extends from 75 to 125 feet of the landing threshold to 3,000 feet down the runway.
2. Runway Centerline Lighting - flush centerline lights spaced at 50-foot intervals beginning 75 feet from the landing threshold and extending to within 75 feet of the opposite end of the runway.
3. Runway Remaining Lighting - is applied to centerline lighting systems in the final 3,000 feet, as viewed from the take-off or approach position. Alternate red and white lights are seen from the 3,000-foot points to the 1,000-foot points, and all red lights are seen for the last 1,000 feet of the runway. From the opposite direction, these lights are seen as white lights.
4. Taxiway turnoff lights - flush lights spaced at 50-foot intervals, defining the curved path of aircraft travel from the runway centerline to a point on the taxiway.

Instrument approach light systems - 1. Instrument approach light systems provide the basic means for transition from instrument flight using electronic approach aids to visual flight and landing. Operational requirements dictate the sophistication and configuration of the approach light system for a particular airport. 2. Condenser-discharge sequenced flashing light systems are installed in conjunction with the instrument approach light system at some airports which have United States standard "A" approach lights as a further aid to pilots making instrument approaches. The system consists of a series of brilliant blue-white bursts of light flashing in sequence along the approach lights. It gives the effect of a ball of light traveling toward the runway. An impression of the system as a pilot first observes the flashing lights when making an approach is that of large tracer shells rapidly fired from a point in space toward the runway.

Instrument flight experience - see PREREQUISITES FOR PRIVATE PILOT CERTIFICATE.

Instrument Flight Rules (IFR) - Rules governing the procedures for conducting instrument flight. Also a term used by pilots and controllers to indicate type of flight plan.

Instrument Meteorological Conditions (IMC) - Meteorological conditions expressed in terms of visibility, distance from cloud, and ceiling less than the minima specified for visual meteorological conditions.

Instrument Runway - A runway equipped with electronic and visual navigation aids for which a precision or nonprecision approach procedure having straight-in landing minimums has been approved.

(ICAO) Instrument Runway - One of the following types of runways intended for the operation of aircraft using instrument approach procedures:

- a. Non-precision Approach Runway - An instrument runway served by visual aids and a nonvisual aid providing at least directional guidance adequate for a straight-in approach.
- b. Precision Approach Runway, Category I - An instrument runway served by ILS and visual aids intended for operations down to 60 m (200 feet) decision height and down to an RVR of the order of 800 m.
- c. Precision Approach Runway, Category II - An instrument runway served by ILS and visual aids intended for operations down to 30 m (100 feet) decision height and down to an RVR of the order of 400 m.
- d. Precision Approach Runway, Category III - An instrument runway served by ILS to and along the surface of the runway and:
 - A. Intended for operations down to an RVR of the order of 200 m (no decision height being applicable using visual aids during the final phase of landing;
 - B. Intended for operations down to an RVR of the order of 50 m (no decision height being applicable) using visual aids for taxiing;
 - C. Intended for operations without reliance on visual reference for landing or taxiing.

Intermediate Fix (IF) - The fix that identifies the beginning of the intermediate approach segment of an instrument approach procedure. The fix is not normally identified on the instrument approach chart as an intermediate fix (IF).

International Airport - Relating to international flights, it means:

1. An airport of entry which has been designated by the Secretary of Treasury or Commissioner of Customs as an international airport for Customs service.
2. A landing rights airport at which specific permission to land must be obtained from Customs authorities in advance of contemplated use.
3. Airports designated under the Convention on International Civil Aviation as an airport for use by international commercial air transport and/or international general aviation.

International Civil Aviation Organization (ICAO) - A specialized agency of the United Nations whose objective is to develop the principles and techniques of international air navigation and to foster planning and development of international civil air transport.

Intersecting Runways - Two or more runways which cross or meet within their lengths.

1. A point defined by any combination of courses, radials, or bearings of two or more navigational aids.
2. Used to describe the point where two runways, a runway and a taxiway, or two taxiways cross or meet.

Intersection Departure/Intersection Takeoff - A takeoff or proposed takeoff on a runway from an intersection.

Intersection take-offs - 1. In order to enhance airport capacities, reduce taxiing distances, minimize departure delays, and provide for more efficient movement of air traffic, controllers may initiate intersection take-offs as well as approve them when the pilot requests. If for ANY reason a pilot prefers to use a different intersection or the full length of the runway, or desires to obtain the distance between the intersection and the runway end, HE IS EXPECTED TO INFORM ATC ACCORDINGLY. 2. Controllers are required to separate small propeller driven aircraft (less than 12,500 pounds) taking off from an intersection on the same runway following a large turbojet aircraft by ensuring that at least a 3-minute interval exists between the time that the preceding turbojet has taken off and the succeeding aircraft begins take-off roll.

J - in the phonetic alphabet is Juliett (jew-lee-ett).

Jet advisory areas - VFR Operation, jet advisory areas have not been designated positive control airspace, and VFR flight is permitted within these areas under the following conditions: (a) radar jet advisory area. Prior approval from ATC is required unless the aircraft has a functioning transponder and is operated on the appropriate code; (b) nonradar jet advisory areas. Prior approval from ATC is required in all cases. NOTE: Jet advisory areas and the flight levels comprising these areas are depicted on en route-high altitude charts.

Jet routes - a high altitude route system at 18,000 feet MSL to flight level 450 inclusive. Jet routes are predicated on high altitude navigational aids.

K - in the phonetic alphabet is Kilo (kee-lo).

L - in the phonetic alphabet is Lima (lee-mah).

Land plane - an airplane designed to rise from and alight on the ground.

Land Use - The present or planned utilization of a given parcel of land. Such land uses are normally indicated or delineated on a land-use map. Land-use maps may indicate usages for any given time period past, present, or future, and such period should always be indicated.

Landing - the act of terminating flight and bringing the airplane to rest; used both for land and seaplanes.

Landing direction indicator - a tetrahedron or a tee installed when conditions at the airport warrant its use, located at the center of the segmented circle, and used to indicate the direction in which landings and take-offs should be made. The large end (cross bar) of a tee is in the direction of landing. The small end of a tetrahedron points in the direction of landing.

Landing Minimums/IFR Landing Minimums - The minimum visibility prescribed for landing a civil aircraft while using an instrument approach procedure. The minimum applies with other limitations set forth in FAR Part 91, with respect to the minimum descent altitude (MDA) or decision height (DH) prescribed in the instrument approach procedures as follows:

1. straight-in landing minimums - A statement of MDA and visibility, or DH and visibility, required for a straight-in landing on a specified runway, or
2. Circling minimums - A statement of MDA and visibility required for the circle-to-land maneuver. Descent below the established MDA or DH is not authorized during an approach to the runway of intended landing can be made and adequate visual reference to required visual cues is maintained.

Landside - Portions of the airport interfacing with or supporting the airfield functions, including such facilities as terminal area buildings, aircraft parking apron, automobile parking area, fuel storage, air cargo, and ground access.

Large Aircraft - Aircraft of more than 12,500 pounds, maximum certificated takeoff weight.

LDA - localizer-type directional aid.

Light gun - an intense, narrowly focused spotlight used to direct a green, red, or white signal at any selected airplane in traffic on or about an airport. Usually used in control towers.

Light systems, runway edge - runway edge lights are used to outline the edges of runways during periods of darkness and restricted visibility conditions. These light systems are classified according to the intensity or brightness they are capable of producing: High Intensity Runway Lights (HIRL), Medium Intensity Runway Lights (MIRL), and Low Intensity Runway Lights (LIRL). The HIRL and MIRL systems have variable intensity controls, whereas the LIRLs normally have one intensity setting.

Limited avigation easement - An easement which provides right of flight above approach slope surfaces, prohibits any obstruction penetrating the approach slope surface, and provides right of entry to remove any structure or growth penetrating the approach slope surface.

LIRL - low intensity runway lights.

LMM - compass locator at middle marker ILS.

Loc - localizer.

Localizer - The component of an ILS which provides course guidance to the runway.

Loran (Long-Range Navigation) - An electronic navigational system by which hyperbolic lines of position are determined by measuring the difference in the time of reception of synchronized pulse signals from two fixed transmitters. Loran A operates in the 1750- to 1950-kHz frequency band.

Low approach - 1. A low approach (sometimes referred to as a low pass) is the go-around maneuver following an approach. Instead of landing or making a touch-and-go, a pilot may wish to go around (low approach) in order to expedite a particular operation; a series of practice instrument approaches is an example of such an operation. Unless otherwise authorized by ATC, the low approach should be made straight ahead, with no turns, or climb made until the pilot has made a thorough visual check for other aircraft in the area.

Low/medium frequency (L/MF) radio range - these ranges are classified by their type of antennae. Two types of low-frequency ranges are in use: loop range (L) and adcock range (A). Low-frequency radio range courses are subject to disturbances resulting in multiple courses, signal fades, and surges over rough country. Pilots flying over unfamiliar routes are cautioned to be on the alert to detect these vagaries, particularly over mountainous terrain.

M - in the phonetic alphabet is Mike (mike).

Marker beacons - serve to identify a particular location in space along an airway or on the approach to an instrument runway. This is done by means of a 75-MHz transmitter which transmits a directional signal to be received by aircraft flying overhead. These markers are generally used in conjunction with low frequency radio ranges and the instrument landing system as point designators. Four classes of markers are now in general use: FM, LFM, station location or Z-Markers, and the ILS marker beacons.

(FAA) Maximum authorized altitude - the highest altitude on a federal airway, jet route, or other direct route for which an MEA is designated in Federal Aviation Regulations, Part 95, at which adequate reception of navigation aid signals is assured.

MHz - megahertz.

Microwave Landing System (MLS) - A precision instrument approach system operating in the microwave spectrum which normally consists of the following components: (1) Azimuth Station, (2) Elevation Station, and (3) Precision distance Measuring Equipment.

Middle Marker (MM) - A marker beacon that defines a point along the glideslope of an ILS normally located at or near the point of decision height (ILS Category I). It is keyed to transmit alternate dots and dashes, with the alternate dots and dashes keyed at the rate of 95dot/dash combinations per minute on a 1300 Hz tone, which is received aurally and visually by compatible airborne equipment.

Military climb corridors - are restricted areas shown on aeronautical charts. Civil aircraft may not fly through these areas without prior approval from the controlling agency.

Military fields, heavy traffic around - pilots are advised to exercise vigilance when in close proximity to most military airports, as these may have jet aircraft traffic patterns extending up to 2,500 feet above the surface. In addition, they may have an unusually heavy concentration of jet aircraft operating within a 25 nautical mile radius and from the surface to all altitudes. This precautionary note also applies to the larger civil airports.

(FAA) Minimum Standards - as used herein, this refers to the qualifications which may be established by an airport owner as the minimum requirements to be met as a condition for the right to conduct a commercial aeronautical activity on the airport.

MIRL - medium intensity runway lights.

MM - middle marker ILS.

MSL - mean sea level.

Muni - municipal.

Multicom service 122.9 MHz - a mobile service used to provide communications essential to conduct of activities being performed by or directed from private aircraft. Example: ground-air communications pertaining to agriculture, ranching, conservation activities, forest fire fighting, aerial advertising, and parachute jumping.

N - in the phonetic alphabet is November (no-ve-m-ber).

N - preceding numbers on an aircraft represents an aircraft of United States registry.

National airspace system (NAS) - the common system of air navigation and air traffic control, encompassing communications facilities, air navigation facilities, airways, controlled airspace, special use airspace, and flight procedures, and authorized by Federal Aviation Regulations for domestic and international aviation.

Nautical mile - 1,852 meters or 1.15 statute miles.

NAVAID - air navigation facility.

NAVAID, classes - VOR, VORTAC, and TACAN aids are classed according to their operational use. There are three classes: T (terminal), L (low altitude), and H (high altitude). Certain operational requirements make it necessary to use some of these aids at greater service ranges than are listed in the table. Extended range is made possible through flight inspection determinations. Some aids also have lesser service range due to location, terrain, frequency protection, etc.

Navigable airspace - airspace at and above minimum flight altitudes, including airspace needed for safe take-offs and landings.

NDB - nondirectional radio beacon.

Negative- No

Noise contours - A noise impact boundary line connecting places on a map where the level of sound is the same. Some of the terminology and methods used in developing noise contours include:

1. A-Weighted Sound Level (dBA): Commonly used sound measurement which approximates the manner in which the human ear responds to sounds.
2. Composite Noise Rating (CNR): A measure, taken over a 24-hour period, of the noise environment produced by aircraft operations. The CNR is calculated from aircraft noise and is expressed in terms of the maximum perceived noise level (PNL) and the number of operations in daytime and nighttime periods.
3. Day-Night Average Sound Level (Ldn): Equivalent noise level produced by airport/aircraft operations during a 24-hour time period, with a 10-decibel penalty applied to the level measured during the nighttime hours of 10 pm to 7 am.
4. Equivalent Sound Level (Leq): the constant sound level which, in a given situation and time period, conveys the same sound energy as does the actual time-varying sound in the same period. the equivalent sound level is the same as the average sound level.
5. Noise Exposure Forecast (NEF): A measure of the noise environment over a 24-hour period. It is based upon summation of individual noise events over the 24-hour period, with adjustments applied for nighttime noises.

Noise Exposure Map - A scaled, geographic depiction of an airport, its noise contours, and its surrounding area developed in accordance with FAR Part 150, including the accompanying documentation setting forth the required descriptions of projected aircraft operations at that airport in the current year and during the fifth calendar year beginning after submission of the map, together with the ways, if any, those operations for each of those years will affect the map (including noise contours and the forecast land uses).

Nondirectional radio beacon (NDB) –

1. A low- or medium-frequency radio beacon transmits nondirectional signals whereby the pilot of an aircraft equipped with a loop antenna can determine his bearing and "home" on the station. These facilities normally operate in the frequency bank of 200 to 415 kHz and transmit a continuous carrier with 1,020-cycle modulation keyed to provide identification except during voice transmission.
2. When a radio beacon is used in conjunction with the instrument landing system markers, it is called a compass locator.
3. All radio beacons except the compass locators transmit a continuous three-letter identification in code except during voice transmissions. Compass locators transmit a continuous two-letter identification in code. The first and second letters of the three-letter location identifier are assigned to the front course outer marker compass locator (LOM), and the second and third letters are assigned to the front course middle marker compass locator (LMM), Example: ATLANTA, ATL, LOM-AT, LMM-TL.
4. Voice transmissions are made on radio beacons unless the letter "W" (without voice) is included in the class designator (HW).
5. Radio beacons are subject to disturbances resulting in ADF needle deviations, signal fades, and interference from distant stations during night operations. Pilots are cautioned to be on the alert for these vagaries.

Nonprecision approach procedure - standard instrument approach procedure in which no electronic glide slope is provided.

Nonprecision instrument runway - A runway having an existing or planned instrument approach procedure from which a straight-in landing is approved but

no electronic glide slope information is available and for which no precision approach facilities are planned.

Nontower airports –

1. Preparatory to landing at an airport without an operating control tower, but at which either an FSS or a UNICOM is located, pilots should contact the FSS or UNICOM for traffic advisories, wind, runway in use, and traffic flow information. CAUTION: all aircraft may not be communications with the FSS or UNICOM. They can only issue traffic advisories on those they are aware of.
2. At those airports not having a tower, FSS or UNICOM visual indicators, if installed, provide the pilot with landing information.

O - in the phonetic alphabet is Oscar (oss-cah).

Obstacle - An existing object, object of natural growth, or terrain at a fixed geographical location, or which may be expected at a fixed location within a prescribed area, with reference to which vertical clearance is or must be provided during flight operation.

Oct - octane.

Offset Parallel Runways - Staggered runways having centerlines which are parallel.

OM - outer marker ILS.

Operations – Basically defined as a single take off or landing event.

Outer fix - a fix in the destination terminal area, other than the approach fix, to which aircraft are normally cleared by an air route traffic control center or a terminal area traffic control facility, and from which aircraft are cleared to the approach fix or final approach course.

Overseas SAR region - overseas unified command areas, including the inland area of Alaska, which are not included within the inland region or maritime region as defined by the national SAR plan.

P - in the phonetic alphabet is Papa (pah-pah).

PAR - precision approach radar.

Parallel Runways - Two or more runways at the same airport whose centerlines are parallel. In addition to runway number, parallel runways are designated as L (left) and R (right) or, if three parallel runways exist, L (left), C (center), and R (right).

PATWAS - pilots automatic weather answering service.

PCA - positive control area.

Pilots automatic telephone weather answering service (PATWAS) - at some locations the numbers of pilots requiring flight weather briefings are too numerous for person-to-person briefings. PATWAS assists in this important service with telephone recorded weather briefings available at several locations. The recorded briefing includes a weather forecast which emphasizes expected weather up to about 12 hours in advance. Forecasts given around for the next morning.

Positive control area - is airspace so designated in Part 71.193 of the Federal Aviation Regulations, wherein aircraft are required to be operated under instrument flight rules.

Precision approach - a descent in an approved procedure where the navigation facility alignment is normally on the runway centerline, and glide slope information is provided such as ILS or PAR.

Precision approach radar - 1. Precision approach radar is designed to be used as a landing aid, rather than an aid for sequencing and spacing aircraft. PAR equipment may be used as a primary landing aid, or it may be used to monitor other types of approaches. It is designed to display range, azimuth, and elevation information.

Primary service - Primary service airports are public-use airports which receive scheduled passenger service aircraft and which annually enplane one one-hundredth percent (0.01%) or more of the combined total domestic passenger enplanements for all United States air carriers.

Primary surface - A primary surface is longitudinally centered on a runway. When the runway has a specially prepared hard surface, the primary surface extends 200 feet beyond each end of that runway. When the runway has no specially prepared hard surface, or planned hard surface, the primary surface terminates at each end of the runway. The width of a primary surface ranges from 250 feet to 1,000 feet, depending on the existing or planned approach system. The elevation of any point on the primary surface is the same as the elevation of the nearest point on the runway centerline.

(FAA) Public Airport - means any airport which is used or to be used for public purposes under control of a public agency, the Landing area of which is publicly-owned.

(FAA) Public-use Airport - means (a) any public airport; (b) any privately-owned reliever airport; or (c) any privately-owned airport which is determined by the Secretary to enplane annually 2,500 or more passengers and receive scheduled passenger service of aircraft, which is used or to be used for public purposes.

Q - in the phonetic alphabet is Quebec (keh-beck).

R - in the phonetic alphabet is Romeo (row-me-oh).

RADAR - radio detection and ranging.

Radar assistance to VFR aircraft - radar equipped Federal Aviation Administration air traffic control facilities provide radar assistance and navigation service (vectors) to VFR aircraft provided the aircraft can communicate with the facility, is within radar coverage, and can be radar identified.

Radar contact - used by air traffic controllers, indicates that an aircraft is identified on the radar display and that radar service can be provided until radar identification is lost or radar service is terminated. When the aircraft is informed of "radar contact" it automatically discontinues reporting over compulsory reporting points.

Radar handoff - that action whereby radar identification of, radio communications with, and, unless otherwise specified, control responsibility for an aircraft is transferred from one controller to another without interruption of radar flight following.

Radar identification - the process of ascertaining that a radar target is the radar return from a particular aircraft.

Radar service - a term which encompasses one or more of the following services, based on the use of radar which can be provided by a controller to a pilot of a radar-identified aircraft: (a) radar separation-radar spacing of aircraft in accordance with established minima; (b) radar navigation guidance-vectoring aircraft to provide course guidance; and (c) radar monitoring-the radar flight following of aircraft, whose primary navigation is being performed by the pilot, to observe and note deviations from its authorized flight path airway, or route. As applied to the monitoring of instrument approaches from the final approach fix to the runway, it also includes the provision of advice on position relative to approach fixes and whenever the aircraft proceeds outside the prescribed safety zones.

Radar traffic information service - a service provided by radar air traffic control facilities. Pilots receiving this service are advised of any radar target observed on the radar display which may be in such proximity to the position of their aircraft or its intended route of flight that it warrants their attention. This service is not intended to relieve the pilot of his responsibility for continual vigilance to see and avoid other aircraft.

Radial - a magnetic bearing extending from an ADF, a VOR, VORTAC, or TACAN.

RAPCON - radar approach control (United States Air Force).

RBN - radio beacon.

RCO - remote communications outlet.

Regional airline - An airline providing regularly scheduled passenger or cargo service with aircraft usually seating less than 60 passengers or cargo aircraft with 18,000 -pound payload or less. Special provisions, however, enable regional airlines to operate any size aircraft under certain conditions.

REIL - runway end identifier lights.

Restricted area - airspace of defined dimensions identified by an area on the surface of the earth within which the flight of aircraft, while not wholly prohibited, is subject to restrictions.

Right traffic indicator - at some airports, a flashing amber light is installed near the center of the segmented circle (but usually on top of the control tower or adjoining building) which indicates that a right traffic pattern is in effect at the time.

Rotating beacons - the rotating (surface) beacon has a vertical light distribution such as to make it most effective at angles of 1 degree to 3 degrees above the horizontal from its site; however, it can be seen well above and below this peak spread. Rotation is in clockwise direction when viewed from above. It is always rotated at a constant speed, producing the visual effect of flashes at regular intervals. Flashes may be one or two colors alternately. The total number of flashes are: 12 to 15 per minute for beacons marking airports, landmarks, and points on federal airways; 12 to 40 per minute for hazard beacons. The colors and color combinations of rotating beacons and auxiliary lights are basically:

White and Green.....lighted land airport
* Green alone.....lighted land airport
White and Yellow.....lighted water airport
* Yellow alone.....lighted water airport
White and Red.....landmark or navigational point
White alone.....unlighted land airport (rare installation)
Red alone.....hazard

* Green alone or yellow alone is used only in connection with a not-far-distant white-and-green or white-and-yellow beacon display, respectively..

There are also rotating beacons and high intensity lights on aircraft for better visibility of their movements at night.

Runway - a strip, either paved or improved, on which take-offs and landings are effected. Runways are numbered to correspond to their magnetic bearing. Runway 27, for example, has a bearing of 270 degrees. Surface wind direction issued by the tower is also magnetic. (Winds aloft are given in true degrees.)

Runway edge light systems - used to outline the edges of runways during periods of darkness and restricted visibility conditions; classified according to the intensity or brightness they are capable of producing. They are high intensity runway lights (HIRL), medium intensity runway lights (MIRL), and low intensity runway lights (LIRL). The HIRL and MIRL systems have variable intensity controls, whereas the LIRLs normally have one intensity setting.

Runway end identifier lights (REIL) - are installed at many airfields to provide rapid and positive identification of the approach end of a particular runway. The system consists of a pair of synchronized flashing lights, one of which is located laterally on each side of the runway threshold facing the approach area. They are effective for: (a) identification of a runway surrounded by a preponderance of other lighting; (b) identification of a runway which lacks contrast with surrounding terrain; and (c) identification of a runway during reduced visibility.

Runway Gradient - The average slope, measured in percent between two ends or points on a runway. Runway gradient is depicted on government aerodrome sketches when total runway gradient exceeds 0.3%.

Runway Heading - The magnetic direction indicated by the runway number. When cleared to "fly/maintain runway heading," pilots are expected to comply with the ATC clearance by flying the heading indicated by the runway number without applying any drift correction.; e.g., Runway 4,040 degrees magnetic heading; Runway 20,200 degrees magnetic heading.

Runway length - landing - The measured length from the threshold to the end of the runway.

Runway length - physical -the actual measured length of the runway.

Runway length - takeoff - The measured length from where the takeoff is designed to begin to the end of the runway.

Runway marking - in the interest of safety, regularity, or efficiency of aircraft operations, the Federal Aviation Administration has recommended for the guidance of the public the following airport marking (runway numbers and letters are determined from the approach direction. The number is the whole

number nearest one-tenth the magnetic azimuth of the centerline of the runway, measured clockwise from the magnetic north. For example, runway 34 is equivalent to 340 degrees. The letter or letters differentiate between parallel runways: For two parallel runways "L" "R"; for three parallel runways "L" "C" "R".):

- (a) basic runway marking - used for operations under VFR: centerline marking and runway direction numbers;
- (b) nonprecision instrument runway marking - served by a nonvisual navigation aid and intended for landings under instrument weather conditions: basic runway markings plus threshold marking;
- (c) precision instrument runway marking - served by nonvisual precision approach aids and on runways having special operational requirements, nonprecision instrument runway marking, touchdown zone marking, fixed distance marking, plus side stripes;
- (d) threshold - a line perpendicular to the runway centerline designating the beginning of that portion of a runway usable for landing;
- (e) displaced threshold - a threshold that is not at the beginning of the full strength runway pavement;
- (f) closed or overrun/stopway areas - any surface or area which appears usable but which, due to the nature of its structure, is unusable;
- (g) fixed distance marker - to provide a fixed distance marker for landing of turbojet aircraft on other than a precision instrument runway. This marking is similar to the fixed distance marking on a precision instrument runway and located 1,000 feet from the threshold;
- (h) short take-off and landing runway (STOL) - in addition to the normal runway number marking, the letters STOL are painted on the approach end of the runway and a touchdown aim point;
- (i) taxiway marking - the taxiway centerline is marked with a continuous yellow line. The edges are marked with 2 continuous lines 6 inches apart. Taxiway HOLDING LINES consists of 2 continuous lines and 2 dashed lines perpendicular to the centerline. Pilots should stop short of the holding line for runway or when instructed by ATC to "HOLD SHORT OF (runway, ILS critical area, etc.)."

Runway separation - tower controllers establish the sequence of arriving and departing aircraft by requiring them to adjust flight or ground operation as necessary to achieve proper spacing.. They may "HOLD" an aircraft short of the runway to achieve spacing between it and another arriving aircraft; the controller may instruct a pilot to "EXTEND DOWNWIND" in order to establish spacing from another arriving or departing aircraft. At times a clearance may include the word "IMMEDIATE TAKE-OFF." In such cases "IMMEDIATE" is used for purposes of air traffic separation. It is up to the pilot to refuse the clearance if, in his opinion, compliance would adversely affect his operation.

Runway Use Program - A noise abatement runway selection plan designed to enhance noise abatement efforts with regard to airport communities for arriving and departing aircraft. These plans are developed into runway use programs and apply to all turbojet aircraft 12,500 pounds or heavier; turbojet aircraft less than 12,500 pounds are included only if the airport proprietor determines that the aircraft creates a noise problem. Runway use programs are coordinated with FAA offices, and safety criteria used in these programs are developed by the Office of Flight Operations. Runway use programs are administered by the air traffic service as "formal" or "informal" programs.

RVR - runway visual range.

S - in the phonetic alphabet is Sierra (see-air-ah).

Segmented circle - a system designed to provide traffic pattern information at airports without operating control towers.

Sequence report - the weather report transmitted hourly to all teletype stations, and available at all FSS communication stations.

Short take-off and landing (STOL) runway - a runway specifically designated and marked for STOL operations. (See RUNWAY MARKING.)

SID - standard instrument departure.

SIGMET - (issued only if the hazardous weather was not accurately predicted in the area/terminal forecasts) include weather phenomena potentially hazardous to all aircraft, specifically: (a) tornadoes; (b) line of thunderstorms (squall lines); (c) embedded thunderstorms; (d) hail 3/4" or more; (e) severe and extreme turbulence; (f) severe icing; and (g) widespread duststorms/sandstorms, lowering visibilities to less than 2 miles.

Simultaneous landings on intersecting runways - the safety and operation of an aircraft are the responsibility of the pilot. If for ANY reason (difficulty in discerning location of intersection at night, wind factors, etc.) a pilot prefers to use the full length of the runway, a different runway, or desires to obtain the distance from the runway threshold to the intersection. HE IS EXPECTED TO PROMPTLY INFORM ATC ACCORDINGLY.

SM - statute mile(s).

Small aircraft - usually aircraft of 12,500 pounds or less, maximum certified take-off weight.

Special use airspace - consists of that airspace wherein activities must be confined because of their nature, or wherein limitations are imposed upon aircraft operations that are not a part of those activities, or both. These areas are depicted on aeronautical charts.

Special VFR clearances –

1. An ATC clearance must be obtained prior to operating within a control zone when the weather is less than that required for VFR flight. Within most control zones, a VFR pilot may request and be given a clearance to conduct special VFR flight to, from, or within the control zone providing such flight will not delay IFR operations. The weather and clearance from cloud requirements for special VFR flight are: 1 mile ground visibility if landing or departing (1/2 mile for air carriers), 1 mile flight visibility if transiting the control zone, and flight to be conducted clear of clouds. When a control tower is located within the control zone, requests for clearances should be to the tower. If no tower is located within the control zone, a clearance may be obtained from the nearest tower, flight service station, or center.
2. It is not necessary to file a complete flight plan with the request for clearance, but the pilot should state his intentions in sufficient detail to permit air traffic control to fit his flight into the traffic flow. The clearance will not contain a specific altitude, as the pilot must remain clear of clouds. The controller may require the pilot to fly at or below a certain altitude due to other traffic, but the altitude specified will permit flight at or above the minimum safe altitude. In addition, at radar locations flights may be vectored if necessary for control purposes or on pilot request.
3. ATC provides separation between special VFR flights and between them and other IFR flights.
4. Within some control zones, the volume of IFR traffic is such that special VFR flight cannot be permitted.

Special VFR operations - aircraft operating in accordance with clearances within control zones in weather conditions less than the basic VFR weather minima.

Standard instrument departure (SID) - a preplanned coded air traffic control IFR departure routing, preprinted for pilot use in graphic and textual or textual form only.

Standard terminal arrival route (STAR) - a preplanned coded air traffic control IFR arrival routing, established for application to arriving IFR aircraft destined for certain airports, and preprinted for pilot use in graphic and textual or textual form only. Its purpose is to simplify clearance delivery procedures.

Statute mile - 5,280 feet. See also NAUTICAL MILE.

STOL - short take-off and landing.

Stopway - area beyond take-off runway used in decelerating airplane during an aborted take-off.

Surveillance radar –

1. Surveillance radars are divided into two general categories: airport surveillance radar (ASR) and air route surveillance radar (ARSR). ASR is designed to provide relatively short-range coverage in the general vicinity of an airport and to serve as an expeditious means of handling terminal area traffic through observation of precise aircraft locations on a radarscope. The ASR can also be used as an instrument approach aid. ARSR is a long-range radar system designed primarily to provide a display of aircraft locations over large areas.
2. Surveillance radars scan through 360 degrees of azimuth and present target information on a radar display located in a tower or center. This information is used independently or in conjunction with other navigational aids in the control of air traffic.

T - in the phonetic alphabet is Tango (tan-go).

T-hangar - A T-shaped aircraft hangar that provides shelter for a single plane.

Tactical air navigation (TACAN) - UHF navigational facility, omni-directional course and distance information. For reasons peculiar to military or naval operations (unusual siting conditions, the pitching and rolling of a naval vessel, etc.) the civil VOR-DME system of air navigation was considered unsuitable for military or naval use. A new navigational system, TACAN, was therefore developed by the military and naval forces to more readily lend itself to military and naval requirements. As a result, the Federal Aviation Administration has been in the process of integrating TACAN facilities with the civil VOR-DME program. Although the theoretical, or technical principles of operation of TACAN equipment are quite different from those of VOR-DME facilities, the end result, as far as the navigating pilot is concerned, is the same. These integrated facilities are called VORTACS.

Take-off clearance - tower controllers establish the sequence of arriving and departing aircraft by requiring them to adjust flight or ground operation as necessary to achieve proper spacing. They may "HOLD" an aircraft short of the runway to achieve spacing between it and another arriving aircraft. At times a clearance may include the word "IMMEDIATE.": For example: "CLEARED FOR IMMEDIATE TAKE-OFF." In such cases "IMMEDIATE" is used for purposes of air traffic separation. It is up to the pilot to refuse the clearance if, in his opinion, compliance would adversely affect his operation.

Taxi - The movement of an airplane under its own power on the surface of an airport. Also, it describes the surface movement of helicopters equipped with wheels.

Terminal Area - The area used or intended to be used for such facilities as terminal and cargo buildings, gates, hangars, shops, other service buildings, automobile parking, airport motels, restaurants, garages, and automobile service.

Terminal control area (TCA) - consists of controlled airspace extending upward from the surface or higher to specified altitudes, within which all aircraft are subject to operating rules and pilot and equipment requirements specified in Part 91 of the Federal Aviation Regulations. TCAs are described in Part 71 of the Federal Aviation Regulations. Each such location is designated as a Group I or Group II terminal control area, and includes at least one primary airport around which the TCA is located.

1. Group I terminal control areas represent some of the busiest locations in terms of aircraft operations and passengers carried, and it is necessary for safety reasons to have stricter requirements for operation within Group I TCAs. Student pilots are forbidden..
2. Group II terminal control areas represent less busy locations, and though safety dictates some pilot and equipment requirements, they are not as stringent as those for Group I locations. Student pilots are permitted.
3. As terminal control areas come into being, they will be described and shown in graphic form, normally in Part 3 of the Airman's Information Manual, and then transferred to Part 4. In addition, for operational use, TCAs will be shown on a new series of VFR TERMINAL AREA CHARTS, available from the coast and geodetic survey.

Terminal control area operation - the operating rules and pilot and equipment requirements for operating within a terminal control area (TCA) are found in Federal Aviation Regulations, 91.90. Pilots should not request a clearance to operate within a TCA unless these requirements are met. (See TERMINAL CONTROL AREA.)

1. Operating rules and pilot/equipment requirements - Regardless of weather conditions, or whether the pilot is on an IFR flight plan or VFR, an ATC authorization is required prior to operating within a TCA. Additional requirements include: (a) a two-way radio capable of communicating with ATC on appropriate frequencies; (b) a VOR or TACAN receiver; (c) an appropriate radar beacon transponder (this is not required for VFR flights at Group II TCAs); and (d) private pilot certificate or better in order to land or take off from an airport within a Group I TCA.
2. Flight procedures - VFR Flights: (a) arriving VFR flights should contact ATC on the appropriate frequency and in relation to geographical fixes shown on local charts. Although a pilot may be operating beneath the floor of the TCA on initial contact, communications with ATC should be established in relation to the points indicated for spacing and sequencing purposes; (b) departing VFR aircraft should advise the ground controller of the intended altitude and route of flight to depart the TCA; (c) aircraft not landing/departing the primary airport may obtain ATC clearance to transit the TCA when traffic conditions permit and provided the requirements of Federal Aviation Regulation 91.90 are met. Such VFR transiting aircraft are encouraged, to the extent possible, to transit through VFR corridors or above or below the TCA.

Tetrahedron - a construction used in place of a T-bar in the segmented circle at some airports to indicate wind direction.

Threshold crossing height (TCH) - the height of the straight line extension of the visual or electronic glide slope above the runway threshold.

Tie-down area - A parking area for securing aircraft; can be for overnight (transient operator) or permanent use (in lieu of a hangar).

Tower-controlled airports –

1. When operating to an airport where traffic control is being exercised by a control tower, pilots are required to maintain two-way radio contact with the tower while operating within the airport traffic area unless the tower authorizes otherwise. Initial callup should be made about 15 miles from the airport.
2. When necessary, the tower controller will issue clearances or other information for aircraft to generally follow the desired flight path (traffic patterns) when flying in the airport traffic area/control zone, and the proper taxi routes when operating on the ground. If not otherwise authorized or directed by the tower, pilots approaching to land in an airplane must circle the airport to the left, and pilots approaching to land in a helicopter must avoid the flow of fixed wing traffic. However, an appropriate clearance must be received from the tower before landing.

TRACON - terminal radar approach control.

Traffic pattern - the traffic flow that is prescribed for aircraft landing at, taxiing on, and taking off from an airport. The usual components of a traffic pattern are upwind leg, crosswind leg, downwind leg, base leg, and final approach. The following terminology for the various components of a traffic pattern has been adopted as standard for use by control towers and pilots:

upwind leg - a flight path parallel to the landing runway in the direction of landing

crosswind leg - a flight path at right angles to the landing runway off its take-off end

downwind leg - a flight path parallel to the landing runway in the direction opposite to landing

base leg - a flight path at right angles to the landing runway off its approach end and extending from the downwind leg to the intersection of the extended runway centerline

final approach - a flight path in the direction of landing along the extended runway centerline from the base leg to the runway.

Traffic pattern altitudes - at most airports and military air bases, generally extend from 600 feet to as high as 1,500 feet above the ground for propeller driven aircraft; up to 2,500 feet above the ground for military turbojet aircraft. Therefore, pilots of en route aircraft should be constantly on the alert for other aircraft in traffic patterns and avoid these areas whenever possible. Traffic pattern altitudes should be maintained unless otherwise required by the applicable distance from cloud criteria (Federal Aviation Regulation 91.105).

Traffic pattern direction - all airport traffic patterns circle to the left unless approved light signals or visual markings in the segmented circle, or dual runways, indicate a right hand pattern.

Transient - Operations or other activity performed by aircraft not based at the airport.

Transition areas -

1. Controlled airspace extending upward from 700 feet or more above the surface when designated in conjunction with an airport for which an instrument approach procedure has been prescribed, or from 1,200 feet or more above the surface when designated in conjunction with airway route structures or segments. Unless specifically specified otherwise, transition areas terminate at the base of overlying controlled airspace.

2. Transition areas are designated to contain IFR operations in controlled airspace during portions of the terminal and en route environment.

Transponder - the airborne radar beacon receiver-transmitter which automatically receives radio signals from all interrogators on the ground, and which selectively replies with a specific reply pulse or pulse group only to those interrogations being received on the mode to which it is set to respond.

TRSA - Terminal radar service area.

Turbojet Aircraft - An aircraft having a jet engine in which the energy of the jet operates a turbine which in turn operates the air compressor.

Turboprop Aircraft - An aircraft having a jet engine in which the energy of the jet operates a turbine which drives the propeller.

TWEB - transcribed weather broadcast.

Twr - tower.

Twy - taxiway.

U - in the phonetic alphabet is Uniform (you-nee-form).

UHF - ultra high frequency.

Ultralight Vehicle - An aeronautical vehicle operated for sport or recreational purposes which does not require FAA registration, an airworthiness certificate, nor pilot certification. They are primarily single-occupant vehicles, although some two-place vehicles are authorized for training purposes. Operation of an ultralight vehicle in certain airspace requires authorization from ATC.

Uncontrolled airports - use left-turn pattern approach unless airport displays approved light signals or visual markings in the segmented circle to indicate right-hand pattern.

Uncontrolled airspace - is that portion of the airspace that has not been designated as continental control area, control area, control zone, terminal control area, or transition area and within which ATC has neither the authority nor the responsibility for exercising control over air traffic.

UNICOM - a private aeronautical advisory communications facility operated for purposes other than air traffic control, transmits and receives on one of the following frequencies:

U1 - 122.8 MHz for landing areas (except heliports) without an ATC tower or FSS;

U2 - 123.0 MHz for landing areas (except heliports) with an ATC tower or FSS;

U3 - 123.05 MHz for heliports.

V - in the phonetic alphabet is Victor (vik-tah).

VASI - visual approach slope indicator.

Vector - the resultant of two quantities (forces, speeds, or deflections); used in aviation to compute load factors, headings, or drift.

Vertical take-off and landing (VTOL) aircraft - an aircraft which has the capability of vertical take-off and landing. These aircraft include, but are not limited to, helicopters.

VFR - visual flight rules.

VFR conditions - basic weather conditions prescribed for flight under visual flight rules.

VHF Omnidirectional range (VOR) -

1. VORs operate within the 108.0 - 117.95 MHz frequency band and have a power output necessary to provide coverage within their assigned operational service volume. The equipment is VHF; thus, it is subject to line-of-sight restriction, and its range varies proportionally to the altitude of the receiving equipment. There is some "spillover," however, and reception at an altitude of 1,000 feet is about 40 to 45 miles. This distance increases with altitude.

2. There is voice transmission on the VOR frequency and all information broadcast over L/MF ranges is also available over the VORs.

3. The effectiveness of the VOR depends upon proper use and adjustment of both ground and airborne equipment: (a) accuracy - the accuracy of course alignment of the VOR is excellent, being generally plus or minus 1 degree; (b) roughness - on some VORs, minor course roughness may be observed, evidenced by course needle or brief flag alarm activity (some receivers are more subject to these irregularities than others). At a few stations, usually in mountainous terrain, the pilot may occasionally observe a brief course needle oscillation, similar to the indication of "approaching station." Pilots flying over unfamiliar routes are cautioned to be on the alert for these vagaries and, in particular, to use the "to-from" indicator to determine positive station passage; (c) certain propeller RPM settings can cause the VOR course deviation indicator to fluctuate as much as plus or minus 6 degrees. Slight changes to the RPM setting will normally smooth out this roughness. Helicopter rotor speeds may also cause VOR course disturbances. Pilots are urged to check for this propeller modulation phenomenon prior to reporting a VOR station or aircraft equipment for unsatisfactory operation.

4. The only positive method of identifying a VOR is by its Morse code identification or by the recorded automatic voice identification, which is always indicated by use of the word "VOR" following the name of the range. Reliance on determining the identification of an omnirange should never be placed on listening to voice transmissions by the flight service station (or approach control facility) involved. Many FSSs remotely operate several omniranges which have different names from each other and in some cases none has the name of the parent FSS. (During periods of maintenance the coded identification is removed.)

5. Voice identification has been added to numerous VHF "AIRVILLE VOR" (VORTAC) alternating with the usual Morse code identification. If no air-ground communications facility is associated with the omnirange, "AIRVILLE UNATTENDED VOR" (VORTAC) will be heard.

VHF omnidirectional range/tactical air navigation (VORTAC)-

1. VORTAC is a facility consisting of two components, VOR and TACAN, which provides three individual services: VOR azimuth, TACAN azimuth, and TACAN distance (DME) at one site. Although consisting of more than one component, incorporating more than one operating frequency, and using more than one antenna system, a VORTAC is considered to be a unified navigational aid. Both components of a VORTAC are envisioned as operating simultaneously and providing the three services at all times.

2. Transmitted signals of VOR and TACAN are each identified by three-letter code transmission and are interlocked so that pilots using VOR azimuth with TACAN distance can be assured that both signals being received are definitely from the same ground station. A supplementary automatic voice identification is being added to the VOR. The frequency channels of the VOR and the TACAN at each VORTAC facility are "paired" in accordance with a national plan to simplify airborne operation.

Victor airways - low altitude federal airways indicated by V and a number on aeronautical charts. East-west airways are even-numbered; north-south, odd-numbered.

Visibility - The ability, as determined by atmospheric conditions and expressed in units of distance, to see and identify prominent unlighted objects by day and prominent lighted objects by night. Visibility is reported as statute miles, hundreds of feet or meters.

Visibility, Flight Visibility - The average forward horizontal distance, from the cockpit of an aircraft in flight, at which prominent unlighted objects may be seen and identified by day and prominent lighted objects may be seen and identified by night

Visibility, Ground Visibility - Prevailing horizontal visibility near the earth's surface as reported by the United States National Weather Service or an accredited observer.

Visibility, Prevailing Visibility - The greatest horizontal visibility equaled or exceeded throughout at least half the horizon circle which need not necessarily be continuous.

Visibility, runway visibility value (RVV) - the visibility determined for a particular runway by a transmissometer, a photoelectric device calibrated in terms of a human observer. A meter in the control tower provides a continuous indication of the visibility (reported in miles or fractions of miles) for the runway. RVV is used in lieu of prevailing visibility in determining minimums for a particular runway. This program is gradually being replaced by RVR at transmissometer locations.

Visibility, runway visual range (RVR) - an instrumentally derived value, based on standard calibrations, that represents the horizontal distance a pilot will see down the runway from the approach end; it is based on the sighting of either high intensity runway lights or on the visual contrast of other targets, whichever yields the greater visual range. RVR, in contrast to prevailing or runway visibility, is based on what a pilot in a moving aircraft should see looking down the runway. RVR is horizontal, and not slant, visual range. It is based on the measurement of a transmissometer made near the touchdown point of the instrument runway and is reported in hundreds of feet. RVR provides an additional operating minimum at fields equipped with specified navigational aids. For example, at the present time the RVR minimum at Newark is 2,000 feet (in combination with a decision height [DH] of 218' MSL) for both take-offs and landings, regardless of the reported ceiling and visibility.

Visual approach - an approach wherein an aircraft on an IFR flight plan, operating in VFR conditions under the control of a radar facility and having an air traffic control authorization, may deviate from the prescribed instrument approach procedure and proceed to the airport of destination by visual reference to the surface.

Visual approach slope indicator (VASI) –

1. The VASI gives visual descent guidance information during the approach to a runway. The standard VASI consists of downwind and upwind light bars that provide a visual glide path which provides safe obstruction clearance within the approach zone. Some airports serving long-bodied aircraft have 3-bar VASIs which provide two visual glide paths to the same runway. The first glide path encountered is the same as provided by the standard Federal Aviation Administration VASI. The second glide is about 1/2 degrees higher than the first and is designed for the use of pilots of long-bodied aircraft. Lateral Descent, using the VASI, should not be initiated until the aircraft is visually aligned with the runway.

2. Standard VASI installation consists of either 2, 4, or 12 light units arranged in downwind and upwind light bars. The 3-bar installation consists of the standard VASI with an additional light bar installed equidistant upwind. A minimum of 6 light units are required for this installation.

3. The following information is provided for pilots as yet unfamiliar with the principles and operation of this system and pilot technique required. The basic principle of the VASI is that of color differentiation between red and white. Each light unit projects a beam of light having a white segment in the upper part of the beam and red segment in the lower part of the beam. The light units are arranged so that the pilot using the VASIs during an approach will see the following combination of lights:

Standard FAA 2-bar VASI

Below glide path	Red	Runway	Red
	Red		Red

On glide path	Red	Runway	Red
	White		White
Above glide path		Runway	White
	White		White
3-Bar VASI			
Below both glide paths	Red	Runway	Red
	Red		Red
	Red		Red
On downwind glide path	Red	Runway	Red
	Red		Red
	White		White
On upwind glide path	Red	Runway	Red
	White		White
	White		White
Above both glide paths	White	Runway	White
	White		White
	White		White

4. When on the proper glide path, the pilot will overshoot the downwind bars and undershoot the upwind bars. Thus he will see the downwind bars as white and the upwind bars as red. From a position below the glide path the pilot will see the light bars as red and from above the glide path the light bars will appear white. Passing through the path from a low position is indicated to the pilot by a transition in color from red through pink to white. From a high position, passing through the path is indicated to the pilot by a transition in color from white through pink to red. When the pilot is below the glide path the red bars tend to merge into one distinct red signal. A safe obstruction clearance may not exist when this distinct red signal is visible. The visual glide path will separate into individual lights as the pilot approaches the runway threshold. At this point, the approach should be continued by reference to the runway touchdown zone.

5. In haze or dust conditions, or when the approach is made into the sun, the white lights may appear yellowish. This is also true at night when the VASI is operated at a low intensity. Certain atmospheric debris may give the white lights an orange or brownish tint; however, the red lights are not affected and the principle of color differentiation is still applicable.

Visual separation –

1. Visual separation is a means employed by ATC to separate IFR aircraft in terminal areas. There are two methods employed to effect this separation: (a) the tower controller sees the aircraft involved and issues instructions, as necessary, to ensure that the aircraft avoid each other; (b) a pilot sees the other aircraft involved and upon instructions from the controller provides his own separation by maneuvering his aircraft as necessary to avoid it. This may involve following in-trail behind another aircraft or keeping it in sight until it is no longer a factor.

2. When pilots have been told to follow another aircraft or to provide visual separation from it, they should promptly notify the controller if they do not sight the other aircraft involved.

VOR - VHF omnidirectional range.

W - in the phonetic alphabet is Whiskey (wiss-key).

Way point, RNAV - a predetermined geographical position, used for route or instrument approach definition or progress reporting purposes, that is defined relative to a VORTAC station position. Two subsequently related way points define a route segment.

Weather radar - the national weather service operates a 90-station network of weather radars. These stations are generally spaced in such a manner as to enable them to detect and identify the type and characteristics of most of the precipitation east of the continental divide.

Wind coverage - The percent of time for which aeronautical operations are considered safe due to acceptable crosswind components.

Wind direction indicator - a wind cone installed at the center of the segmented circle on an airport and used to indicate wind direction and velocity. The large end of the wind cone points into the wind.

Wind rose - A graphic depiction of historical prevailing wind patterns by speed and direction at a given location. A series of concentric circles cut by radial lines indicates the average percentage of time during the observation period that winds were occurring at successive wind speed groupings and by true direction. Wind rose data are used primarily for determining optimal runway alignment for wind coverage.

Wind shear - A change in wind speed and/or wind direction in a short distance, resulting in a tearing or shearing effect. It can exist in a horizontal or vertical direction and occasionally in both.

Wind sock - a cloth sleeve, mounted aloft at an airport to use for estimating wind direction and velocity

Wind tee - an indicator for wind or traffic direction at an airport.

X - in the phonetic alphabet is Xray (ecks-ray).

Y - in the phonetic alphabet is Yankee (yang-key).

Z - in the phonetic alphabet is Zulu (zoo-loo).

Z - Greenwich mean time.

APPENDIX C
FAA Grant Assurances



**FAA
Airports**

Grant Assurances Airport Sponsors

A. General.

1. These assurances shall be complied with in the performance of grant agreements for airport development, airport planning, and noise compatibility program grants for airport sponsors.
2. These assurances are required to be submitted as part of the project application by sponsors requesting funds under the provisions of Title 49, U.S.C., subtitle VII, as amended. As used herein, the term "public agency sponsor" means a public agency with control of a public-use airport; the term "private sponsor" means a private owner of a public-use airport; and the term "sponsor" includes both public agency sponsors and private sponsors.
3. Upon acceptance of this grant offer by the sponsor, these assurances are incorporated in and become part of this grant agreement.

B. Duration and Applicability.

1. **Airport development or Noise Compatibility Program Projects Undertaken by a Public Agency Sponsor.** The terms, conditions and assurances of this grant agreement shall remain in full force and effect throughout the useful life of the facilities developed or equipment acquired for an airport development or noise compatibility program project, or throughout the useful life of the project items installed within a facility under a noise compatibility program project, but in any event not to exceed twenty (20) years from the date of acceptance of a grant offer of Federal funds for the project. However, there shall be no limit on the duration of the assurances regarding Exclusive Rights and Airport Revenue so long as the airport is used as an airport. There shall be no limit on the duration of the terms, conditions, and assurances with respect to real property acquired with federal funds. Furthermore, the duration of the Civil Rights assurance shall be specified in the assurances.
2. **Airport Development or Noise Compatibility Projects Undertaken by a Private Sponsor.** The preceding paragraph 1 also applies to a private sponsor except that the useful life of project items installed within a facility or the useful life of the facilities developed or equipment acquired under an airport development or noise compatibility program project shall be no less than ten (10) years from the date of acceptance of Federal aid for the project.

3. **Airport Planning Undertaken by a Sponsor.** Unless otherwise specified in this grant agreement, only Assurances 1, 2, 3, 5, 6, 13, 18, 30, 32, 33, and 34 in section C apply to planning projects. The terms, conditions, and assurances of this grant agreement shall remain in full force and effect during the life of the project.

C. **Sponsor Certification.** The sponsor hereby assures and certifies, with respect to this grant that:

1. **General Federal Requirements.** It will comply with all applicable Federal laws, regulations, executive orders, policies, guidelines, and requirements as they relate to the application, acceptance and use of Federal funds for this project including but not limited to the following:

Federal Legislation

- a. Title 49, U.S.C., subtitle VII, as amended.
- b. Davis-Bacon Act - 40 U.S.C. 276(a), et seq.¹
- c. Federal Fair Labor Standards Act - 29 U.S.C. 201, et seq.
- d. Hatch Act – 5 U.S.C. 1501, et seq.²
- e. Uniform Relocation Assistance and Real Property Acquisition Policies Act of 1970 Title 42 U.S.C. 4601, et seq.^{1 2}
- f. National Historic Preservation Act of 1966 - Section 106 - 16 U.S.C. 470(f).¹
- g. Archeological and Historic Preservation Act of 1974 - 16 U.S.C. 469 through 469c.¹
- h. Native Americans Grave Repatriation Act - 25 U.S.C. Section 3001, et seq.
- i. Clean Air Act, P.L. 90-148, as amended.
- j. Coastal Zone Management Act, P.L. 93-205, as amended.
- k. Flood Disaster Protection Act of 1973 - Section 102(a) - 42 U.S.C. 4012a.¹
- l. Title 49, U.S.C., Section 303, (formerly known as Section 4(f))
- m. Rehabilitation Act of 1973 - 29 U.S.C. 794.
- n. Civil Rights Act of 1964 - Title VI - 42 U.S.C. 2000d through d-4.
- o. Age Discrimination Act of 1975 - 42 U.S.C. 6101, et seq.
- p. American Indian Religious Freedom Act, P.L. 95-341, as amended.
- q. Architectural Barriers Act of 1968 -42 U.S.C. 4151, et seq.¹
- r. Power plant and Industrial Fuel Use Act of 1978 - Section 403- 2 U.S.C. 8373.¹
- s. Contract Work Hours and Safety Standards Act - 40 U.S.C. 327, et seq.¹
- t. Copeland Anti kickback Act - 18 U.S.C. 874.1
- u. National Environmental Policy Act of 1969 - 42 U.S.C. 4321, et seq.¹
- v. Wild and Scenic Rivers Act, P.L. 90-542, as amended.
- w. Single Audit Act of 1984 - 31 U.S.C. 7501, et seq.²
- x. Drug-Free Workplace Act of 1988 - 41 U.S.C. 702 through 706.

Executive Orders

Executive Order 11246 - Equal Employment Opportunity¹
Executive Order 11990 - Protection of Wetlands
Executive Order 11998 – Flood Plain Management
Executive Order 12372 - Intergovernmental Review of Federal Programs
Executive Order 12699 - Seismic Safety of Federal and Federally Assisted New
Building Construction¹
Executive Order 12898 - Environmental Justice

Federal Regulations

- a. 14 CFR Part 13 - Investigative and Enforcement Procedures.
- b. 14 CFR Part 16 - Rules of Practice For Federally Assisted Airport Enforcement Proceedings.
- c. 14 CFR Part 150 - Airport noise compatibility planning.
- d. 29 CFR Part 1 - Procedures for predetermination of wage rates.¹
- e. 29 CFR Part 3 - Contractors and subcontractors on public building or public work financed in whole or part by loans or grants from the United States.¹
- f. 29 CFR Part 5 - Labor standards provisions applicable to contracts covering federally financed and assisted construction (also labor standards provisions applicable to non-construction contracts subject to the Contract Work Hours and Safety Standards Act).¹
- g. 41 CFR Part 60 - Office of Federal Contract Compliance Programs, Equal Employment Opportunity, Department of Labor (Federal and federally assisted contracting requirements).¹
- h. 49 CFR Part 18 - Uniform administrative requirements for grants and cooperative agreements to state and local governments.³
- i. 49 CFR Part 20 - New restrictions on lobbying.
- j. 49 CFR Part 21 - Nondiscrimination in federally-assisted programs of the Department of Transportation - effectuation of Title VI of the Civil Rights Act of 1964.
- k. 49 CFR Part 23 - Participation by Disadvantage Business Enterprise in Airport Concessions.
- l. 49 CFR Part 24 - Uniform relocation assistance and real property acquisition for Federal and federally assisted programs.^{1,2}
- m. 49 CFR Part 26 – Participation By Disadvantaged Business Enterprises in Department of Transportation Programs.
- n. 49 CFR Part 27 - Nondiscrimination on the basis of handicap in programs and activities receiving or benefiting from Federal financial assistance.¹
- o. 49 CFR Part 29 – Government wide debarment and suspension (nonprocurement) and government wide requirements for drug-free workplace (grants).
- p. 49 CFR Part 30 - Denial of public works contracts to suppliers of goods and services of countries that deny procurement market access to U.S. contractors.

- q. 49 CFR Part 41 - Seismic safety of Federal and federally assisted or regulated new building construction.¹

Office of Management and Budget Circulars

- a. A-87 - Cost Principles Applicable to Grants and Contracts with State and Local Governments.
- b. A-133 - Audits of States, Local Governments, and Non-Profit Organizations

¹ These laws do not apply to airport planning sponsors.

² These laws do not apply to private sponsors.

³ 49 CFR Part 18 and OMB Circular A-87 contain requirements for State and Local Governments receiving Federal assistance. Any requirement levied upon State and Local Governments by this regulation and circular shall also be applicable to private sponsors receiving Federal assistance under Title 49, United States Code.

Specific assurances required to be included in grant agreements by any of the above laws, regulations or circulars are incorporated by reference in this grant agreement.

2. Responsibility and Authority of the Sponsor.

- a. **Public Agency Sponsor:** It has legal authority to apply for this grant, and to finance and carry out the proposed project; that a resolution, motion or similar action has been duly adopted or passed as an official act of the applicant's governing body authorizing the filing of the application, including all understandings and assurances contained therein, and directing and authorizing the person identified as the official representative of the applicant to act in connection with the application and to provide such additional information as may be required.
- b. **Private Sponsor:** It has legal authority to apply for this grant and to finance and carry out the proposed project and comply with all terms, conditions, and assurances of this grant agreement. It shall designate an official representative and shall in writing direct and authorize that person to file this application, including all understandings and assurances contained therein; to act in connection with this application; and to provide such additional information as may be required.

3. Sponsor Fund Availability. It has sufficient funds available for that portion of the project costs which are not to be paid by the United States. It has sufficient funds available to assure operation and maintenance of items funded under this grant agreement which it will own or control.

4. Good Title.

- a. It, a public agency or the Federal government, holds good title, satisfactory to the Secretary, to the landing area of the airport or site thereof, or will give assurance satisfactory to the Secretary that good title will be acquired.

- b. For noise compatibility program projects to be carried out on the property of the sponsor, it holds good title satisfactory to the Secretary to that portion of the property upon which Federal funds will be expended or will give assurance to the Secretary that good title will be obtained.

5. Preserving Rights and Powers.

- a. It will not take or permit any action which would operate to deprive it of any of the rights and powers necessary to perform any or all of the terms, conditions, and assurances in this grant agreement without the written approval of the Secretary, and will act promptly to acquire, extinguish or modify any outstanding rights or claims of right of others which would interfere with such performance by the sponsor. This shall be done in a manner acceptable to the Secretary.
- b. It will not sell, lease, encumber, or otherwise transfer or dispose of any part of its title or other interests in the property shown on Exhibit A to this application or, for a noise compatibility program project, that portion of the property upon which Federal funds have been expended, for the duration of the terms, conditions, and assurances in this grant agreement without approval by the Secretary. If the transferee is found by the Secretary to be eligible under Title 49, United States Code, to assume the obligations of this grant agreement and to have the power, authority, and financial resources to carry out all such obligations, the sponsor shall insert in the contract or document transferring or disposing of the sponsor's interest, and make binding upon the transferee all of the terms, conditions, and assurances contained in this grant agreement.
- c. For all noise compatibility program projects which are to be carried out by another unit of local government or are on property owned by a unit of local government other than the sponsor, it will enter into an agreement with that government. Except as otherwise specified by the Secretary, that agreement shall obligate that government to the same terms, conditions, and assurances that would be applicable to it if it applied directly to the FAA for a grant to undertake the noise compatibility program project. That agreement and changes thereto must be satisfactory to the Secretary. It will take steps to enforce this agreement against the local government if there is substantial non-compliance with the terms of the agreement.
- d. For noise compatibility program projects to be carried out on privately owned property, it will enter into an agreement with the owner of that property which includes provisions specified by the Secretary. It will take steps to enforce this agreement against the property owner whenever there is substantial non-compliance with the terms of the agreement.
- e. If the sponsor is a private sponsor, it will take steps satisfactory to the Secretary to ensure that the airport will continue to function as a public-use airport in accordance with these assurances for the duration of these assurances.
- f. If an arrangement is made for management and operation of the airport by any agency or person other than the sponsor or an employee of the sponsor, the sponsor will reserve sufficient rights and authority to insure

that the airport will be operated and maintained in accordance Title 49, United States Code, the regulations and the terms, conditions and assurances in this grant agreement and shall insure that such arrangement also requires compliance therewith.

- g. Sponsors of commercial service airports will not permit or enter into any arrangement that results in permission for the owner or tenant of a property used as a residence, or zoned for residential use, to taxi an aircraft between that property and any location on airport. Sponsors of general aviation airports entering into any arrangement that results in permission for the owner of residential real property adjacent to or near the airport must comply with the requirements of Sec. 136 of Public Law 112-95 and the sponsor assurances.

6. **Consistency with Local Plans.** The project is reasonably consistent with plans (existing at the time of submission of this application) of public agencies that are authorized by the State in which the project is located to plan for the development of the area surrounding the airport.
7. **Consideration of Local Interest.** It has given fair consideration to the interest of communities in or near where the project may be located.
8. **Consultation with Users.** In making a decision to undertake any airport development project under Title 49, United States Code, it has undertaken reasonable consultations with affected parties using the airport at which project is proposed.
9. **Public Hearings.** In projects involving the location of an airport, an airport runway, or a major runway extension, it has afforded the opportunity for public hearings for the purpose of considering the economic, social, and environmental effects of the airport or runway location and its consistency with goals and objectives of such planning as has been carried out by the community and it shall, when requested by the Secretary, submit a copy of the transcript of such hearings to the Secretary. Further, for such projects, it has on its management board either voting representation from the communities where the project is located or has advised the communities that they have the right to petition the Secretary concerning a proposed project.
10. **Air and Water Quality Standards.** In projects involving airport location, a major runway extension, or runway location it will provide for the Governor of the state in which the project is located to certify in writing to the Secretary that the project will be located, designed, constructed, and operated so as to comply with applicable air and water quality standards. In any case where such standards have not been approved and where applicable air and water quality standards have been promulgated by the Administrator of the Environmental Protection Agency, certification shall be obtained from such Administrator. Notice of certification or refusal to certify shall be provided within sixty days after the project application has been received by the Secretary.
11. **Pavement Preventive Maintenance.** With respect to a project approved after January 1, 1995, for the replacement or reconstruction of pavement at the airport,

it assures or certifies that it has implemented an effective airport pavement maintenance-management program and it assures that it will use such program for the useful life of any pavement constructed, reconstructed or repaired with Federal financial assistance at the airport. It will provide such reports on pavement condition and pavement management programs as the Secretary determines may be useful.

- 12. Terminal Development Prerequisites.** For projects which include terminal development at a public use airport, as defined in Title 49, it has, on the date of submittal of the project grant application, all the safety equipment required for certification of such airport under section 44706 of Title 49, United States Code, and all the security equipment required by rule or regulation, and has provided for access to the passenger enplaning and deplaning area of such airport to passengers enplaning and deplaning from aircraft other than air carrier aircraft.
- 13. Accounting System, Audit, and Record Keeping Requirements.**

 - a. It shall keep all project accounts and records which fully disclose the amount and disposition by the recipient of the proceeds of this grant, the total cost of the project in connection with which this grant is given or used, and the amount or nature of that portion of the cost of the project supplied by other sources, and such other financial records pertinent to the project. The accounts and records shall be kept in accordance with an accounting system that will facilitate an effective audit in accordance with the Single Audit Act of 1984.
 - b. It shall make available to the Secretary and the Comptroller General of the United States, or any of their duly authorized representatives, for the purpose of audit and examination, any books, documents, papers, and records of the recipient that are pertinent to this grant. The Secretary may require that an appropriate audit be conducted by a recipient. In any case in which an independent audit is made of the accounts of a sponsor relating to the disposition of the proceeds of a grant or relating to the project in connection with which this grant was given or used, it shall file a certified copy of such audit with the Comptroller General of the United States not later than six (6) months following the close of the fiscal year for which the audit was made.
- 14. Minimum Wage Rates.** It shall include, in all contracts in excess of \$2,000 for work on any projects funded under this grant agreement which involve labor, provisions establishing minimum rates of wages, to be predetermined by the Secretary of Labor, in accordance with the Davis-Bacon Act, as amended (40 U.S.C. 276a-276a-5), which contractors shall pay to skilled and unskilled labor, and such minimum rates shall be stated in the invitation for bids and shall be included in proposals or bids for the work.
- 15. Veteran's Preference.** It shall include in all contracts for work on any project funded under this grant agreement which involve labor, such provisions as are necessary to insure that, in the employment of labor (except in executive, administrative, and supervisory positions), preference shall be given to Vietnam

era veterans, Persian Gulf veterans, Afghanistan-Iraq war veterans, disabled veterans, and small business concerns owned and controlled by disabled veterans as defined in Section 47112 of Title 49, United States Code. However, this preference shall apply only where the individuals are available and qualified to perform the work to which the employment relates.

- 16. Conformity to Plans and Specifications.** It will execute the project subject to plans, specifications, and schedules approved by the Secretary. Such plans, specifications, and schedules shall be submitted to the Secretary prior to commencement of site preparation, construction, or other performance under this grant agreement, and, upon approval of the Secretary, shall be incorporated into this grant agreement. Any modification to the approved plans, specifications, and schedules shall also be subject to approval of the Secretary, and incorporated into this grant agreement.
- 17. Construction Inspection and Approval.** It will provide and maintain competent technical supervision at the construction site throughout the project to assure that the work conforms to the plans, specifications, and schedules approved by the Secretary for the project. It shall subject the construction work on any project contained in an approved project application to inspection and approval by the Secretary and such work shall be in accordance with regulations and procedures prescribed by the Secretary. Such regulations and procedures shall require such cost and progress reporting by the sponsor or sponsors of such project as the Secretary shall deem necessary.
- 18. Planning Projects.** In carrying out planning projects:
 - a. It will execute the project in accordance with the approved program narrative contained in the project application or with the modifications similarly approved.
 - b. It will furnish the Secretary with such periodic reports as required pertaining to the planning project and planning work activities.
 - c. It will include in all published material prepared in connection with the planning project a notice that the material was prepared under a grant provided by the United States.
 - d. It will make such material available for examination by the public, and agrees that no material prepared with funds under this project shall be subject to copyright in the United States or any other country.
 - e. It will give the Secretary unrestricted authority to publish, disclose, distribute, and otherwise use any of the material prepared in connection with this grant.
 - f. It will grant the Secretary the right to disapprove the sponsor's employment of specific consultants and their subcontractors to do all or any part of this project as well as the right to disapprove the proposed scope and cost of professional services.
 - g. It will grant the Secretary the right to disapprove the use of the sponsor's employees to do all or any part of the project.
 - h. It understands and agrees that the Secretary's approval of this project grant or the Secretary's approval of any planning material developed as part of

this grant does not constitute or imply any assurance or commitment on the part of the Secretary to approve any pending or future application for a Federal airport grant.

19. Operation and Maintenance.

- a. The airport and all facilities which are necessary to serve the aeronautical users of the airport, other than facilities owned or controlled by the United States, shall be operated at all times in a safe and serviceable condition and in accordance with the minimum standards as may be required or prescribed by applicable Federal, state and local agencies for maintenance and operation. It will not cause or permit any activity or action thereon which would interfere with its use for airport purposes. It will suitably operate and maintain the airport and all facilities thereon or connected therewith, with due regard to climatic and flood conditions. Any proposal to temporarily close the airport for non-aeronautical purposes must first be approved by the Secretary. In furtherance of this assurance, the sponsor will have in effect arrangements for-
- 1) Operating the airport's aeronautical facilities whenever required;
 - 2) Promptly marking and lighting hazards resulting from airport conditions, including temporary conditions; and
 - 3) Promptly notifying airmen of any condition affecting aeronautical use of the airport. Nothing contained herein shall be construed to require that the airport be operated for aeronautical use during temporary periods when snow, flood or other climatic conditions interfere with such operation and maintenance. Further, nothing herein shall be construed as requiring the maintenance, repair, restoration, or replacement of any structure or facility which is substantially damaged or destroyed due to an act of God or other condition or circumstance beyond the control of the sponsor.
- b. It will suitably operate and maintain noise compatibility program items that it owns or controls upon which Federal funds have been expended.

20. Hazard Removal and Mitigation. It will take appropriate action to assure that such terminal airspace as is required to protect instrument and visual operations to the airport (including established minimum flight altitudes) will be adequately cleared and protected by removing, lowering, relocating, marking, or lighting or otherwise mitigating existing airport hazards and by preventing the establishment or creation of future airport hazards.

21. Compatible Land Use. It will take appropriate action, to the extent reasonable, including the adoption of zoning laws, to restrict the use of land adjacent to or in the immediate vicinity of the airport to activities and purposes compatible with normal airport operations, including landing and takeoff of aircraft. In addition, if the project is for noise compatibility program implementation, it will not cause or permit any change in land use, within its jurisdiction, that will reduce its compatibility, with respect to the airport, of the noise compatibility program measures upon which Federal funds have been expended.

22. Economic Nondiscrimination.

- a. It will make the airport available as an airport for public use on reasonable terms and without unjust discrimination to all types, kinds and classes of aeronautical activities, including commercial aeronautical activities offering services to the public at the airport.
- b. In any agreement, contract, lease, or other arrangement under which a right or privilege at the airport is granted to any person, firm, or corporation to conduct or to engage in any aeronautical activity for furnishing services to the public at the airport, the sponsor will insert and enforce provisions requiring the contractor to-
 - 1) furnish said services on a reasonable, and not unjustly discriminatory, basis to all users thereof, and
 - 2) charge reasonable, and not unjustly discriminatory, prices for each unit or service, provided that the contractor may be allowed to make reasonable and nondiscriminatory discounts, rebates, or other similar types of price reductions to volume purchasers.
- c. Each fixed-based operator at the airport shall be subject to the same rates, fees, rentals, and other charges as are uniformly applicable to all other fixed-based operators making the same or similar uses of such airport and utilizing the same or similar facilities.
- d. Each air carrier using such airport shall have the right to service itself or to use any fixed-based operator that is authorized or permitted by the airport to serve any air carrier at such airport.
- e. Each air carrier using such airport (whether as a tenant, non tenant, or subtenant of another air carrier tenant) shall be subject to such nondiscriminatory and substantially comparable rules, regulations, conditions, rates, fees, rentals, and other charges with respect to facilities directly and substantially related to providing air transportation as are applicable to all such air carriers which make similar use of such airport and utilize similar facilities, subject to reasonable classifications such as tenants or non tenants and signatory carriers and non signatory carriers. Classification or status as tenant or signatory shall not be unreasonably withheld by any airport provided an air carrier assumes obligations substantially similar to those already imposed on air carriers in such classification or status.
- f. It will not exercise or grant any right or privilege which operates to prevent any person, firm, or corporation operating aircraft on the airport from performing any services on its own aircraft with its own employees [including, but not limited to maintenance, repair, and fueling] that it may choose to perform.
- g. In the event the sponsor itself exercises any of the rights and privileges referred to in this assurance, the services involved will be provided on the same conditions as would apply to the furnishing of such services by commercial aeronautical service providers authorized by the sponsor under these provisions.

- h. The sponsor may establish such reasonable, and not unjustly discriminatory, conditions to be met by all users of the airport as may be necessary for the safe and efficient operation of the airport.
- i. The sponsor may prohibit or limit any given type, kind or class of aeronautical use of the airport if such action is necessary for the safe operation of the airport or necessary to serve the civil aviation needs of the public.

23. Exclusive Rights. It will permit no exclusive right for the use of the airport by any person providing, or intending to provide, aeronautical services to the public. For purposes of this paragraph, the providing of the services at an airport by a single fixed-based operator shall not be construed as an exclusive right if both of the following apply:

- a. It would be unreasonably costly, burdensome, or impractical for more than one fixed-based operator to provide such services, and
- b. If allowing more than one fixed-based operator to provide such services would require the reduction of space leased pursuant to an existing agreement between such single fixed-based operator and such airport. It further agrees that it will not, either directly or indirectly, grant or permit any person, firm, or corporation, the exclusive right at the airport to conduct any aeronautical activities, including, but not limited to charter flights, pilot training, aircraft rental and sightseeing, aerial photography, crop dusting, aerial advertising and surveying, air carrier operations, aircraft sales and services, sale of aviation petroleum products whether or not conducted in conjunction with other aeronautical activity, repair and maintenance of aircraft, sale of aircraft parts, and any other activities which because of their direct relationship to the operation of aircraft can be regarded as an aeronautical activity, and that it will terminate any exclusive right to conduct an aeronautical activity now existing at such an airport before the grant of any assistance under Title 49, United States Code.

24. Fee and Rental Structure. It will maintain a fee and rental structure for the facilities and services at the airport which will make the airport as self-sustaining as possible under the circumstances existing at the particular airport, taking into account such factors as the volume of traffic and economy of collection. No part of the Federal share of an airport development, airport planning or noise compatibility project for which a grant is made under Title 49, United States Code, the Airport and Airway Improvement Act of 1982, the Federal Airport Act or the Airport and Airway Development Act of 1970 shall be included in the rate basis in establishing fees, rates, and charges for users of that airport.

25. Airport Revenues.

- a. All revenues generated by the airport and any local taxes on aviation fuel established after December 30, 1987, will be expended by it for the capital or operating costs of the airport; the local airport system; or other local facilities which are owned or operated by the owner or operator of the

airport and which are directly and substantially related to the actual air transportation of passengers or property; or for noise mitigation purposes on or off the airport. The following exceptions apply to this paragraph:

- 1) If covenants or assurances in debt obligations issued before September 3, 1982, by the owner or operator of the airport, or provisions enacted before September 3, 1982, in governing statutes controlling the owner or operator's financing, provide for the use of the revenues from any of the airport owner or operator's facilities, including the airport, to support not only the airport but also the airport owner or operator's general debt obligations or other facilities, then this limitation on the use of all revenues generated by the airport (and, in the case of a public airport, local taxes on aviation fuel) shall not apply.
 - 2) If the Secretary approves the sale of a privately owned airport to a public sponsor and provides funding for any portion of the public sponsor's acquisition of land, this limitation on the use of all revenues generated by the sale shall not apply to certain proceeds from the sale. This is conditioned on repayment to the Secretary by the private owner of an amount equal to the remaining unamortized portion (amortized over a 20-year period) of any airport improvement grant made to the private owner for any purpose other than land acquisition on or after October 1, 1996, plus an amount equal to the federal share of the current fair market value of any land acquired with an airport improvement grant made to that airport on or after October 1, 1996.
 - 3) Certain revenue derived from or generated by mineral extraction, production, lease, or other means at a general aviation airport (as defined at Section 47102 of title 49 United States Code), if the FAA determines the airport sponsor meets the requirements set forth in Sec. 813 of Public Law 112-95.
- b. As part of the annual audit required under the Single Audit Act of 1984, the sponsor will direct that the audit will review, and the resulting audit report will provide an opinion concerning, the use of airport revenue and taxes in paragraph (a), and indicating whether funds paid or transferred to the owner or operator are paid or transferred in a manner consistent with Title 49, United States Code and any other applicable provision of law, including any regulation promulgated by the Secretary or Administrator.
 - c. Any civil penalties or other sanctions will be imposed for violation of this assurance in accordance with the provisions of Section 47107 of Title 49, United States Code.

26. Reports and Inspections. It will:

- a. submit to the Secretary such annual or special financial and operations reports as the Secretary may reasonably request and make such reports

available to the public; make available to the public at reasonable times and places a report of the airport budget in a format prescribed by the Secretary;

- b. for airport development projects, make the airport and all airport records and documents affecting the airport, including deeds, leases, operation and use agreements, regulations and other instruments, available for inspection by any duly authorized agent of the Secretary upon reasonable request;
- c. for noise compatibility program projects, make records and documents relating to the project and continued compliance with the terms, conditions, and assurances of this grant agreement including deeds, leases, agreements, regulations, and other instruments, available for inspection by any duly authorized agent of the Secretary upon reasonable request; and
- d. in a format and time prescribed by the Secretary, provide to the Secretary and make available to the public following each of its fiscal years, an annual report listing in detail:
 - 1) all amounts paid by the airport to any other unit of government and the purposes for which each such payment was made; and
 - 2) all services and property provided by the airport to other units of government and the amount of compensation received for provision of each such service and property.

27. Use by Government Aircraft. It will make available all of the facilities of the airport developed with Federal financial assistance and all those usable for landing and takeoff of aircraft to the United States for use by Government aircraft in common with other aircraft at all times without charge, except, if the use by Government aircraft is substantial, charge may be made for a reasonable share, proportional to such use, for the cost of operating and maintaining the facilities used. Unless otherwise determined by the Secretary, or otherwise agreed to by the sponsor and the using agency, substantial use of an airport by Government aircraft will be considered to exist when operations of such aircraft are in excess of those which, in the opinion of the Secretary, would unduly interfere with use of the landing areas by other authorized aircraft, or during any calendar month that –

- a. Five (5) or more Government aircraft are regularly based at the airport or on land adjacent thereto; or
- b. The total number of movements (counting each landing as a movement) of Government aircraft is 300 or more, or the gross accumulative weight of Government aircraft using the airport (the total movement of Government aircraft multiplied by gross weights of such aircraft) is in excess of five million pounds.

28. Land for Federal Facilities. It will furnish without cost to the Federal Government for use in connection with any air traffic control or air navigation activities, or weather-reporting and communication activities related to air traffic control, any areas of land or water, or estate therein, or rights in buildings of the sponsor as the Secretary considers necessary or desirable for construction, operation, and maintenance at Federal expense of space or facilities for such

purposes. Such areas or any portion thereof will be made available as provided herein within four months after receipt of a written request from the Secretary.

29. Airport Layout Plan.

- a. It will keep up to date at all times an airport layout plan of the airport showing (1) boundaries of the airport and all proposed additions thereto, together with the boundaries of all offsite areas owned or controlled by the sponsor for airport purposes and proposed additions thereto; (2) the location and nature of all existing and proposed airport facilities and structures (such as runways, taxiways, aprons, terminal buildings, hangars and roads), including all proposed extensions and reductions of existing airport facilities; (3) the location of all existing and proposed nonaviation areas and of all existing improvements thereon; and (4) all proposed and existing access points used to taxi aircraft across the airport's property boundary. Such airport layout plans and each amendment, revision, or modification thereof, shall be subject to the approval of the Secretary which approval shall be evidenced by the signature of a duly authorized representative of the Secretary on the face of the airport layout plan. The sponsor will not make or permit any changes or alterations in the airport or any of its facilities which are not in conformity with the airport layout plan as approved by the Secretary and which might, in the opinion of the Secretary, adversely affect the safety, utility or efficiency of the airport.
- b. If a change or alteration in the airport or the facilities is made which the Secretary determines adversely affects the safety, utility, or efficiency of any federally owned, leased, or funded property on or off the airport and which is not in conformity with the airport layout plan as approved by the Secretary, the owner or operator will, if requested, by the Secretary (1) eliminate such adverse effect in a manner approved by the Secretary; or (2) bear all costs of relocating such property (or replacement thereof) to a site acceptable to the Secretary and all costs of restoring such property (or replacement thereof) to the level of safety, utility, efficiency, and cost of operation existing before the unapproved change in the airport or its facilities except in the case of a relocation or replacement of an existing airport facility due to a change in the Secretary's design standards beyond the control of the airport sponsor.

- 30. Civil Rights.** It will comply with such rules as are promulgated to assure that no person shall, on the grounds of race, creed, color, national origin, sex, age, or handicap be excluded from participating in any activity conducted with or benefiting from funds received from this grant. This assurance obligates the sponsor for the period during which Federal financial assistance is extended to the program, except where Federal financial assistance is to provide, or is in the form of personal property or real property or interest therein or structures or improvements thereon in which case the assurance obligates the sponsor or any transferee for the longer of the following periods: (a) the period during which the property is used for a purpose for which Federal financial assistance is extended, or for another purpose involving the provision of similar services or benefits, or

(b) the period during which the sponsor retains ownership or possession of the property.

31. Disposal of Land.

- a. For land purchased under a grant for airport noise compatibility purposes, including land serving as a noise buffer, it will dispose of the land, when the land is no longer needed for such purposes, at fair market value, at the earliest practicable time. That portion of the proceeds of such disposition which is proportionate to the United States' share of acquisition of such land will be, at the discretion of the Secretary, (1) reinvested in another project at the airport, or (2) transferred to another eligible airport as prescribed by the Secretary. The Secretary shall give preference to the following, in descending order, (1) reinvestment in an approved noise compatibility project, (2) reinvestment in an approved project that is eligible for grant funding under Section 47117(e) of title 49 United States Code, (3) reinvestment in an approved airport development project that is eligible for grant funding under Sections 47114, 47115, or 47117 of title 49 United States Code, (4) transferred to an eligible sponsor of another public airport to be reinvested in an approved noise compatibility project at that airport, and (5) paid to the Secretary for deposit in the Airport and Airway Trust Fund. If land acquired under a grant for noise compatibility purposes is leased at fair market value and consistent with noise buffering purposes, the lease will not be considered a disposal of the land. Revenues derived from such a lease may be used for an approved airport development project that would otherwise be eligible for grant funding or any permitted use of airport revenue.
- b. For land purchased under a grant for airport development purposes (other than noise compatibility), it will, when the land is no longer needed for airport purposes, dispose of such land at fair market value or make available to the Secretary an amount equal to the United States' proportionate share of the fair market value of the land. That portion of the proceeds of such disposition which is proportionate to the United States' share of the cost of acquisition of such land will, (1) upon application to the Secretary, be reinvested or transferred to another eligible airport as prescribed by the Secretary. The Secretary shall give preference to the following, in descending order: (1) reinvestment in an approved noise compatibility project, (2) reinvestment in an approved project that is eligible for grant funding under Section 47117(e) of title 49 United States Code, (3) reinvestment in an approved airport development project that is eligible for grant funding under Sections 47114, 47115, or 47117 of title 49 United States Code, (4) transferred to an eligible sponsor of another public airport to be reinvested in an approved noise compatibility project at that airport, and (5) paid to the Secretary for deposit in the Airport and Airway Trust Fund.
- c. Land shall be considered to be needed for airport purposes under this assurance if (1) it may be needed for aeronautical purposes (including runway protection zones) or serve as noise buffer land, and (2) the revenue

from interim uses of such land contributes to the financial self-sufficiency of the airport. Further, land purchased with a grant received by an airport operator or owner before December 31, 1987, will be considered to be needed for airport purposes if the Secretary or Federal agency making such grant before December 31, 1987, was notified by the operator or owner of the uses of such land, did not object to such use, and the land continues to be used for that purpose, such use having commenced no later than December 15, 1989.

- d. Disposition of such land under (a) (b) or (c) will be subject to the retention or reservation of any interest or right therein necessary to ensure that such land will only be used for purposes which are compatible with noise levels associated with operation of the airport.
32. **Engineering and Design Services.** It will award each contract, or sub-contract for program management, construction management, planning studies, feasibility studies, architectural services, preliminary engineering, design, engineering, surveying, mapping or related services with respect to the project in the same manner as a contract for architectural and engineering services is negotiated under Title IX of the Federal Property and Administrative Services Act of 1949 or an equivalent qualifications-based requirement **prescribed** for or by the sponsor of the airport.
 33. **Foreign Market Restrictions.** It will not allow funds provided under this grant to be used to fund any project which uses any product or service of a foreign country during the period in which such foreign country is listed by the United States Trade Representative as denying fair and equitable market opportunities for products and suppliers of the United States in procurement and construction.
 34. **Policies, Standards, and Specifications.** It will carry out the project in accordance with policies, standards, and specifications approved by the Secretary including but not limited to the advisory circulars listed in the Current FAA Advisory Circulars for AIP projects, dated _____ (the latest approved version as of this grant offer) and included in this grant, and in accordance with applicable state policies, standards, and specifications approved by the Secretary.
 35. **Relocation and Real Property Acquisition.** (1) It will be guided in acquiring real property, to the greatest extent practicable under State law, by the land acquisition policies in Subpart B of 49 CFR Part 24 and will pay or reimburse property owners for necessary expenses as specified in Subpart B. (2) It will provide a relocation assistance program offering the services described in Subpart C and fair and reasonable relocation payments and assistance to displaced persons as required in Subpart D and E of 49 CFR Part 24. (3) It will make available within a reasonable period of time prior to displacement, comparable replacement dwellings to displaced persons in accordance with Subpart E of 49 CFR Part 24.
 36. **Access By Intercity Buses.** The airport owner or operator will permit, to the maximum extent practicable, intercity buses or other modes of transportation to

have access to the airport; however, it has no obligation to fund special facilities for intercity buses or for other modes of transportation.

- 37. Disadvantaged Business Enterprises.** The recipient shall not discriminate on the basis of race, color, national origin or sex in the award and performance of any DOT-assisted contract or in the administration of its DBE program or the requirements of 49 CFR Part 26. The Recipient shall take all necessary and reasonable steps under 49 CFR Part 26 to ensure non discrimination in the award and administration of DOT-assisted contracts. The recipient's DBE program, as required by 49 CFR Part 26, and as approved by DOT, is incorporated by reference in this agreement. Implementation of this program is a legal obligation and failure to carry out its terms shall be treated as a violation of this agreement. Upon notification to the recipient of its failure to carry out its approved program, the Department may impose sanctions as provided for under Part 26 and may, in appropriate cases, refer the matter for enforcement under 18 U.S.C. 1001 and/or the Program Fraud Civil Remedies Act of 1986 (31 U.S.C. 3801).
- 38. Hangar Construction.** If the airport owner or operator and a person who owns an aircraft agree that a hangar is to be constructed at the airport for the aircraft at the aircraft owner's expense, the airport owner or operator will grant to the aircraft owner for the hangar a long term lease that is subject to such terms and conditions on the hangar as the airport owner or operator may impose.
- 39. Competitive Access.**
- a. If the airport owner or operator of a medium or large hub airport (as defined in section 47102 of title 49, U.S.C.) has been unable to accommodate one or more requests by an air carrier for access to gates or other facilities at that airport in order to allow the air carrier to provide service to the airport or to expand service at the airport, the airport owner or operator shall transmit a report to the Secretary that-
 - 1) Describes the requests;
 - 2) Provides an explanation as to why the requests could not be accommodated; and
 - 3) Provides a time frame within which, if any, the airport will be able to accommodate the requests.
 - b. Such report shall be due on either February 1 or August 1 of each year if the airport has been unable to accommodate the request(s) in the six month period prior to the applicable due date.

