

AIRPORT BUSINESS PLAN

Groton-New London 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 Groton-New London Airport (GON) 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

Groton-New London Airport is a public-use, publically owned General Aviation (GA) airport on 489 acres, located in Groton, in the county of New London and is situated in the Mystic Region, a popular area for visitors. The Airport consists of two asphalt runways and supporting infrastructure that includes a taxiway system, aircraft parking aprons, hangar facilities, an instrument landing system, air traffic control tower, vehicle parking, and numerous airport tenant facilities.

Designated as a GA airport in the FAA's National Plan of Integrated Airport Systems (NPIAS), Groton's role is to serve GA, corporate business, and tourist related demand in southeastern Connecticut.

Existing Airport Characteristics

To a large degree, an airport's characteristics are directly related to its ability to achieve its mission which for Groton-New London 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.



GON has supported commercial airline operations in the past, but in the last decade commercial passenger traffic has ceased, and by and large, corporate shuttle and GA activity has dominated the downward trending operational counts. In 2001, total operations exceeded 75,000, and in 2010 the counts just surpassed 38,000. Consequently, the Airport has experienced a fluctuation on the revenues and expenses of the baseline financial data with the FY10-11 data reporting a deficit of \$285,000.

The Airport is in the process of completing a 20-year master plan update for the facility that is expected to be complete in late 2012.

Airport Market Area

For the purpose of this business plan, Groton-New London's market area is comprised of 15 airports in the surrounding area that are comparable in size, function, or service level. In broader terms, Groton-New London's market area includes the surrounding airports from which Groton-New London draws business from and vice versa.

There are a total of 996 based aircraft within the market area of Groton-New London Airport and the full business plan provides a comparison of based aircraft and operations data between Groton-New London 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 Groton- New London 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 Groton-New London Airport was conducted on December 14, 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 Groton-New London 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 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.

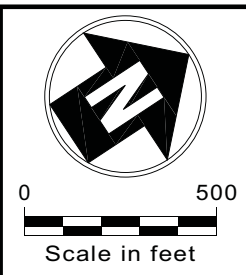
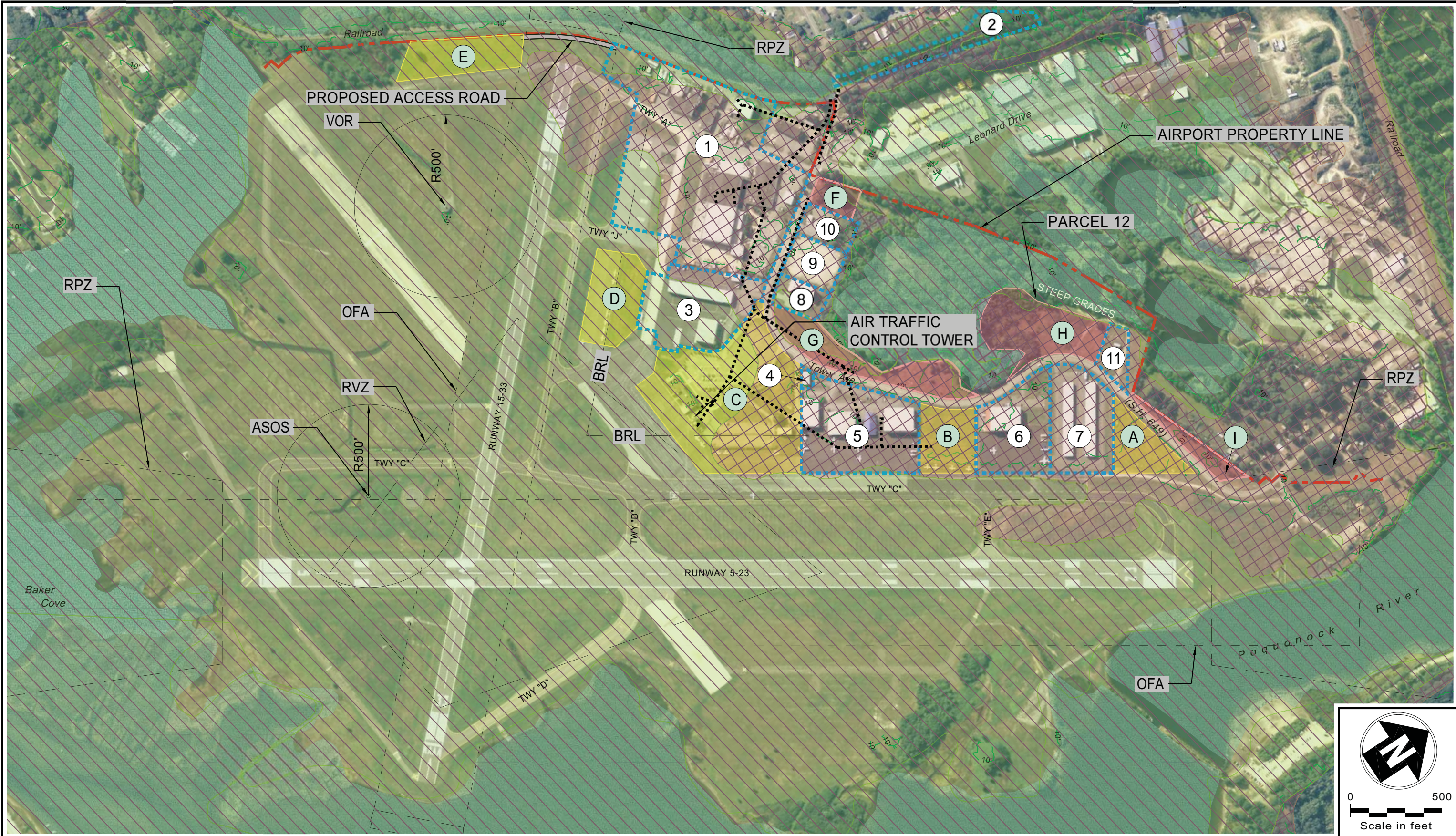
Several factors were used to assess each parcel for its development potential. These factors are discussed in depth in the report, and include: FAA Airport Design Standards; FAR Part 77 (Obstructions to navigation); Federal obligations; Site topography; Utility availability or constraints (e.g., buried gas lines); Ground and airside access; Compatible land use; and Environmental considerations. The summary figure of Lease Opportunities and Constraints for GON 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 Groton-New London 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
	NON-AVIATION DEVELOPMENT	1 EXISTING PROPERTY LEASE	EXISTING LEASE LINE
	NOT READILY DEVELOPABLE	GROUND CONTOUR	APPROX. WATER LINE
	WETLANDS	FLOODPLAINS	

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

FIGURE 5-2

CT Airport Business Plan - Groton-New London Airport (GON)



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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 GON 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 Groton-New London Airport is presented below as well as the associated tax revenues.

Overview Economic Contribution, 2010

	New London County			Connecticut		
	Jobs	Labor Income (\$000s)	Output (\$000s)	Jobs	Labor Income (\$000s)	Output (\$000s)
On-Airport Jobs	415*	\$31,590	\$57,282	415	\$31,590	\$57,282
Operations and Maintenance Spending	5	\$242	\$661	6	\$296	\$813
Capital Spending	81	\$4,159	\$9,622	86	\$4,401	\$10,283
Airport Tenant Spending	256	\$11,963	\$31,408	326	\$16,190	\$43,284
Visitor Spending	70	\$2,319	\$6,791	76	\$2,705	\$7,873
Total	827	\$50,274	\$105,763	909	\$55,183	\$119,534

*Note: *Does not include the 260 part-time National Guardsmen*

Overview Connecticut Tax Revenues

Tax Type	(\$000s)
Personal Income Tax	\$2,598
Sales Tax	\$1,074
Corporate Income Tax	\$211
Total	\$3,883

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 Groton-New London 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

	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



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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.

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

Recommendation	Priority	Impact
System Wide Recommendations		
Complete the transition of the airports from ConnDOT to the Authority as soon as possible	In-progress	Efficiency in Governance
New or revised position, centralized role overseeing development opportunities at the airports	Immediate	Coordinated and Focused Efforts
Improve and shorten lease development process. This should be completed prior to soliciting for any airport development	Immediate	Reduce loss of development opportunities
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
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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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
Maximize participation with industry association marketing and partnerships	On-going	Increase airport activity
Establish Statewide Aviation Group	Mid-term < 3 years	Increase aviation awareness in CT
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 B, C, and D	Mid-term < 3 years	Revenue increase
Implement proposed rates and charges	Near-term < 1 year	Revenue increase
Review and implement recommendations for Terminal Area development	Mid-term < 3 years	Potential for revenue increase
Actively pursue development needs of the Army National Guard	Near-term < 1 year	Revenue increase
Actively pursue development needs of existing tenants	On-going	Increased understanding of tenant needs, revenue increase
Continue active local marketing and outreach	On-going	Increase airport activity and aviation awareness
Continue to pursue an on-airport restaurant	On-going	Increase airport activity and revenue
Marketing of the airport to niche markets including joint marketing with FBOs, specific shuttle services	On-going	Increase airport activity and revenue
Consideration should be given to change the Airport name to make a connection with its geographic location. An example of <i>Southeastern Connecticut Regional Airport</i> was suggested	Mid-term < 3 years	Increase airport activity and awareness



1.0 INTRODUCTION

The primary objective of this business plan for the Groton-New London Airport (GON) 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.

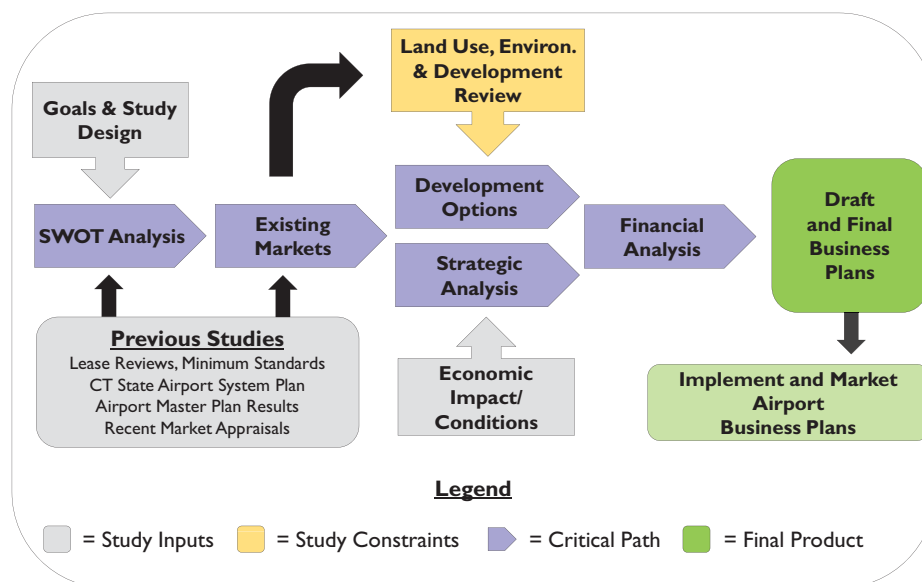


1.1 Business Plan Process

In order to meet the objective of this plan and ensure that it examines the entire field of airport issues at Groton-New London, 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

Groton-New London Airport is a public-use, publically owned General Aviation (GA) airport on 489 acres, located in Groton, in the county of New London and is situated in the Mystic Region, a popular area for visitors. The Airport consists of two asphalt runways and supporting infrastructure that includes a taxiway system, aircraft parking aprons, hangar facilities, an instrument landing system, air traffic control tower, vehicle parking, and numerous airport tenant facilities. Although most aircraft operations at the Airport include that of GA aircraft such as corporate business and single and multi-engine aircraft, the Airport is also home to the Army National Guard's 1109th Theater Aviation Sustainment Maintenance Group (TASMG) who assists in deployment and redeployment, and provides technical assistance, in support of Army aviation which provides for a considerable amount of military operations as well.

Designated as a General Aviation (GA) airport in the FAA's National Plan of Integrated Airport Systems (NPIAS), Groton's role is to serve GA, corporate business, and tourist related demand in southeastern Connecticut. In order to meet this demand, the Airport provides infrastructure and aeronautical support facilities for corporate jets, and multi

and single engine aircraft operators. This includes aircraft flight instruction, maintenance, fuel, aircraft storage, and support facilities. Since 1984, GON has operated under Part 139 of the Federal Aviation Regulations which governs the operation of airports with air carrier service which the Airport had until 2004. GON currently holds what is referred to as a Limited Airport Operating Certificate or AOC, since the Airport maintains Part 139 which allows for unscheduled large air carrier aircraft service.

Dependent upon the type of activities at an airport, the population, geography, and transportation infrastructure of a region is what makes up an airport's service area. Shown in Figure 1-2, the service area of Groton-New London is consistent with the Airport's Master Plan that was completed in 1999, and suggests that people using GON include those within a 30 minute drive time from the Airport. It encompasses much of southeast Connecticut and a small portion of southwest Rhode Island. The Airport is located within the Town of Groton's zoning boundaries and is zoned light industrial. The Airport is located within the Connecticut Coastal Area Management (CAM) boundary and is subject to specific development guidelines.

Figure 1-2: Groton-New London 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 Groton-New London is to provide an efficient, effective, convenient, and safe aviation facility. This section and associated subsections identify the existing characteristics of Groton-New London 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

Groton-New London Airport has two paved runways. The primary runway (5/23) is 5,000 feet long by 150 feet wide, while the secondary runway (15/33) is 4,000 feet long by 100 feet wide. The taxiway system at GON includes eight taxiways that provide access to and from each runway and landside facilities. This includes a full parallel taxiway that serves Runway 5/23 and a partial parallel taxiway to Runway 15/33. Last inspected by the FAA in May of 2011, the runway pavements were reported to be in good condition. Recently, the Airport installed EMAS (engineered materials arresting system) beds at both ends of the primary runway to meet runway safety standards set by the FAA.

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, GON is equipped with various NAVAIDS and airfield lighting equipment. Runway 5 is equipped with a 1,400 foot medium intensity approach lighting system with runway alignment indicator lights, and a four light, Precision Approach Path Indicator (PAPI). A four box Visual Approach Slope Indicator (VASI) and Runway End Identifier Lights (REILs) are installed on Runway 23 while Runway 33 is equipped with a PAPI and REILs. Additionally, high intensity runway edge lights (HIRLs) are installed on both runways.

The Airport also has an Air Traffic Control Tower (ATCT) equipped with a rotating beacon. Standard arrival procedures (Stars) are available for the Airport and are regularly used by used by Air Traffic Control.

ILS, GPS and VOR Instrument approach procedures are available for Runway 5, while a GPS and VOR approach is available for Runway 23. A GPS approach is also available for Runway 33.



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Additionally, GON is equipped with weather reporting instrumentation in the form of an Automated Surface Observation System (ASOS) designed to support aviation activities by providing weather forecasting information, and a Stand Alone Weather Station (SAWS) which can be used as ASOS backup, and measures the critical parameters of: wind speed and direction, gust, altimeter setting, dew point, air temperature, and relative humidity at the Airport.

2.2 Existing Airport Tenants

Groton-New London 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. Detailed descriptions for each tenant can be found below and include:

- ➔ Army National Guard
- ➔ Avis Rent A Car
- ➔ Civil Air Patrol (CAP)
- ➔ Coastal Air/Action Multi Ratings
- ➔ Columbia Air Services
- ➔ Lanmar Aviation
- ➔ Midwest ATC Services(Air Traffic Control Tower)
- ➔ Survival Systems

1109th Army National Guard Helicopter Repair Facility (TASMG)

The 1109th Theater Aviation Sustainment Maintenance Group (TASMG) as an aviation unit is located at GON and is one of only four facilities of its type in the United States Army and Army National Guard. Its day-to-day mission is to provide limited depot level maintenance and back-up aviation intermediate maintenance (AVIM) to Army National Guard aviation facilities in 14 northeastern states including 23 Army Aviation Support Facilities and approximately 500 aircraft. The repairs performed by the 1109th TASMG on these aircraft include airframe and component repair performed on site at the Airport.



Avis Rent A Car counter at GON

Avis Rent A Car

Located within the Airport terminal building, Avis Rent A Car provides rental car services to airport visitors.

Coastal Air Inc. and Action Multi Ratings

Coastal Air Inc., and Action Multi Ratings, located in the same facility at the Groton-New London Airport, offer pilot training by certified flight instructors and also provide small aircraft rental services.



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Columbia Air Services

Columbia Air Services is a fixed based operator (FBO) offering a full range of aviation services including aircraft sales and aircraft maintenance and management at the Airport.



Columbia Air Services

Lanmar Aviation

Lanmar Aviation is another fixed based operator at GON. They offer T hangar and jetpod aircraft storage as well as, fuel, maintenance, avionics, and management services to based and transient aircraft. Other fueling services include support of all Government operations on the field, primarily to the Army National Guard.



Lanmar Aviation

Midwest Air Traffic Control (ATC) Services

Midwest ATC provides contracted air traffic control services.



Air Traffic Control Tower



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Survival Systems USA, Inc.

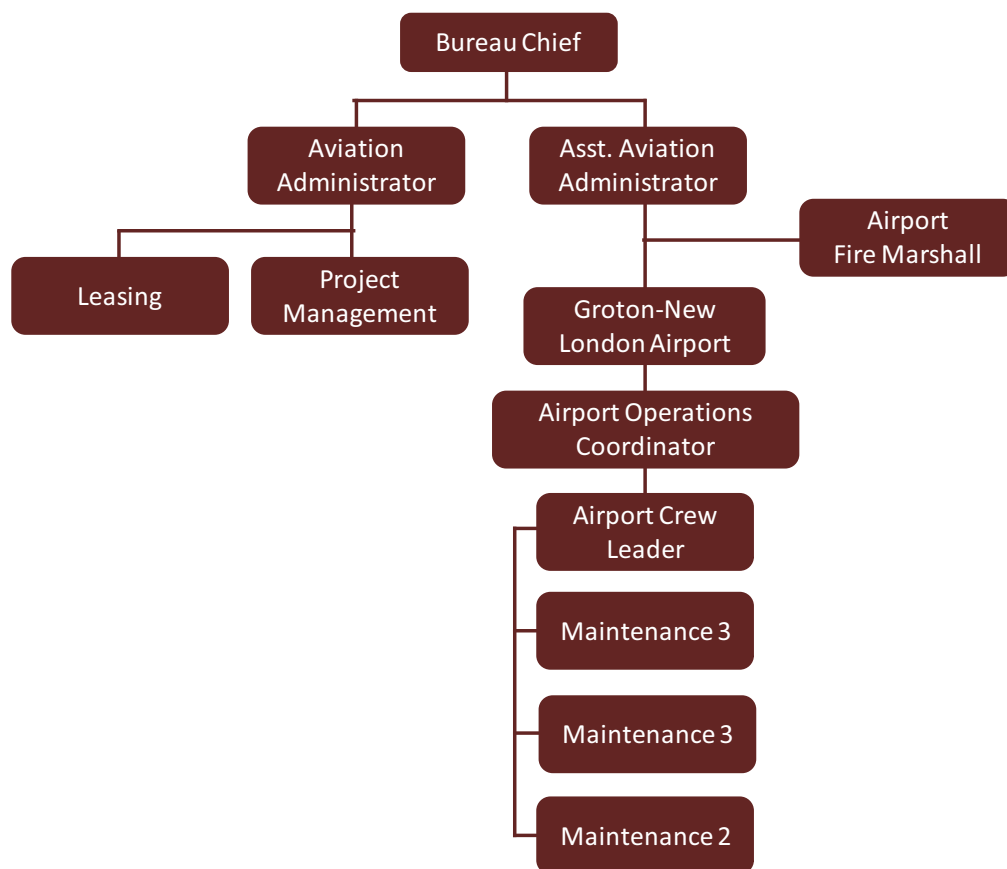
Survival Systems USA, Inc.

Specializing in safety and survival education, Survival Systems USA, Inc. provides underwater egress training and sea survival techniques. The Groton-New London Airport serves as the company's North American headquarters.

2.3 Management Structure

Groton-New London 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 in Figure 2-1.

Figure 2-1: Groton-New London 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 at Groton-New London.

Figure 2-2: Groton-New London Historical Based Aircraft & Operations

Year	Air Carrier Operations	Air Taxi Operations	Total Operations	Based Single Engine	Based Multi Engine	Based Jet	Based Helicopter	Total Based Aircraft
2001	6	3,080	75,579	N/A	N/A	N/A	N/A	N/A
2002	3	2,776	69,528	N/A	N/A	N/A	N/A	N/A
2003	4	3,228	61,461	N/A	N/A	N/A	N/A	N/A
2004	0	1,851	66,156	N/A	N/A	N/A	N/A	N/A
2005	4	1,988	57,921	23	6	3	3	35
2006	2	1,853	55,417	30	5	7	0	42
2007	0	1,899	51,960	23	7	8	1	39
2008	2	1,548	43,467	39	12	11	5	67
2009	5	1,239	38,735	38	7	7	1	53
2010	2	1,137	38,237	39	7	8	2	56

*Source: Air Traffic Activity System (ATADS) & ConnDOT
Prepared: March 2011*

Before 2000, the Airport underwent renovations to update the passenger terminal which at that time accommodated a single commercial operator (US Airways Express), two flight schools, one charter airline, and rental car companies. The majority of passengers on US Airways were corporate and military (US navy sub school sailors from Groton, and Coast Guard cadets and officers from New London). Both of these local segments of the GON passenger base now fly predominately to and from PVD.

In addition to US Airways, below are the operators that account for 2001-2010 air taxi operations listed on Figure 2-2.

Two companies initiated corporate air shuttles at GON prior to US Airways Express' departure in 2003:

One was General Dynamics/Electric Boat who continues their flights today carrying an average of 10,000+ passengers annually on the B-1900 during weekdays. General



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Dynamics has based an aircraft at GON since 1988 and has operated the shuttle since 2000.

- ➔ Pfizer was the other corporate shuttle which flew from 2003 to 2008 conducting two roundtrips each day Sunday to Friday averaging approximately 28 passengers per flight on the Embraer 135.

From 2007-2009, Mohegan Sun resort and casinos, owned and operated by the Mohegan Tribe of Connecticut, operated a year-round once daily charter air shuttle, **Sun Skies**, for entertainment customers Wednesdays thru Sundays. The average passenger loads were 20-24 each way on the Embraer 120.

From 2003-2004, a company operating under the name of Pan American Clipper Connection, briefly operated Monday and Friday flights for the public with JetStream 31 aircraft. Passenger loads were light.

From 2005-2006, Voyageur Airways, a regional sized Canadian airline, operated 48 passenger De Havilland Dash 7 aircraft, from Montreal to GON, for long weekend visitors to the CT casinos. There was one arrival each Friday and one departure each Sunday for a total of 5 trips. Typically these charter flights were full.

Military flight operations at GON historically have encompassed the 1109th ARNG with one notable exception. The U.S. Coast Guard (USCG) International Ice Patrol, whose headquarters are located in New London, CT, conducts its ice reconnaissance detachment flights at the Airport. The flight season schedule begins in February and ends in July, resulting in monthly landing and departure of a military C-130 aircraft for enplaning and deplaning USCG personnel and equipment. Other military operations usually involve VIP passengers for the U.S. Naval Submarine Base in Groton and the U.S. Coast Guard Academy in New London.

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

<i>Study/Plan/Project</i>	<i>Year Conducted</i>
Airport Master Plan Update	In Progress
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 Groton New-London Airport, it is necessary to examine historical airport revenue and expense data. Baseline financial information serves as a 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 2005-FY 2010 and is shown in Figure 2-4.

Figure 2-4: Historical Revenue and Expenses

<i>Groton-New London 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	\$668,543	\$548,372	\$461,184	\$454,722	\$513,759
Expenses					
Personnel	\$409,378	\$469,926	\$398,247	\$284,123	\$239,961
Overtime	\$113,708	\$113,434	\$125,869	\$92,118	\$113,928
Fringe	-	-	290,378	\$233,666	\$227,331
Other Expenses	\$80,425	\$70,581	\$80,035	\$88,637	\$88,282
Building Expense	\$155,279	\$143,963	\$145,742	\$150,523	\$129,264
Total Expenses	\$758,790	\$797,904	\$1,040,271	\$849,067	\$798,766
Operating Surplus/Deficit	(90,247)	(249,532)	(579,087)	(394,345)	(285,007)

*Source: ConnDOT
Prepared: December 2011*



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3.0 AIRPORT MARKET AREA

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

- ➔ Block Island, RI (BID);
- ➔ Chester Airport, CT (SNC);
- ➔ Danielson Airport, CT (LZD);
- ➔ Goodspeed Airport, CT (42B);
- ➔ Hartford-Brainard Airport, CT (HFD);
- ➔ Meriden Markham Municipal Airport, CT (MMK);
- ➔ New Bedford Regional Airport, MA (EWB);
- ➔ Newport State Airport, RI (UUU);
- ➔ North Central State Airport, RI (SFZ);
- ➔ Quonset State Airport, RI (OQU);
- ➔ Richmond Airport, RI (08R);
- ➔ T.F. Green Airport, RI (PVD);
- ➔ Tweed-New Haven Airport, CT (HVN);
- ➔ Westerly State Airport, RI (WST); and
- ➔ Windham Airport, CT (IJD);

There are a total of 996 based aircraft within the market area of Groton-New London Airport. Figure 3-1 provides a comparison of based aircraft and operations data between Groton-New London 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.



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

Airport	ID	State	Primary RWY (L x W)	Secondary RWY (L x W)	SE	Based Aircraft			General Aviation Operations* (est.)	Control Tower
						ME	Jet	Total		
Groton-New London	GON	CT	5,000' X 150'	4,000' x 100'	39	7	8	54	34,892	Yes
Block Island State	BID	RI	2,502' X 100'	-	3	1	0	4	16,468	No
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
Goodspeed	42B	CT	2,120' X 50'	Water RWY	29	1	0	30	6,230	No
Hartford-Brainard	HFD	CT	4,417' X 150'	2314' x 71'	144	11	2	157	70,946	Yes
Meriden Markham Municipal	MMK	CT	3,100' x 75'	-	63	2	0	65	16,208	No
New Bedford Regional	EWB	MA	4,977' X 150'	5,000' x 150'	101	15	4	120	66,238	Yes
Newport State	UUU	RI	2,999' X 75'	2,623' x 75'	28	4	0	32	25,773	No
North Central State	SFZ	RI	5,000' X 100'	3,210' x 75'	79	8	0	87	21,554	No
Quonset State	OQU	RI	7,504' X 150'	4,000' x 75'	19	1	0	20	23,586	Yes
Richmond	08R	CT	2,129' X 30'	-	17	0	0	17	7,400	No
T.F. Green	PVD	RI	7,166' X 150'	6,081' x 150'	55	4	12	71	39,239	Yes
Tweed-New Haven	HVN	CT	5,600' X 150'	3,626' x 100'	52	5	1	58	35,084	Yes
Westerly State	WST	RI	4,010' x 100'	3,960' x 75'	46	8	0	54	23,184	No
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



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Figure 3-2: Market Area Service 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>
Groton-New London	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Block Island State	No	No	No	No	Yes	No	No	No	Yes	Yes	No
Chester	Yes	Yes	Yes	No	Yes	Yes	Yes	Yes	Yes	Yes	No
Danielson	Yes	No	Yes	No	Yes	Yes	Yes	Yes	Yes	Yes	No
Goodspeed	No	No	No	No	Yes	No	Yes	Yes	Yes	No	No
Hartford-Brainard	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	No
Meriden Markham Municipal	Yes	No	Yes	No	Yes	No	Yes	Yes	Yes	Yes	No
New Bedford Regional	Yes	Yes	Yes	No	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Newport State	Yes	No	Yes	No	Yes	Yes	Yes	Yes	Yes	Yes	No
North Central State	Yes	Yes	Yes	No	Yes	Yes	Yes	Yes	Yes	Yes	No
Quonset State	Yes	Yes	No	No	Yes	No	Yes	Yes	No	Yes	Yes
Richmond	Yes	No	Yes	No	Yes	Yes	Yes	No	No	No	No
T.F. Green	Yes	Yes	Yes	No	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Tweed-New Haven	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Westerly State	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	No
Windham	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	No

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



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Figure 3-3: GON Airport Advantages and Disadvantages

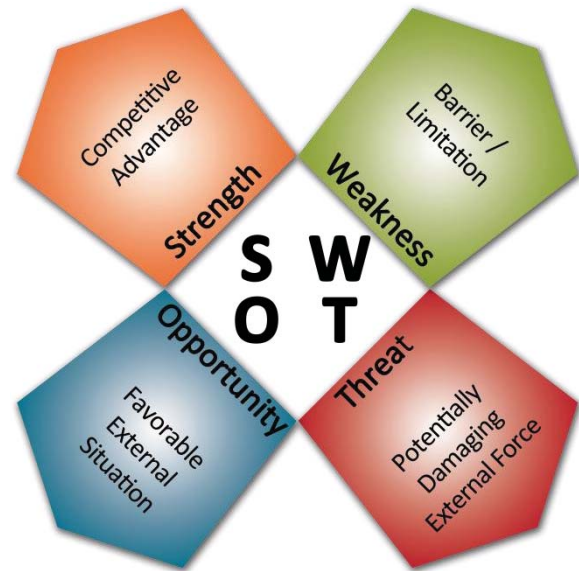
<i>Advantage</i>	<i>Disadvantage</i>
Provides all 11 services offered by other market area airports	Close proximity between Bradley and T.F. Green has limited the Airport's ability to retain scheduled commercial service
One of 5 out of 16 market area airports with an ILS	No airport restaurant
One of 5 out of 16 market area airports with avionics repair services	
4th longest runway of all airports compared with other market area airports	
Close proximity to casinos and tourist destinations	
The Airport has the ability to accommodate more based aircraft compared to other market airports	
One of 6 out of 16 market area airports with a Control Tower	
Ability to provide commercial service to niche markets (islands)	

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



4.0 SWOT ANALYSIS FOR GROTON-NEW LONDON AIRPORT

Prior to the development of alternatives and recommendations regarding the operational and economic development opportunities at Groton-New London 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 are considered in this plan's strategic recommendations and will help the Airport capitalize on their strengths and identify potential opportunities. Additionally, this process 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 the entire group. 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 the Airport Operator in optimizing the Airport's assets and achieving the Operator'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 Groton-New London 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 Groton New London Airport was conducted on December 14, 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. Air carrier service is heavily reliant on the length of the runway; GON has a 5,000-foot runway which limits the type of air carrier service.
2. The Airport currently has an Instrument Landing System (ILS) which will help attract air carrier service.
3. The Airport maintains its Part 139 certificate even though it is not currently required.
4. The Airport has three precision approaches to its runways and an operating control tower.
5. Currently there is free parking for Airport patrons.
6. Cost of doing business at GON is generally less expensive than at other airports in the region.
7. GON has a fully functional terminal building.
8. The Airport is in close proximity to numerous tourist attractions, including two resort casino complexes which are among some of the most frequented visitor locations in the State.
9. Property development adjacent to the Airport is limited due to bodies of water.
10. MALSR approach lighting system.
11. Cost of doing business- Could it be lower?
12. Seasonal community
13. Military activity. Over 275 service people based on the Airport.
14. Military technical capabilities.
15. Proximity to other modes of transportation (high speed rail and ferry service), and bus service.
16. Charter services are available.
17. Military culture and links to the community.
18. Population density surrounding the Airport.

Weaknesses

1. Increasing cost of maintaining a Part 139 certificate.
2. Government ownership is a hindrance because of a lack of ability to react to external forces (seen as too much involvement).
3. As it relates to air carrier service at GON, the location of the Airport is a weakness since T.F. Green Airport in Rhode Island is in close proximity and offers frequent air carrier service to many locations.
4. Constrained by the water, existing runways are difficult to extend.
5. Wildlife primarily bird activity causes safety problems.



6. Migratory birds in the vicinity of the Airport.
7. Lack of a marketing budget.
8. Local access roads limit the ingress and egress of vehicular traffic.
9. Entrance to the Airport is limited.
10. Policy objective of the Airport at the State level.
11. There needs to be a written funded plan to market the Airport.
12. The Groton area is more of a seasonal area with spring and summer being the heaviest seasons; fall is starting to pick up.
13. Loss of military travelers to other Airports with more destinations.
14. Property exists for military expansion.
15. Current military space is limited and cannot increase capabilities or capacity.
16. Existing incentive to attract tenants and business is not working.
17. Mechanism to approve business deals and addressing opportunities is slow.
18. GA operations are trending downward.
19. Lack of a restaurant.
20. Lack of air carrier service that could potentially support the local large businesses in the region (e.g. Pfizer, General Dynamics, military bases, electric boat, and the casinos).
21. Lack of infrastructure in and around the Airport.
22. Maintaining "Critical volume" of aircraft operations through increasing GA traffic, air carrier service may not "save" the Airport.

Opportunities

1. Work with smaller regional air carriers. Requires buy in from the community in order for it to work.
2. Nantucket/Martha's Vineyard market.
3. Promote Airport (NBAA, Jump Start, etc.).
4. More involvement from the community; increase Airport exposure in the community.
5. Proximity to the second largest casino in the United States.
6. New State Administration with a focus on the GA airports.
7. Corporate shuttle activity.
8. Destination and potential population market.
9. The Mystic area is a great destination location and there are so many entities that are spending money to promote the Airport in conjunction with the marketing campaigns that are currently going on.
10. Explore the possibility of a system of airports.
11. The Air Guard is seeking to expand its operation and facility. Adding air services would make it convenient for the Guard to bring members in and out of the community.
12. State of Connecticut Army National Guard (ARNG) 1109th Theater Aviation Sustainment Maintenance Group (TASMG) location potential. From 200,000 to 400,000 square feet.
13. Military non-airside expansion.
14. Proximity to other modes of transportation (ferry and rail).
15. Try to attract niche market air carriers.
16. Need State policy to support Airport.



17. Cargo business development (small package sector).
18. Increase Airport foot traffic related to flight training.
19. Military training funding.
20. Form Airport association to assist with the promotion and visioning of the Airport; act as one voice for the pilot community.
21. Investigate the local culinary school operating the restaurant.
22. Flight catering is needed.
23. Surrounding education needs.
24. Air shows, open houses, and other events.
25. Guard members bring money into the local area and used to use the Airport restaurant when it was available.
26. Foreign Trade Zone could be a potential source of revenue and business.
27. Look to solicit other restaurants that work out of the marina to operate the Airport restaurant; they may be able to apply a similar business model that they use at the marina.

Threats (Constraints)

1. The economy.
2. Marketing of the Airport.
3. Not enough community involvement with the Airport.
4. Commuter rail service from the shoreline east (Providence to Westerly)
5. A lack of airline service to support corporate market. Electric Boat operates four flights per day.
6. The policy of the State to provide subsidies to Tweed-New Haven of approximately \$1.5 million and Bradley International Airport.
7. Loss of passengers to Rhode Island and New York.
8. Involvement and inability of State government to react to business opportunities that are presented in a timely fashion.
9. Fuel prices need to be more competitive.
10. GA pilot pool getting smaller.
11. High cost of insurance for public access to airfield for air shows and other events.
12. Train service to T.F. Green Airport has siphoned off the need for air service at GON.

While the lists of items identified above are not all inclusive, they are generally representative of the Airport stakeholder's points of view.



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 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

The workshop attendees generally had a positive outlook for the Airport. The consensus of the group was that overall; the Airport is well maintained by the State of Connecticut and Airport staff. The group also agreed that there are opportunities that, if capitalized on, could make the airport operating environment more appealing to outside businesses and airlines. One of the primary discussions revolved around the significant military presence at the Airport and within the community. Some of these installations include the U.S. Coast Guard Academy in New London, U.S. Naval Submarine Base and Training School, and the State of Connecticut Army National Guard (ARNG) 1109th Theater Aviation Sustainment Maintenance Group (TASMG) which is located at the Airport. The Army's 1109th TASMG is located on the Airport employs over 275 military members. In addition to this Army site, there are other Coast Guard and Navy installations in the local area with significant military personnel. This population requires frequent travel in and out of the area on military assignments and on personal leave. Having an



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economical and reliable source of commercial air transportation in the area would be of great benefit and convenience to the military travelers and provide GON with a source frequent airport users.

Another key issue among participants was the overall marketing of the Airport. While many of the businesses based on the Airport have mechanisms to market themselves in both the aviation community and surrounding area, many felt that the Airport was unable to market itself properly. The group attributed this weakness to the lack of a marketing budget and suggested that if the appropriate funding were in place, the Airport would have the ability to better market air service and related businesses to the Airport. This type of reasoning is common and in some cases warranted, however the demand for Airport services in any given area is complex and requires more than implementing a multifaceted marketing effort.

In this business planning process the study team evaluated several other key pieces including what attracts the Airport's current users and customers to the Airport and suggest recommendations to attract new business. This may come in the form of adding amenities such as a restaurant, improving infrastructure, or reducing fees. Additionally, the collection and analysis of relevant socio-economic, airport economic and demographic data was assessed to determine the economic impact the Airport has on the community. This helps to further identify some key areas in which the Airport can target potential customers and attract airport based businesses.

Groton-New London Airport is situated in a highly diverse coastal region with an abundant number of attractions, including Mystic Aquarium, Mystic Seaport, and Casinos among others in the seaside area. These attractions make the Airport a good candidate for a "destination airport" where tourists travel to and from the "Greater Mystic Area" from this facility.

Attracting residents from the surrounding communities to experience the services that the Airport offers is critical. A discussion about the lack of an airport restaurant suggested this as a significant drawback of the Airport. It was mentioned that previous airport restaurants lacked the hours and quality food of a successful establishment. The group suggested that a local restaurant with an established clientele opening a location at the Airport would be a workable business opportunity and provide an asset to the Airport.

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



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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 Groton-New London 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.



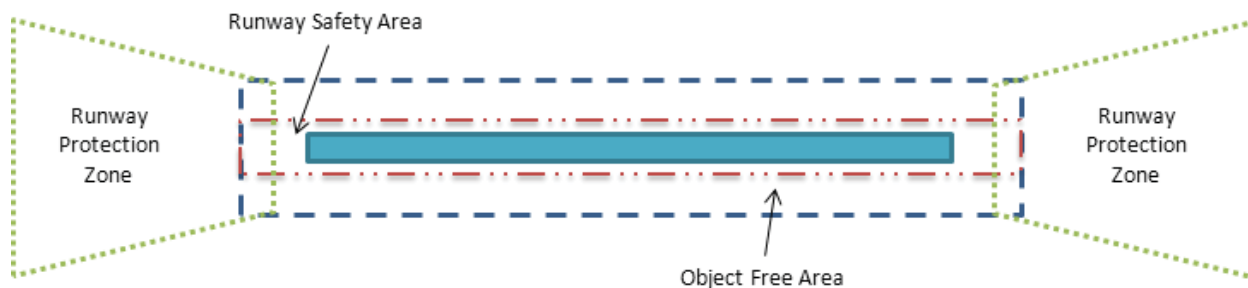
Runway Object Free Area (ROFA)

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

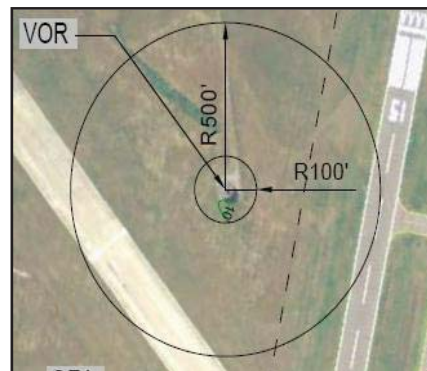


Source: CHA
Prepared: May 2011

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.

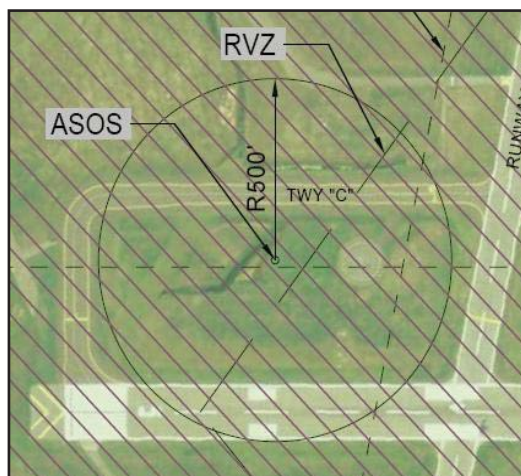
At Groton-New London Airport the VOR is located on the west side of the airfield near the Runway 15 end. Per FAA regulations, no buildings may reside within a clear 500-foot radius area to ensure accuracy of the navigational aid. This restricts the development potential of this area.





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The Automated Surface Observation System (ASOS) wind tower near the Runway 5 end. Per FAA regulations, an accurate sensor reading requires a clear 100-foot radius area in which no buildings may reside. Within 500-feet, any structures should be at least 15-feet below the tower height. The ASOS is not anticipated to affect any potential development.



Source: CHA
Prepared: May 2011

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 Groton-New London 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 is serviced by utilities, including water, sewer, electric, natural gas, and telecommunication to the major facilities on the north side of airport. The conventional hangars and T-hangars have electricity and in some cases, water and telecommunications. Utilities are available to the majority of depicted development sites.

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.

The northwest side of the airfield is accessible via Tower Avenue. Access to the southwest is restricted due to the railroad bordering the airfield. The south and east are not accessible due to the Poquonock River and Baker Cove. As such, it is anticipated that all public access and development locations will be restricted to the northwest side of the Airport along Tower Road. Providing access to other locations of the Airport property is not considered feasible.

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 northwest side of the airfield by parallel taxiways along both runways. Access to the south and east side of the airfield is restrictive due to the lack of vehicle access for tenants.

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.

Although state-owned airport property is not subject to municipal zoning or site plan approval regulations, it is noted that the entire airport property at GON is zoned Industrial which allows



for industrial, warehousing, and manufacturing activities, as well as airports. In addition to state parks and various bodies of water, the land surrounding the Airport consists of residential, commercial, industrial and recreational areas. South of the Airport are the Poquonnock River, Baker Cover, and Fishers Island Sound. To the east is Bluff Point State Park and to the west is the City of Groton which predominately consists of single-family residences. The adjacent property to the north is mainly industrial use and includes a rail line that runs along the west border of the Airport property. Over the last few years, the adjacent industrial business park has seen an increase in tenants. The land further to the north includes many residential, sports and recreation fields, a boat launch, a church, and various schools.

As the airport development locations are concentrated in the northern portion of the property, it is concluded that future facilities will be compatible with the surrounding land use.

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 Energy and Environmental Protection (CT DEEP), not the local municipal wetland commission.

A 2005 biological survey revealed several state-listed plants, birds, and vegetation communities on the property. Birds include the Saltmarsh Sharp-tailed Sparrow, Brown Thrasher, Bobolink, and Savannah Sparrow. Additional reviews, including field surveys and archeological surveys may be necessary prior to any significant development within unpaved areas. Notably, there are underutilized developed areas on airport property that could be redeveloped so as to not disturb additional natural areas. Additionally, a Wildlife Hazard Assessment (WHA) was conducted at the Airport in 2011 which resulted in a Wildlife Hazard Management Plan in 2012.

Floodplains can be detrimental to development, as the property at one point may be flooded and new impervious surfaces increase flooding potential. Due to its low lying and coastal location, much of the Airport is within the floodplain, particularly all of the airfield areas. Fortunately, most areas along Tower Road are above the 100-year flood elevation. For this review, development sites are generally not recommended within the 100-year floodplain. Some exceptions are made where the site would consist of redevelopment of existing facilities.

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. The Airport does contain some prime farmland soils; however, there is no property that is used for agricultural purposes.



5.2 Existing Leases and Recommendations

Existing leases on the Airport property are shown in Figure 5-2. As shown, the majority of tenants have long-term leases with 20 or more years remaining. Lanmar, one of two fixed based operators (FBO) at the Airport currently has a contract with the CT Army National Guard to provide aviation fuel for their fleet of aircraft. Currently, the t-hangars operated by Lanmar are not occupied to capacity and many are rented rather than owned (i.e, as condominiums), as originally intended. With the construction of the t-hangars, the Airport has seen more year round activity since pilots have the option to store their aircraft rather than leaving their aircraft exposed to the elements at a tie-down on the ramp during the winter months. The other FBO, Columbia Air Services has a private terminal building that is capable of providing passenger screening for charter and scheduled air service but is currently underutilized.

Due to the economic benefits it provides, the community generally supports the presence and future expansion of the Army Guard base located at the Airport. In order to comply with new safety requirements and office space demands, the Guard has indicated interest in additional property for expansion. Airport Management is seeking to accommodate their plans.

Figure 5-2 graphically displays the parcels listed in the following tables and identifies relative ground elevation, floodplains, and wetlands. Figure 5-3 lists the existing leases on the Airport property. Figure 5-4 lists the most probable sites to be developed or redeveloped and their recommended use. The property to the south near the Poquonnock River is unlikely to be developed due to the lack of access.

Figure 5-3: Existing Airport Leases

<i>Parcel</i>	<i>Lease</i>	<i>Description</i>	<i>Expiration</i>
1	CT Army National Guard	Hangars & Maintenance	2046
2	CT Army National Guard	Storage Area	2046
3	Lanmar Marine & Aviation	Hangars	2035
4	Columbia Air Services	Fuel Farm	2043
5	Columbia Air Services	Hangars & Apron	2043
6	Lanmar Marine & Aviation	Hangars & Apron	2038
7	Lanmar Marine & Aviation	T-Hangars	2036
8	Survival Systems	Building	2032
9	CT Army National Guard	Parking	2039
10	Avis Rent-a-Car	Wash Bay Building	2010
11	Civil Air Patrol	Office Trailers	2016
12	Groton Utilities	Easement	N/A

*Source: CHA
Prepared: May 2011*

File: V:\PROJECTS\ANY\K2\22337\CADD\FIGURES\22337-GON-5-2.DWG Saved: 1/23/2012 10:31:17 AM Plotted: --- User: Medina, Perry LastSavedBy: 976



LEGEND	AVIATION DEVELOPMENT	A POTENTIAL DEVELOPMENT SITE	AIRPORT PROPERTY LINE		CHW 2139 Silas Deane Highway, Suite 212 • Rocky Hill, CT 06067-2336 Main: (860) 257-4557 • www.chwcompanies.com	POTENTIAL DEVELOPMENT AREAS	PROJECT NO. 22337
	NON-AVIATION DEVELOPMENT	1 EXISTING PROPERTY LEASE	EXISTING LEASE LINE				DATE: JAN. 2012
	NOT READILY DEVELOPABLE	GROUND CONTOUR	APPROX. WATER LINE				FIGURE 5-2
	WETLANDS	FLOODPLAINS					



AIRPORT BUSINESS PLAN

Figure 5-4: Recommended Parcel Usage

<i>Parcel</i>	<i>Current Use</i>	<i>Recommended Use</i>
A	Open Space	Aviation - Hangars
B	Open Space	Aviation - Hangars
C	Terminal, Parking, & Ramp	Aviation – Hangars (Redevelopment)
D	Tie-downs	Tie-downs or Hangars
E	Open Space	National Guard
F	Wooded	National Guard
G	Open Space	Aviation or Non-Aviation Development
H	Open Space	Aviation or Non-Aviation Development
I	Open Space	Aviation or Non-Aviation Development

*Source: CHA
Prepared: May 2011*

Parcel A

Parcel A is a level, 2.2 acre parcel consisting of open space that includes vehicle access along Tower Road. This location is above the 100-year floodplain and is suitable for new private conventional hangars, t-hangars, or a parking apron however; vehicle parking would need to be provided. A minor taxiway extension would be necessary to provide airfield access. Any hangar development in this area should avoid penetrating the transitional surface; otherwise coordination with the FAA would be required. This property contains Prime Farmland Soil, which may require special consideration prior to development due to the Farmland Protection Policy Act. However, no agricultural activities are permitted within this location. No other environmental conditions are of concern on Parcel A.

Parcel B

Parcel B is a well maintained and level, 2.5 acre parcel consisting of open space located above the 100-year floodplain. The area is well suited for aircraft hangars and supporting apron. Vehicle access can be provided along Tower Road, but associated parking would need to be constructed. The six tie-downs in front of the parcel would need to be removed to provide airfield access. Any hangar development in this area should avoid penetrating the transitional surface; otherwise coordination with the FAA would be required. This property contains Prime Farmland Soil, which may require special consideration prior to development due to the Farmland Protection Policy Act. No other environmental conditions are of concern on this parcel.

Parcel C

Parcel C currently encompasses the passenger terminal, main parking lot, and an aircraft ramp that is currently occupied by the flight school's single and multi-engine aircraft. This large 12.5 acre parcel could be redeveloped for a variety of uses, including a redesigned terminal with food and beverage space, a mix of t-hangars, conventional hangars, tie-downs, and vehicle



parking. The specific design would need to consider the Airport's future needs as identified in the ongoing Airport Master Plan. If future air service is a goal, this location is well suited for air passenger service facilities.

The parcel may be subdivided. Any hangar development in this area should avoid penetrating the transitional surface; otherwise coordination with the FAA would be required. Aside from any disposal pavement and building materials upon the redevelopment of the property, no other environmental conditions are of concern. However, note that over half of the parcel, including the existing buildings, is within the 100-year floodplain. As such, this will need to be addressed as part of any redevelopment.

Parcels A, B, and C comprise of over 15 acres of prime aviation development space, with adequate airfield and roadway access. Marketing these parcels to potential developers should be a priority to support airport business development.

Parcel D

At 3.3 acre level site, Parcel D is currently a tie-down ramp for 22 based single-engine aircraft and transient aircraft customers who also utilize the main terminal. Approximately half of the parcel lies within the Airport's 35-foot Building Restriction Line, which limits its use and restricts any vertical development beyond this line closer to the runway. Any hangar development in this area should avoid penetrating the transitional surface; otherwise coordination with the FAA would be required. Additionally, to ensure that the air traffic control tower can maintain visual control of the Runway 15 end, a line of sight assessment would need to be conducted for any proposed vertical development.

Direct vehicle access is not available to this parcel, but tenants may use the main parking lot with pedestrian only access to the parcel. Existing identification and security practices would apply to any new tenants utilizing this parcel. This restriction reduces the development potential of this parcel and the expansion of adjacent parcels. The development of the future terminal area will need to be coordinated with the tenants of this parcel to ensure access no matter its future use.

The parcel could also be leased to the National Guard for additional space or a combination of hangars, ramp, and tie-downs. If utilized by the National Guard, vehicle access could be provided through extension of their existing infrastructure. Airfield access is available, and because improvements would only consist of redevelopment, no environmental conditions are of concern other than the location of the 100-year floodplain, which covers all of Parcel D.

Parcel E

Parcel E is currently a level, open space, without vehicle access. Depicted on Figure 5-3 at 2.9 acres, depending on its use, Parcel E could be expanded. The size is only limited by the railroad tracks to the northeast and the VOR clear area to the southwest. Trees to the west could be



removed. With access from their existing facilities, it is recommended that this parcel be provided for use by the National Guard for low activity equipment storage. An access road would cross through the OFA, which would require a clearance from the control tower at each crossing. As such, this site would not be recommended for a private tenant. If necessary, airfield access would require a taxiway extension or the rehabilitation of existing pavement. Beyond any potential tree clearing and floodplain, no other environmental conditions are of concern. Any utilities for this site would need to be extended from existing infrastructure.

Parcel F

Parcel F is a 0.9 acre, level, wooded parcel that could be used by the National Guard or for non-aviation development. Due its location across from Tower Avenue, airfield access is not available. However, vehicle access is available from Tower Avenue and Leonard Drive. This property contains Prime Farmland Soil, which may require special consideration prior to development due to the Farmland Protection Policy Act. Beyond tree clearing, no other environmental conditions are of concern. An FAA Land Release would be required for non-aviation use.

Parcel G

Parcel G is a level, open space that could be used for non-aviation development or an aviation dependent business that does not require airfield access. Shown at 3.6 acres, this parcel could also be subdivided at the request of a developer. While vehicle access is available from Tower Avenue, airfield access is not available since it is across the road. The shape and limited depth of this land parcel may be prohibitive in providing facilities for parking and storage. This property contains Prime Farmland Soil, which may require special consideration prior to development due to the Farmland Protection Policy Act. The parcel is adjacent to wetlands, and aside from minor tree clearing, no other known environmental impacts are anticipated. Portions of this location are within the 100-year floodplain. An FAA Land Release would be required for non-aviation use.

Parcel H

Parcel H is a 4.3 acre site consisting of fairly level open space with trees and shrubs. The parcel is separate from the airfield side by Tower Avenue and has vehicle access, but no airfield access. This parcel could be used for an aviation dependent business that does not require airfield access or non-aviation development. This property contains Prime Farmland Soil, which may require special consideration prior to development due to the Farmland Protection Policy Act. An FAA Land Release would be required for non-aviation use and any needed utilities would require an extension from existing infrastructure.



Parcel I

Parcel I is a 1.1 acre site that could also be used for non-aviation development or an aviation dependent business that does not require airfield access. Like Parcel H, this parcel has available vehicle access along Tower Avenue but does not have airfield access. An FAA Land Release would be required for non-aviation use. The narrow width of this parcel may be prohibitive in providing facilities for parking and storage. The property contains Prime Farmland Soil, which may require special consideration prior to development due to the Farmland Protection Policy Act. Note that this parcel is adjacent to residential development in the Town of Groton. Although the adjacent homes are located within an industrial zone, a light business use would be more appropriate than industry or use with heavy traffic.

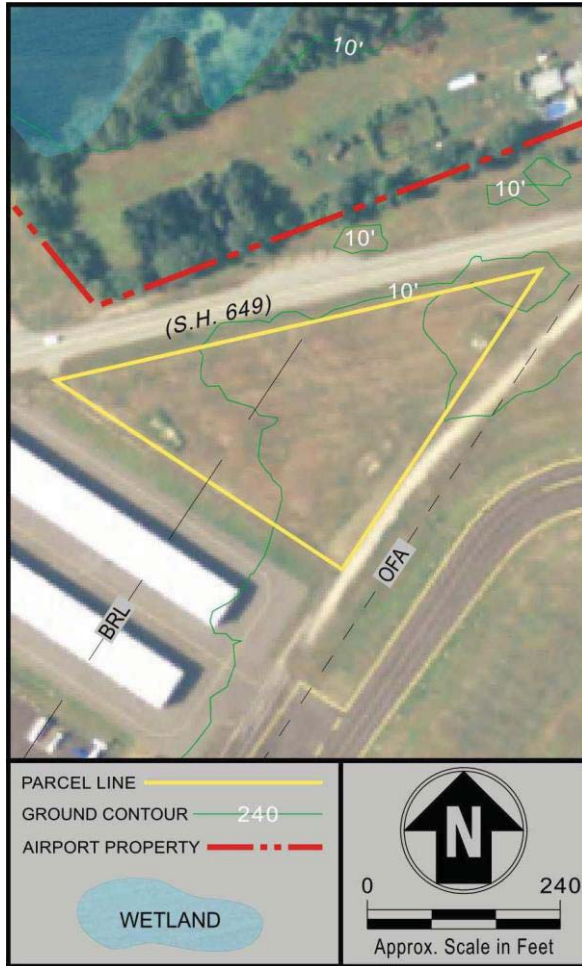
5.3 Opportunities & Constraints Summary

Considering the property characteristics at the Airport, opportunities for outside land developers are somewhat limited but certainly available at GON. Through the use of this section and Figure 5-2 in particular, 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. The following pages provide individual summary sheets for the parcels described herein.

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.



AIRPORT BUSINESS PLAN



Groton-New London Airport Development Parcel A

Location: West of Runway 23 End

Access: Via State Highway 649/Tower Avenue Available

Road Frontage: Approximately 720 Linear Feet

Approximate Area: 2.2 Acres

Predominant Soil Type: Haven and Enfield soils, Portion Prime Farmland Soil

Current Land Use: Open Space

Wetlands Present: None

Floodplains: 500-Year

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 with Taxilane Extension

Zoning: Industrial

Potential Obstruction: Coordinate with FAA if necessary

Comments: None



AIRPORT BUSINESS PLAN



Groton-New London Airport Development Parcel B

Location: West of Runway 23 End

Access: Via State Highway 649 / Tower Avenue

Road Frontage: Approximately 300 Linear Feet

Approximate Area: 2.5 Acres

Predominant Soil Type: Haven and Enfield soils, Portion Prime Farmland Soil

Current Land Use: Open Space

Wetlands Present: None

Floodplains: 500-Year

Vegetation Cover: Approximately 90%

Topography: Relatively Flat

Public Sewer: Extend from Existing Infrastructure

Public Water: Extend from Existing Infrastructure

Electricity: Extend from Existing Infrastructure

Airside Access: Available

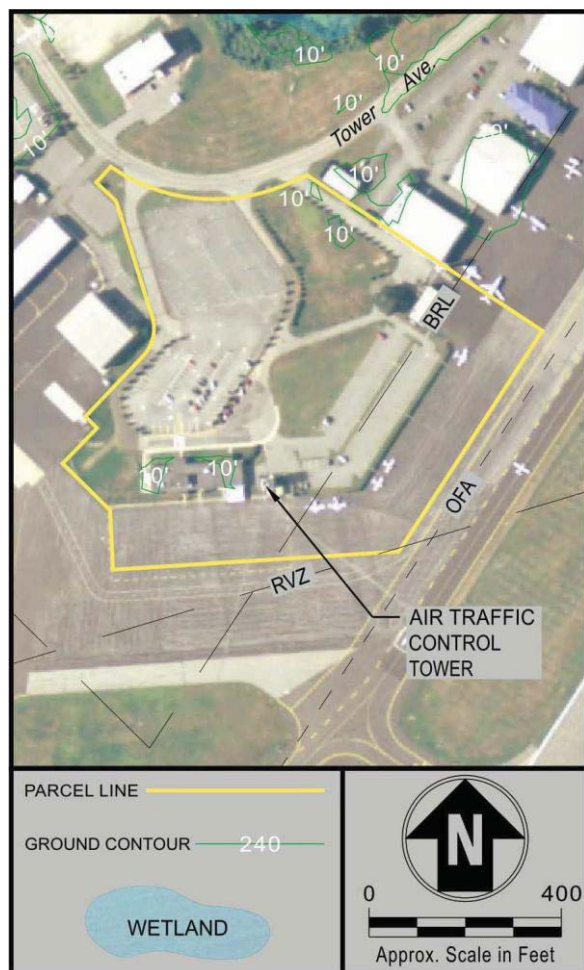
Zoning: Industrial

Potential Obstruction: Coordinate with FAA if necessary

Comments: Development would likely require the removal of existing aircraft tie-down anchors.



AIRPORT BUSINESS PLAN



Groton-New London Airport Development Parcel C

Location: Midfield of Airport Property

Access: Via State Highway 649 / Tower Avenue

Road Frontage: Approximately 400 Linear Feet

Approximate Area: 12.5 Acres, May be Subdivided

Predominant Soil Type: Udorthents-Urban Land Complex

Current Land Use: Terminal with restaurant space, Automobile Parking, & Ramp/Apron and Fire Station and Emergency access road for Fire/EMS.

Wetlands Present: None

Floodplains: 100- & 500-Year

Vegetation Cover: Approximately 15%

Topography: Relatively Flat

Public Sewer: Existing

Public Water: Existing

Electricity: Existing

Airside Access: Available

Zoning: Industrial

Potential Obstruction: Coordinate with FAA if necessary

Comments: None



AIRPORT BUSINESS PLAN



Groton-New London Airport Development Parcel D

Location: North of Runway 15 End

Access: Airfield via Taxiway "H"

Road Frontage: None

Approximate Area: 3.3 Acres

Predominant Soil Type Udorthents-Urban Land Complex

Current Land Use: Based and Transient Aircraft Tiedowns

Wetlands Present: None

Floodplains: 100-Year

Vegetation Cover: Approximately 40%

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: Tower Line of Sight Assessment. Coordinate with FAA if necessary

Comments: None



Groton-New London Airport Development Parcel E

Location: Southwest of Runway 15 End

Access: Restrictive

Road Frontage: None

Approximate Area: 2.9 Acres, May be expanded

Predominant Soil Type: Udorthents-Urban Land Complex

Current Land Use: Open Space

Wetlands Present: None

Floodplains: 100-Year

Vegetation Cover: 100% - No Pavement

Topography: Relatively Flat

Public Sewer: Not readily available

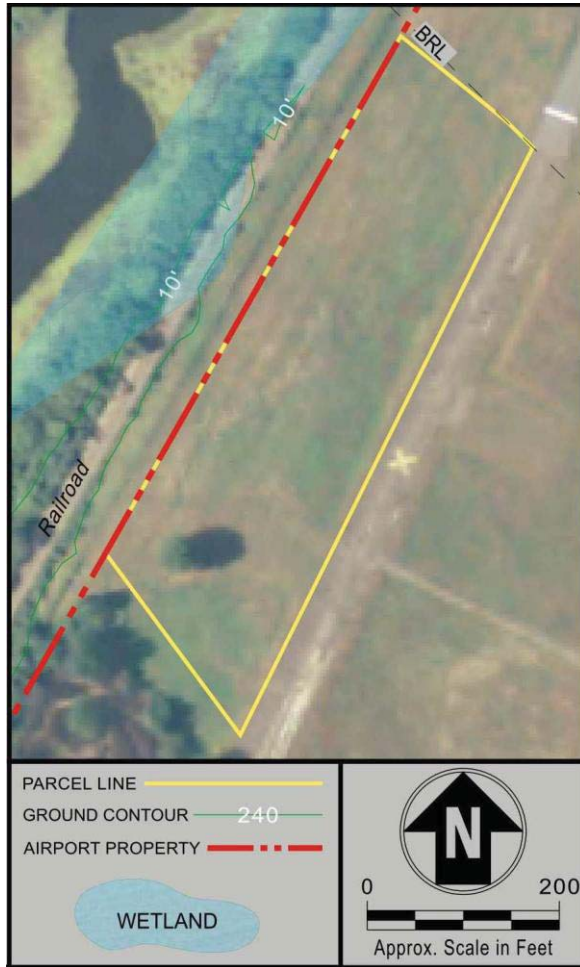
Public Water: Not readily available

Electricity: Not readily available

Airside Access: Available with Taxiway Rehabilitation

Zoning: Industrial

Potential Obstruction: VOR clear area near parcel. Coordinate with FAA if necessary



Comments: Coordination with Tower required to access site.



AIRPORT BUSINESS PLAN



Groton-New London Airport Development Parcel F

Location: East of Runway 15 End

Access: Via State Highway 649 / Tower Avenue

Road Frontage: Approximately 200 Linear Feet

Approximate Area: 0.9 Acres

Predominant Soil Type: Udorthents-Urban
Land Complex

Current Land Use: Wooded

Wetlands Present: None

Floodplains: 500-Year

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: Not Available

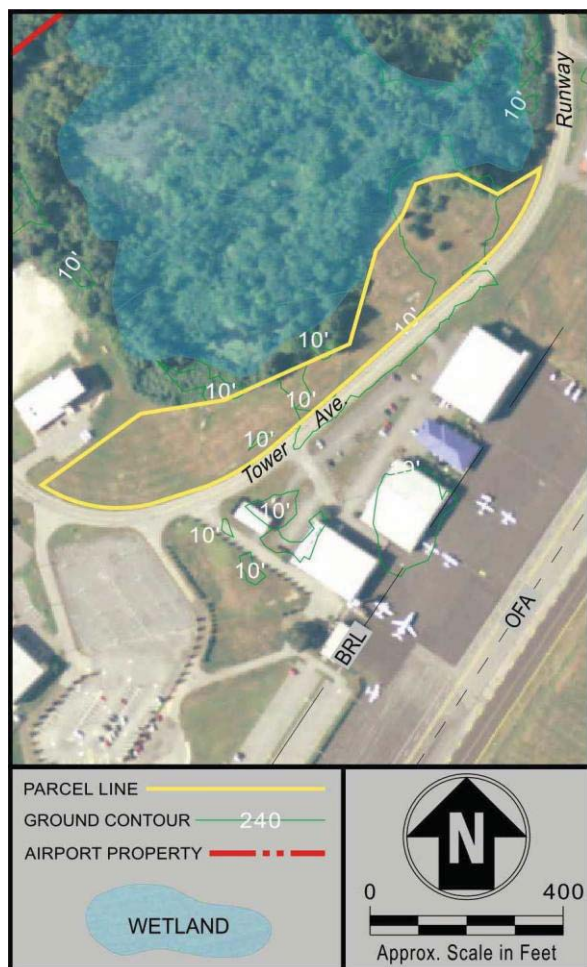
Zoning: Industrial

Potential Obstruction: None

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



AIRPORT BUSINESS PLAN



Groton-New London Airport Development Parcel G

Location: Northwest Airport Property

Access: Via Tower Avenue

Road Frontage: Approximately 1,200 Linear Feet

Approximate Area: 3.6 Acres, May be Subdivided

Predominant Soil Type: Haven and Enfield soils, Portion Prime Farmland Soil

Current Land Use: Open Space

Wetlands Present: Adjacent

Floodplains: 100- & 500-Year

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: Not Available

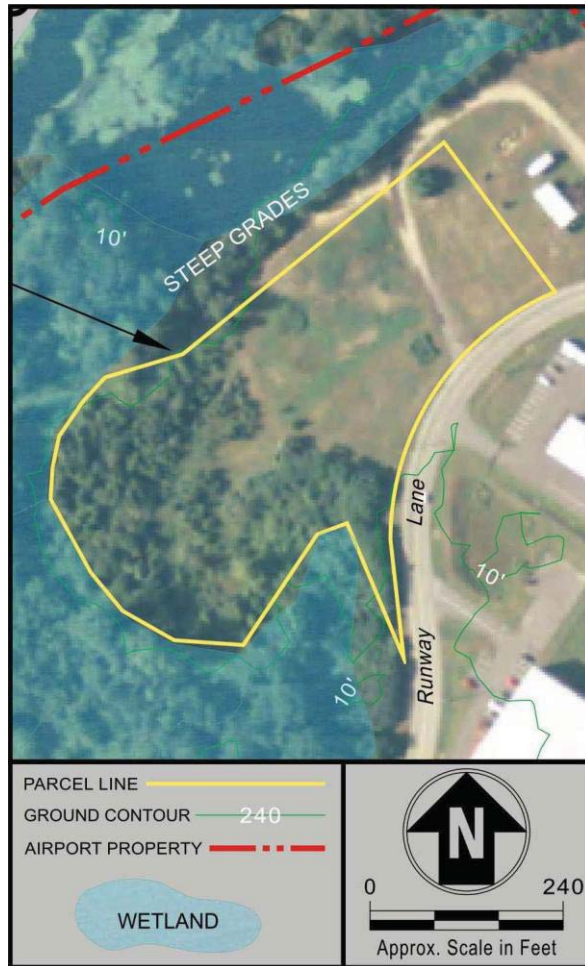
Zoning: Industrial

Potential Obstruction: None

Comments: FAA Land Release required for non-aviation use. Limited space for parking area.



AIRPORT BUSINESS PLAN



Groton-New London Airport Development Parcel H

Location: Northwest Airport Property

Access: Via Tower Avenue

Road Frontage: Approximately 450 Linear Feet

Approximate Area: 4.3 Acres

Predominant Soil Type: Haven, Enfield soils, Portion Prime Farmland Soil

Current Land Use: Open Space

Wetlands Present: Adjacent

Floodplains: 100- & 500-Year

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: Not Available

Zoning: Industrial

Potential Obstruction: None

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



AIRPORT BUSINESS PLAN



Groton-New London Airport Development Parcel I

Location: Northwest Airport Property

Access: Via State Highway 649

Road Frontage: Approximately 950 Linear Feet

Approximate Area: 1.1 Acres

Predominant Soil Type: Haven, Enfield soils, Portion Prime Farmland Soil

Current Land Use: Open Space

Wetlands Present: Adjacent

Floodplains: 500-Year

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: Not Available

Zoning: Industrial

Potential Obstruction: None

Comments: FAA Land Release required for non-aviation use. Limited space for parking area.

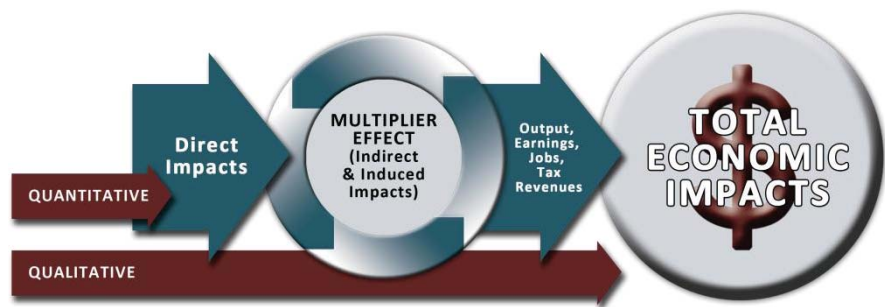


6.0 ECONOMIC CONTRIBUTION OF GROTON-NEW LONDON AIRPORT

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 which include recreational pilots and flight school students. These airport users visit local tourist attractions and 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 supporting GA interests, found that GA contributes \$2.4 billion total or \$726 per capita

to 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 (FBOs), repair stations, and charter operators – at 22 GA airports in Connecticut.



Focusing on the Groton-New London Airport in Groton, Connecticut, this assessment starts with an overview of the demographic and economic characteristics of the Town of Groton and New London County. Defining these characteristics 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 operations 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 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



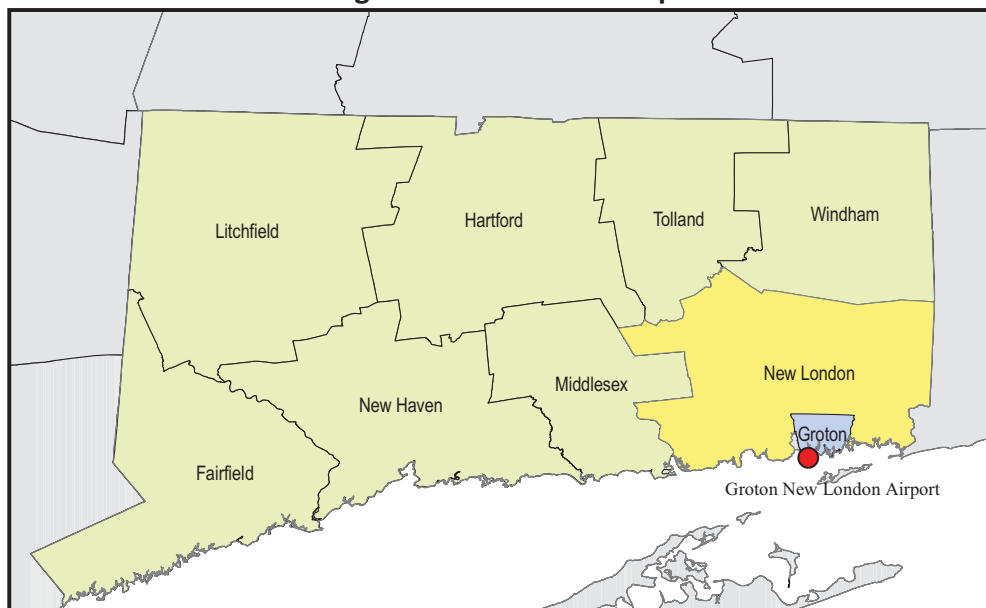
6.1 Demographic and Economic Profile

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.

Town of Groton

The Groton-New London Airport is located in the Town of Groton, CT. With a population of 40,115 in 2010, Groton is the largest town in New London County, accounting for 15.5 percent of the total County population. Between 2000 and 2010, population remained stable.

Figure 6-1: Overview Map



Total employment in Groton was 25,287 in 2009.² In 2005, government employed 48.7 percent of the total workers, followed by manufacturing (21.8 percent) and services (13.3 percent). The largest employers include the U.S. Navy Submarine Base (Subase), Town of Groton, and the State of Connecticut Army National Guard (ARNG) 1109th Theater Aviation Sustainment Maintenance Group (TASMG), a Connecticut Army National Guard helicopter maintenance and repair facility located at the Groton-New London Airport. The largest private employers are Electric Boat Corporation, a designer and builder of submarines, which has a 118-acre location along the Thames River in Groton, and the global pharmaceuticals company Pfizer, Inc., which has a research and development facility in Groton.

² CERC Town Profile 2011

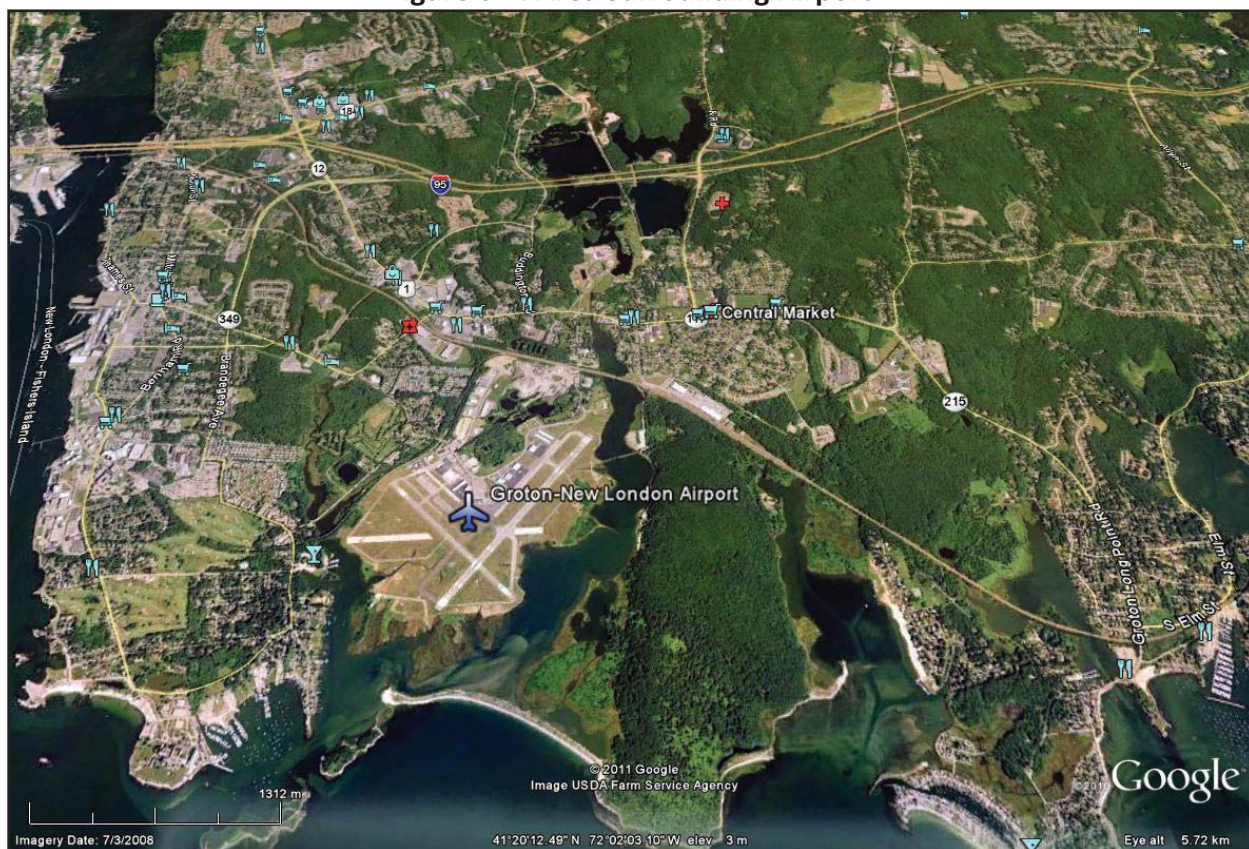


AIRPORT BUSINESS PLAN

While the key industries in Groton are defense and pharmaceuticals, tourism is also one of the town's main industries. Groton has several tourist attractions, including historic downtown Mystic, the Nautilus/Submarine Museum, Fort Griswold and Esker Point and Eastern Point Beaches. The Village of Mystic is partially located within the Town of West Mystic and partially in Stonington (east of the Mystic River) and is at the heart of Mystic Country, a 1,800 square mile region that includes eastern Connecticut and Westerly, Rhode Island and receives more than 20 million visitors each year.

Dining and lodging near the Airport are convenient for visitors arriving by aircraft. The Airport is located 2.2 miles southwest of the center of Groton. Within one (1) mile of the Airport there are 15 retail establishments and one (1) hotel.³ The 15 retail establishments include three (3) full-service and two (2) limited-service restaurants and one (1) bar.⁴ Based on an estimated 479 households in the 1-mile radius around the Airport, there is a retail surplus which means that the supply, especially in terms of food and drinks, exceeds the local demand and are frequented by persons living outside the immediate area. In 2006 there were about 1,300 hotel rooms in the Town of Groton as a whole.

Figure 6-2: Area Surrounding Airport



Source: Google Earth

³ Google Earth

⁴ ESRI Community Analyst



New London County – Norwich-New London MSA

The Norwich-New London metropolitan statistical area (MSA) is composed of a single county, New London. In 2010, New London County had a population of 274,055, which is 7.7 percent of the statewide population.⁵ New London County is one of the State's less densely populated counties, with 412 persons per square mile. Median age is 40, which is also the median age of population statewide. Almost one third (30.7 percent) of the residents aged 26 and older have at least a bachelor's degree. As many as 37.1 percent of the workers⁵ who reside within the County have managerial, professional or related occupations. According to the 2005-2009 American Community Survey, median household income (in 2009 dollars) equaled \$65,120. New London County resembles the State of Connecticut as a whole in regard to occupations, education and income as shown in Figure 6-3.

Figure 6-3: Economic and Social Characteristics

	New London County	Connecticut
OCCUPATION		
Civilian employed population 16 years and over	132,784	1,745,261
Management, professional, and related occupations	37.1%	39.6%
Service occupations	21.2%	16.4%
Sales and office occupations	23.1%	25.4%
Farming, fishing, and forestry occupations	0.3%	0.2%
Construction, extraction, maintenance, and repair occupations	8.7%	8.1%
Production, transportation, and material moving occupations	9.5%	10.3%
EDUCATIONAL ATTAINMENT		
Population 25 years and over	179,214	2,344,192
Less than 9th grade	3.2%	4.7%
9th to 12th grade, no diploma	6.6%	7.1%
High school graduate (includes equivalency)	32.3%	28.8%
Some college, no degree	18.9%	17.1%
Associate's degree	8.3%	7.3%
Bachelor's degree	17.2%	19.9%
Graduate or professional degree	13.5%	15.2%
INCOME		
Median household income (dollars)	\$ 65,120	\$ 67,721
Mean household income (dollars)	\$ 81,856	\$ 94,026

Source: 2005-2009 American Community Survey

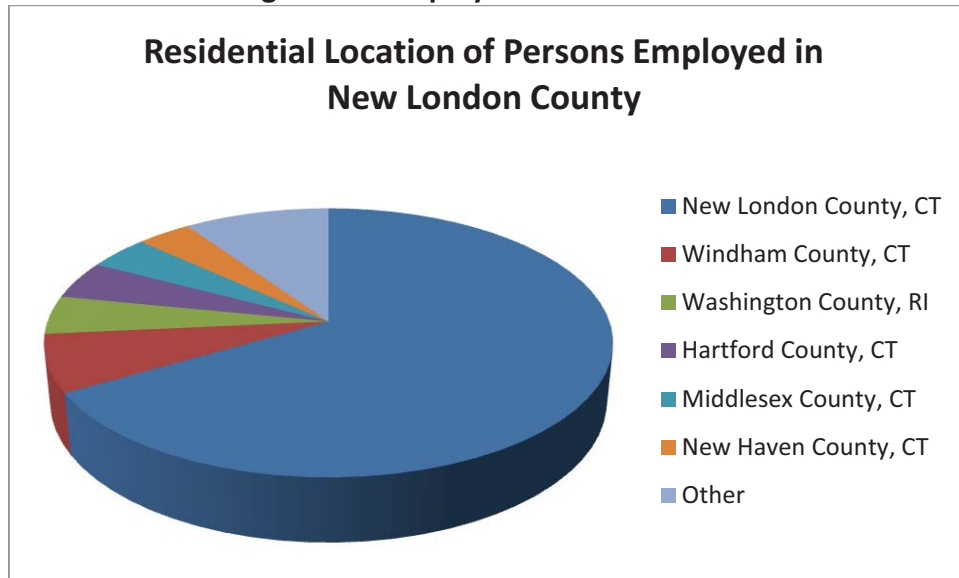
In 2009 there were 141,157 jobs in the County according to the Bureau of Economic Analysis with the average wage of \$47,600. According to "LED On the Map", a tool from the U.S. Bureau of Census Longitudinal Employer-Household Dynamics Program, two thirds of these workers

⁶ "Workers" is defined here to include only employed civilians age 16 and over



reside within New London County. Neighboring Windham County houses 6.9 percent of New London County employees.

Figure 6-4: Employed Person Location



Source: LED On the Map

Defense and pharmaceuticals are the key industries of Southeastern Connecticut, with Naval Subbase, Electric Boat Corporation and Pfizer in Groton being the most prominent. Located with Mystic Country, tourism is also a key industry in New London County. In addition to the Mystic Region attractions in and around Groton, the County is home to Foxwoods Casino Resort in Mashantucket and Mohegan Sun Casino in Uncasville.



6.2 Economic Contribution

As part of the assessment of the economic contribution of the Airport on the state and local economy, the on-airport effects (6.2.1) were quantified, as well as the 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 675 in 2010. The State of Connecticut employed four full-time persons at the Groton-New London Airport to manage and maintain the facility. In addition to these permanent jobs, the State also supported three part-time seasonal jobs during the winter months. However, most of the on-airport employment was at the 9 airport tenant businesses, which collectively employed a total of 671 employees, including 392 full-time and 279 part-time employees. The largest tenant is the 1109th TSMG. In addition to full-time employment, they provide part-time employment to 260 Army National Guardsmen who only work a limited number of hours on weekends per year. Other tenants include Columbia Air Services and Lanmar Aviation, which are both full-service FBOs providing fuel and repair services. Figure 6-5 presents the tenant business types at the Airport. The combined employee compensation in 2010 – including wages, salaries and benefits – is estimated as \$37.7 million.

Figure 6-5: On Airport Tenants

Type of Business
CT Army National Guard Helicopter Repair
Fixed Base Operator (2)
Over Water Crash Survival Training center
Submarine design and construction (corporate flight department)
Air Traffic Control Services (private)
Flight Instruction
Car Rental
Naval Repair and Maintenance

Source: Groton-New London Airport

Not including the part-time National Guardsmen, the total on-airport permanent employment in 2010 totaled 415. Since all of these jobs are directly dependent on the Airport, they would not have existed in Groton or in New London County if the Airport did not exist. They account for 1.6 percent of total employment in Groton.

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 local household goods and



services. In the case of the Groton-New London 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 New London County 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 Groton-New London Airport totaled \$327,200. Expenditures included building operating costs 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 three (3) seasonal employees totaled \$609,900. Vendors and employees used a portion of their income to make local purchases which generated additional economic activity (i.e., multiplier effects).

Taking into account the multiplier effects, the estimated economic contribution to New London County from the operations and maintenance expenditures of the Airport is the equivalent of five (5) jobs totaling \$0.2 million in labor income and \$0.7 million in output. Additionally, the State of Connecticut receives an economic contribution through these expenditures with an estimated six (6) jobs, \$0.3 million in labor income, and \$0.8 million in output. State tax revenues associated with these expenditures including personal income tax, corporate income tax and sales tax totals \$0.02 million.

Airport Capital Expenditures

In 2010 capital improvements at Groton-New London Airport totaled \$6.4 million. This greatly exceeds previous years as capital spending was \$2.5 million in 2008 and \$1 million in 2009.

Taking into account the multiplier effect, the total economic contribution of the Airport capital expenditures equals 81 jobs, \$4.2 million in labor income, and \$9.6 million in output in New London County. In Connecticut as a whole, the economic contribution of these expenditures is estimated as 86 jobs, \$4.4 million in labor income, and \$10.3 million in output.

State tax revenues associated with these expenditures including personal income tax, corporate income tax and sales tax total \$0.3 million.

Airport Tenants

There are nine on-airport tenant businesses that collectively employ 671 workers, including 392 full-time and 279 part-time, as previously described in this section. The permanent year-round employment at the Airport not including the 260 National Guard members who typically work a very limited number of days a year totals 411. Using industry average wages, the estimated compensation for these employees is \$31.0 million. As these tenants and their employees



purchase goods and services at other local business additional economic activity is generated through the multiplier effect.

Taking into account the multiplier effect, the spending by the on-airport tenants and their employees is the equivalent of 256 jobs, \$12.0 million in labor income, \$31.4 million in output in New London County. In Connecticut as a whole, the economic contribution of these expenditures is estimated as 326 jobs, \$16.2 million in labor income, \$43.3 million in output. State tax revenues associated with these expenditures, including personal income tax, corporate income tax and sales tax, total \$3.3 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 Groton-New London Airport as well as those who arrive by other modes of transportation to attend training offered by schools located on the Airport. 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 22,436 GA itinerant operations at the Groton-New London Airport in 2010. An estimated 7,300 visiting aircraft landed at Groton in 2010, which corresponds to an average of 20 aircraft per day.⁶ Data provided by on-airport training providers, revealed that almost 1,600 students traveled to Connecticut to attend the courses and that these students required overnight accommodations for one (1) to five (5) nights.

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.

The following assumptions for students were used:

- ➔ Ninety-two (92) percent of students come from out-of-state.
- ➔ Average length of stay is two (2) nights.
- ➔ Average spending off airport spending per student per night is \$330.

⁶ This estimate is calculated as follows 1) 22,436 operations divided by 2 equals 11,218 landings; 2) 11,218 times 65 percent equals ~ 7,300 visiting aircraft; This is based on the assumption that 35 percent of the arriving itinerant aircraft are based at the Airport and that the remaining 65 percent are not.



Based on the assumptions above, the total spending by visitors, including students, at New London County businesses was estimated at \$5.5 million. Assumptions for 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 70 jobs, \$2.3 million in labor income, and \$6.8 million in output in New London County. Statewide, the economic contribution of these expenditures is estimated as 76 jobs, \$2.7 million in labor income, and \$7.9 million in output. State tax revenues associated with these expenditures, including personal income tax, corporate income tax and sales tax, total \$0.2 million.

6.2.3 Other Effects

In addition to the economic effects previously listed, the Airport provides benefits to residents and businesses that are difficult to quantify. Approximately 10 to 15 percent of the 38,000 annual operations at Groton 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. In some cases this dependency may be critical, such that that the businesses would be based elsewhere if not for the Airport's current location. 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. Examples of local companies that are important airport users include, General Dynamics/Electric Boat and Whelen Engineering. Both companies use the Airport on a daily basis to transport management and staff. Electric Boat is one of the largest employers in New London County. The company has a flight department at Groton-New London and uses charter flights to bring employees to and from Newport News, Virginia and Washington, DC. Pfizer Pharmaceuticals, also one of the largest employers in New London County, uses the Airport several times a week. Garbo Lobster Company, a Groton-based seafood wholesaler, is one of the largest live lobster companies in North America and exports live lobsters to Europe. Lobsters are purchased from Maine fishermen and are brought to the packing facility in Groton using the company plane based at Groton.⁷ Executives of Dominion, the company that operates the nuclear power plant in Waterford, also uses the Airport weekly. Other regular travelers include executives and VIPs of the Navy and the Coast Guard. Occasionally, executives of large retail stores such as Lowes, Walmart and Home Depot travel to and from the Groton-New London Airport.

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 emergency medical evacuation. Figure 6-6 presents the activities that are supported by the Airport and their frequency.

⁷ <http://thefisheriesexchange.com/feature.php?id=110>; http://www.bigy.com/content/mags/070209-072909_mag/main_event.php; <http://www.fda.gov/ohrms/dockets/dockets/04d0510/04d-0510-c000003-01-vol1.pdf>



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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				
Gateway for resort visitors	X				
Staging area for community events				X	
Police/law enforcement				X	
Prisoner transport					X
Military exercises/training	X				
Aviation career training/education				X	
Search & rescue/Civil Air Patrol		X			
Environmental patrol (i.e., wildlife, fisheries)				X	
Emergency medical evacuation/patient transfer				X	
Medical doctor transport					X
Forest/wildland firefighting					X
Aerial photography/surveying				X	
Real estate tours				X	
Aerial advertising/banner towing				X	
Youth outreach (Young Eagles, scouting, etc.)				X	
Air shows (Static)				X	
Group Airport Tours				X	

Source: Groton/New London Airport

6.2.4 Conclusion

With full- and part-time employment totaling 675 in 2010, of which 415 were permanent year-round jobs, the Groton-New London Airport is certainly an economic asset to Groton, New London County, and the State of Connecticut. More than 7,000 visiting aircraft landed at Groton-New London in 2010, carrying recreational pilots, business travelers, and visitors to the Mystic Region and to the two local casinos, Foxwoods and Mohegan Sun. In addition, almost 1,600 students traveled to Connecticut to attend classes at the on-airport flight and survival training schools. Indirectly, the Airport supports about 500 jobs in Connecticut through its \$6.4 million capital improvements and multiplier effects triggered by airport management, tenant and visitor spending. The total economic contribution of the Groton New London Airport in 2010 amounted to 909 jobs and \$119.5 million of output, including \$55.2 million of labor income, and \$3.9 million in state tax revenues in the State of Connecticut. Perhaps even more important are the less quantifiable impacts of the Airport. About 10 to 15 percent of the 38,000 operations at Groton in 2010 were for business purposes, with General Dynamics/Electric Boat, one of the largest employers in Groton and in New London County, as well as several smaller businesses being major airport users.



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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

	New London County			Connecticut		
	Jobs	Labor Income (\$000s)	Output (\$000s)	Jobs	Labor Income (\$000s)	Output (\$000s)
On-Airport Jobs	415*	\$31,590	\$57,282	415	\$31,590	\$57,282
Operations and Maintenance Spending	5	\$242	\$661	6	\$296	\$813
Capital Spending	81	\$4,159	\$9,622	86	\$4,401	\$10,283
Airport Tenant Spending	256	\$11,963	\$31,408	326	\$16,190	\$43,284
Visitor Spending	70	\$2,319	\$6,791	76	\$2,705	\$7,873
Total	827	\$50,274	\$105,763	909	\$55,183	\$119,534

*Note: *Does not include the 260 part-time National Guardsmen*

Figure 6-8: Overview Connecticut Tax Revenues

Tax Type	(\$000s)
Personal Income Tax	\$2,598
Sales Tax	\$1,074
Corporate Income Tax	\$211
Total	\$3,883



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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 Groton-New London 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 Groton-New London 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 and 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 if they had 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 funding reduction or 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.



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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

	<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



Figure 7-2: 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. The findings and recommendation 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 opportunities 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*



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- *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 occurred in the past at NBAA annual events such as the Schedulers and Dispatchers Conference, but due to budget limitations, has not been done recently. 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 aid 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 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



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desirable to potential users. This can be done relatively inexpensively 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.airnav.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 Groton-New London 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 GON.

7.2.1 Operations and Management

As mentioned in Section 3.0, for the purposes of this business plan, there are 15 airports and 942 aircraft within the market area of the Groton-New London Airport. Although varying in service level, the airports within the market area include based aircraft that use GON from time to time, and from which, GON can draw business from. Based on the Airport's 2010 air traffic control tower report, transient air traffic accounts for almost 70% of the operations at the Airport, while the remaining 30% is from local civil and military air traffic.

Based Aircraft

According to the information provided by the Airport, the number of based aircraft at Groton has increased by 5%, from 2009 to 2010 (53 to 56). However, the Airport experienced a 20 % decrease in based aircraft from 2008 to 2009 (67 to 53) and a nearly 72% increase from 2007 to 2008 (39 to 67). Due to such fluctuations in based aircraft from year to year, historical trends are difficult to determine, however overall, since 2005 the number of based aircraft at the Airport has increased by 60%. This suggests that the Airport is providing an attractive alternative for people who require hangar and/or aircraft tie-down space. 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 potentially increase the number of based aircraft into the future. Based on the market area identified in Section 3, Groton-New London currently holds almost 6% 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, roughly 75 % the fleet mix at Groton is made up of single-engine, piston driven aircraft, while 25% of the fleet mix are multi-engine or jet aircraft. Since 2005 the number of based jet aircraft at the Airport has increased from 3 to 8. By continuing to provide services and facilities that meet the needs of corporate type jet aircraft, by providing competitive rates, the Airport can continue to attract jet owners who consider GON a suitable location to base their aircraft. Provided the Airport's physical characteristics (i.e., runway length) remain the same, no significant changes to the fleet mix are expected. The recently installed EMAS beds are an attractive feature for aircraft operators since they provide an increased level of operational safety while adhering to FAA runway safety area standards.



Aircraft Operations

Contrary to a typical GA airport whose total operations are made up of mostly local air traffic from based aircraft and flight school activities, GON experiences a significant amount of non-local air traffic which is representative of the value the Airport provides to the people who come to the Groton-New London area to visit or conduct business. In terms of number of overall operations at the Airport, historical trends indicate a nearly 50% decrease in operations since 2000 when the Airport saw nearly 75,000 annual operations. Over 10,000 of the operations in 2000 were attributed to air carrier operations. In 2010, total operations at GON were just over 38,000 including no air carrier operations but corporate shuttle services that accounted for over 1,100 air taxi operations.

Instrument Operations

As previously mentioned, Groton offers instrument approaches in the form of: ILS, GPS, and VOR procedures. Historical counts of the number of instrument approaches at the Airport indicate that instrument operations have continuously trended upward since 2000 when instrument operations accounted for 13% of total operations. In 2010, instrument operations were roughly 18% 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 Groton 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 Groton 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 Groton-New London indicate that fuel volume has dropped by roughly 30% since 2006 when the annual volume of fuel for the Airport was nearly 1,429,000 gallons, excluding exemptions. In 2010, annual fuel volume totaled 983,437 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 dropped by roughly 26% from 2006 to 2010, historical airport records supports a possible relationship between fuel volume and airport operations at Groton-New London. Notably, US Air commuter shuttles ceased in 2004 and Pfizer corporate shuttles ceased in 2008.



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.

Groton-New London 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 such as 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.

Part 139 Certification

14 CFR Part 139 requires airports meeting certain criteria to maintain operating certificates that require certain operational and safety standards be met to ensure safety in air transportation. Airports holding such certificates are required to meet varying standards (such as Aircraft Rescue and Firefighting) based upon the size of the facility and the types of operations that regularly take place at the Airport. From 1984-2004 Groton experienced scheduled airline service that required adherence to standards to maintain a Part 139 operating certificate. However, the air traffic characteristics of the Airport have changed in recent history and the Airport is no longer required to maintain a Part 139 operating certificate but since 2005 has chosen to continue to comply under a limited Part 139 operating certificate. Under a limited (Class IV) Part 139 certificate airports are held to airfield pavement, marking, lighting, firefighting and rescue standards, in addition to inspection, personnel training, and safety standards that contribute to increased operational costs for the Airport. Although these costs were not quantified as part of this plan, the study team believes that costs associated with the airfield maintenance and operations could be reduced if the Airport were to surrender its Part 139 Certification. To a certain extent airports with Part 139 certificates are more marketable to prospective users and furthermore, if the Airport were to surrender its certificate, it's possible that obtaining it again at a later date could be difficult.

Existing Airport Leases

Well planned airport development including leasing properties is 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 that 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, to ensure potential opportunities are not lost due to negotiation inactivity or a stalled process, the leasing process should avoid getting encumbered by the bureaucratic process.

Overall the leases for the Airport were generally complete and accurate. The lease abstracts for the Airport were reviewed and in some instances where additional questions remained 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 findings and recommendations based on the results of this evaluation are as follows:

- ➔ The State currently has two tenants that have leases which are not charged fair market value for the property or facilities in which they occupy. 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 such as the Civil Air Patrol and the Army Air Guard both leases should be reevaluated to ensure compliance with FAA obligations and assurances.
- ➔ Currently, under a lease agreement with the Army Air Guard, the State is providing Airport Rescue and Firefighting (ARFF) services for 16 hours per day. In addition to providing the ARRF services, the State is required to maintain or provide the following: aircraft parking aprons; infield grass areas; snow removal on taxiways; and pesticide spraying. The areas are used exclusively by the Army Air National Guard and the State is paid \$8,025 annually. This agreement expires on September 13, 2013 and it is recommended the Airport renegotiate the agreement to ensure the Airport is receiving the appropriate compensation for the services rendered.
- ➔ 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.
- ➔ 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 numbers can create significant fiscal 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, Groton-New London Airport operated at an annual deficit of approximately \$285,000 in FY10-11 and an average deficit of approximately \$319,000 over the last five years. A portion of the deficit can be attributed to a more accurate accounting allocation of fringe benefits. In 2010, the Airport did however provide an estimated \$119 million in economic output activity and 908 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, potential expansion/reconfiguration of existing facilities, 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, services, and expansion opportunities (e.g. FBOs, food and beverage areas, Hangars, t-hangars, rental cars and trucks, etc.) at the Airport in the short term. Further, recommendations from the Master Plan, once completed, should be implemented and coordinated with the recommendations of this business plan. 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 Groton-New London 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

Rate/Charge	Current	Proposed
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

As leases at the Airport 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

Based upon the professional valuation conducted as part of this effort, suggested land lease rates were produced for undeveloped 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 a rate of \$.30/s.f. Non aviation development parcels, as well as non-readily developable parcels were omitted since market rates were not prepared for these land areas.

Figure 7-4: Potential Revenues from Future Land Leases

Parcel	Size (Acres)	Rate	Potential Annual Revenue
A	2.2	\$.30/s.f	\$28,750.00
B	2.5	\$.30/s.f	\$32,670.00
C	12.5	\$.30/s.f	\$163,350.00
D	3.3	\$.30/s.f	\$43,124.00
E	2.9	\$.30/s.f	\$37,897.00

Source: Consultant Calculations

Based on existing characteristics, particularly related to existing topography and airside access, it is recommended in the short term, ConnDOT solicit for private development on parcels B, C, and D. Cumulatively, leasing these parcels and applying the valuated rate would result in an additional \$239,000 of annual generated revenue.

Terminal Area RFP and Development

The on-going Master Plan Update that is being developed for the Airport includes recommendations on the development and/or redevelopment of the Airport's terminal area. Once complete, ConnDOT should move forward with the necessary steps to implement the recommendations concerning development in this area.

Army Guard Expansion Need

The Army National Guard at the Airport has expressed a serious interest in expanding its current full service helicopter repair facility. This plan recommends that ConnDOT coordinate closely with the Army National Guard, to gain a better understanding of the needs of the 1109th Aviation Group, and develop a development plan with conditions that are agreeably suited for both the Army National Guard and ConnDOT.

Existing Tenants desire to expand

In a similar fashion of working with the Guard, it is recommended that ConnDOT personnel and management meet regularly with existing airport tenants to discuss the future needs and potential expansion of existing airport facilities. By keeping aware of the future needs of its



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tenants the Airport can better position themselves encourage future development in a way that may avoid hindering the expansion plans of existing tenants.

Capital Program

The table below 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 through the FAA's Airport Improvement Program (AIP) 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 receive funding.

Figure 7-5: Groton-New London Airport Capital Program FY11 to FY15

<i>Projects</i>		<i>Total Project Cost</i>	<i>FAA Participation</i>	<i>State Participation</i>
FY11	Construct Rwy Safety Phase 2, Rehab Twy D	\$8,000,000	\$7,600,500	\$399,500
FY12	No Projects Planned	0	0	0
FY13	No Projects Planned	0	0	0
FY14	No Projects Planned	0	0	0
FY15	No Projects Planned	0	0	0
Total Airport Capital Program		\$8,000,000	\$7,600,500	\$399,500

Source: ConnDOT

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 increased and funded to promote and enhance the Airport as a regional and local asset.

Some areas for Groton 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:

Community Activity/Restaurant

The SWOT analysis indicated that the Airport would like to attract a viable restaurant in order to help increase transient operations and to improve the general attractiveness of the Airport for not only pilots and aircraft passengers but also airport employees and the local community. SWOT workshop participants indicated that the lack of a successful restaurant in recent history



makes GON a less attractive destination for GA pilots and regional flying clubs. In order to establish a viable restaurant at the Airport, it is recommended that ConnDOT solicit proposals from well known local or regional restaurants with a successful track record of restaurant operations and established clientele who may be interested in opening a additional restaurant at the Airport.

Given the non-aviation development potential on Parcel H as identified in Section 5, ConnDOT may want to also consider attracting a culinary school that may be interested in opening a location on non-airside, state-owned property at the Airport.

Air Service/Charters

Marketing of scheduled commercial air service should be limited to niche markets (i.e. tourism). The flight schedules and frequency of service at Bradley International and T.F. Green Airports makes the feasibility of reliable air service unlikely. The focus of the Airport should be on the following:

- ➔ Limited/Niche Markets
- ➔ Availability/Joint Marketing/FBOs
- ➔ Specific Shuttle Services

It is recommended that the Airport sponsor coordinate closely with the CT Department of Economic and Community Development to position the Airport to provide attractive air transportation options.

Airport Name

The SWOT analysis indicated that the Airport's identity, particularly as it relates to the Airport's current name is a weakness that needs addressing. SWOT workshop participants indicated that potential airport users often find it difficult to make a connection between "Groton-New London" and the Airport's geographic location as it relates to better known landmarks. The study team believes that a change in the Airport's name could contribute to reinforcing the value and benefit communicated through marketing and promotional activities. A potential name for the Airport might be *Southeastern Connecticut Regional Airport*, or some variation that calls to mind the area that the Airport serves. Thus, this plan recommends that ConnDOT consider renaming Groton-New London Airport.



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 Groton-New London Airport.

Staffing

The adequacy of staffing levels at GON 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 B, C, and D), Review Master Plan Update recommendations with regard to the redevelopment of the Terminal area and implement/RFP for development of the area, work with existing tenants to accommodate expansion needs, assure existing leases meet federal obligations, and implement recommended rates and charges. It is also suggested that the Airport pursue an on-airport restaurant.

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. Community activities, a restaurant, niche air service, and consideration of a name change should be among the activities.

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 Methodology



APPENDIX A: ECONOMIC IMPACT ASSESSMENT METHODOLOGY

This Appendix presents the methodology for estimating the economic contribution of the Groton-New London 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 Effects** – 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



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) Norwich-New London, CT Metropolitan Statistical Area
- 2) State of Connecticut

The Norwich-New London, CT Metropolitan Statistical Area as defined by the U.S. Office of Management and Budget is composed of only one county, New London County, CT.

Figure AA1: Study Area



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 requested and received from the Airport, the following data:

- ➔ 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; and
- ➔ 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.



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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 Groton-New London 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.



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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 New London County who either arrive at the Groton-New London 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 22,436 civilian itinerant operations at GON in 2010 were landings and that 65 percent of the landings were by non-based aircraft. The resulting 7,300 visiting aircraft translates into an average of 20 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.
- ➔ Additional visitors to the Groton-New London Airport in 2010 include nearly 1,600 students who traveled to Connecticut to attend training facilities led by Groton-New London tenant businesses. This number is based on data provided by airport management.
- ➔ Based on the above assumptions, the total number of visitors arriving in 2010 was estimated at approximately 19,700 persons. This includes tourists, recreational pilots, business visitors, as well as those flying in for aircraft repair and maintenance. Including the students, the total number of visitors is estimated at 21,300.

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.



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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, students in excess of 1,600 who attended the 1 to 3 day classes stay an average of 2 nights.
- ➔ 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 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 Groton. The lodging cost included in the spending pattern of \$135 falls about midway between the average low price of \$93 and average high price of \$176.



Figure AA9: Typical Rates at Hotels near Airport

	Miles from Airport	Price (\$)
Marriott Mystic Hotel And Spa	2.6	219-249
Radisson Hotel New London	3.2	115-175
Econo Lodge Inn & Suites Groton	3.0	70-140
Ramada Groton	2.7	59-184
Howard Johnson Inn	1.1	54-144
Hampton Inn Groton/Mystic/New London	2.2	87-219
Knights Inn Groton	2.5	48-125
Quality Inn Groton	2.5	70-130
Groton Inn And Suites	2.8	116-179
Days Inn & Suites	2.8	48-181
Hilton Garden Inn Mysticgroton	2.8	123-219
Super 8 Motel Groton Foxwood	2.9	47-134
Flagship Inn And Suites	2.9	50-109
Best Western Olympic Inn	3.2	99-230
Red Roof Inn Mystic - New London	4.5	68-123
Inn At Mystic	4.6	130-190
Holiday Inn New London (Mystic)	4.7	103-149
Springhill Suites By Marriott	4.7	159-160
Hyatt Place Mystic	5.1	119-319
Econo Lodge Mystic	5.3	70-160
Howard Johnson Mystic	5.3	93-169
Average		93-176

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

Economic Contribution Assessment Results

In addition to on-airport employment, additional multiplier effects are triggered by four activities: (1) airport operations 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.



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

	New London County			Connecticut		
Impact Type	Jobs	Labor Income	Output	Jobs	Labor Income	Output
Direct Effect	1	\$81	\$216	1	\$81	\$216
Indirect Effect	<1	\$14	\$34	<1	\$22	\$54
Induced Effect	4	\$146	\$411	4	\$193	\$543
Total Effect	5	\$242	\$661	6	\$296	\$813

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

Personal Income Tax	\$14
Sales Tax	\$7
Corporate Income Tax	\$2
Total	\$23

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)

	New London County			State		
Impact Type	Jobs	Labor Income	Output	Jobs	Labor Income	Output
Direct Effect	55	\$2,951	\$6,400	56	\$3,033	\$6,616
Indirect Effect	9	\$474	\$1,157	9	\$488	\$1,191
Induced Effect	18	\$ 734	\$2,065	21	\$880	\$2,476
Total Effect	81	\$4,159	\$ 9,622	86	\$4,401	\$10,283

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

Personal Income Tax	\$210
Sales Tax	\$93
Corporate Income Tax	\$ 18
Total	\$321



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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	New London County			State		
	Jobs	Labor Income	Output	Jobs	Labor Income	Output
Direct Effect	415	\$ 31,590	\$ 57,282	411	\$ 31,590	\$ 57,282
Indirect Effect	80	\$ 4,527	\$ 10,514	102	\$ 6,133	\$ 15,017
Induced Effect	177	\$ 7,436	\$ 20,894	223	\$ 10,057	\$ 28,266
Indirect and Induced Subtotal	257	\$ 11,963	\$ 31,408	326	\$16,190	\$ 43,284
Total Effect	672	\$ 43,553	\$ 88,079	737	\$47,170	\$ 100,566

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

Personal Income Tax	\$ 2,246
Sales Tax	\$ 902
Corporate Income Tax	\$ 178
Total	\$ 3,325

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	New London County			State		
	Jobs	Labor Income	Output	Jobs	Labor Income	Output
Direct Effect	53	\$1,600	\$4,703	53	\$1,600	\$4,703
Indirect Effect	7	\$317	\$959	10	\$527	\$1,549
Induced Effect	10	\$402	\$1,128	13	\$577	\$1,621
Total Effect	70	\$2,319	\$6,791	76	\$2,705	\$7,873

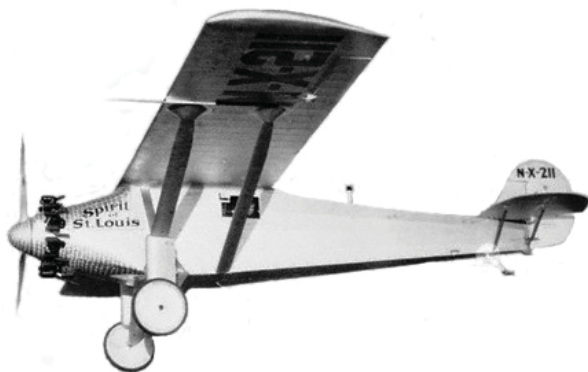
Figure AA17: State Tax Revenue generated by Visitor Spending, 2010 (\$000s)

Personal Income Tax	\$129
Sales Tax	\$71
Corporate Income Tax	\$14
Total	\$214

APPENDIX B

Airport Valuation

Airport & Aviation Appraisals, Inc.



THE LOUIS BERGER GROUP, INC.
SUMMARY VALUATION REPORT
AS OF JANUARY 1, 2011
OF
GROTON-NEW LONDON AIRPORT
GROTON, CONNECTICUT

Airport & Aviation Appraisals, Inc.



THE LOUIS BERGER GROUP, INC.

SUMMARY VALUATION REPORT

AS OF JANUARY 1, 2011

OF

GROTON-NEW LONDON AIRPORT

GROTON, CONNECTICUT

Airport & Aviation Appraisals, Inc.
The Aviation Professional & Flight Training Center

Morristown Municipal Airport
50 Airport Road, Suite 180
Morristown, NJ 07960
973-401-1739
Fax: 973-401-1700

Web Site: www.airportappraisals.com
wperkins@airportappraisals.com



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 their side land and improvements at Groton-New London Airport in Groton 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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Airport & Aviation Appraisals, Inc.

SALIENT FACTS AND CONCLUSIONS

Location:

Groton-New London Airport
Groton, Connecticut

Owner of Record:

State of Connecticut

Lessee of Underlying Sites: Various

R.E. Tax Assessment: NA

Airport Size: 489 Acres

Zoning: Airport District

Highest and Best Use:

As Vacant and Improved: General Aviation Airport

Indications of Market Value:

Parcel A

	<u>Acres</u>	<u>Per Sq. Ft.</u>
Site Size:	2.26	\$0.30
Supporting Proprietary Ramp Rental:		<u>\$0.00</u>
Adjusted Land Rental:		\$0.30
Overall Annual Rental:		\$29,534

Parcel C

	<u>Acres</u>	<u>Per Sq. Ft.</u>
Site Size:	2.60	\$0.35
Supporting Proprietary Ramp Rental:		<u>\$0.00</u>
Adjusted Land Rental:		\$0.35
Overall Annual Rental:		\$39,640



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Parcel G

	<u>Acres</u>	
Site Size:	12.65	
	<u>Acres</u>	<u>Per Sq. Ft.</u>
Site Size:	1 - 3	\$.35- \$.37
	<u>Acres</u>	<u>Per Sq. Ft.</u>
Site Size:	3-6	\$.30- \$.35
	<u>Acres</u>	<u>Per Sq. Ft.</u>
Site Size:	6-9	\$.28- \$.30
	<u>Acres</u>	<u>Per Sq. Ft.</u>
Site Size:	9-12	\$.30

T Hangar Rental Rates

	<u>Monthly Rent.</u>
T- Unit	\$350.00
End Unit	\$375.00

Open Bay Hangar

		Rent
	<u>Sq. Ft.</u>	<u>Per Sq. Ft.</u>
Hangar Bay Size:	Varies	\$5.00 - \$8.00

Terminal Space

		Rent
	<u>Sq. Ft.</u>	<u>Per Sq. Ft.</u>
Counter Space:	Various	\$16.00

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 Groton-New London Airport in Groton, Connecticut.

The subject properties are land and structures which have been optimized for aviation, and are situated on the airside at Groton-New London 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 airside property in both improved and unimproved condition at Danielson, Hartford Brainard, Waterbury Oxford, Groton 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. A comparison and analysis of rental rates are used as a basis for the subject's stabilized economic



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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

The subject properties are located at Groton-New London Airport in the southeastern quadrant of the State of Connecticut, along the Atlantic Coast. The general area has been recognized as an important saltwater port for a number of years. The most significant development in the general area around the subject property is the United States Naval Submarine Base at New London. This facility has served as a major port for submarine activities since the submarine first became an effective naval weapon during WWI. The overall impact of the naval submarine base is to create the economic synergy which is inherent in virtually any major military manufacturing operation.

The Thames River flows southward from the Norwich area and opens into the Atlantic Ocean adjacent to Fishers Island. The Groton-New London area is well positioned with regard to automotive and truck access. The main east-west artery is US Route 95, and this connects with Route 395, a north-south artery that runs northward through Norwich and on up into Massachusetts and Rhode Island. Amtrak and other major rail operators utilize the railway line which runs parallel to the Connecticut coast and connects Boston with points southward such as New Haven, New York, Washington and other locations on the east coast. The parallel importance of US Route 95 and the major rail lines is mirrored in other New England cities such as Providence, New Haven, Bridgeport and Boston.

In addition to automotive and rail access, virtually all major trucking companies serve the Groton-New London area and provide shipping services to businesses and residences. The two major concentrations of development of population in New London County are the Town of New London and the Town of Groton. The general area, like much of the New England seashore, has a large interdependence with the tourism industry and the recent construction and expansion of the Foxwoods Casino and other proposed tourist oriented development has further augmented this tendency. The Town of Groton had approximately 47,000 inhabitants and is projected to grow to just over 52,000 inhabitants as of the year 2011. The governmental structure which is applicable to the general area around the subject property varies. Like many New England



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communities, there are various forms of community incorporation and self-government. Since the subject property is on a state owned airport, the most salient governmental restrictions applicable to it are those promulgated by the State of Connecticut, and its agent for the airport, the Bureau of Aeronautics.

The Groton-New London labor market has a basic civilian labor force of approximately 140,000. The unemployment rate is approximately 8.3%. The bulk of non-farm wage and salary employment in the New London labor market is clustered in service producing industries.

The net effect of the development on the airport is that it is likely that the increased business related to tourism generated by casinos and other attractions will make the Groton-New London Airport of some importance for the region. We are informed that overall, the capacity to provide direct and unfettered access to the burgeoning tourist-related attractions in the region has had a positive effect on the subject properties, and the airport as a whole. Continued military presence in the area will undoubtedly require that the overall operational capability offered by the runway services and related navigational aids at the airport will aid the military and defense related operations at the airport.

Like most aviation properties, the most important neighborhood influence on the subject are those which provide landside access to the subject and also allow interface with the airside and landside inventory on the Groton-New London Airport. The main access road to the airport is Tower Avenue and this connects the subject to the road system utilized by vehicles and is within five minutes driving distance to US Route 95. The airport is also located adjacent to the coastline and there are few significant obstructions constructed in and around the airport environment which might constitute a hazard to air navigation.



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AIRPORT AND PROPERTY DESCRIPTIONS

Facility Name: Groton-New London
 City Name: Groton (New London)
 County: New London
 State Name: Connecticut

Geographic Data

Latitude: N4119.8
 Longitude: W07202.7 (Estimated)
 Arpt Elevation: 9ft (Surveyed)
 Magnetic Variation: 14W
 3 Miles SE Of Groton (New London)

Aircraft Data

Operations (reported) Yearly Avg.
 General Aviation transient: 22,168
 General Aviation Local: 11,346
 Air Taxi: 1,417
 Commercial: 0
 Commuter: 0
 Military: 3,651

Aircraft based on Field

General Aviation Singles: 19
 General Aviation Multi: 5
 Jet Aircraft: 3
 General Aviation Helicopters: 1
 Military Aircraft: 2
 Gliders: 0
 Ultralights: 0

Runway & Approach Info for KGON

Rwy	Length	Land Dist Avail	Approach	Rwy	Length	Land Dist Avail	Approach
05	5,000x150	5,000'	ILS/DME 111.30 - 048°	23	5,000x150	5,000'	
15	4,000x100	3,693'		33	4,000x100	3,795'	

Airport Facilities

Airport Attendance Schedule: 7 Days A Week 0600- 2100
 Airport Status: Operational
 Airport Lighting Schedule: Dusk-Dawn
 Airport Storage Available: Hangars, Tie Downs
 Extra Services Available: Air Freight, Avionics, Cargo Handling, Charter, Flight Instruction, Aircraft Rental, Annual Surveying



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Wind Indicator: Yes - (Lighted)
Control Tower: Yes

Federal Agreements

National Plan Of Integrated Airport Systems (NPIAS)
Grant Agreements Under FAAP/ADAP/AIP
Surplus Property Agreement Under Public Law 289
Assurances Pursuant To Title VI, Civil Rights Act Of 1964
Agreement Under DLAND Or DCLA Has Expired.

Groton-New London Airport, one of twenty-three current public use airports, was established as the first State of Connecticut airport in 1929. Originally called Trumbull Airport after Governor Jonathan Trumbull, airport ownership was transferred to the United States Navy during World War II. After World War II, the Navy returned the airport to the State of Connecticut, and in 1980, the name of the airport changed to Groton-New London Airport.

GON is situated on approximately 489 acres in the town of Groton, Connecticut, along the Poquonnock River, at an average elevation of nine feet above mean sea level (MSL). The airport is located approximately seven miles driving distance southeast of downtown New London and 55 miles southwest of Providence, Rhode Island. The airport is bounded by Interstate 95 to the northwest and Long Island Sound to the south. The Groton-New London Airport is located in the Town of Groton and abutting the boundary with the City of Groton. The airport is on a peninsula and all of the land on the airport property is occupied for aircraft related uses with the exception a pocket of undeveloped shrub lands northwest of Tower Avenue/South Road. Runways and taxiways occupy the southern tip and eastern half of the airport property with one generally northeast/southwest runway and one southeast/northwest runway. These runways and adjacent taxiways abut waterways including Baker Cove and the Poquonnock River. The northwest corner of the airport includes hangars, aircraft parking and related buildings, including maintenance buildings, charter facilities, aircraft sales, safety and rescue training facilities, and a Connecticut National Guard complex.



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The airport is situated on the Connecticut coast at Long Island Sound and is surrounded on the southwest, south, and east by Baker Cove, the Sound, and the Poquonnock River respectively. The land to the east across the river from the airport is Bluff Point State Park which encompasses over 800 acres and provides public-access to Bushy Point Beach. The park is designated a coastal reserve and is only accessible via non-motorized vehicles or on foot. The City of Groton lies immediately to the west and land uses adjacent to the airport in the City are predominantly single-family residents, including the Jupiter Point neighborhood. Other land uses to the west are, the University of Connecticut at Avery Point on the Avery Point peninsula, the Shennecossett Beach Club and Golf Course. Land to the north of the airport is a mix of activities typical of long-established urban and suburban communities including Pleasant Valley Mobile Home Park with approximately 240 homes. Development abutting the airport to the north and northwest is predominantly industrial, including a rail line, but with residential subdivisions further north. Other uses of note in the vicinity include a town ball field and boat launch to the northeast of the airport, several schools, a daycare, a cemetery and several places of worship.

The airfield is serviced by all essential utilities; water, sanitary, electric, natural gas, and telecommunication lines are connected to the Terminal Building and all other major facilities/businesses on the airport. The conventional hangars, including T-hangars, have electrical power service, and some have water and telecommunications.

The 1109th AVCRAD is one of only four facilities of its type in the United States Army and Army National Guard. Its day-to-day mission is to provide limited depot level maintenance and back-up aviation intermediate maintenance (AVIM) to Army National Guard aviation facilities in 14 northeastern states from Maine to Virginia to Ohio as well as the District of Columbia. This includes a total of 23 Army Aviation Support Facilities (AASFs) and approximately 500 aircraft. The repairs performed by the 1109th AVCRAD on these aircraft include airframe and component repair performed at the 1109th AVCRAD and on site at the facility location.



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The 1109th AVCRAD makes a significant contribution to both the local economy and community sponsorships. The 1109th AVCRAD supports numerous local events to include the sponsorship of a Little League Team in Groton. Contributing a significant boost to the local economy, the combined payroll from the full-time force (military, civilians and contractors) and the part-time traditional Guardsmen is in excess of eight million dollars annually.



Aerial View Of Groton-New London Airport



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Aerial View Of South End Of The Airport And Terminal Area



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Aerial View Of Northern Portion Of The Property



Area Showing Development Along Tower Avenue



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Terminal Section Of The Airport



T Hangars, Lanmar Aviation Hangar Along With Terminal Parking Lot



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East End Of Airport Property



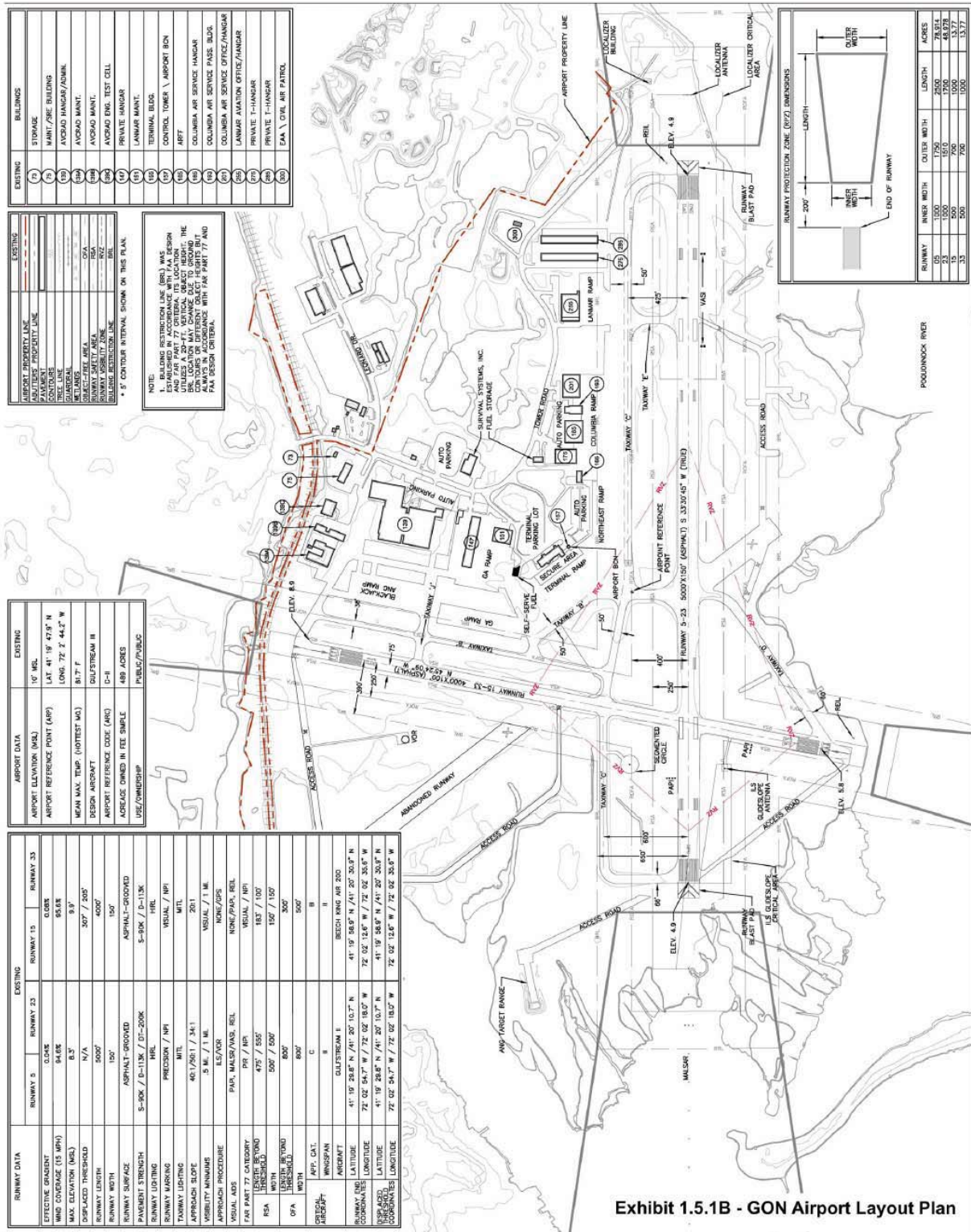
T Hangar Development



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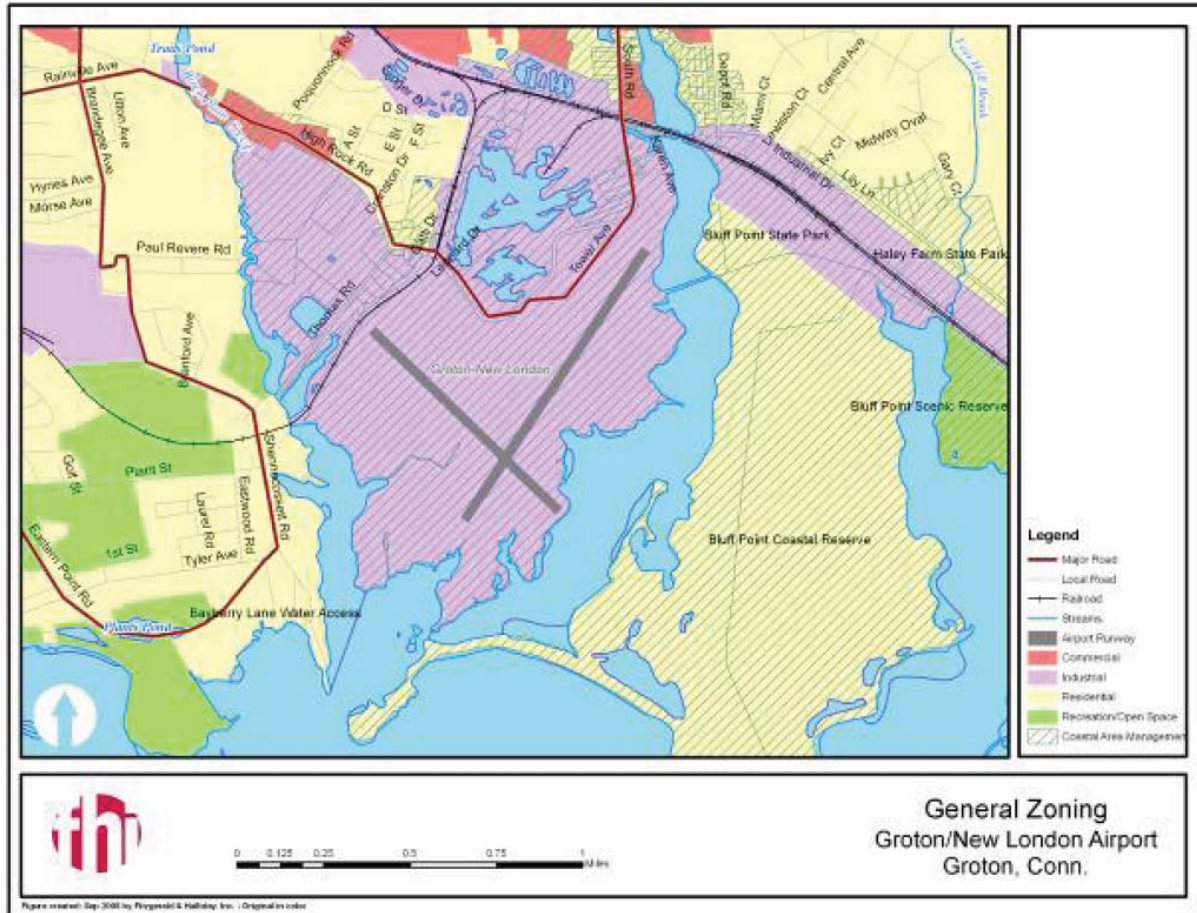
Columbia Air Services and Terminal Area



Airport Layout Plan



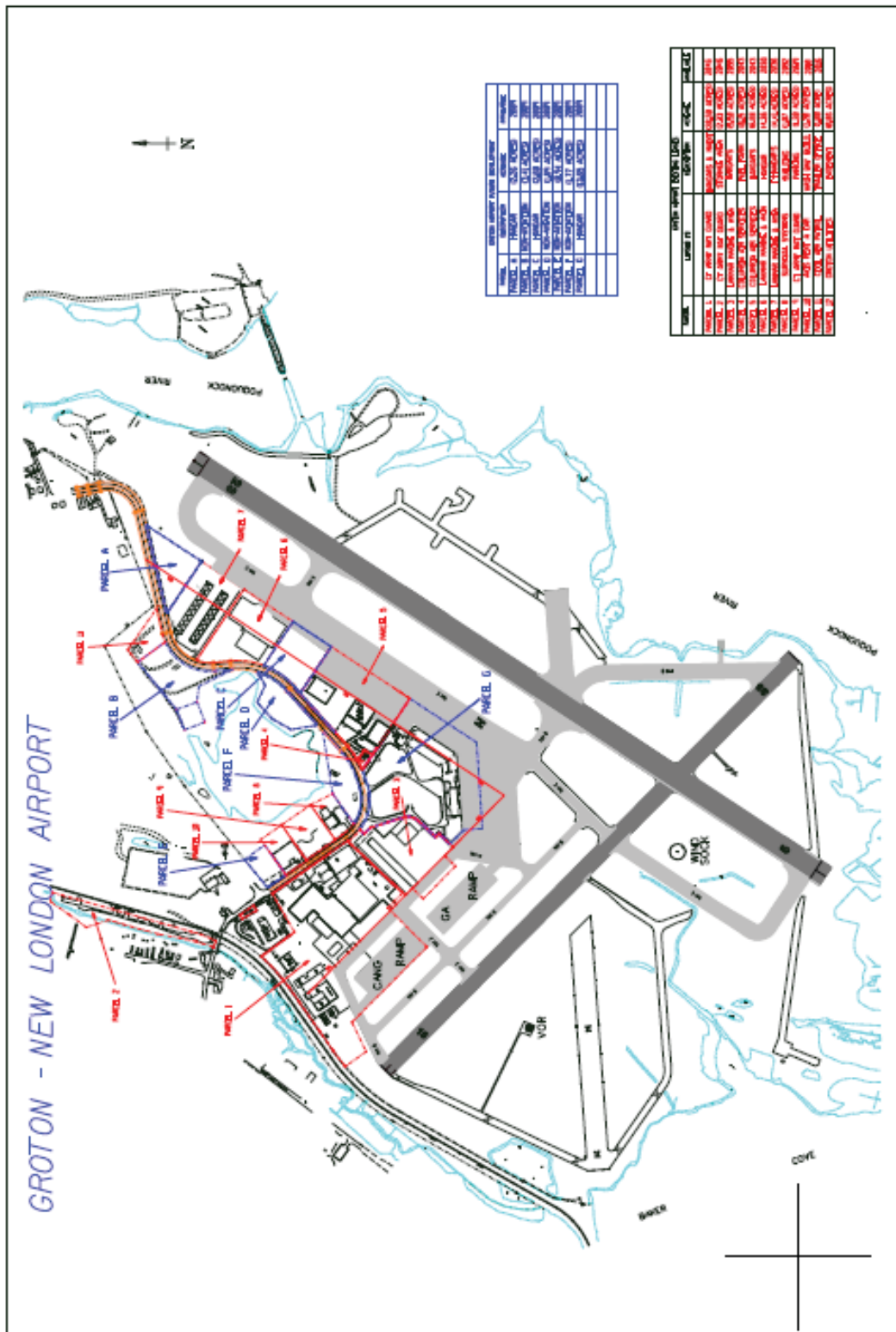
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Zoning Map



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Groton Airport Land Use



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ZONING

According to the Town of Groton zoning map (October, 2003), the Groton-New London Airport falls entirely within the industrial IA-40 Zone. The IA-40 zone has a minimum lot size requirement of one acre (or 40,000 square feet) with a maximum building coverage of 40 percent. 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

As is the case with Brainard airport, Groton has a scarcity of airside land, and a significant presence of the Connecticut State military occupying significant portions of the airside property inventory. Unlike the other airports under study in this exercise, Groton has a state operated passenger terminal which is capable of supporting Part 139 air carrier service if provided by airlines wishing to serve the airport. The balance of the property is occupied by two fixed base operations, and several parcels that have been developed by third-party entities with hangar facilities. There is some room for development on the existing airside land, and if it were determined it was desirable, existing facilities could be removed and replaced with newer properties.

It is also impacted by the presence of the Indian tribe casinos and is influenced by aircraft which travel to the area carrying gamblers and others who wish to visit the Foxwoods Casino. Foxwoods Resort Casino is a hotel-casino in Mashantucket. Together with the MGM Grand at Foxwoods, it is one of the largest casino complexes in the world in terms of floor space for gaming. The entire resort comprises 4,700,000 sq ft of space. The casino has over 380 gaming tables including blackjack, craps, roulette, and poker. Foxwoods has 1,416 hotel rooms and a two story arcade for children and teens. Due to the proximity of the casino to New York City, a steady stream of first-rate talent and entertainment is available, and the casino has been successful in attracting a reliable constituency over the course of its existence. Additionally, it is the only casino which is within reasonable distance of the rest of New England.

In addition to the casino, the General Dynamics Electric Boat Company is a major defense contractor, and also has an impact on the utilization of Groton. Columbia Air Services, began to develop their property in earnest in the early 1990s, and now has three large open bay hangars and a terminal facility that was constructed in 2004. A second fixed base operation, Lanmar Aviation, developed the facility next to Columbia along with a T hangar component in 2002 and 2003.



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Columbia Air Services also has a significant maintenance operation, which focuses on the repair and upgrading of the Piper Cheyenne turboprop line along with other maintenance activity related to turbine aircraft. Columbia's sales operation handles the TBM single-engine turbo props, and this particular model has proved popular with owner-pilots over the years. This diversification beyond the normal fixed base operation staples of selling fuel and offering hangar space, has added to the stability of the operation, and currently Columbia has four other locations in Farmingdale, New Jersey, Bar Harbor, Maine, Rutland, Vermont and Lakeland, Florida. Columbia is one of the few independently owned chains that still exist in the United States. The maintenance operation also provides additional support to the general economic infrastructure of the region due to the skilled nature of the mechanics required to perform these services.

With the presence of two fixed base operations already existing on the facility with recent construction, it is unlikely that there will be a foreseeable demand from another pure fixed base operator. The demographic of the aircraft owners then surround the Groton-New London area is somewhat inferior to those found in the greater Hartford region. This creates some limitations with regard to absorption and demands of airside property, and the open bay hangars which exist on the facility operated by the two FBOs should satisfy the foreseeable demand. Additionally, there are both T hangars offered by one of the FBOs for lease, and also condominium type development for aircraft owners that desire this particular type of space.

It is currently under consideration to redevelop the terminal area that is not only located at a prime location with regard to the airport operational surfaces, but also yields a potential development parcel of just over 12 acres. Due to the physical characteristics that pertain to airline terminal operations, the site is already improved with a large amount of usable apron area, along with the requisite airside and landside connections for aircraft and automobiles. The demolition of the existing structures would yield a significant parcel of land. The depth of this particular parcel could also offer non-aviation possibilities, without compromising the aeronautical potential of the site.

Land



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Due to the solid level of demand and recent activity that has pertained to the vacant airside property at Groton, there is an existing range of rentals which constitutes an excellent barometer of demand for land. Land that pertains to the sites occupied by both fixed base operations, currently leases for \$.30 per square foot in the case of the main supporting parcels, and Lanmar has a T hangar parcel which leases for \$.23 per square foot. Based on the level of comparability with other airside land leases for airports in Groton's general market area, this is a competitive rate, and is exceeded by airside land at much larger facilities to the north in Providence, Rhode Island, or general aviation airports that have a better location and overall demographic such as Brainard Airport in Hartford. The main adjustments pertinent to the three airside parcels which are designated for future development by the state of Connecticut relate largely to size and location.

Parcel A is located at the easternmost section of the airport, and is a triangular shaped parcel of 2.2 acres. It is adjacent to the departure end of Runway 23, and its location is good with regard to this particular operational surface. Its visibility is less desirable because of this particular location on the airport, and it is less likely to be sought after by a commercial aviation operation that would require a more pronounced presence. It would be appropriate for corporate hangars or other noncommercial applications that could feasibly fit on the site. Its triangular shape creates some problems with regard to the type and position of improvements which would be most appropriate for the site, but in the case of a non-commercial property which does not require large amounts of apron area, this would be less of a problem. We believe that the site's size allows it to be leased in its entirety, and we have determined that the overall rental rate per square foot is as follows:

Parcel A

	<u>Acres</u>	<u>Per Sq. Ft.</u>
Site Size:	2.26	\$0.30
Supporting Proprietary Ramp Rental:		<u>\$0.00</u>
Adjusted Land Rental:		\$0.30
Overall Annual Rental:		\$29,534



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Parcel C is a rectangularly shaped site which is essentially located between the two competing fixed base operations on the airport. It is level, and offers good visibility from both the airside and the landside. The site is approximately 2.7 acres, and can be utilized for a wide variety of airside applications. The site could conceivably be utilized by either fixed base operation, depending on their requirements, or the site could be used for a corporate hangar or a standalone specialty operation such as an avionics shop. It offers relatively few challenges relating to the physical characteristics that are embodied in it, and what impact they may have on development. It requires very little adjustment for any individual characteristics and is a primary development site on the airport. Its overall valuation is as follows:

Parcel C

	<u>Acres</u>	<u>Per Sq. Ft.</u>
Site Size:	2.60	\$0.35
Supporting Proprietary Ramp Rental:		<u>\$0.00</u>
Adjusted Land Rental:		\$0.35
Overall Annual Rental:		\$39,640

Partial G is the site which is essentially supporting the existing terminal at Groton Airport. As previously mentioned, there is currently no airline service available to the airport, and the terminal functions as offices for airport management, and there are also several tenants in the facility. The future of air service at Groton is questionable given the changes which are currently taking place in the airline industry. The terminal is a modest facility, and we are informed that it was constructed in the early 1970s. By leveling the terminal and opening the site up for various forms of airside development, a large, contiguous parcel which is essentially located at the intersection of the two runway systems is created.

12 acre sites are large, and occupied by substantial fixed base operations when they are located on general aviation airports like Groton. There may be a variety of applications that could include air cargo and other air carrier activities depending on the local demand. It would be prudent to consider that if partial G were available for aviation applications, it would be



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subdivided based on the relatively remote likelihood that a single user would take down the entire property.

We have therefore developed a matrix of value which envisions different sized parcels being leased to unrelated entities for aviation applications. We recognize that the elimination of the existing improvements would create a wide variety of possibilities with regard to the configuration of this particular parcel. It is deep with regard to the distance from the setback lines relating to the taxiway and the road system which provides vehicle access from the landside portion of the airport. Our valuation considers the entire parcel to be utilized as an aeronautical property and the main adjustment we have applied relates to the amount of land leased by an individual tenant, and the appropriate discounting which would be most likely applied given the large aggregate acreage contained on the property. The overall value is presented as follows:

Parcel G

	<u>Acre</u>	
Site Size:	12.65	
	<u>Acre</u>	<u>Per Sq. Ft.</u>
Site Size:	1 - 3	\$.35- \$.37
	<u>Acre</u>	<u>Per Sq. Ft.</u>
Site Size:	3-6	\$.30- \$.35
	<u>Acre</u>	<u>Per Sq. Ft.</u>
Site Size:	6-9	\$.28- \$.30
	<u>Acre</u>	<u>Per Sq. Ft.</u>
Site Size:	9-12	\$.30

T hangars

The market for T hangars at Groton is heavily influenced by the inventory which was created by Lanmar Aviation parcel located to the east of its main fixed base operation facility. Unlike most FBOs who have generally avoided constructing T hangars in the northeast as a part of their facilities, Lanmar built a complex consisting of 36 T hangars. These units are condos, and represent what we feel is a viable marketplace given the characteristics of the airport and the particular demand in Groton area.



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Based on comparable data for leased T hangars that pertain to were recently constructed units, the rental rates exhibited at Groton represent market rates.

T Hangar Rental Rates

	<u>Monthly Rent.</u>
T- Unit	\$350.00
End Unit	\$375.00

Open Bay Hangars

As previously mentioned, the open bay hangars that are not occupied by the Connecticut Air Guard, have been built by the two fixed base operations on the airport. There are five open bay hangars utilized in this capacity, and three are owned by Columbia, and two are owned by Lanmar. These facilities are utilized in a variety of applications, with Columbia employing two of the three hangars in support of their maintenance and avionics operations. Lanmar utilizes both of its hangars for storage purposes. The hangars were all built after 1993 and exhibit modern characteristics and construction.

There is also terminal area which is leased in the airline terminal by the state, and there is also office space in small quantities leased out by Columbia. Aircraft which are stored in either FBO, are tenants who lease space for individual aircraft. We have developed the matrix of value for open bay hangar space and terminal area based on the characteristics of the Groton marketplace and how it relates to comparable airports which may compete directly with it for particular types of tenants. The overall market rentals pertinent to this category of airside property are as follows:

Open Bay Hangar

	<u>Sq. Ft.</u>	<u>Rent</u> <u>Per Sq. Ft.</u>
Hangar Bay Size:	Varies	\$5.00 - \$8.00

Terminal Space

	<u>Sq. Ft.</u>	<u>Rent</u> <u>Per Sq. Ft.</u>
Counter Space:	Various	\$16.00



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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

United States, North America



Connecticut, United States, North America



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).

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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.



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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)



Airport & Aviation Appraisals, Inc.

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)



Airport & Aviation Appraisals, Inc.

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, 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 debarring 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 Nkts) 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 aviation 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-vem-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 band 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	White	Runway	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 purposed, 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.



Airport & Aviation Appraisals, Inc.

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.

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.

