Regional Airspace Report
A review of the current airspace system of North Central Texas

May 2010
REGIONAL AIRSPACE REPORT

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REGIONAL AIRSPACE REPORT

A. GLOSSARY

This section defines acronyms and abbreviations used throughout the document.

<table>
<thead>
<tr>
<th>Term</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>AGL</td>
<td>Above Ground Level</td>
</tr>
<tr>
<td>AMICC</td>
<td>Air Marine Interdiction Coordination Center</td>
</tr>
<tr>
<td>AOPA</td>
<td>Aircraft Owners and Pilots Association</td>
</tr>
<tr>
<td>ATC</td>
<td>Air Traffic Control</td>
</tr>
<tr>
<td>CBP</td>
<td>U.S. Customs and Border Protection</td>
</tr>
<tr>
<td>FAA</td>
<td>Federal Aviation Administration</td>
</tr>
<tr>
<td>FAR</td>
<td>Federal Aviation Regulations</td>
</tr>
<tr>
<td>GA</td>
<td>General Aviation</td>
</tr>
<tr>
<td>GPS</td>
<td>Global Positioning System</td>
</tr>
<tr>
<td>IFR</td>
<td>Instrument Flight Rules</td>
</tr>
<tr>
<td>MOA</td>
<td>Military Operation Areas</td>
</tr>
<tr>
<td>MSL</td>
<td>Mean Sea Level</td>
</tr>
<tr>
<td>NM</td>
<td>Nautical Miles</td>
</tr>
<tr>
<td>NOTAM</td>
<td>Notice to Airmen</td>
</tr>
<tr>
<td>RNAV</td>
<td>Area Navigation</td>
</tr>
<tr>
<td>SID</td>
<td>Standard Instrument Departures</td>
</tr>
<tr>
<td>SM</td>
<td>Statute Miles</td>
</tr>
<tr>
<td>TFR</td>
<td>Temporary Flight Restrictions</td>
</tr>
<tr>
<td>TRACON</td>
<td>Dallas/Fort Worth Terminal Radar Approach Control</td>
</tr>
<tr>
<td>U.S.</td>
<td>United States</td>
</tr>
<tr>
<td>VFR</td>
<td>Visual Flight Rules</td>
</tr>
<tr>
<td>VOR</td>
<td>Very High Frequency Omnidirectional Range</td>
</tr>
</tbody>
</table>
B. AIRSPACE CLASSIFICATIONS

To efficiently administer the significant air traffic that navigates the nation each day, the airspace within the United States (U.S.) is divided into several classes. Airspace around busy metropolitan airports has requirements that ensure the safe operations of arriving and departing aircraft. Requirements by classification include visibility minimums, cloud clearances, contact with Air Traffic Control (ATC), and special aircraft equipment. The classification system is visually depicted in Exhibit 1.

Exhibit 1: Visual Depiction of Airspace Classifications

Class A: All airspace above 18,000 feet mean sea level (MSL) to Flight Level 600 (approximately 60,000 feet). All flights within Class A must be operating under Instrument Flight Rules (IFR). Class A airspace contains all high altitude airways (jet routes).

Class B: The airspace surrounding major commercial airports. To enter this airspace a clearance must be received from ATC. Class B airspace, which typically covers the surface to 11,000 feet above MSL in most locations, surrounds Dallas/Fort Worth International Airport (DFW) and Dallas Love Field Airport (DAL) with an outer radius of approximately 30 nautical miles (NM). Student pilots are prohibited from landing or departing from DFW and must receive certain training before flying in North Central Texas Class B airspace.

Class C: The airspace found at airports that have an operational control tower, are serviced by a radar approach control, and that have a certain number of IFR operations other than Class B airports. Two-Way radio communication with ATC is required for all aircraft within Class C airspace. There is no Class C airspace within North Central Texas.
**Class D**: The airspace surrounding towered and military airports with a radius of five NM. Class D airspace surrounds the following thirteen airports in North Central Texas:

- Addison (ADS)
- Dallas Executive (RBD)
- Fort Worth Alliance (AFW)
- NAS Fort Worth JRB/Carswell Field (NFW)
- Collin County Regional in McKinney (TKI)
- Denton Municipal (DTO)
- Fort Worth Meacham International (FTW)
- Majors (GVT)
- North Texas Regional/Grayson County (GYI)
- Gainesville Municipal (GLE)
- Arlington Municipal (GKY)*
- Fort Worth Spinks (FWS)*
- Grand Prairie Municipal (GPM)*

Class D airspace for these airports covers surface to typically 2,500 feet above ground level (AGL). Within Class D airspace, aircraft are required to communicate with ATC. Only DTO has a standard Class D airspace configuration while residing under Class B. All other Class D airspace at airports under Class B have been modified so that either part of the lateral five-mile radius is truncated or the vertical limits have been lowered due to the boundaries of the Class B airspace. Exhibit 3 shows Majors Airport within a standard Class D airspace (blue dashed line) which is then surrounded by Class E airspace (shaded magenta band). Exhibit 4 shows Fort Worth Meacham International within a non-standard Class D airspace.
Note that Class B, C, and D airspace always begin at ground level, but vary in height and elevation. Depending on their geographic relationship, Class C and D may extend underneath the outer rings of adjacent Class B.

**Class E:** The general controlled airspace that includes most of the remaining airspace begins at 700 feet AGL (in most cases). This airspace contains low altitude airways. Exhibit 5 displays Class E airspace (shaded magenta band) incorporating Granbury Regional Airport and Bourland Airport. ATC communication is not required in Class E. However, standard procedures for aircraft operations at non-towered airports include announcing position and intentions on a common traffic advisory frequency (CTAF) assigned to the airport.
**Class G**: The uncontrolled airspace below Class E airspace, from the ground up to 700 feet, and in some cases 1,200 feet. Much of the rural areas in the region are within Class G airspace. Class G airspace is not depicted on navigation charts such as the sectional or Terminal Area Charts (TAC). Class G is the least restrictive in terms of communications, equipment, and clearance from clouds. Exhibit 6 details the variations of the elevation of Class G airspace within North Central Texas. Exhibit 7 displays Copeland Airport and Hicks Airfield as operating within Class G airspace under Class B airspace up to, but not including 700 feet AGL. Exhibit 8 displays Dublin Municipal Airport as operating within Class G airspace under Class E airspace up to, but not including 1,200 feet.

<table>
<thead>
<tr>
<th>Airport</th>
<th>Copeland</th>
<th>Dublin</th>
</tr>
</thead>
<tbody>
<tr>
<td>Class A</td>
<td>&gt;18,000’</td>
<td>&gt;18,000’</td>
</tr>
<tr>
<td>Class B</td>
<td>5,000’ – 11,000’</td>
<td>-</td>
</tr>
<tr>
<td>Class E</td>
<td>700’ – 5,000’</td>
<td>1,200’ – 18,000’</td>
</tr>
<tr>
<td>Class G</td>
<td>Ground – 700’</td>
<td>Ground – 1,200’</td>
</tr>
</tbody>
</table>

Source: FAA DFW Sectional Chart
**Special Use Airspace**: An area of special concern or restriction due to unusual hazards. Special use airspace is typically based on security and has posted restrictions and warnings that pilots are required to know. Contact and advisories with ATC is recommended when operating within most special use airspace. The most common Special Use Airspace types include:
• **Alert Areas**: Areas of unusual activity where caution is advised, but no special flight rules are enforced. Exhibit 9 shows the A-633 Alert Area near the Laughlin Air Force Base near the U.S.-Mexican border.

![Exhibit 9 – A 633 Alert Area](source)

• **Military Operation Areas (MOA)**: Designated for military flight traffic and training. Visual Flight Rules (VFR) flights are allowed to fly in these areas, but are advised to use caution. Exhibit 10 shows the Brownwood MOA outside of Dallas, Texas.

![Exhibit 10 – Brownwood MOA](source)

• **Military Training Routes (MTR)**: Military Training Routes are divided into Instrument Routes (IR), and Visual Routes (VR). Exhibit 11 shows MTRs near the Brownwood MOA.
Exhibit 11 – Military Training Routes

- **Restricted Areas:** Enclose possible risks to aircraft where flight is prohibited to aircraft without authorization. Exhibit 12 shows restricted area R-6302A outside of Waco, Texas within the Prohibit Area P-49.

Exhibit 12 – Restricted Area R-6302A

- **Prohibited Areas:** Restrict flight operations for national security or welfare reasons.
- **Warning Areas:** Extend from three NM off the shore of the U.S. coastline over domestic or international waters.
- **Temporary Flight Restrictions (TFR):** Areas issued by the Federal Aviation Administration (FAA) in a Notice to Airmen (NOTAM) for short term prevention of flights over an area for safety or security reasons. In some cases, TFRs are placed on an area indefinitely, such as the one over the Washington D.C. area.

There is one Special Use Airspace within North Central Texas, issued by the FAA through NOTAM #9/2934, centered over the Bush residence in Dallas, Texas, Exhibit 13. The airspace within this area has been classified as “National Defense Airspace” and pilots are not allowed to fly within this area up to 1,500 feet AGL if they do not have authorization from ATC.

**Exhibit 13: TFR over President Bush’s Dallas, TX Residence**

The next closest special use airspace outside of North Central Texas is Prohibited Area (P-49), Exhibit 14, in Waco, TX, approximately 75 NM to the southwest of DFW. This prohibited area (and other restricted areas, and TFRs) restricts most VFR flight transition to and from the southwest by aircraft and helicopters, thus significantly altered the changing air routes in that area.

**Exhibit 14: WACO Special Use Airspace Depiction**
Other TFRs such as Comanche Peak Nuclear Power Station (Comanche Peak) have restricted the use of airspace within 10 miles of nuclear containment facilities. Potentially significant long-term effects on air operations of airports and heliports have occurred whenever this particular TFR is activated by a NOTAM. All traffic must divert around or get vectored around the TFR as necessary, extending flight type. Facilities within the study area affected by Comanche Peak include:

- Granbury Municipal (GDJ), Granbury - Public
- Running M Ranch (09F), Glen Rose - Private
- Circle P Ranch (41TA), Glen Rose - Private
- Wyatt 3 Rivers (8TS7), Glen Rose - Private
- Little “L” Ranch (TX61), Glen Rose - Private
- Wright Ranch (TX93), Glen Rose – Private
- Nassau Bay (0TX0), Granbury - Private
- Pecan Plantation (0TX1), Granbury – Private (Airpark)
- Parker (TX89), Granbury – Private
C. REGIONAL CHARACTERISTICS

Several characteristics are present within the airspace of North Central Texas that can be attributed to regional aspects of aviation activity and geography. The presence of two primary commercial service airports within Class B airspace (DFW and DAL) creates irregularities in its shape, as shown in Exhibit 15, and has the potential to reduce the airspace capacity for IFR flights due to the intermixing of traffic. While this is not a major complication for the commercial airports themselves according to ATC, it can cause difficulties for GA traffic operating in and around Class B airspace. Pilots need to be familiar with the various ceiling levels of Class B airspace and use extra caution due to large jet traffic. There are several public-use airports that either lie within or below Class B airspace as listed in Exhibit 16.

Exhibit 15: Commercial Air Service Airports in North Central Texas

Source: FAA DFW Terminal Area Chart
## Exhibit 16: Public-Use Airports within or below the Class B

<table>
<thead>
<tr>
<th>Airport Name</th>
<th>Location</th>
</tr>
</thead>
<tbody>
<tr>
<td>Addison</td>
<td>Garland/DFW Heloplex</td>
</tr>
<tr>
<td>Aero Country</td>
<td>Grand Prairie Municipal</td>
</tr>
<tr>
<td>Air Park – Dallas</td>
<td>Hicks Airfield</td>
</tr>
<tr>
<td>Arlington Municipal</td>
<td>Kenneth Copeland</td>
</tr>
<tr>
<td>Collin County Regional</td>
<td>Kittyhawk</td>
</tr>
<tr>
<td>Dallas Executive</td>
<td>Lakeview</td>
</tr>
<tr>
<td>Dallas Love Field</td>
<td>Lancaster</td>
</tr>
<tr>
<td>Dallas South Port</td>
<td>Mesquite Metro</td>
</tr>
<tr>
<td>Dallas CBD Vertiport</td>
<td>Mid-Way Regional</td>
</tr>
<tr>
<td>Denton Municipal</td>
<td>Northwest Regional</td>
</tr>
<tr>
<td>Ferris Red Oak Municipal Heliport</td>
<td>Propwash</td>
</tr>
<tr>
<td>Fort Worth Alliance</td>
<td>Rhome Meadows</td>
</tr>
<tr>
<td>Fort Worth Meacham International</td>
<td>Rockwall Municipal</td>
</tr>
<tr>
<td>Fort Worth Spinks</td>
<td>Sycamore Strip</td>
</tr>
</tbody>
</table>

Source: CHA Aviation Development Team

Other irregularities in the airspace can complicate operations at other facilities in the region, such as Addison Airport (ADS) as shown in Exhibit 17. The proximity of ADS to DFW and DAL, coupled with the high level of small jet traffic operating in and out of ADS, results in the need for better control of the aircraft via more restrictive airspace, but not at the level of Class B. Traffic is accommodated at ADS by starting the Class B ceiling at 2,000 feet rather than the surface, which enables aircraft to operate at ADS without a clearance from ATC; communication with the control tower is required. The FAA has recently proposed changes in this area to obtain positive control over the aircraft as discussed in section F below.

## Exhibit 17: Airspace Surrounding Addison Airport

Source: FAA DFW Terminal Area Chart
Arrival and Departures

The flow of traffic in and out of DFW is considered a “four-post” design. As shown in Exhibit 18, there are four arrival routes and four departure routes. Departure routes are centered on north, south, east and west while arrival routes are to the northeast, northwest, southeast, and southwest. It is relatively unusual for key commercial airports to be centered within a region, allowing for this pattern to be used effectively.

As DFW and DAL handle flights from all points in the U.S. (east, west, north, and south), this design reduces congestion by allowing flights to have a standard approach and departure in each direction with minimal crossing. The controllers can utilize the standard routes, and adjust accordingly, when congestion occurs by rerouting flights to different “posts”.

Exhibit 18: Four Post Design of DFW Traffic Flow

In order to automate the ATC procedure, FAA has published Standard Terminal Arrival Routes (STAR) and Standard Instrument Departures (SID) procedures. These procedures reduce both
ATC and pilot workload by supplying predesigned arrival and departure routing to and from DFW and DAL. The addition of RNAV SIDs at DFW is discussed below in section F.

STARs into DFW include:
- Bonham Five
- Bowie Nine
- Cedar Creek Six
- Dodje Three
- Dumpy Two
- Finger Three
- Glen Rose Eight
- Gregs Five
- Jaggo Two
- Jonez Four
- Jumbo Two
- Knead Five
- Masty Two
- Motza Six
- Sasie Two
- Slugg Five
- Wilbr Three

SIDs out of DFW include:
- Akuna Two
- Ardia Three
- Belco Two
- Ceola Three
- Clara Two
- Dallas Eight
- Dartz Two
- Ferra Two
- Garland Two
- Grabe Two
- Hubbard Five
- Jacky Four
- Jaspa Two
- Joe Pool Three
- Keene Six
- Kingdom Five
- Lowgn Two
- Nelyn Two
- Nobly Two
- Podde Three
- Slott Two
- Soldo Two
- Texoma Nine
- Tri-Gate Five
- Triss Two
- Worth Five
- Wylie Five

U.S. Customs and Border Protection

Another aspect of airspace in North Central Texas is the Air Marine Interdiction Coordination Center (AMICC), which is part of U.S. Customs and Border Protection (CBP). In a combined effort with the Dallas/Fort Worth Terminal Radar Approach Control (TRACON), AMICC actively manages airspace in the region. Using one of the most modern air surveillance systems in the U.S., its mission is to stem the flow of illicit drugs coming into the country by aircraft, as well as to assist other federal, state and local law enforcement agencies.

Using comprehensive ground-based and airborne radar capabilities, this operation can detect aircraft and deploy personnel from a sophisticated armada of sensor-equipped interceptor planes and apprehension helicopters. Since 9/11, AMICC has had the responsibility of keeping vigilant watch over U.S. airspace. These vital components of homeland security provide 24-hour surveillance of high priority targets and perform airspace security missions.
Regional Climate

North Central Texas is subject to quick changes in the weather patterns; which can have a large impact on air operations. Thunderstorms can easily and quickly overload a typically uncongested airspace system. Controllers in North Central Texas must closely monitor the weather across the country and understand the affect it can have on local activity. The arrival of a thunderstorm affects the commercial and GA traffic in and out of airports and controllers must appropriately adjust traffic flows to ensure that sequencing and congestion is manageable and delays are reduced as much as possible.

D. REGIONAL AIR TRAFFIC CONTROL OPERATIONS

The tasks of an air traffic controller include assessing weather impacts, managing air traffic sequences, resolving aircraft conflicts, routing or planning flights, and situational monitoring. Controllers are responsible for safety and efficiency while managing at a fast pace numerous aircraft with arrivals, departures, and across controlled airspace. There are two types of controllers: 1) those who manage the traffic flow on the ground at, and in the immediate vicinity of, an airport and work in the ATCT tower mostly by visual reference; and, 2) those who manage the airspace between airports, and the arrival and departure of aircraft and work in large darkened rooms that can radar track flights from liftoff to touchdown. The number of aircraft communicating with the ATC depends on time of day, facility size and weather. A controller must be able to work and think clearly at all times to avoid potential incidents. DFW has a typical airfield capacity of 120 operations per hour.

A controller works forty hours a week and has elevated pay rates for overtime and holidays. Controllers work rotating shifts between days, nights, and weekends. The pressure associated with controlling air traffic creates a need for them to be well qualified and in good health. In addition to having related experience or an educational background, ATC candidates must pass a written test, an interview, and regular proficiency and physical examinations. The maximum age to become a controller is 30, and 56 is the mandatory retirement age. Long term stress-related health risks have been associated with air traffic control, leading to a range of stress intervention practices including personal health management, counseling, and workplace organization.

Typically, airport controllers work in the cab of the control tower surrounded by tinted windows in order to control aircraft movements. Radio, computer, telephone, and display equipment is placed strategically to maximize the comfort and efficiency of controller operations. Radar control centers are not typically located in the top of control towers since visual guidance is not required. Controllers at DFW work in one of three control towers located on the airfield. The central tower’s visibility of the airfield became obstructed in the mid 1990s due to the construction of airfield buildings. Thus, east and west towers were constructed, making DFW the only airport in the world to utilize three air traffic control towers.

Control towers in North Central Texas are technologically advanced, allowing for smooth operations. A management program allows the controllers to track the queue of each corridor and set a specific capacity limit. The program can then forecast the activity for the next hour based on filed flight plans, thus notifying controllers of future congestion. The controllers can then reroute traffic. DFW has a typical capacity of around 120 operations per hour when clear
conditions exist and approximately 90-95 operations per hour when the visibility deteriorates. The substantial airfield infrastructure, controlled airspace, and level of technology present allows for North Central Texas to handle a higher level of capacity than other regions.

The TRACON for Class B operates out of DFW’s central tower location near the center of the airfield and has four operational stations; terminal arrival, terminal departure, east satellite, and west satellite. The satellite stations are one of the main reasons Class B airspace is able to handle the high level of GA traffic so efficiently. These stations control the traffic to the east and west that do not have DFW as their destination; such as DAL, ADS, and FTW.

Density of Airports

Within North Central Texas, an approximate 15,696 square mile area, there are approximately 400 aviation facilities, 57 of which are public use. Of these public-use airports, approximately 21 are located within 30 NM from DFW as listed in Exhibit 19.

Exhibit 17 demonstrates that within the 30 NM radius, the number of public-use airports is similar to other metropolitan regions in the U.S. However, the high density of reliever airports compared to other regions indicates that more airport services and capacity is needed to support the GA traffic in North Central Texas. This ratio implies a higher level of, or greater dependency on GA activity than other regions.

<table>
<thead>
<tr>
<th>Region</th>
<th>Commercial</th>
<th>Reliever</th>
<th>General Aviation</th>
<th>Non-NPIAS</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>North Central Texas</td>
<td>2</td>
<td>11</td>
<td>1</td>
<td>7</td>
<td>21</td>
</tr>
<tr>
<td>Chicago</td>
<td>3</td>
<td>5</td>
<td>7</td>
<td>7</td>
<td>22</td>
</tr>
<tr>
<td>Houston</td>
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<td>2</td>
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<td>Los Angeles</td>
<td>4</td>
<td>13</td>
<td>2</td>
<td>6</td>
<td>25</td>
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<tr>
<td>New York City</td>
<td>3</td>
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<td>2</td>
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<td>Orlando</td>
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<td>4</td>
<td>1</td>
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<td>San Francisco</td>
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<td>Seattle</td>
<td>2</td>
<td>4</td>
<td>3</td>
<td>13</td>
<td>22</td>
</tr>
</tbody>
</table>

Source: CHA Aviation Development Team

There are 13 airports, as shown in Exhibit 20, within North Central Texas that have an ATC. Of these, six towers operate under the Contract Tower Program. The FAA’s Air Traffic Division administers the funding for the operation of Level 1 VFR air traffic control towers through contract agreements with qualified vendors on a regional basis. This federal “Contract Tower” program is effective in reducing the cost of providing ATC services so that many locations which would have otherwise seen their ATC services eliminated can continue to benefit from the services of an ATC tower facility. Depending on the airport's activity type and level, the FAA may fund some or all of the cost of operating the control tower. The airport sponsor is responsible for the remaining costs, if any.
Exhibit 20: ATCT in North Central Texas

<table>
<thead>
<tr>
<th>Federal Tower</th>
<th>Contract Tower</th>
</tr>
</thead>
<tbody>
<tr>
<td>Addison</td>
<td>Arlington Municipal</td>
</tr>
<tr>
<td>Dallas/Fort Worth International</td>
<td>Dallas Executive</td>
</tr>
<tr>
<td>Dallas-Love Field</td>
<td>Denton Municipal</td>
</tr>
<tr>
<td>Fort Worth NAS/JRB</td>
<td>Collin County Regional</td>
</tr>
<tr>
<td>Fort Worth Alliance</td>
<td>Grand Prairie Municipal</td>
</tr>
<tr>
<td>Fort Worth Meacham</td>
<td>Fort Worth Spinks</td>
</tr>
<tr>
<td>Greenville-Majors</td>
<td></td>
</tr>
</tbody>
</table>

Source: FAA 5010 and Federal Contract Tower Program

E. INSTRUMENT / VISUAL FLIGHT RULES AIRCRAFT OPERATIONS

There are two basic types of aircraft flight rules within the ATC system: VFR and IFR. They are determined by visibility conditions and specify the required flight procedures and operations for aircraft and given weather conditions.

VFR operations depend primarily on the following: good visual conditions including weather minimums of at least a 1,000-foot ceiling and three statute miles (SM) of visibility; control of the aircraft; separation from other objects and aircraft; and, flight path which is generally the responsibility of the pilot. The primary collision principal under VFR is "see and avoid." Pilots flying under VFR assume responsibility for their separation from all other aircraft and are generally not assigned routes or altitudes by air traffic control. Aircraft operating under VFR navigate by orientation to geographic points and other visual references, as well as the utilization of navigation aids such as Very High Frequency Omnidirectional Ranges (VORs) and Global Positioning Systems (GPS). A flight plan is not required for VFR operations, but is recommended, and ATC typically directs VFR operations in only airspace where radar coverage is available.

North Central Texas has a high degree of flight training activity that generally operates under VFR. This training activity adds flight congestion and necessitates ATC to monitor a large volume of air traffic to ensure safety and compatibility between VFR and IFR operators. Students and other VFR pilots can request “flight following” from ATC which provides pilots with assistance from controllers who view the aircraft's path via radar and will alert the pilot of any relevant air traffic information and separation. Controllers at DFW provide flight following to all VFR flights that request it. Aircraft receiving flight following may be delayed or rerouted by controllers to ensure safe integration of all activity. The difference occurs in how they are sequenced or transitioned into their destination airport.

IFR operations depend primarily on radar detection by ATC for separation or flow management. IFR operations are designed for weather conditions that are below that of VFR weather minimums. As such, during IFR operations aircraft are controlled from takeoff to touchdown. IFR traffic is required to follow headings and guidelines given by ATC to ensure proper separation. Outside of controlled airspace, IFR traffic is responsible for its own clearance from the ground and other aircraft. It is important to note that most IFR flights are not operating in bad weather...
conditions, as commercial activity always file IFR flight plans. Instrument Meteorological Conditions (IMC) are when conditions exist that require IFR operations, however commercial and some GA flights may still follow IFR under VFR weather conditions. IFR air traffic utilizes the ATC system more than does VFR traffic.

F. NEXT GENERATION AIR TRANSPORTATION SYSTEM (NEXTGEN)

The Next Generation Air Transportation System (NextGen) is a multi-faceted federal initiative to combine the capabilities of satellite-based and other emerging technologies with the need to accommodate increasing levels of air traffic, especially aircraft operating in constrained airspace and at congested airports. The NextGen program seeks to implement safer and more efficient departure, en route, and arrival procedures to improve the overall capacity of the nation’s airport/airspace system. Benefits indicated by the implementation of NextGen technology and procedures include:

- **Direct Flight Operations** – Pilots will have the ability and authority to select specific flight paths, rather than being required to follow existing airways defined by ground based navigational aids. To do this safely, each aircraft will communicate precise location, altitude, direction, airspeed and other data to other aircraft and to air traffic managers, to avoid conflicts, and enable sequencing when required.

- **Collaborative Air Traffic Management** – Imbalances created by uneven demand on existing airport and airspace capacity can be managed through stronger collaborative efforts among air traffic managers and aircraft operators. Increases in the scope, volume and distribution of available data provided by NextGen will serve to improve the quality of participation in decision-making processes.

- **Reduced Weather Impacts** – NextGen will reduce the impact of weather on air traffic flows by improving the decision-making process through better information sharing. New technologies will be employed to sense existing and impending inclement weather, improve weather forecasting, and to integrate weather data into the data dissemination process.

- **Improved Airfield Capacity** – NextGen will provide the capability of providing more efficient procedures to improve airport surface movements and reduce air traffic spacing and separation requirements. Doing so will allow better management of the flows into and out of the constrained airspace of major metropolitan areas to enable the maximum use of high-demand airports. It should be noted that DFW and by extension, the North Central Texas system of airports, have been officially identified by the FAA as being in a capacity-constrained area.

- **Expand Capacity of Airfields and Terminals** – NextGen will expand the capacity of the national air transportation system by encouraging the use of underutilized airport and terminal facilities. By providing the same capabilities available to the larger airports, a broader definition of “reliever airport” can expand the ability of congested regions to handle increasing activity without requiring extensive capital improvements.
Reduced Cost of Delays – The FAA estimates that by 2022, $22 billion will be lost annually due to operational delays and other system inefficiencies. By 2033, the number increases to over $40 billion annually if left unabated. NextGen is designed to rapidly introduce cost-effective measures to enhance the ability for the national air transportation system to absorb additional activity by reducing existing inefficiencies and reducing delays.

The continuing implementation of NextGen programs (see examples below) include a move away from ground-based surveillance and navigation equipment and procedures based on this technology and places a greater reliance on the capabilities and flexibilities of the new and more dynamic GPS procedures.

Surveillance Program

Airport Surface Detection Equipment Model X (ASDE-X)

ASDE-X is a system that allows air traffic controllers to see, via a monitor in the tower, the precise location of every aircraft and vehicle on the airport’s runways, taxiways and ramps. ASDE-X receives its information about aircraft and vehicle location from a variety of sources, not just radar, automatically transmitting the most accurate targets to the screen. ASDE-X is in use at 12 airports and will be installed at an additional 35 airports by the end of 2010.

Automation Program

En Route Automation Modernization (ERAM)

ERAM is replacing the computers used by controllers controlling the high altitude airspace at the en route centers. When implemented ERAM will double the capacity to process and display traffic to controllers, and will display both radar and ADS-B targets. In addition to processing the flight radar data that is shown on controller screens, ERAM provides safety alerts, including altitude and conflict warnings.

Advanced Technologies and Oceanic Procedures (ATOP)

ATOP significantly reduces the intensive manual processes that limit the ability of controllers to safely handle airline requests. ATOP replaces the current oceanic air traffic control systems and procedures by:

- integrating flight and radar data processing
- detecting conflicts between aircraft
- providing satellite data link communication and surveillance capabilities
- eliminating the need for paper flight strips
Communication Program:

System Wide Information Management (SWIM)

SWIM is an advanced technology program designed to facilitate greater sharing of Air Traffic Management (ATM) system information, such as airport operational status, weather information, flight data, status of special use airspace, and National Air Space (NAS) restrictions. SWIM will support current and future NAS programs by providing a flexible and secure information management architecture for sharing NAS information.

From an airspace standpoint, NextGen will allow pilots the ability to specify direct routes for their flight rather than fly established routes along with up-to-date, accurate information about other pilots in the immediate area and weather. This data transferred electronically through the NextGen system will reduce the volume of communication and information required to be processed through ATC, increasing the traffic volume that they can handle. It is also expected that the system will significantly reduce flight delays due to operational and system inefficiencies.

NextGen will serve to expand the capacity of the national air transportation system by encouraging the use of underutilized airport and terminal facilities. By providing the same capabilities available to the larger airports, a broader definition of “reliever airport” can expand the ability of congested regions to handle increasing activity without requiring extensive capital improvements. The implementation of NextGen will help to ensure that there will continue to be adequate room to accommodate future traffic and the development of new approach and departure procedures for each of the region’s airports.

Area Navigation (RNAV) Implementation at DFW

In September 2005, the FAA implemented 16 Area Navigation (RNAV) Standard Instrument Departures (SID) at DFW using GPS technology. Approximately 95 percent of commercial aircraft operating out of DFW are equipped to fly these RNAV IFR departures. RNAV allows pilots to fly directly from one pre-assigned point (or waypoint) to another, rather than having to depart using vectors or assignments from ATC, thus resulting in better traffic flow in the terminal airspace surrounding DFW. RNAV significantly reduced the dispersion of flight operations in the region by condensing the flight tracks to specific corridors. As of March 2006, DFW gained seven to eight percent departure capacity and reported a reduction in controller-pilot communications due to the reduce need to issue vectors for departing aircraft. American Airlines has estimated that the new RNAV SID saves $15 million annually at DFW (one of its main hubs) due mainly to reduced fuel costs. Exhibits 21 and 22 compare the typical flight tracks with conventional SID and RNAV SID.
Exhibit 21: Comparison of Conventional SID to RNAV SID

Source: ICAO Regional Seminar on Performance – Based Navigation

Exhibit 22: Comparison of Conventional SID to RNAV SID

Source: ICAO Regional Seminar on Performance – Based Navigation
ADS-B

Automatic Dependent Surveillance – Broadcast (ADS-B) is one of the newest technologies to be utilized by ATC as part of the FAA’s NextGen. ADS-B allows for pilots and controllers to monitor and control aircraft with more precision over a larger area than capable of before. The name is derived from the fact that the system is always operating, is dependent on an accurate GPS signals, provides surveillance services, and continuously broadcasts the data to other pilots and ATC via ground equipment. Unlike receiving broadcast aircraft position reports, the accuracy does not degrade with range, atmospheric conditions, or altitude. This accuracy has the potential for allowing pilots to fly at reduce separation distances, reducing the risk of mid-air collisions and weather related incidents, improving situational awareness, and providing efficient routes in adverse weather conditions. Aside from the obvious safety benefit, ADS-B will increase the capacity of the system to accommodate additional traffic.

The cost, footprint, and power requirements are significantly smaller than conventional radar, allowing for ABS-B to be available in the most remote areas. This reduced cost per unit will reduce the overall cost of managing the air transportation system for the nation.

The system was tested in Alaska by the Surveillance and Broadcast Services’ Western Service Area because of the high level of dependence on aviation for transportation, the mountainous terrain, and harsh climate. Research in Alaska showed that 38% of the accidents between 1994 and 1996 could have been prevented with the use of ADS-B, real-time weather and position to terrain and traffic. The successful testing in Alaska demonstrates the usefulness of ADS-B to enhance safety. The Segment 1 expansion, Exhibit 24, which is expected to be complete by September 2010, includes Ontario, CA; Garden City, KS; North Platte, NE; Kansas City, KS; Louisville, KY; Gulf of Mexico; and Philadelphia, PA. The full integration of ADS-B will take approximately 20 years to complete.

Exhibit 23: Current ADS-B Coverage

Source: FAA
The expansion into the Gulf of Mexico, Exhibit 25, which was expected to be completed in March 2009, will include the installation of 22 ADS-B ground stations on oil platforms and the shore, 35 weather sensor stations, seven new communication stations, and the utilization of 12 existing communication stations.

**Exhibit 25: Houston, Texas ADS-B Coverage**

Source: FAA

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**G. REGIONAL CONSTRAINTS**

With two heavily used commercial service airports in North Central Texas, operational constraints are placed on the other airports in the system, depending on the location of the airport and runway orientation. NextGen technologies could help alleviate these constraints in the future in the ways discussed above.

The immediate area surrounding DFW and DAL is a constrained location due to the need for positive control of aircraft with the high level of commercial traffic. This requirement affects airports to the northeast such as ADS and potentially the airports to the south, depending on an increase in their level of activity or aircraft types. At reliever airports, airspace is already constrained due to its geographic location to Class B. Much of the activity at ADS is related to
business activities, but a high number of recreational and training flights still operate at the airport. Based on these constraints, if future growth continues to rise, a surrounding airport could also serve as a type of secondary reliever would provide an alternative location primarily for non-business related GA traffic in order to reduce congestion. This “reliever” would need to be chosen based on proximity to ADS and on services and facilities available.

Lancaster Municipal Airport (LNC) has expressed an interest in increasing its role and activity level. Increased activity may affect the airspace based on the type of aircraft utilized and the requirements for new instrument approaches. Currently, no instrument approach exists into the runway from the north. The orientation of the runway may conflict with the traffic flow from DFW as shown by the dashed line in Exhibit 26. Discussions with TRACON suggest that conflicts are not anticipated with additional instrument approaches at LNC, but this would need to be evaluated by the FAA prior to any installation.

Exhibit 26: Lancaster and DFW Orientation

The addition of commercial air service at an airport within the region could add congestion to the system if not closely evaluated. This possibility was reviewed in the northeast, Exhibit 28, due to the population growth trends evaluated through other components completed for the System Plan as well as the southeast for additional possibilities, Exhibit 29. It was assumed for this review that a relatively standard Class C airspace would be used, as shown in Exhibit 27 at Daytona Beach International Airport, Florida. Class C airspace typically begins at the surface and extends to 4,000 feet for 5NM and then starts from 2,500 feet to 4,000 feet from 5 to 10NM.
Exhibit 27: Class C Airspace at Daytona Beach International Airport

Source: FAA Orlando Sectional Chart

As it is unlikely that additional commercial service would be scheduled at an airport within 20NM of DFW, this evaluation assumed the airport would be 20 to 30NM from DFW for the northeast. This 30NM distance would still include it within all or part of the Mode C ring and ATC influence of Class B. For this example, it is assumed that the level of commercial activity would be moderate.

For the southwest it was assumed the commercial service would at an airport just outside of the Mode C and Class B influence so as to evaluate the effects. In this location there are more airports within Class E airspace that would be affected by Class C airspace.
An evaluation by the FAA would determine if Class C, D, or an extension of the Class B airspace would be more appropriate. In general, the future activity level at the airport would be
the primary factor in determining the airspace (i.e., level of control) class necessary. Initial commercial service would likely only require Class D airspace, with conversion to Class C if activity grew to small hub level. The standard Class C design would affectively increase positive control of VFR traffic from the surface to 4,000 feet AGL where it would have not been previously. As shown in Exhibit 30, Norman Y. Mineta San José International Airport (SJC) is an example of a modified Class C design due to surrounding Class B airspace of San Francisco International Airport (SFO).

Exhibit 30: Modified Class C Airspace

The arrival and departure routes into a new commercial airport would need to be evaluated for their impact on the four post design of traffic flow at DFW as these potential commercial lie directly under the arrival corridor of aircraft arriving from the northeast or southeast. The current Class B airspace begins at 4,000 feet AGL which corresponds to the highest altitude of a potential Class C in both locations; thus a conflict is not anticipated. Although in both examples, the extended runway centerline may intersect the extended centerlines of the runways at DFW and DAL, they are located well over 20 miles apart; conflicts would be manageable.

A review of the FAA DFW TAC and DFW instrument approach plates and discussion with the DFW TRACON concludes that additional commercial service within North Central Texas would not impose upon the current activity other than tighter controls on GA traffic within the immediate vicinity of the airport. The DFW TRACON also indicated that traffic flow to all airports could be reasonably managed with appropriate coordination.

The region may also be able to accommodate an additional airport, depending upon the specific location. It is recommended that if a new airport was to be constructed that it be done so within the 30NM Mode C ring, but further than 20NM from DFW and below the Class B airspace.
Within 20NM of DFW, the current land use and population densities are not generally conducive to a facility beyond those already established. The floor of the Class B airspace varies from the surface to 3,000 feet within this area, which can inhibit transitioning GA traffic. By establishing the airport within the Mode C ring, but below the Class B airspace, aircraft are required to be equipped with an altitude reporting transponder, but do not need ATC clearance to operate. An airport directly outside of the Mode C ring may cause potential difficulties as some pilots without transponders may inadvertently enter the area. This would result in ATC not being able to accurately determine their altitude and adjust traffic as necessary.

There are additional airspace factors that should be considered when determining a specific location for a new facility within North Central Texas:

- While the tower farm in Cedar Hill is within the 20NM, it should be noted as a significant obstruction and may affect instrument approaches.
- The runway alignment should be reviewed in conjunction with the extended centerlines of DFW and DAL. While the ATC has said that they will work to accommodate all instrument approaches in the region, it should be considered when planning for the location of the airport.
- The “high density” area in the northeast near Addison should also be considered due safety and congestion. Jet traffic would be restricted at the airports due to airspace separation requirements if they were in too close of proximity. GA traffic would also need to be extra cautious in this area due to the high density traffic of jets.
- A new facility should also avoid the others airports with Class D airspace as they too will have higher traffic. It is unlikely that the potential demand would justify the construction of an additional airport within such close proximity.

While it is apparent that the regional airspace system could accommodate additional facilities within reason, a FAA evaluation would need to take place for any specific sites to ensure that it would not disrupt the existing airspace system or that local obstructions would not disrupt flight patterns.

H. FEDERAL AVIATION ADMINISTRATION PROPOSED CHANGES

In 2008, the FAA proposed changes to the DFW Class B airspace, which GA pilots and aviation organizations have questioned. The Aircraft Owners and Pilots Association (AOPA) utilized its AD HOC Committee to review and comment on the changes and to setup meetings to inform the public; local communities have also organized to review and respond to the FAA.

As shown in Exhibit 31, the proposed changes include reducing the Class B ceiling in several locations around DFW. The FAA states that the changes will allow ATC and TRACON to better contain the aircraft operating on the arrival and departure routes of DFW and DAL. Lowering the ceiling from 3,000’ to 2,500’ Mean Sea Level (MSL over airports such as Lakeview and Addison) could potentially reduce the operating capabilities at these airports as well as those transitioning through Class B airspace. The modified ceiling would condense transient traffic at ADS into the flight path of pilots operating within the traffic pattern of the airport. The FAA states that many of the aircraft operating out of ADS are already following the path informally created by the proposed changes.
Pilots are concerned about safety and congestion at airports affected by the reduced ceiling. The need to circumvent newly congested areas increases fuel costs from traveling greater distances to avoid Class B airspace. The FAA is currently planning another round of meetings to address the public comments.

Exhibit 31: Proposed FAA Class B Airspace Changes

Source: FAA

I. CONCLUSION

Airspace, by its nature, is a finite resource and must be managed wisely to avoid saturation. While the current airspace system is effectively managed, airspace in and around North Central Texas could become overly congested at a point in the future. This is most likely to occur during inclement weather conditions when, barring unforeseen improvements in technology or reduction in separation standards, airspace congestion may cause the need for capacity controls. Of course, the heaviest users of the system during these conditions would be commercial aircraft operating into and out of DFW and DAL. They would likely enjoy a higher priority than GA operators. This would not preclude the use of the outlying GA airports for handling GA traffic, but may require their occasional use for diverting air carrier flights if necessary.

Such congestion may require additional measures to further expand the area of the Class B airspace and perhaps to redesign airspace procedures to accommodate additional traffic and sustain adequate levels of safety for all users. It can be concluded that additional airports more than 20NM from DFW, instrument approaches, or Class C airspace could be accommodated within North Central Texas without negatively affecting the existing airspace system.
1 David Hughes, FAA Accelerates Performance-Based Navigation, Outlines Mandates (Online: Aviation Week, July 30, 2006).

2 Small hub status is reached when the percentage of annual passenger boardings reaches 0.05%. As an example, Corpus Christi International is a small hub, with approximately 400,000 annual enplanements and Class C airspace.