BASICS FOR AIR TRAFFIC CONTROL – VFR CHARTS AND PUBLICATIONS

MODULE OVERVIEW

Purpose: The purpose of this module is to introduce you to the Sectional Aeronautical chart, the VFR Terminal Area chart, and the Chart Supplement (formerly the Airport/Facility Directory).

MODULE OUTLINE

Lesson: Sectional Aeronautical Charts

Purpose: The purpose of this lesson is to describe the information that is displayed in Sectional Aeronautical charts.

Objective:

- Identify contents and information in a Sectional Aeronautical chart

Topics:

- Sectional Aeronautical Charts
  - Description
  - Layout of Charts
- Types of Information Presented
  - Publication Information
  - Effective Dates
  - Geographical Area Presentation
  - Maximum Elevation Figure (MEF)
  - Highest Terrain and Contour Information
- Knowledge Check
- Types of Information Presented *(Continued)*
  - Chart Legend
  - Airport Information
  - Airport Data
- Knowledge Check
- Types of Information Presented *(Continued)*
  - Radio Aids to Navigation
  - Communication Boxes
  - Airport Traffic Service and Airspace Information
  - Obstructions
  - Miscellaneous
  - Topographic Information
- Knowledge Check
- Types of Information Presented *(Continued)*
  - Facility Frequencies
  - Control Tower Frequencies
  - Class B, Class C, Terminal Radar Service Area (TRSA) and Selected Radar Approach Frequencies
  - Special Use Airspace (SUA)
  - Prohibited, Restricted, Alert, and Warning Areas
  - Military Operations Areas (MOAs)

- Knowledge Check
- Review/Summary

Exercise – Symbol Search

Question and Answer Session – *Parking Lot*

Lesson: VFR Terminal Area Charts

Purpose: The purpose of this lesson is to describe the information that is displayed in Visual Flight Rules (VFR) Terminal Area charts (TACs) and Chart Supplements.

Objectives:

- Identify contents and information in a VFR Terminal Area chart
- Identify Chart Supplements

Topics:

- VFR Terminal Area Charts (TACs)
  - Description
  - Class B Operating Rules
  - VFR Flyway Planning Chart Legend
- Knowledge Check
- Chart Supplement
  - Description
  - Contents
  - Legend
  - Miscellaneous Information
- Knowledge Check

Video – VFR Cross-Country Flying (12:47 mins.)

- Review/Summary

Exercise – Chart Supplement

Exercise – VFR Charts and Publications Practice

Activity – VFR Chart Review Activity

Question and Answer Session – *Parking Lot*

End-of-Module (EOM) Test

INTRODUCTION

LESSONS	■ Sectional Aeronautical Charts ■ VFR Terminal Area Charts
TOTAL ESTIMATED RUN TIME	4 hrs. 02 mins.
MODULE CONTENT	■ Module Overview ■ Lesson: Sectional Aeronautical Charts ■ Exercise – Symbol Search ■ Q&A Session – Parking Lot ■ Lesson: VFR Terminal Area Charts ■ Exercise – Chart Supplement ■ Exercise – VFR Charts and Publications Practice ■ Q&A Session – Parking Lot ■ End-of-Module Test

FACILITATOR INSTRUCTIONS	**DELIVERY METHOD**
■ Instruct students to select ***VFR Charts and Publications*** module link within Blackboard ■ Instruct students to read the module introduction and then wait quietly for additional instructions	Blackboard
	EST. RUN TIME
	2 mins.

Visual Flight Rules (VFR) navigation is accomplished by matching what is seen outside the cockpit with the features found on a chart. Pilots must be able to interpret the symbols and landscape markings on the chart and correlate them with the real world in order to keep track of their position over the ground.

VFR pilots use several charts and publications to assist them in flight. By becoming familiar with these, you can be of greater assistance to the VFR pilot flying through your airspace.

Each chart or publication serves a different purpose, and the VFR pilot must know how to use them all. You also need to have a thorough knowledge of these publications so you can communicate knowledgeably with the pilot.

The purpose of this module is to introduce you to the Sectional Aeronautical chart, the VFR Terminal Area chart, and the Chart Supplement (formerly the Airport/Facility Directory).

FACILITATOR INSTRUCTIONS	DELIVERY METHOD
■ **ENABLE *Sectional Aeronautical Charts*** lesson in Blackboard ■ Instruct students to navigate to the ***Sectional Aeronautical Charts*** lesson in Blackboard ■ Instruct students to work individually through the lesson content ■ Upon completion of the lesson, students should review previously introduced content or wait quietly until other students have completed	Blackboard **EST. RUN TIME** 20 mins.

SECTIONAL AERONAUTICAL CHARTS

Purpose: The purpose of this lesson is to describe the information that is displayed on Sectional Aeronautical charts.

Objective:

- Identify contents and information in a Sectional Aeronautical chart

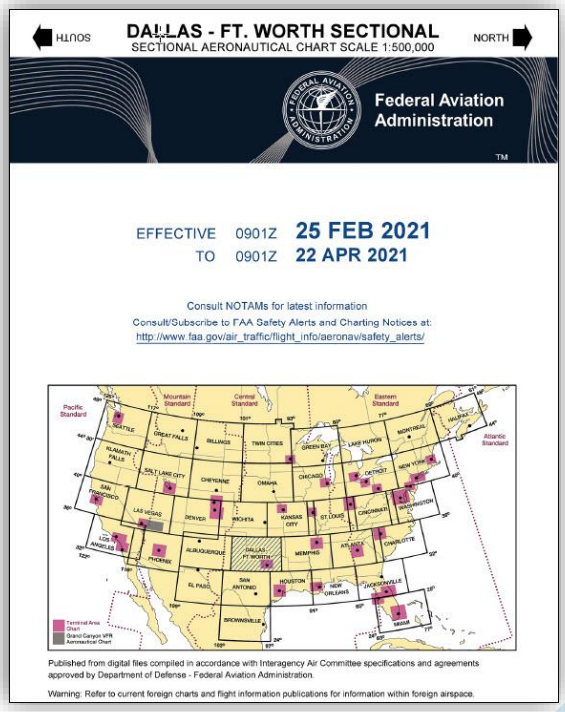
References for this lesson are as follows:

- FAA Order JO 7110.65, Air Traffic Control
- Sectional Aeronautical Chart and Terminal Area Charts, Chart Legends
- FAA Aeronautical Chart User's Guide
- Aeronautical Information Manual (AIM)

Sectional Aeronautical Charts

Sectional Aeronautical charts are designed to be used by slow and medium speed aircraft flying under Visual Flight Rules (VFR).

- Published every 56 days
- Used primarily for pilotage (navigation by use of visual landmarks)

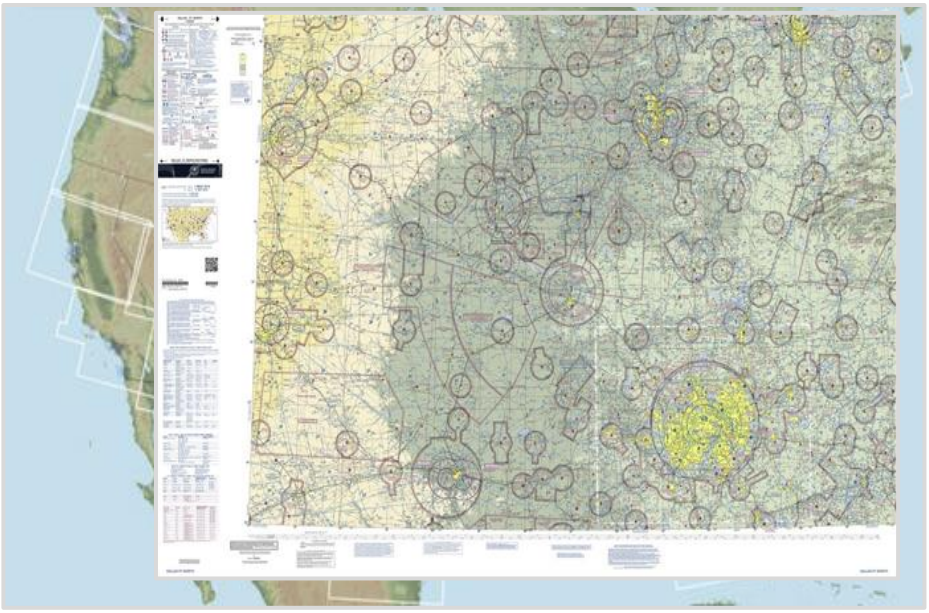


Layout of Charts

The geographical area is divided, normally with the north half on one side and the south half on the other.

- Some overlap exists to aid the pilot in planning and following a route of flight

Pilots generally orient charts either with north at the top or with the chart turned so that the aircraft's heading is at the top.



Types of Information Presented

Sectional Aeronautical Charts depict topographical and aeronautical information, including:

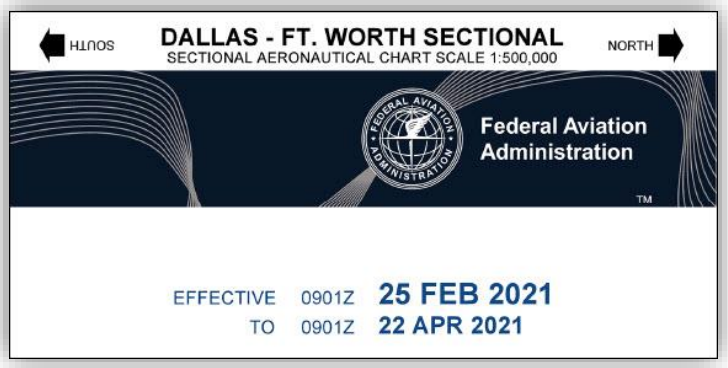
VFR Checkpoints	A selection of VFR checkpoints (artificially constructed as well as natural features)
Radio Navigation Aids (NAVAIDs)	Radio aids to navigation, such as very high frequency omnidirectional ranges (VORs), VOR tactical air navigation system (VORTACs), VOR-distance measuring equipment (DME), and non-directional beacons (NDBs)
Airways	Low altitude federal airways
Airports	Airport diagrams showing runway alignment and related data
Controlled Airspace	Types of controlled airspace, including Class B, C, and D areas
Special Use Airspace (SUA)	MOAs, Restricted, Prohibited, Alert, and Warning Areas
Obstructions	Obstructions and elevation information
Frequencies	Communication frequencies

Note: *This listing is just a sampling of information found on the Sectional Aeronautical Chart.*

Publication Information

The following dates are shown on the chart:

- Effective date upon which the map can be used for navigation
- Date when current chart becomes obsolete



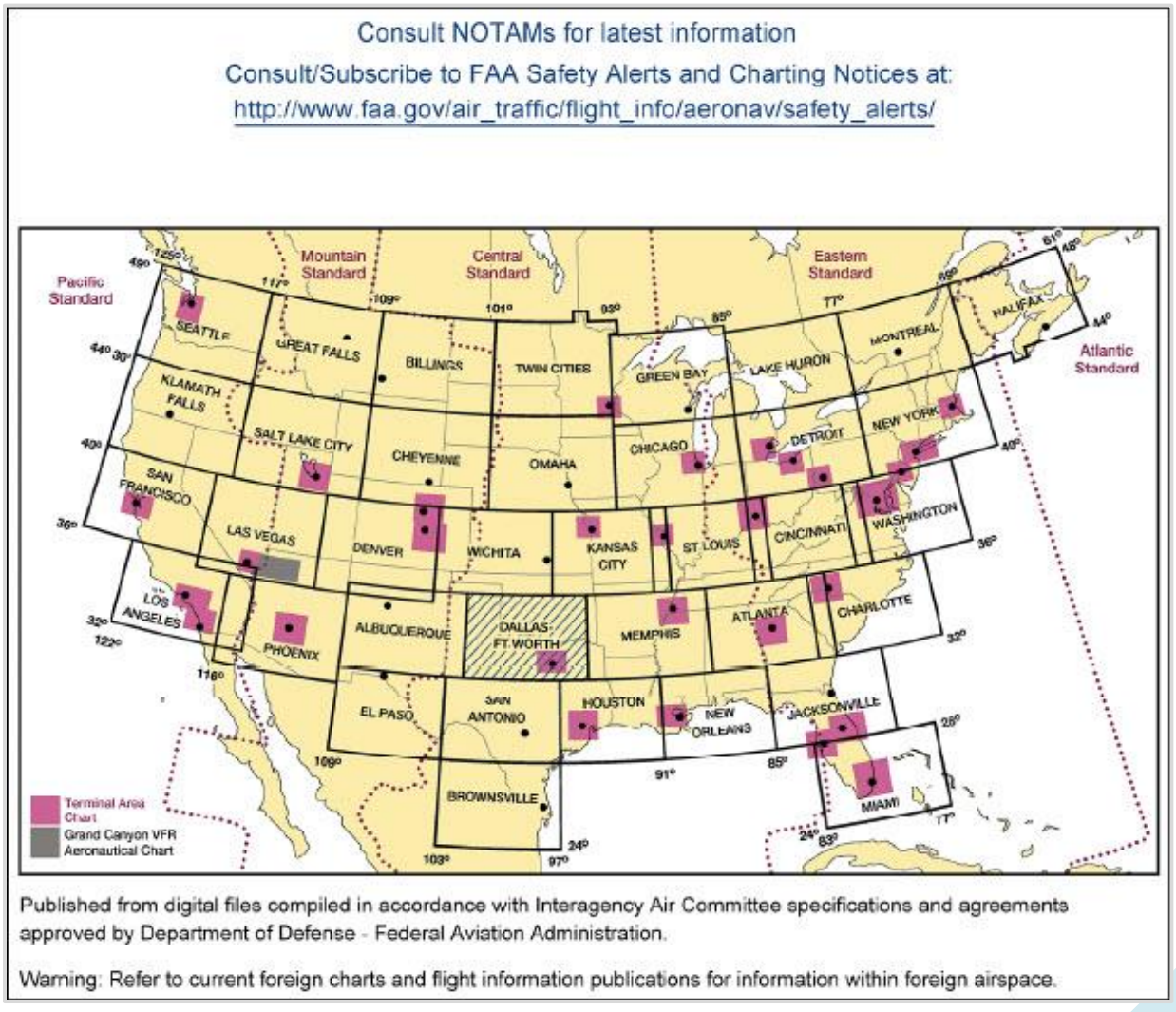
Geographical Area Presentation

Map of the U.S. shows the area covered by each sectional chart:

- Individual chart titles are listed within each coverage area
- Shaded region indicates area covered by this chart

Each chart is named after a major population center located within the chart's boundaries.

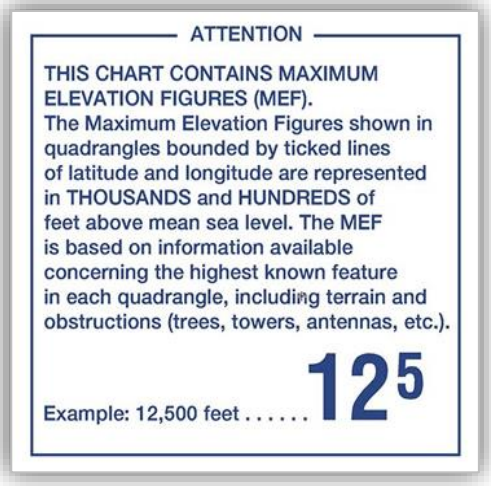
Map scale is 1:500,000 [1 inch = 6.86 Nautical Miles (NM)].



Maximum Elevation Figure (MEF)

MEF is shown in each quadrangle on the chart bounded by lines of latitude and longitude.

- This section indicates the elevation of the highest known feature (either terrain or obstructions) to be found within that section of the chart
- The **large number** represents **thousands** of feet, and the **small number** represents **hundreds** of feet above Mean Sea Level (MSL)
- Elevation is rounded up to the next higher 100 feet for safety reasons, except in areas of rapidly rising terrain, where an additional 250 feet may be added



Highest Terrain and Contour Information

Height of the highest terrain elevation on the chart and its location in latitude and longitude are depicted.

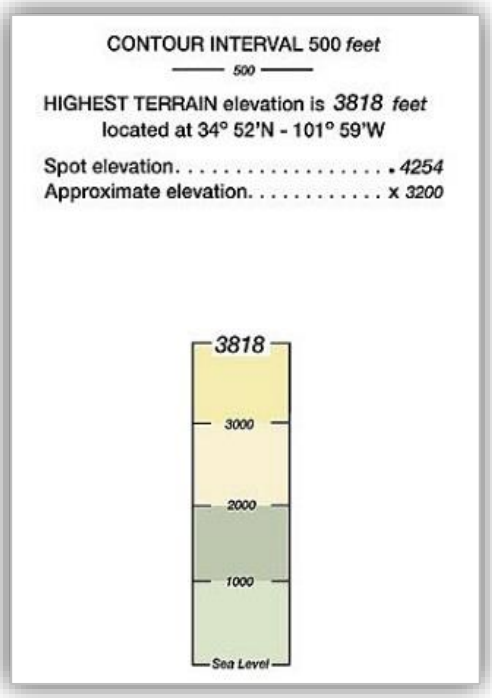
Basic terrain contour lines are generally spaced at 500-foot intervals.

- Gently sloping terrain may have intermediate contours at 250-foot intervals, while relatively featureless terrain may even display auxiliary contours at intervals ranging from 50 to 150 feet
- Widely spaced contours represent gentle slopes, while closely spaced contours represent steep slopes

Changes in elevation are indicated by changes in color or tint for easy recognition.

- Colors change every 1,000 feet

Note: *The Highest Terrain Elevation Figure differs from the MEF in that the Highest Terrain Elevation Figure considers only terrain features with no buffer built in. However, the MEF also includes artificially constructed objects (towers, etc.) and then rounds that figure up for safety.*



Knowledge Check A

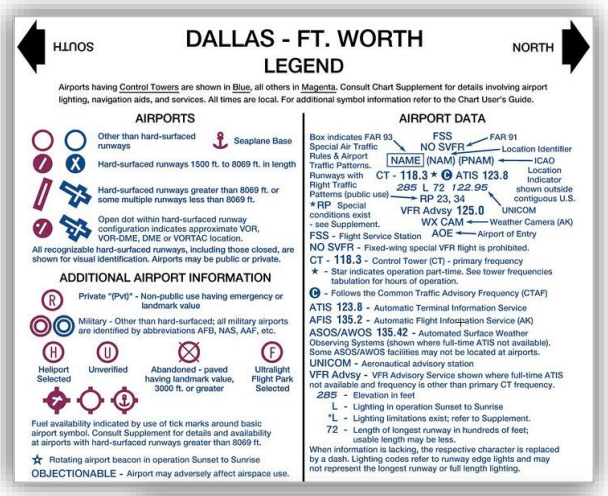
REVIEW what you have learned so far about Sectional Aeronautical charts. ANSWER the question listed below.

1. MEFs depict the elevation of the highest _____. *(Select the correct answer.)*
   - ❑ Topographical feature on the chart
   - ❑ **Known feature within each chart quadrangle**
   - ❑ Elevation rounded up to the next 1,000 feet

Chart Legend

The Chart Legend provides information on a variety of features, including:

- Airports and related data
- Symbols associated with radio NAVAIDs
- Communications information, including appropriate frequencies
- Airspace, obstruction, and topographic details



Airport Information

The Airport Information Section contains symbols for controlled and uncontrolled airports.

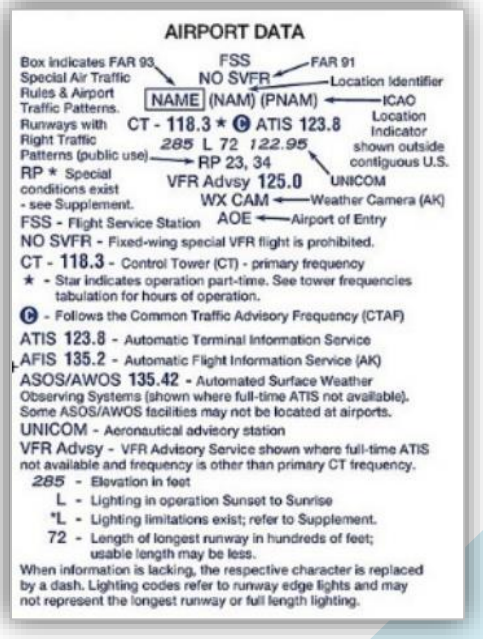
- Runway surface and orientation are depicted
- Military and private airports, as well as heliports and seaplane bases, are shown

Due to map scale, runways greater than 8,069 feet would protrude from the circle, so the circle was eliminated for those airports.

Airport Data

Lists information related to a particular airport, including:

- Frequencies, longest runway length, elevation above sea level
- Tower, Flight Service Station (FSS)
- Unicom
- Automated Surface Observation System (ASOS)/Automated Weather Observing System (AWOS), and Automatic Terminal Information Service (ATIS) frequencies, where applicable
- Runway lighting and other related details



Knowledge Check B

REVIEW what you have learned so far about Sectional Aeronautical charts. ANSWER the questions listed below.

2. How are airports with control towers always depicted? *(Select the correct answer.)*
   - ❑ **In the color blue**
   - ❑ By a circle with runway configurations shown
   - ❑ With the letter "T" next to the airport

3. In the airport data "450 L 51 122.7," what does the letter "L" indicate? *(Select the correct answer.)*
   - ❑ The category of NAVAID located at the airport
   - ❑ A left-hand traffic pattern is standard at that airport
   - ❑ **The airport has runway lighting**

4. In the airport data "4500 L 72 122.95," what does "4500" represent? *(Select the correct answer.)*
   - ❑ **Airport elevation above sea level**
   - ❑ Length of the longest runway
   - ❑ Height above sea level of the tallest obstruction within 5 NM

Radio Aids to Navigation

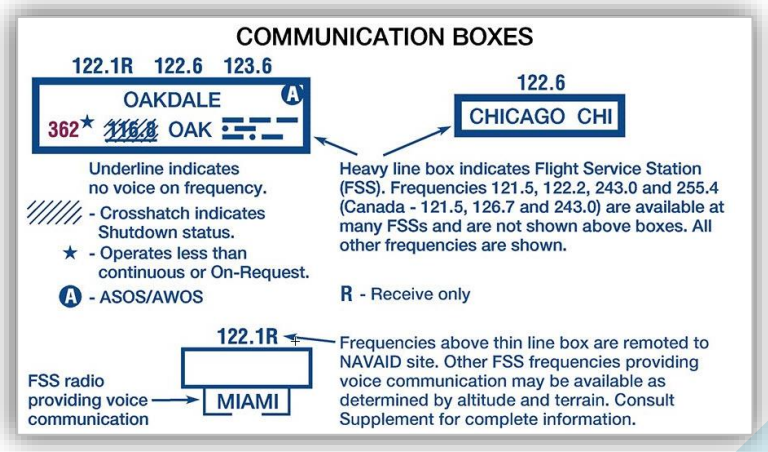
The Radio Aids to Navigation section depicts the symbols used for various NAVAIDs, including:

- VORs, VORTACs, and VOR-DMEs
- NDBs and NDB-DMEs
- Other facilities, i.e., FSS Outlet, RCO, WX CAM (AK) (see Supplement), etc.

Communication Boxes

Communication boxes list frequencies used for a variety of functions:

- FSS and local airport advisory service
- NAVAID information and related data



Airport Traffic Service and Airspace Information

Boundaries of airspace classes are indicated by different colors, shadings, and lines. Vertical limits are shown, when appropriate, and are MSL unless noted.

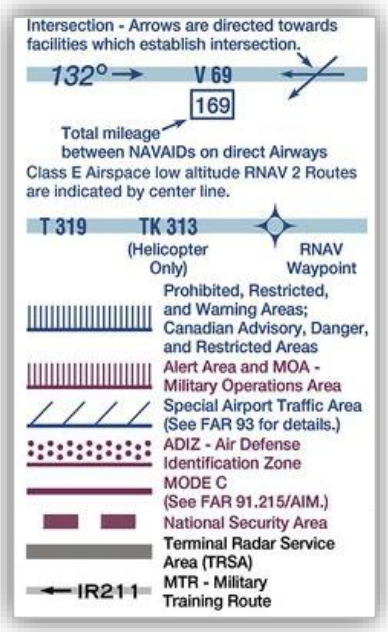
- Class B airspace – solid blue
- Class C airspace – solid magenta
- Class D airspace – dashed blue
- Class E airspace (at surface) – dashed magenta
- Class E airspace (at 700 feet above ground level [AGL]) – solid magenta (feathered)
- Class E airspace (at 1200 feet AGL) – solid blue (feathered)

Airway markings are depicted.

- Distance is depicted in nautical miles for low altitude federal airways on direct routes between NAVAIDs

SUA and Military Training Routes (MTRs) are depicted.

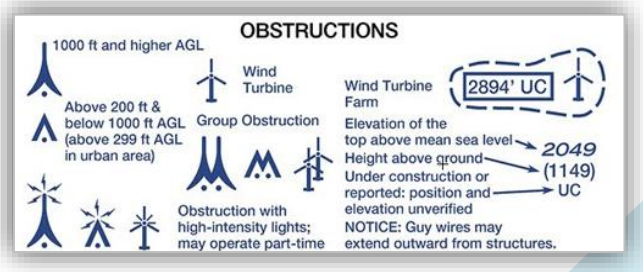
- Prohibited, Restricted, and Warning Areas – hatched blue
- Alert Areas and MOA – hatched magenta
- Special Airport Traffic Area – slanted, hatched blue
- ADIZ – dotted magenta
- Mode C area – solid magenta
- National Security Area – dashed magenta
- Terminal Radar Service Area (TRSA) – solid gray
- MTR – gray with route ID



Obstructions

Different symbols are used for obstructions extending above and below 1,000 feet AGL.

- Special symbols are used for group and lighted obstructions
- Altitudes above MSL and AGL are indicated

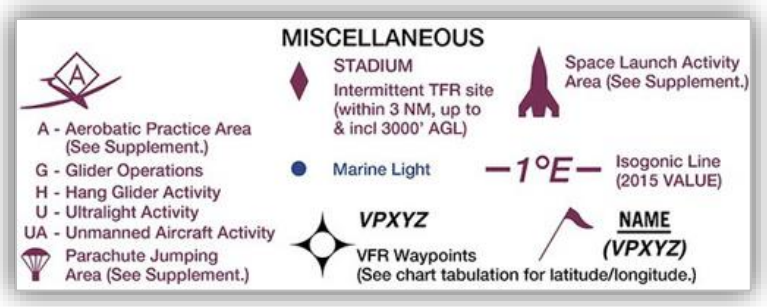


Miscellaneous

Lines of equal variation (isogonic lines) are indicated along with the degree of variation.

Markings show where ultralight aircraft, hang gliders, parachute jumping, and sailplanes are usually found.

- These markings assist pilots in avoiding these areas

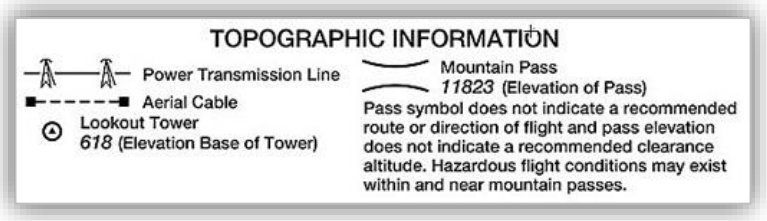


Prominent landmarks such as airports, large buildings, lakes, dams, cities, etc. are singled out as waypoints for VFR navigation.

Topographic Information

Numerous natural and artificially constructed features are identified for use in visual navigation.

- Specific symbols and drawings are used for roads, railroads, bridges, power lines, etc.
- Icons identify outdoor theaters, race tracks, tanks, wells, mines, etc.
- Lakes and dams are particularly useful because of their uniqueness



Knowledge Check C

REVIEW what you have learned so far about Sectional Aeronautical charts. ANSWER the questions listed below.

1. Communication boxes list frequencies used for a variety of functions including _____. *(Select the correct answer.)*
   - ❑ ARTCC frequencies
   - ❑ NAVAID information and related data
   - ❑ Automatic Terminal Information Service

2. The boundary of Class B airspace is always depicted in what color? *(Select the correct answer.)*
   - ❑ Magenta
   - ❑ **Blue**
   - ❑ Dark gray

3. The height of an obstruction is indicated on the chart in feet _____. *(Select the correct answer.)*
   - ❑ AGL
   - ❑ MSL
   - ❑ **AGL and MSL**

Facility Frequencies

Communication frequencies for those facilities located within the boundaries of the chart are listed on the reverse side of the Sectional Chart Legend flap.

Frequencies are divided into two sections for easier identification:

- Control tower frequencies
- Class B, Class C, TRSA, and radar approach frequencies

Control Tower Frequencies

Airports with control towers are listed in alphabetical order.

Control tower information includes:

- Operating hours and tower, ground, and ATIS frequencies
- Whether the facility can provide either an Airport Surveillance Radar (ASR) or Precision Approach Radar (PAR) approach

CONTROL TOWER FREQUENCIES ON DALLAS–FT WORTH SECTIONAL CHART

Airports with control towers are indicated on the face of the chart by the letters CT followed by the primary VHF tower frequency(ies). Information for each tower is listed in the table below. Operational hours are local time. The primary VHF and UHF tower and ground control frequencies are listed.

Automatic Terminal Information Service (ATIS) frequencies shown on the face of the chart are arrival VHF/UHF frequencies. All ATIS frequencies are listed in the table below. ATIS operational hours may differ from tower operational hours.

ASR and/or PAR indicate Radar Instrument Approach available.

"MON-FRI" indicates Monday through Friday.

O/T indicates other times.

CONTROL TOWER	OPERATES	TOWER	GND CON	ATIS	ASR/PAR
ABILENE RGNL	CONTINUOUS	120.1 257.8	121.7 348.6	118.25	ASR
ADDISON	0600-2200	126.0 239.0	121.6	133.4	
ALTUS AFB	0900-0230 MON-FRI CLSD HOL	119.65 254.4	121.85 275.8	273.5	
ARDMORE	0700-2300 MON-FRI 0700-1700 SAT-SUN	118.5 257.7	121.8	125.6	

Class B, Class C, Terminal Radar Service Area (TRSA), and Selected Radar Approach Frequencies

Class B, Class C, TRSA, and selected radar approach control frequencies are:

- Listed by quadrant (Northwest, Southwest, etc.)
- Defined by compass sectors (161° – 339°)

Hours of availability are listed for Class B, Class C, TRSA, and approach control facilities.

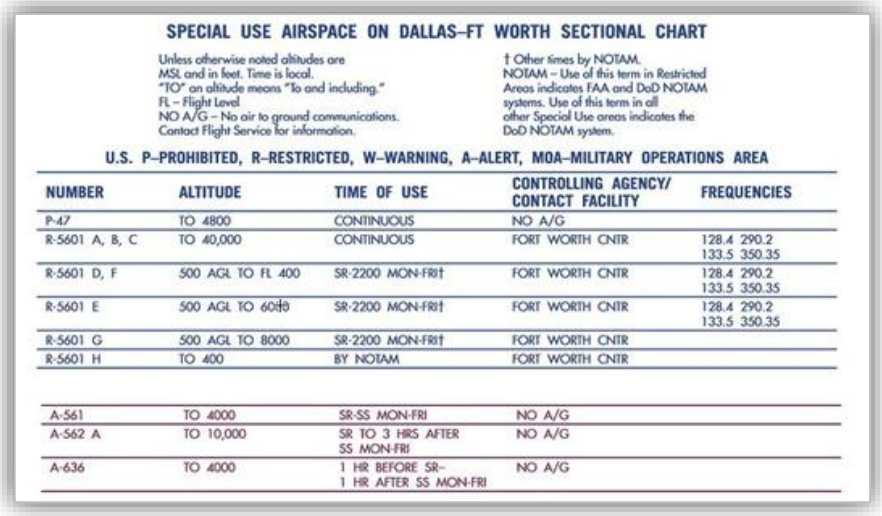
CLASS B, CLASS C, TRSA, AND SELECTED APPROACH CONTROL FREQUENCIES

FACILITY	FREQUENCIES	SERVICE AVAILABILITY
DALLAS-FT WORTH CLASS B	118.1 306.95 (NW) 135.975 379.9 (SW) 124.3 282.275 (NE) 125.2 343.65 (SE)	CONTINUOUS
ABILENE CLASS C	125.0 338.3 (E) 127.2 282.3 (W)	CONTINUOUS
AMARILLO CLASS C	119.5 307.0 O/T 127.85 285.475 ALBUQUERQUE CNTR	0600-2400 O/T CLASS E
LUBBOCK CLASS C	119.2 351.8	CONTINUOUS
OKLAHOMA CITY CLASS C	124.2 336.4 (001°-080°) 120.45 288.325 (081°-170°) 124.6 266.8 (171°-360°)	CONTINUOUS
TULSA CLASS C	119.1 351.8 (355°-174°) 124.0 338.3 (175°-354°)	CONTINUOUS

Special Use Airspace (SUA)

Information pertaining to SUA within the boundaries of the chart is listed on the reverse side of the Sectional Chart Legend flap.

- SUAs are divided into two sections for easier identification



SPECIAL USE AIRSPACE ON DALLAS–FT WORTH SECTIONAL CHART

Unless otherwise noted altitudes are MSL and in feet. Time is local. "TO" an altitude means "To and including." FL – Flight Level NO A/G – No air to ground communications. Contact Flight Service for information.

† Other times by NOTAM. NOTAM – Use of this term in Restricted Areas indicates FAA and DoD NOTAM systems. Use of this term in all other Special Use areas indicates the DoD NOTAM system.

U.S. P–PROHIBITED, R–RESTRICTED, W–WARNING, A–ALERT, MOA–MILITARY OPERATIONS AREA

NUMBER	ALTITUDE	TIME OF USE	CONTROLLING AGENCY/ CONTACT FACILITY	FREQUENCIES
P-47	TO 4800	CONTINUOUS	NO A/G	
R-5601 A, B, C	TO 40,000	CONTINUOUS	FORT WORTH CNTR	128.4 290.2 133.5 350.35
R-5601 D, F	500 AGL TO FL 400	SR-2200 MON-FRI†	FORT WORTH CNTR	128.4 290.2 133.5 350.35
R-5601 E	500 AGL TO 6000	SR-2200 MON-FRI†	FORT WORTH CNTR	128.4 290.2 133.5 350.35
R-5601 G	500 AGL TO 8000	SR-2200 MON-FRI†	FORT WORTH CNTR	
R-5601 H	TO 400	BY NOTAM	FORT WORTH CNTR	
A-561	TO 4000	SR-SS MON-FRI	NO A/G	
A-562 A	TO 10,000	SR TO 3 HRS AFTER SS MON-FRI	NO A/G	
A-636	TO 4000	1 HR BEFORE SR– 1 HR AFTER SS MON-FRI	NO A/G	

Prohibited, Restricted, Alert, and Warning Areas

Prohibited, Restricted, Alert, and Warning Areas are listed in numerical order within each category of SUA.

SUA information includes:

- Location
- Vertical limits
- Time of use
- Appropriate controlling agency for each SUA

SPECIAL USE AIRSPACE ON DALLAS–FT WORTH SECTIONAL CHART

Unless otherwise noted altitudes are MSL and in feet. Time is local. "TO" an altitude means "To and including." FL – Flight Level NO A/G – No air to ground communications. Contact Flight Service for information.

† Other times by NOTAM. NOTAM – Use of this term in Restricted Areas indicates FAA and DoD NOTAM systems. Use of this term in all other Special Use areas indicates the DoD NOTAM system.

U.S. P–PROHIBITED, R–RESTRICTED, W–WARNING, A–ALERT, MOA–MILITARY OPERATIONS AREA

NUMBER	ALTITUDE	TIME OF USE	CONTROLLING AGENCY/ CONTACT FACILITY	FREQUENCIES
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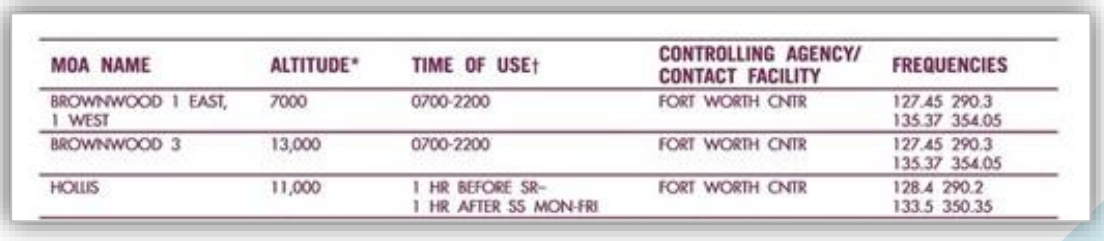
R-5601 A, B, C	TO 40,000	CONTINUOUS	FORT WORTH CNTR	128.4 290.2 133.5 350.35
R-5601 D, F	500 AGL TO FL 400	SR-2200 MON-FRI†	FORT WORTH CNTR	128.4 290.2 133.5 350.35

Military Operations Areas (MOAs)

MOAs are listed in alphabetical order.

MOA information includes:

- Lower vertical limit
- Time of use
- Appropriate controlling agency for each MOA



MOA NAME	ALTITUDE*	TIME OF USE†	CONTROLLING AGENCY/ CONTACT FACILITY	FREQUENCIES
BROWNWOOD 1 EAST, 1 WEST	7000	0700-2200	FORT WORTH CNTR	127.45 290.3 135.37 354.05
BROWNWOOD 3	13,000	0700-2200	FORT WORTH CNTR	127.45 290.3 135.37 354.05
HOLLIS	11,000	1 HR BEFORE SR– 1 HR AFTER SS MON-FRI	FORT WORTH CNTR	128.4 290.2 133.5 350.35

Knowledge Check D

REVIEW what you have learned so far about Sectional Aeronautical charts. ANSWER the questions listed below.

1. Control tower information in the control tower frequencies area includes: *(Select all correct answers that apply.)*
   - ❑ Runway lighting information
   - ❑ **ASR and PAR approach availability**
   - ❑ Only PAR approach availability
   - ❑ **Hours of operation**
   - ❑ **Tower, ground, and ATIS frequencies**

2. SUA information includes: *(Select all correct answers that apply.)*
   - ❑ **Location**
   - ❑ **Vertical limits**
   - ❑ **Time of use**
   - ❑ Usage details
   - ❑ **Controlling agency**

Sectional Aeronautical Charts Summary

Sectional Aeronautical charts are the primary navigational reference used by visual flight rules pilots and are designed for visual navigation of slow- to medium-speed aircraft.

FACILITATOR INSTRUCTIONS	DELIVERY METHOD
■ ***Note:*** The reference files used to complete the exercise are large and may require additional time to download ■ Instruct students to locate the student exercise ***Symbol Search*** in the printed ***Student Guide*** ■ Instruct students to locate the ***Dallas Ft-Worth Sectional*** reference in the ***Student Guide and References*** folder ■ Inform students to use this reference to answer questions ■ The exercise will be performed in groups of 2 or 3 individuals ■ Instruct students to locate the symbols represented in the reference ■ Record the location of the symbol and the meaning of the symbol ■ At the end of the exercise, randomly select students to provide answers orally ■ Encourage student discussion with this exercise and resolve any questions	Exercise **EST. RUN TIME** 30 mins.

EXERCISE: SYMBOL SEARCH

Purpose

This exercise promotes interaction and gives the student a hands-on opportunity to locate and identify symbols used on VFR charts.

Detailed Facilitator Instructions: *The reference required to complete this exercise is located in the* ***Student Guide and References*** *folder. Instruct and ensure students have located the reference before beginning the exercise. Display this page from Student Guide on the projector so students can see color of symbols.*

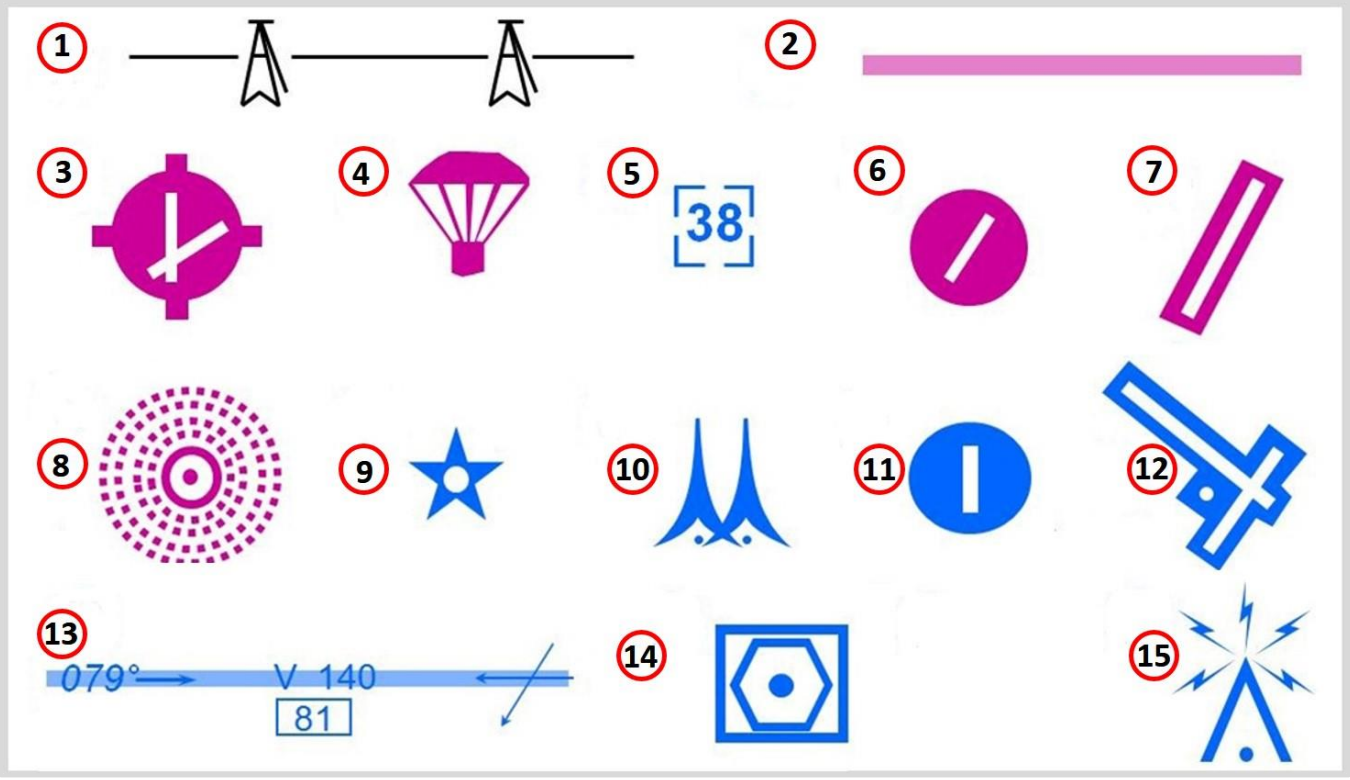
Reference: *Dallas Ft-Worth Sectional*

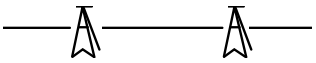
Students should work in groups of 2 or 3 individuals to complete the exercise. Instruct students to locate ***Symbol Search*** *worksheet in the* ***Student Guide****. Using the reference, locate the answers and record answers on the worksheet. After completion, select students to report their responses. Check answers given with the findings of the whole class to verify consistency or to point out differences in findings. Encourage student discussion with this exercise and clarify any misunderstandings.*

Directions

Using the *Dallas Ft-Worth Sectional*, locate as many of the symbols represented below as you can. Find a symbol similar to the one depicted in the graphic. Example: for symbol 4, locate any intersecting runway symbol of this type and color. On the worksheet, record the location of the symbol and its meaning. Be prepared to present your findings to the class.

Reference – *Dallas Ft-Worth Sectional*



	SYMBOL	LOCATION ON CHART	MEANING
1		Two miles south of the Will Rogers (IRW) VORTAC, running northwest-southeast	Power Transmission Lines
2		Surrounds Oklahoma City	Class C airspace boundary
3		Avenger Field (SWW) Airport, 33 miles W of Abilene	Airport with hard-surfaced runways between 1,500 and 8,069 ft long with services available but no tower
4		At the Redhills Airport, 24 miles southwest of Oklahoma City	Parachute Jumping Area
5		Oklahoma City's Wiley Post Airport, with a Class D airspace ceiling of 3,800 feet	Ceiling of Class D airspace
6		Purcell-Shephard Airport 15 miles southeast of Norman, OK	Airport with hard-surfaced runways between 1,500 and 8,069 ft long, NO services available, and NO tower
7		Big Spring – McMahon – Wrinkle (BGS), about 60 miles SSE of Lubbock (32° 15'N, 101° 30'W), or Muskogee - Davis Fld (MKO), about 41 miles SE of Tulsa (35 39' N, 95 21' W)	Airport with hard-surfaced runway greater than 8,069 ft long, or shorter multiple runways, and NO tower
8		CUH (Cushing) Approx. 45 NE OKC	NDB
9		At OKC or TIK	Rotating Beacon
10		15 miles N of OKC	Group Obstruction 1,000 AGL or higher
11		FSI (Ft Sill)	Airport with hard surface between 1,500 and 8,069 feet in length with an ATCT
12		At OKC or TIK	Airport with hard surface greater than 8,069 feet in length with a NAVAID on airport with ATCT

	SYMBOL	LOCATION ON CHART	MEANING
13		**V140, TUL to PRYOR intersection**	**Victor airway with intersection arrows and total mileage**
14		**OKM (Okmulgee), approx. 30 miles S TUL**	**VOR/DME**
15		**8 miles SE TIK**	**Lighted obstruction less than 1,000 feet**

FACILITATOR INSTRUCTIONS	DELIVERY METHOD
■ Review answers for ***Symbol Search*** exercise and ***Sectional Aeronautical Charts*** lesson ■ Navigate to the ***Parking Lot*** link within Blackboard and review any student questions ■ Address ***Parking Lot*** questions and facilitate a brief discussion of the lesson content	Facilitated Discussion **EST. RUN TIME** 15 mins.

FACILITATOR INSTRUCTIONS	DELIVERY METHOD
■ **ENABLE *VFR Terminal Area Charts*** lesson in Blackboard ■ Instruct students to navigate to the ***VFR Terminal Area Charts*** lesson in Blackboard ■ Instruct students to work individually through the lesson content ■ Upon completion of the lesson, students should review previously introduced content or wait quietly until other students have completed	Blackboard **EST. RUN TIME** 20 mins.

VFR TERMINAL AREA CHARTS

Purpose: The purpose of this lesson is to describe the information that is displayed on Visual Flight Rules (VFR) Terminal Area charts (TACs) and Chart Supplements.

Objectives:

- Identify contents and information in a VFR Terminal Area chart
- Identify Chart Supplements

References for this lesson are as follows:

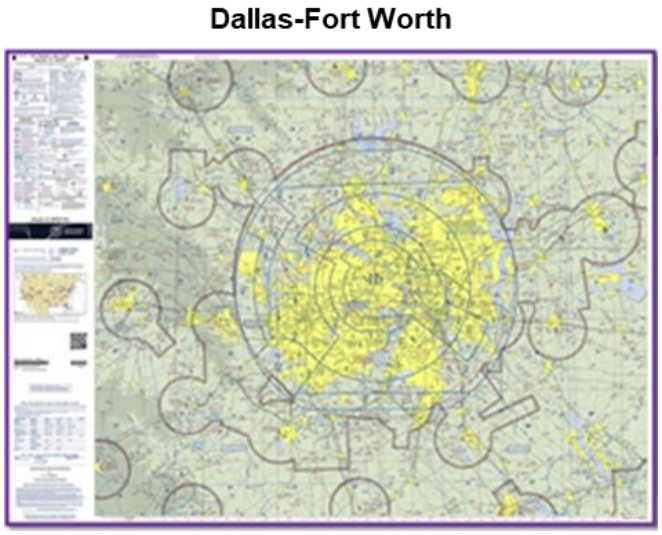
- FAA Order JO 7110.65, Air Traffic Control
- Sectional Aeronautical Chart and Terminal Area Charts, Chart Supplements
- Aeronautical Information Manual (AIM)

VFR Terminal Area Charts (TACs)

VFR TACs depict Class B airspace, which provides for the control and separation of all aircraft operating within that airspace.

TAC features:

- Map scale is 1:250,000 (1 inch = 3.43 NM)
  - Larger scale allows for much greater detail of topographical features as well as man-made and natural landmarks
- Contains the greatest amount of detail of all the VFR navigation charts
- Used to help pilots navigate visually around busy terminal areas



Legend is similar to the Sectional Aeronautical chart, which includes:

- Airport data
- Tower frequencies
- Navigation and communication information
- Airspace
- Obstruction
- Topographical depictions

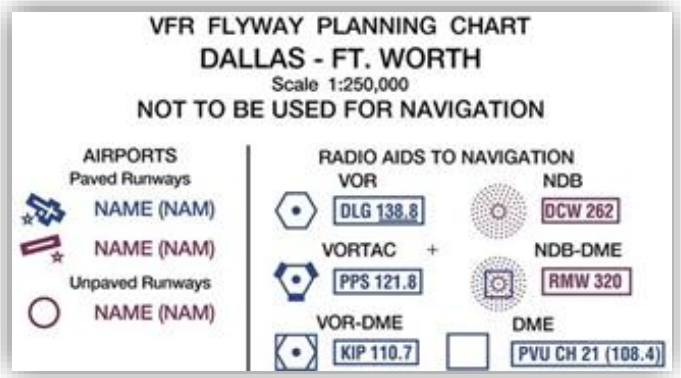
Class B Operating Rules

The chart contains operating rules for flight in Class B airspace, including the following requirements for flight in accordance with Title 14 CFR, Part 91:

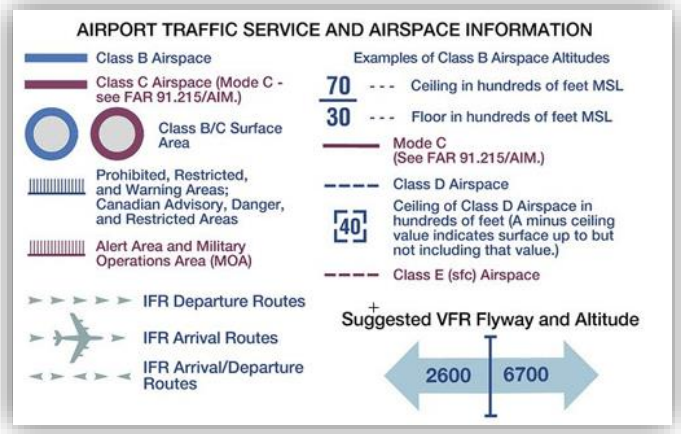
- An operating two-way radio that is capable of communicating with ATC on the appropriate frequencies used
- Private pilot certificate or instructor authorization (if student pilot)
- Appropriate navigation capabilities (if instrument flight rules [IFR])
- Transponder with Mode C altitude reporting capability

VFR Flyway Planning Chart Legend

Selected charts include a VFR Flyway Planning Chart on the reverse side.



Airports, navigational aids (NAVAIDs), and airspace boundaries are shown in great detail. Class B and Class C surface areas are shaded for easy identification.



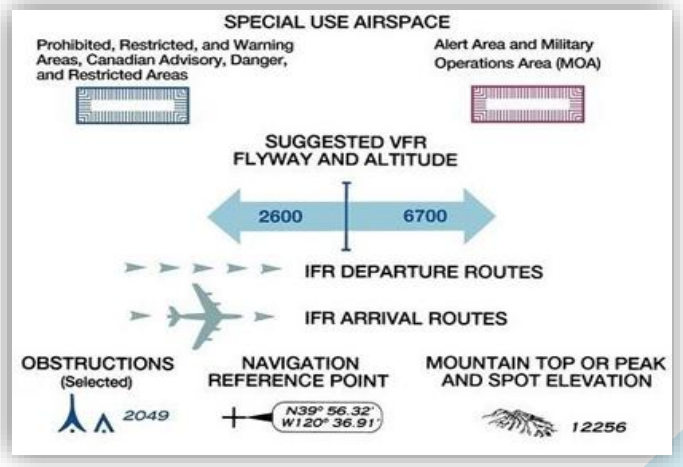
Shaded arrows depict suggested VFR routes in the vicinity of Class B airspace.

VFR routes:

- Avoid the major busy traffic flow areas
- Provide altitudes that generally aid aircraft in staying above or below Class B airspace

IFR departure and arrival routes are shown.

Obstructions, navigational reference points, and topographical features are emphasized.



Knowledge Check E

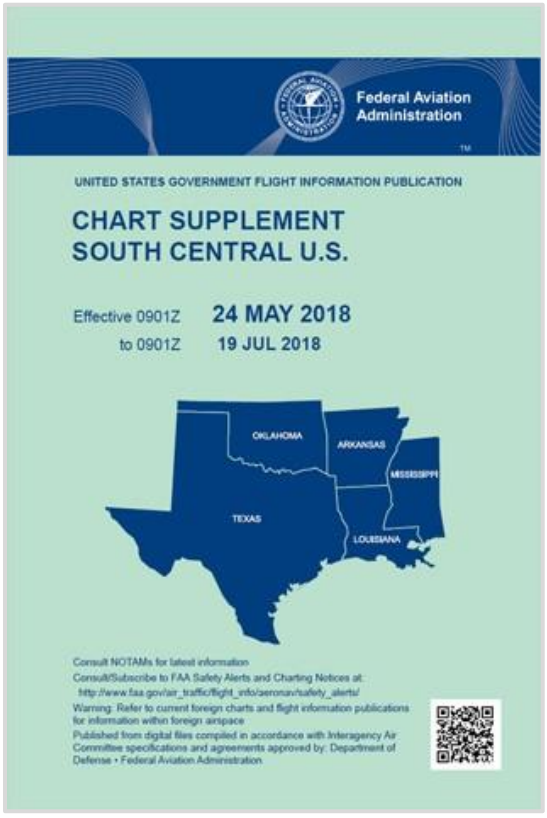
REVIEW what you have learned so far about VFR Terminal Area charts. ANSWER the question listed below.

1. What is a major difference between a Sectional Aeronautical chart and a TAC? *(Select the correct answer.)*
   - ❑ **A TAC provides greater detail and a larger scale**
   - ❑ A TAC is used primarily for IFR flight in the terminal area
   - ❑ A Sectional Aeronautical chart uses different symbols

2. A TAC contains operating rules for flight in which class of airspace? *(Select the correct answer.)*
   - ❑ Class A
   - ❑ **Class B**
   - ❑ Class C

Chart Supplement

The Chart Supplement is designed primarily as a pilot's operational manual and includes much more detailed information about airports and NAVAIDs than can be found on any chart. The Chart Supplement is published every 56 days.



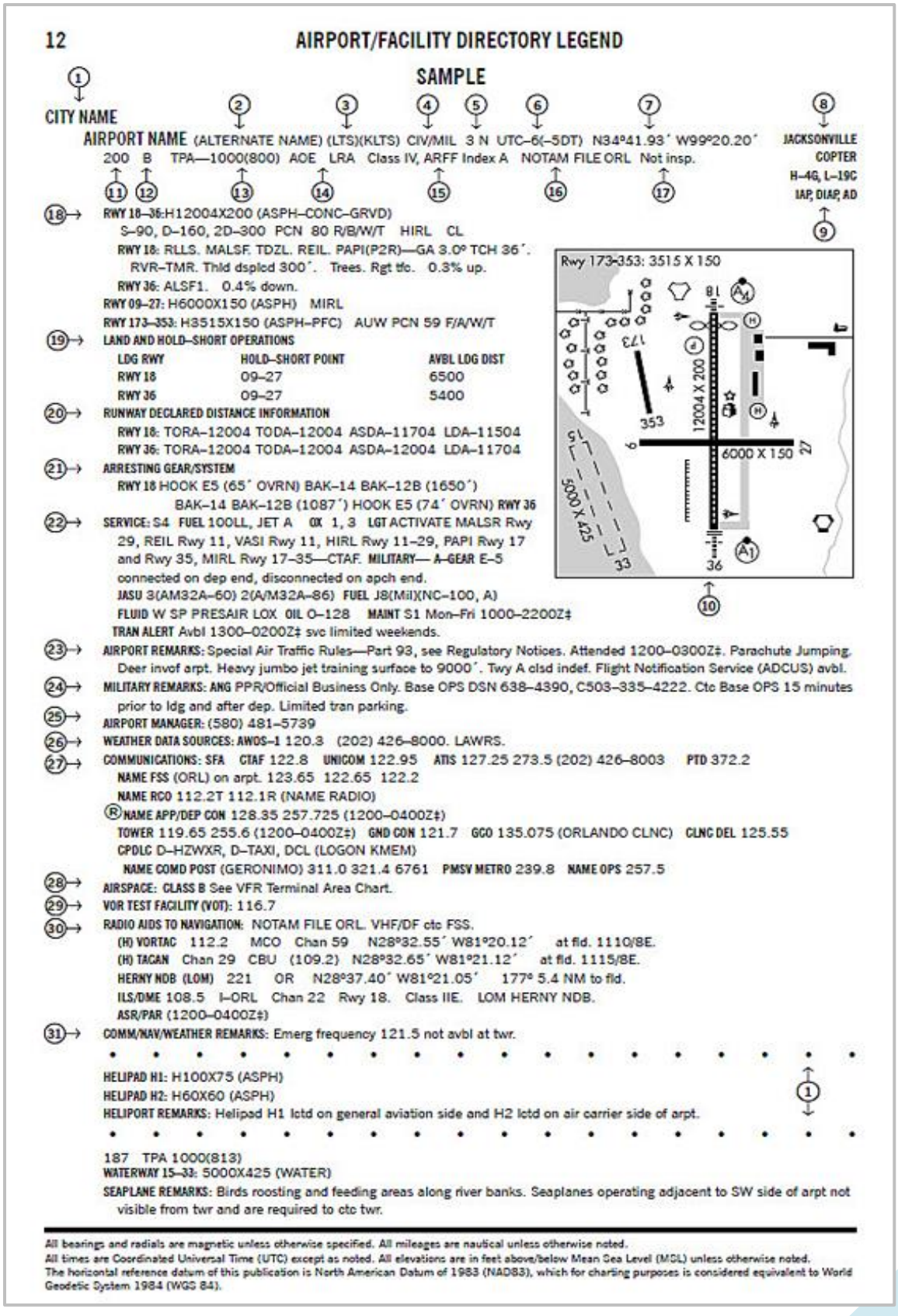
Contents

Includes airport information, services available, radio and NAVAID data, and ATC services, including the following:

Airport Locations	Airport locations are given in relation to the associated city, as well as in terms of latitude and longitude.
Fuel Availability	Availability of fuel is listed by type.
Runway Info	Individual runway information includes: ■ Length ■ Width ■ Surface texture ■ Lighting ■ Any applicable notes of caution
Airport Remarks	Airport remarks address items peculiar to the individual airport, such as: ■ Hours of airport attendance ■ Special operations ■ Instructions for activating pilot-controlled lighting
Daylight Savings	The symbol ‡ indicates that during periods of Daylight Savings Time, effective hours will be one hour earlier than shown.
Weather Info Sources	Frequencies and telephone numbers for obtaining weather information are included.
Frequencies	Communications frequencies, including: ■ Automatic Terminal Information Service (ATIS) ■ Unicom ■ Flight Service Station (FSS) ■ Approach/departure control ■ Tower ■ Ground ■ Clearance delivery, where applicable
Miscellaneous	Class of airspace, data on NAVAIDs serving the airport, and other miscellaneous items that are helpful to a pilot can also be found.

Legend

The legend depicts a sample airport entry with all associated data and provides the decoded meaning for each item of information.



12 AIRPORT/FACILITY DIRECTORY LEGEND

SAMPLE

CITY NAME

AIRPORT NAME (ALTERNATE NAME) (LTS)(KLTS) CIV/MIL 3 N UTC–6(–5DT) N34°41.93′ W99°20.20′
200 B TPA—1000(800) AOE LRA Class IV, ARFF Index A NOTAM FILE ORL Not insp.

JACKSONVILLE COPTER
H–4G, L–19C
IAP, DIAP, AD

(18) RWY 18–36: H12004X200 (ASPH–CONC–GRVD)
S–90, D–160, 2D–300 PCN 80 R/B/W/T HIRL CL
RWY 18: RLLS. MALSF. TDZL. REIL. PAPI(P2R)—GA 3.0° TCH 36′. RVR–TMR. Thld dsplcd 300′. Trees. Rgt tfc. 0.3% up.
RWY 36: ALSF1. 0.4% down.
RWY 09–27: H6000X150 (ASPH) MIRL
RWY 173–353: H3515X150 (ASPH–PFC) AUW PCN 59 F/A/W/T

(19) LAND AND HOLD–SHORT OPERATIONS

LDG RWY	HOLD–SHORT POINT	AVBL LDG DIST
RWY 18	09–27	6500
RWY 36	09–27	5400

(20) RUNWAY DECLARED DISTANCE INFORMATION
RWY 18: TORA–12004 TODA–12004 ASDA–11704 LDA–11504
RWY 36: TORA–12004 TODA–12004 ASDA–12004 LDA–11704

(21) ARRESTING GEAR/SYSTEM
RWY 18 HOOK E5 (65′ OVRN) BAK–14 BAK–12B (1650′)
BAK–14 BAK–12B (1087′) HOOK E5 (74′ OVRN) RWY 36

(22) SERVICE: S4 FUEL 100LL, JET A OX 1, 3 LGT ACTIVATE MALSR Rwy 29, REIL Rwy 11, VASI Rwy 11, HIRL Rwy 11–29, PAPI Rwy 17 and Rwy 35, MIRL Rwy 17–35—CTAF. MILITARY— A–GEAR E–5 connected on dep end, disconnected on apch end.
JASU 3(AM32A–60) 2(A/M32A–86) FUEL J8(Mil)(NC–100, A)
FLUID W SP PRESAIR LOX OIL O–128 MAINT S1 Mon–Fri 1000–2200Z‡
TRAN ALERT Avbl 1300–0200Z‡ svc limited weekends.

(23) AIRPORT REMARKS: Special Air Traffic Rules—Part 93, see Regulatory Notices. Attended 1200–0300Z‡. Parachute Jumping. Deer invof arpt. Heavy jumbo jet training surface to 9000′. Twy A clsd indef. Flight Notification Service (ADCUS) avbl.

(24) MILITARY REMARKS: ANG PPR/Official Business Only. Base OPS DSN 638–4390, C503–335–4222. Ctc Base OPS 15 minutes prior to ldg and after dep. Limited tran parking.

(25) AIRPORT MANAGER: (580) 481–5739

(26) WEATHER DATA SOURCES: AWOS–1 120.3 (202) 426–8000. LAWRS.

(27) COMMUNICATIONS: SFA CTAF 122.8 UNICOM 122.95 ATIS 127.25 273.5 (202) 426–8003 PTD 372.2
NAME FSS (ORL) on arpt. 123.65 122.65 122.2
NAME RCO 112.2T 112.1R (NAME RADIO)
(R) NAME APP/DEP CON 128.35 257.725 (1200–0400Z‡)
TOWER 119.65 255.6 (1200–0400Z‡) GND CON 121.7 GCO 135.075 (ORLANDO CLNC) CLNC DEL 125.55
CPDLC D–HZWXR, D–TAXI, DCL (LOGON KMEM)
NAME COMD POST (GERONIMO) 311.0 321.4 6761 PMSV METRO 239.8 NAME OPS 257.5

(28) AIRSPACE: CLASS B See VFR Terminal Area Chart.

(29) VOR TEST FACILITY (VOT): 116.7

(30) RADIO AIDS TO NAVIGATION: NOTAM FILE ORL. VHF/DF ctc FSS.
(H) VORTAC 112.2 MCO Chan 59 N28°32.55′ W81°20.12′ at fld. 1110/8E.
(H) TACAN Chan 29 CBU (109.2) N28°32.65′ W81°21.12′ at fld. 1115/8E.
HERNY NDB (LOM) 221 OR N28°37.40′ W81°21.05′ 177° 5.4 NM to fld.
ILS/DME 108.5 I–ORL Chan 22 Rwy 18. Class IIE. LOM HERNY NDB.
ASR/PAR (1200–0400Z‡)

(31) COMM/NAV/WEATHER REMARKS: Emerg frequency 121.5 not avbl at twr.

HELIPAD H1: H100X75 (ASPH)
HELIPAD H2: H60X60 (ASPH)
HELIPORT REMARKS: Helipad H1 lctd on general aviation side and H2 lctd on air carrier side of arpt.

187 TPA 1000(813)
WATERWAY 15–33: 5000X425 (WATER)
SEAPLANE REMARKS: Birds roosting and feeding areas along river banks. Seaplanes operating adjacent to SW side of arpt not visible from twr and are required to ctc twr.

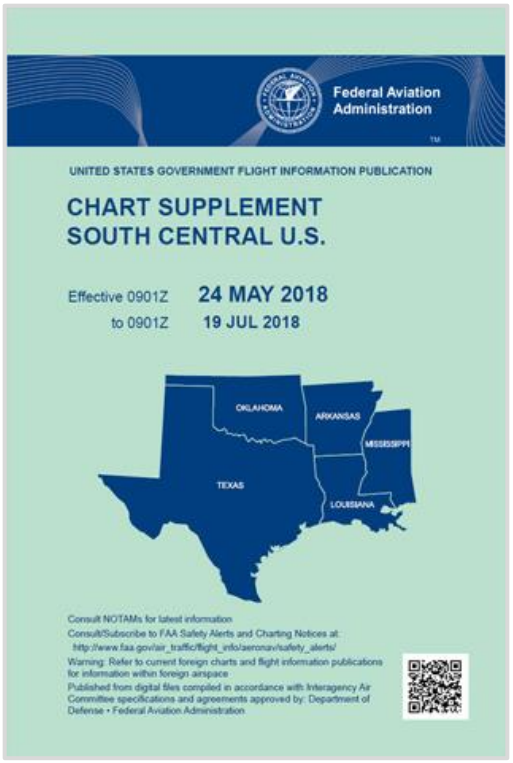
Rwy 173–353: 3515 X 150
12004 X 200
6000 X 150
5000 X 425

All bearings and radials are magnetic unless otherwise specified. All mileages are nautical unless otherwise noted.
All times are Coordinated Universal Time (UTC) except as noted. All elevations are in feet above/below Mean Sea Level (MSL) unless otherwise noted.
The horizontal reference datum of this publication is North American Datum of 1983 (NAD83), which for charting purposes is considered equivalent to World Geodetic System 1984 (WGS 84).

Miscellaneous Information

Miscellaneous information follows the state and airport listings and includes such items as:

- Seaplane landing areas
- Special and Regulatory Notices
- Land and Hold Short Operations (LAHSO)
- FAA and NWS phone numbers
- TAF and METAR decoding keys
- ATC frequencies
- Flight Standards District Office (FSDO) addresses and phone numbers
- Preferred IFR routes and VOR checkpoints
- Parachute jumping areas and chart bulletins
- Airport diagrams



Knowledge Check F

REVIEW what you have learned so far about Chart Supplements. ANSWER the questions listed below.

1. How often is a Chart Supplement published? *(Select the correct answer.)*
   - ❑ Monthly
   - ❑ **Every 56 days**
   - ❑ Every 58 days

2. What are some types of information that a Chart Supplement includes? *(Select all correct answers that apply.)*
   - ❑ **Weather information sources**
   - ❑ **Runway information**
   - ❑ **Fuel availability**
   - ❑ **Tower frequencies**
   - ❑ **Hours of airport attendance**

Video – *VFR Cross-Country Flying* (12:47 mins.)

VFR Terminal Area Charts Summary

VFR Terminal Area charts and Chart Supplements work together to provide VFR pilots with the information they need for flight planning around, over, or to major U.S. airports.

VFR Terminal Area charts provide the visual road map, while Chart Supplements provide information that cannot be depicted in graphic form on the charts.

FACILITATOR INSTRUCTIONS	DELIVERY METHOD
■ ***Note:*** The reference files used to complete the exercise are large and may require additional time to download ■ Instruct students to locate the student exercise ***Chart Supplement*** in the printed ***Student Guide*** ■ Instruct students to locate the ***Chart Supplement South Central US*** in the ***Student Guide and References*** folder ■ The exercise will be performed in groups of 2 or 3 individuals ■ Instruct students to use the document to locate the answers to the questions ■ At the end of the exercise, randomly select students to provide answers orally ■ Encourage student discussion with this exercise and resolve any questions	Exercise **EST. RUN TIME** 30 mins.

EXERCISE: CHART SUPPLEMENT

Purpose

This exercise promotes interaction and gives the student a hands-on opportunity to locate and identify information contained in a chart supplement.

Detailed Facilitator Instructions: *The reference required to complete this exercise is located in the* ***Student Guide and References*** *folder. Ensure students have located the reference before beginning the exercise.*

Reference: *Chart Supplement South Central US*

Students should work in small groups to complete the exercise. Assign students groups. Instruct students to locate ***Chart Supplement*** *worksheet in the* ***Student Guide.*** *Using the reference, locate the answers and record answers on the worksheet. After completion, select students to report their responses. Check answers given with the findings of the whole class to verify consistency or to point out differences in findings. Encourage student discussion with this exercise and clarify any misunderstandings.*

Directions

Access the link to the Chart Supplement labeled Chart Supplement South Central US on Blackboard. Use the document to help you find the answers to the questions below. Be prepared to present your findings to the class.

Reference – *Chart Supplement South Central US*

Question	Answer
1. List the airport CTAF/UNICOM frequencies and NAVAID names and frequencies for Pollock Muni, LA Airport.	**CTAF/Unicom=122.9,** **Alexandria VORTAC 116.1 CH 108**
2. What is the source for weather data at Arlington Muni Airport, Arlington, TX?	**ASOS 127.375 or** **Phone (817) 557-0251**
3. What are the coordinates for the Maverick VOR/DME?	**N3252/W9702**
4. Describe the runway at Fayetteville, AR, Drake field length, width, type surface, and lighting.	**6005X100, ASPH-GRVD, medium intensity runway lights preset to medium intensity when tower is closed**
5. What are the hours of the Class D airspace at GYI North Texas RGNL/Perrin Field?	**01300-0100Z**
6. What are the CTAF, UNICOM, and AWOS frequencies for The University of OK airport in Norman, OK?	**118.0; 122.95; 119.55**
7. Provide the NAVAID names and associated frequencies for Hinton Muni Airport in Oklahoma.	**IRW VORTAC 114.1 Chan 88**

FACILITATOR INSTRUCTIONS	DELIVERY METHOD
■ ***Note:*** The reference files used to complete the exercise are large and may require additional time to download ■ Instruct students to locate the student exercise ***VFR Charts and Publications Practice*** in the printed ***Student Guide*** ■ Instruct students to locate the ***Dallas Ft-Worth Sectional*** in the ***Student Guide and References*** folder ■ The exercise will be performed in groups of 2 or 3 individuals ■ Instruct students to use the document to locate the answers to the questions ■ At the end of the exercise, randomly select students to provide answers orally ■ Encourage student discussion with this exercise and resolve any questions	Exercise **EST. RUN TIME** 30 mins.

EXERCISE: VFR CHARTS AND PUBLICATIONS PRACTICE

Purpose

This exercise promotes interaction and gives the student a hands-on opportunity to locate and identify information contained in a sectional aeronautical chart and chart supplement.

Detailed Facilitator Instructions: *The reference required to complete this exercise is located in the* ***Student Guide and References*** *folder. Ensure students have located the reference before beginning the exercise.*

Reference: *Dallas Ft-Worth Sectional*

Students should work in small groups to complete the exercise. Assign students groups. Instruct students to locate ***VFR Charts and Publications Practice*** *worksheet in the* ***Student Guide****. Using the reference, locate the answers and record answers on the worksheet. After completion, select students to report their responses. Check answers given with the findings of the whole class to verify consistency or to point out differences in findings. Encourage student discussion with this exercise and clarify any misunderstandings.*

Directions

Using the *Dallas Ft-Worth Sectional*, write your answers to questions 1 through 9 in the space provided.

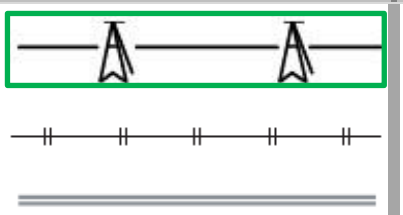
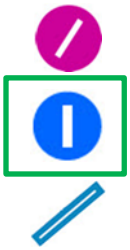
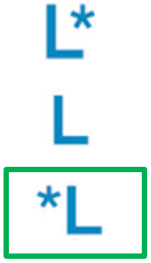
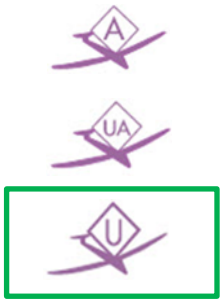
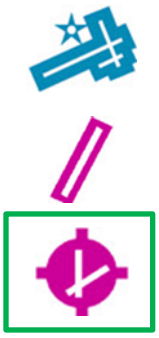
Reference – *Dallas Ft-Worth Sectional*

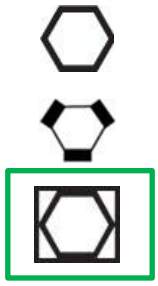
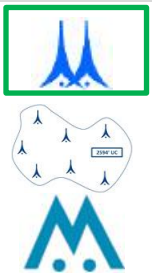
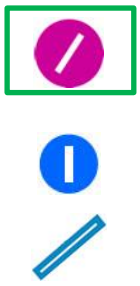
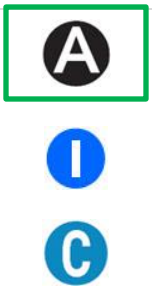
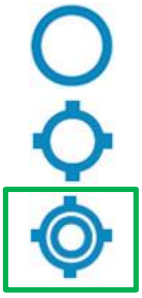
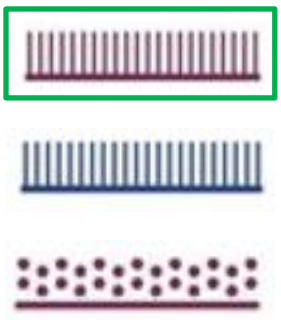
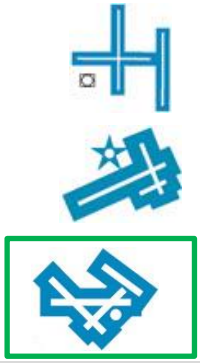
Question	Answer
1. You will be navigating using pilotage and dead reckoning from Plainview, TX, to Amarillo, TX. However, if you wanted to use radio navigation methods, what airway would you follow that is most closely aligned with your intended direct route of flight?	**Victor 81**
2. Which VORs would you use to fly this airway?	**V81 proceeds over the Plainview VOR and Panhandle VORTAC**
3. You are flying VFR at 9,500 feet from Clinton-Sherman, OK, to Pauls Valley, OK. What Special Use Airspace (SUA) will you encounter?	**Washita MOA which extends from 8,000 to FL 180**
4. You are departing an airport at N3553/W10024, destination is at N3312/W9539. What is the name of the departure airport and the destination airport?	**Departing Hemphill, CO, and arriving at Sulphur Springs (SLR)**
5. What is the Maximum Elevation Figure (MEF) in the vicinity of Hemphill County Airport?	**3,500 feet**
6. What type of airspace surrounds Altus AFB?	**Class D and a Terminal Radar Service Area (TRSA)**
7. What are the hours or operation for Atlus Tower and how does the operation affect the airspace?	**Monday thru Friday 1500 – 0830Z, closed weekends and holidays , Class D when tower is open Class G when it is closed**

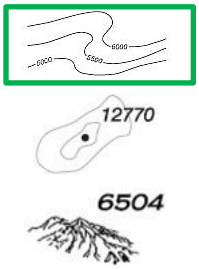
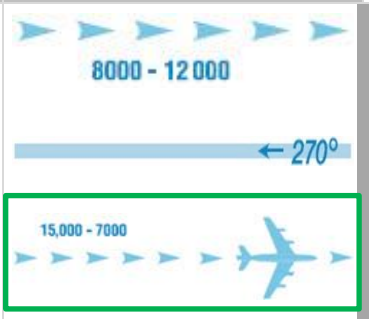
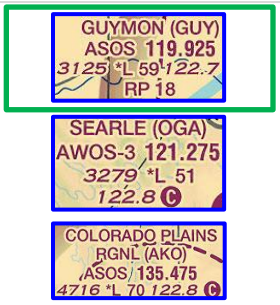
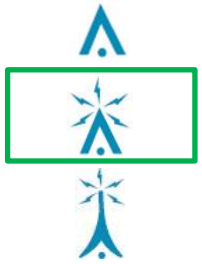
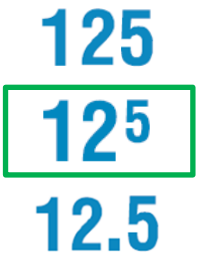
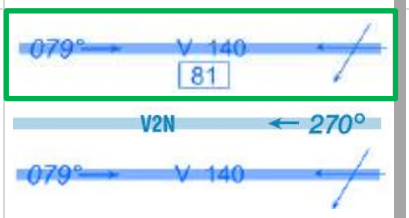
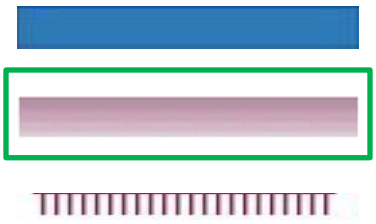
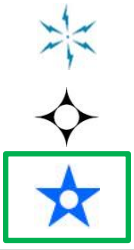
8. What do McAlester Regional, OK, Mineral Wells, TX, and Childress, TX, airports have in common?	**All have ASOS for weather data;** **All have Class E surface area;** **Optional: Find another airport with surface based Class E, Hobart Regional north of Altus**
9. List the airports located below the DFW Class B airspace that have Class D airspace and the tower frequency for each airport. (Hint: there are eleven)	**McKinney Nat'l, 118.825;** **Denton Enterprise, 119.95;** **Fort Worth Alliance,135.15;** **Fort Worth Meacham, 118.3;** **Fort Worth JRB, 120.95;** **Fort Worth Spinks, 124.625;** **Arlington, 128.625;** **Grand Prairie, 128.55;** **Dallas Exec, 127.25;** **Mesquite, 120.3;** **Addison, 126.0**

FACILITATOR INSTRUCTIONS	DELIVERY METHOD
■ ***Note: Symbol Matching*** should have already been enabled in Blackboard, if not ensure it is enabled ■ Instruct students to navigate to the ***Exercises and Activities*** folder in Blackboard ■ Instruct students to locate activity ***Symbol Matching***, located in this folder ■ The activity will be performed individually ■ Instruct students to answer each question ■ The activity will evaluate the students' performance and provide feedback after each answer is submitted ■ Suggest allowing opportunities to repeat the activity during periods of down time	Activity **EST. RUN TIME** 20 mins.

ACTIVITY: VFR CHART REVIEW (ANSWER KEY)

Question	Answer	Question	Answer
1. Power Transmission Lines		6. Runway 1,500' to 8,069' with ATCT	
2. Heliport		7. Lighting limitations exist	
3. Ultralight Activity		8. Non Directional Beacon symbol	
4. Ceiling of class D airspace up to and including		9. Which facility cannot receive live FSS transmissions	
5. Runway 1,500' to 8,069', fuel available 24 hours, no ATCT		10. Identify the NAVID in shutdown status	

Question	Answer	Question	Answer
11. VOR/DME		16. Group obstruction 1,000' AGL or higher	
12. Runway 1,500' to 8,069', no 24 hour fuel, no ATCT		17. Provides weather information for pilots	
13. Ceiling of Class D airspace up to but not including		18. Military Airport symbol	
14. Identify the MOA boundary		19. Identifies a landing area with current field conditions not available	
15. NAVAID on field with ATCT		20. Sectional VFR checkpoint symbol	

Question	Answer	Question	Answer
21. Which symbol is not a spot elevation		27. Identifies TAC chart IFR arrival routes	
22. Identifies an airport with Customs Service		28. Identify the airport with the non-standard traffic pattern	
23. Lighted obstruction less than 1000' AGL		29. Identify the MEF	
24. Victor Airway with intersection and mileage		30. Which symbol represents a Remote Communications Outlet (RCO)	
25. Class E airspace boundaries			
26. Rotating Beacon			

SUMMARY

The purpose of this module was to introduce you to the Sectional Aeronautical chart, the VFR Terminal Area chart, and the Chart Supplement (formerly the Airport/Facility Directory).

In accordance with FAA Order JO 7110.65, Air Traffic Control; Aeronautical Information Manual (AIM); FAA Aeronautical Chart User's Guide; and Sectional Aeronautical Chart and Terminal Area Charts, Chart Legends; you should now be able to:

- Identify contents and information in a Sectional Aeronautical chart
- Identify contents and information in a VFR Terminal Area chart
- Identify Chart Supplements

FACILITATOR INSTRUCTIONS	DELIVERY METHOD
■ Navigate to the ***Parking Lot*** link within Blackboard and review any student questions ■ Address ***Parking Lot*** questions and facilitate a brief discussion of the lesson content ■ Instruct students to prepare for the End-of-Module test by putting away their Student Guides	Facilitated Discussion **EST. RUN TIME** 15 mins.

FACILITATOR INSTRUCTIONS	DELIVERY METHOD
■ **ENABLE *VFR Charts and Publications End-of-Module Test*** link in Blackboard ■ Instruct students: ○ Clear desks ○ Do not write anything during or after the test ○ Navigate to the ***VFR Charts and Publications End-of-Module Test*** link in Blackboard ○ Once they are satisfied with their responses, click "Save and Submit;" do not click "OK" to review results until directed to do so ○ Choose "Cancel" if they receive a warning message that the test has unanswered questions; choosing OK will submit the test and not allow them to go back and answer the questions ○ Leave the room after submitting the test and return at the "Be Back" time ■ ***Note:*** *This test is scored but not graded* ■ During test, monitor students to ensure a secure testing environment ■ Identify the most commonly missed questions by reviewing student statistics in Blackboard ■ Instruct students to click "View Results" when ready to review commonly missed questions ■ Review commonly missed questions with students	Blackboard Assessment **EST. RUN TIME** 10 mins.

END OF MODULE TEST

Note: *Test questions in Blackboard are presented to the students in random order. Please be aware the test key question order will not match the student version.*

1. Which of the following information is found on Sectional Aeronautical charts? *(Select the correct answer.)*
   - ❑ **All of the answers**
   - ❑ VOR, VORTACs, NDBs, as well as their position, identification, and frequencies
   - ❑ MOAs, Restricted, Prohibited, Alert, and Warning Areas
   - ❑ Airports

   Reference(s): FAA Aeronautical Chart User's Guide

2. Frequencies placed just above a communication box on a Sectional Aeronautical chart are used to contact which type of facility? *(Select the correct answer.)*
   - ❑ **Flight Service Station**
   - ❑ En Route Air Traffic Control Center
   - ❑ Approach Tower
   - ❑ Tower

   Reference(s): FAA Aeronautical Chart User's Guide

3. In which document would you locate operating rules for flight in Class B airspace? *(Select the correct answer.)*
   - ❑ **VFR Terminal Area Charts**
   - ❑ IFR/VFR planning charts
   - ❑ Sectional charts
   - ❑ World Area Charts

   Reference(s): JO 7110.65, Pilot/Controller Glossary; AIM, Chap. 9; TAC Legend

4. Which of the following is **NOT** information included in a Chart Supplement? *(Select the correct answer.)*
   - ❑ **Aircraft hangar cost**
   - ❑ Communication frequencies
   - ❑ Weather information sources
   - ❑ Runway information

   Reference(s): Chart Supplement Legend