PROGRAMED TEXT

AERONAUTICAL CHART SYMBOLS

AM-55

MARCH 1969

UNITED STATES ARMY

PRIMARY HELICOPTER SCHOOL

FORT WOLTERS, TEXAS

PROGRAMED TEXT

PROGRAM TEXT

FILE NO: AM-55

PROGRAM TITLE AERONAUTICAL CHART SYMBOLS

POI SCOPE: Presents the student with the aeronautical chart legend and provides the knowledge necessary to use the legend when using the chart.

INSTRUCTOR REFERENCES:

TM 1-225, Dallas Sectional (Aeronautical) Chart

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PREFACE

Aeronautical charts are of vital use to us in both preflight planning and in-flight navigation. A thorough understanding of the aeronautical and topographic symbols depicted on aeronautical charts is basic to using the charts.

This program is designed to be used in conjunction with the Dallas Sectional Aeronautical Chart. Some frames will require you to refer to the chart to enable you to select the correct frame response. Feel free to refer to the chart, front or back, at any time throughout the program.

Start with frame 1 and work each frame in succession. Each frame will usually ask you a question. The correct answer is printed on the top of the next frame. If you were incorrect, turn back and restudy the information before going on to the next frame. When you have finished the text, complete the Self Evaluation Exercise. Now begin by studying the Performance Objectives on page iv.

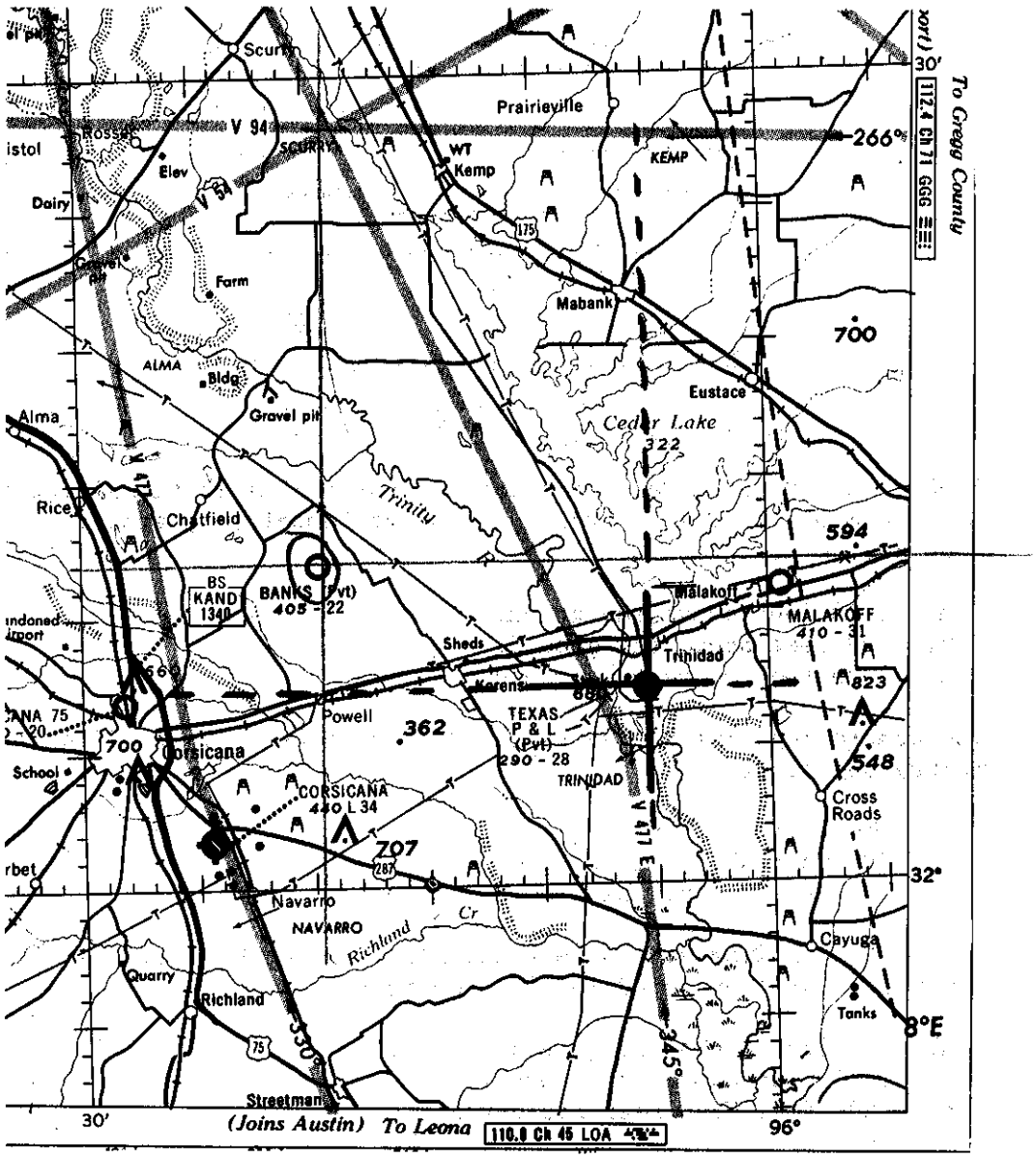
PERFORMANCE OBJECTIVES

After completing this program you will be able to interpret the legend and chart section of a sectional chart and when given chart coordinates, identify, without error, the aeronautical or topographic symbol at that location.

FRAME 1

To find any location on the sectional chart, you will use geographical coordinates. Latitude is given first, in degrees and minutes, and read up. Longitude is given second, in degrees and minutes, and read to the left.

To determine the location of Texas P and L airport (32°07'N, 96°05'W) as shown below, you would read 7' up to the meridian from 32° and 5' west (left) of 96°.



What are the coordinates of Banks Airport (Pvt.) on the illustration above?

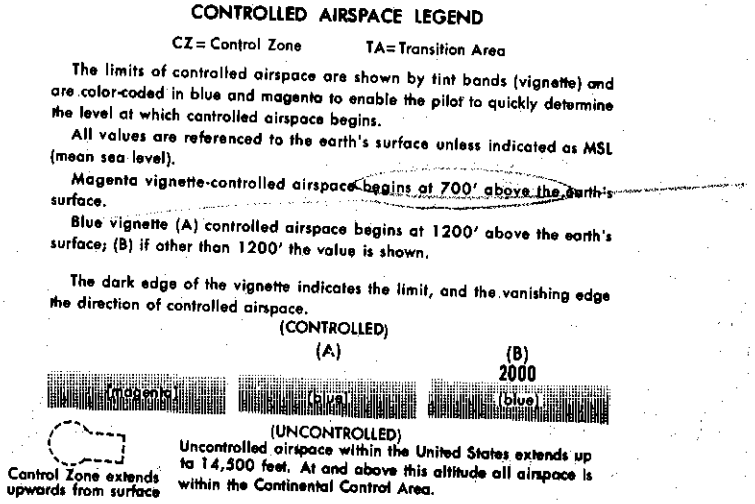
32° 12' N
96° 01' W

ANSWER: d. A radio broadcasting station.
b. Milltown non-directional radio beacon.

FRAME 8

Nearly all of the airspace above the United States is now classified as controlled airspace.

This controlled airspace is depicted on our legend as shown below.



Look at the Mineral Wells Airport on your Dallas Sectional (coordinates 32°47'-98°04'). The controlled airspace immediately around the control zone begins at

a. 1200 feet above the ground.
b. 700 feet above the ground.
c. 2000 feet above the ground.

The controlled airspace above the control zone (area outlined by hash marks) begins at

a. the surface.
b. 700 feet above the ground.
c. 1200 feet above the ground.

Now look approximately 75 nautical miles WNW of Mineral Wells. The controlled area enclosed in blue begins at

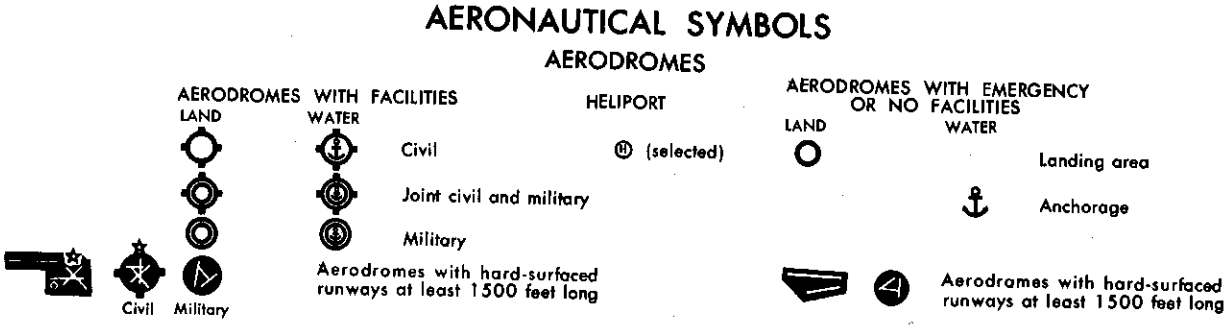
a. 700 feet above the ground.
b. 1200 feet above the ground.
c. 7500 feet MSL (Mean Sea Level).

NOTE: Control areas and control zones affect VFR (Visual Flight Rules) only in regard to weather minimums. No other control is exercised.

ANSWER: Banks Airport (32°12'N, 96°20'W)

FRAME 2

The symbols shown below are from the legend on the back of the sectional chart and depict the various aerodromes that are found on an aeronautical chart.



NOTE: Magenta is a reddish brown color.

When an aerodrome symbol is colored magenta, it means that the airfield <u>does not</u> have a control tower. If the symbol is colored blue, the airport <u>does</u> have a control tower.

By using the legend we know that this symbol, represents a civil aerodrome with hard surfaced runways at least 1500 feet long.
(civil) (military)
(500) (1500) (2500)

This symbol, represents a land based aerodrome with emergency or no facilities.
(land) (water)
(facilities) (emergency or no facilities)

ANSWER: b. 700 feet above the ground.
a. the surface.
c. 7500 feet MSL (Mean Sea Level).

FRAME 9

Airport traffic areas are also classified as controlled airspace. Regulations pertaining to these areas apply to all pilots flying VFR (Visual Flight Rules).

Information below, taken from front of sectional charts.

AIRPORT TRAFFIC AREAS

FAR 91.87 establishes an airport traffic area within a radius of 5 statute miles from the center of any airport having an operative control tower and extending from the surface to, but not including 2000 feet above the surface. Unless authorized by air traffic control, aircraft may not be operated within an airport traffic area except for landing and taking off at airports within that area. When operating to, from, or on an airport having a control tower operated by the Federal Government, two-way radio communication must be maintained while in the airport traffic area. (The same requirement applies where the control tower is operated by other than the Federal Government, if the aircraft has two-way radio capability. If equipment permits reception only, a listening watch must be maintained on the appropriate tower frequency.) Limits of airport traffic areas are not shown on this chart. However, all airports having traffic areas or FSS advisory service are shown in blue, all other airports in magenta, thus:

Federally operated control tower — DAYTON 1008 L 70 119.5 257.8

Non-Federal control tower — NF MARTINSBURG 556 L 70 120.5 236.6

Other Airport (no traffic area, no airport advisory service on FSS) — SOMERSET 1540 L 37

Hours of operation of tower, if not continuous, are included under Remarks in aerodrome directory on back of chart.

You are departing Mineral Wells Airport for Abilene Municipal Airport (32°25'N-99°41'W). Approximately 15 miles out of Abilene Municipal you should

a. call the tower at Abilene for permission to enter the airport traffic area.
b. do nothing, because Abilene Municipal is not in an airport traffic area.
c. call the tower and request clearance into the control area.

ANSWER:

Civil
(civil) (military)

1500
(500) (1500) (2500)

Land
(land) (water)

Emergency or no Facilities
(Facilities) (Emergency or no Facilities)

FRAME 3

Four "Cogs" around an aerodrome symbol depicts facilities such as fuel and maintenance. Military aerodromes DO NOT have these cogs but are assumed to have facilities. The very large military and civil airports are shown in their actual shape as they appear on the ground. All military aerodromes may be recognized by the name in the aerodrome data box, e.g. (Hood AAF).

Of the three symbols shown below, which shows an aerodrome at which fuel is available?

a.

b.

c.

d. Both a and c

In planning a cross country flight would you select the airport located at 33°11', 99°44' on your Dallas Sectional for a refueling stop?

a. Yes
b. No

ANSWER: a. Call the tower at Abilene for permission to enter the airport traffic area.

FRAME 10

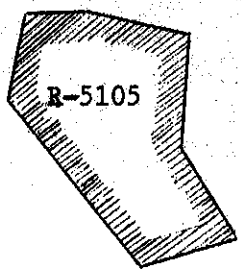
In certain cases it is often necessary to prohibit aircraft from flying in an area or at least warn or caution a pilot of possible hazards. An example of a prohibited area would be the airspace above the White House. A restricted area is one to be entered only on official business, with prior approval, such as a SAC (Strategic Air Command) Base. A caution area might be that airspace immediately surrounding an aviation school. These areas of airspace reservations are shown on our legend in the following format.

Match the following symbols with their correct description:

ANSWER	SYMBOL	DESCRIPTION
c		a. Caution Area
b		b. Danger Area
a		c. Prohibited Area

The reserved airspace R-5105 surrounding the missile impact area at Los Alamos, New Mexico resembles the example below. This area is an example of

a. a restricted area.
b. a caution area.
c. a prohibited area.



ANSWER: d. Both a and c.
b. No

FRAME 4

In this Aerodrome Data Section of the chart legend, we find that a great deal of information is available to us concerning any particular airfield. Let's take a look at this part of the legend.

AERODROME DATA

ATIS ---------- Automatic Terminal Information Service
2427 ------- Elevation in feet
L ---------- Lighting { L-Lighting available Sunset to Sunrise; *L-Lighting available Sunset to Sunrise on prior request; (L)-Lighting available part of night only }
S ---------- Normally sheltered take-off area
48 ---------- *Length of longest runway in hundreds of feet

LAND

WOODSTOCK
ATIS 115.9
2427 L 48 U
Airport of entry
GCA ILS DF
278 119.5 126.2
257.8 122.7R

WATER

NAS NORFOLK
00 L S 250
3053

The Aerodrome Data Box at ~~Winston~~ woodstock shows the elevation above Sea Level to be 2427 feet.

What type of lighting is available at ~~Winston~~ Woodstock? lighted available at night

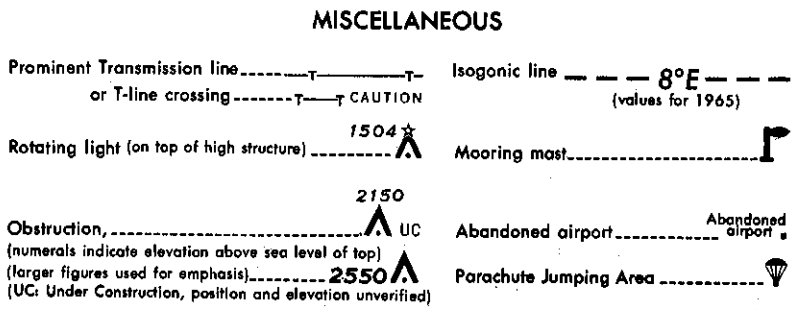
Length of the longest runway at ~~Winston is~~ Woodstock 4700 feet.

*For the exact number of feet, look on the back of the Sectional under the Aerodrome Section.

ANSWER: c. Prohibited Area
b. Danger Area
a. Caution Area
a. Restricted Area

FRAME 11

Other important items of aeronautical information are shown in the miscellaneous portion of our legend.



We are particularly interested in the height of obstructions as they pose a definite safety hazard to our aircraft.

What is the following symbol? 3612 ∧

a. An abandoned airfield whose elevation is 3612 feet.
b. A rotating light 3612 feet above the ground.
c. An obstruction 3612 feet above sea level.
d. An obstruction under construction that will be 3612 feet above sea level.

In the northern part of the city of Mineral Wells there is a television retransmission tower. This hazard to flight is shown on the Dallas Sectional as

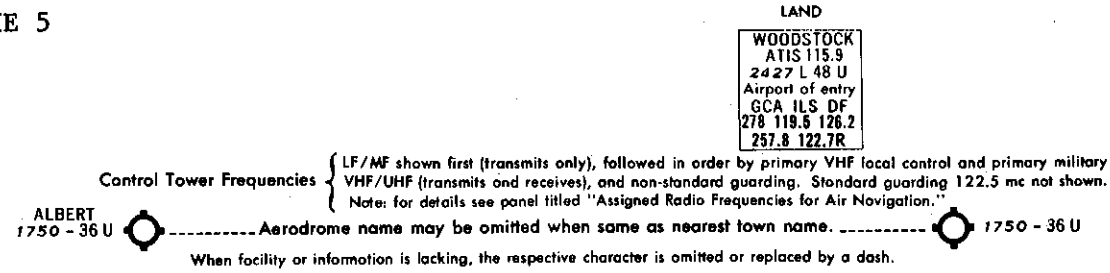
a. 1368 ∧

b. caution, television tower.

c.

ANSWER: elevation 2427 feet
Lighting available sunset to sunrise.
longest runway 4800 feet. In the aerodrome section on the back of the sectional, the length of the longest runway will be given to the nearest foot.

FRAME 5



In the Aerodrome Data Box, "Airport of Entry" is for airports on the borders of the United States. GCA (Ground Control Approach), ILS (Instrument Landing System), and DF (Direction Finder) are aids located at this aerodrome.

VHF frequencies can be identified by the number "1" appearing as the first digit, e.g. 121.3. Those frequencies where the number "2" appears as the first digit are UHF frequencies, e.g. 237.4. Keep in mind there must be three whole numbers, a decimal point, then another number, e.g. 122.1 or 241.0. UHF frequencies may begin with a 3.

In the Aerodrome Data Box above, list VHF frequencies.

119.5 126.2 122.7R

In the Aerodrome Data Box above, list UHF frequencies.

257.8 278

An aeronautical advisory station (unicom) is an unofficial information facility usually operated by an aircraft representative as a service to pilots. If unicom is available, it will be shown by a "U" after the length of the longest runway.

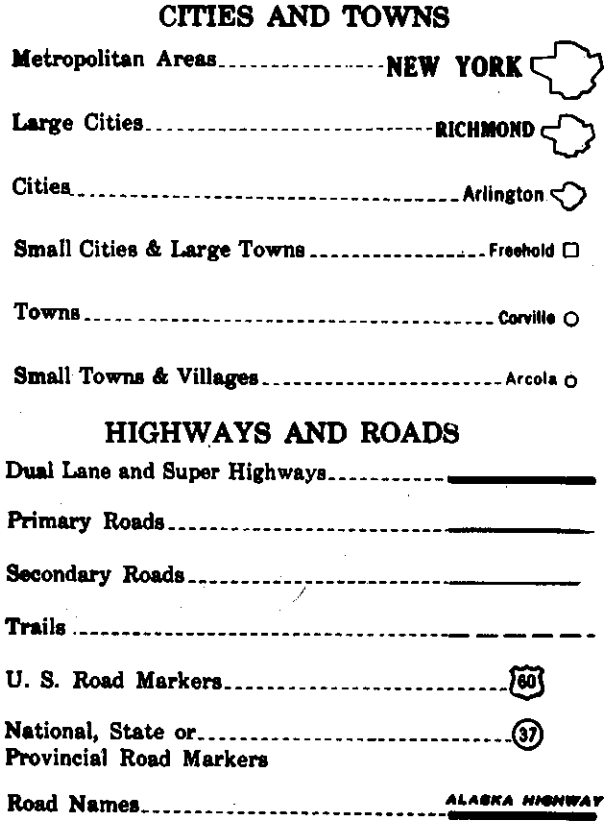
ANSWER: c. An obstruction 3612 feet above sea level.

a. 1368

FRAME 12

The colors of the symbols on aeronautical charts are different from those you have seen during your map reading course. As an example, you will notice that there are no symbols in red on aeronautical charts. This is because red markings of any kind will disappear while using the red map light during night flights.

The following symbols are examples of those whose colors differ from topographic maps.



On Sectional Charts, cities and towns are colored in yellow.

Highways and roads are shown by the color brown on our Sectional Charts.

The colors on Sectional Charts are _____ the
(same as) (different from)
colors shown on topographic maps. The color _____
(red) (yellow) (blue)
is not used on Sectional Charts because it will "disappear" when used with the red map light while night flying.

ANSWER: VHF Frequencies, 119.5, 126.2, and 122.7R
UHF Frequencies, 257.8, 278.0

FRAME 6

Below is the Aerodrome Data Box for Webb Air Force Base.

WEBB AFB		
2561	L	91
GCA	ILS	DF
120.3	126.2	289.6

Which of the following statements about Webb Air Force Base is correct?

a. Elevation 2561 feet, GCA available, and tower receives and transmits on 91.0, 126.2 and 289.6.

b. Lighting available part of night only, longest runway is 9100 feet and tower receives on 120.3, 125.2 and 289.6.

c. Elevation 2561, lighting available sunset to sunrise, GCA available and tower transmits and receives on 289.6.

d. Longest Runway 2561, GCA available, tower transmits on 120.3 and 126.2.

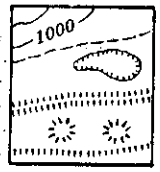
ANSWER: different from
(same as) (different from)

red
(red) (yellow) (blue)

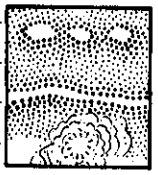
FRAME 13

A thorough look at the Dallas Sectional Chart shows that in some areas covered by the chart, one can find no man made structures by which to navigate. Because of this, an aviator must be familiar with the relief and hydrographic symbols found on the chart.

RELIEF FEATURES



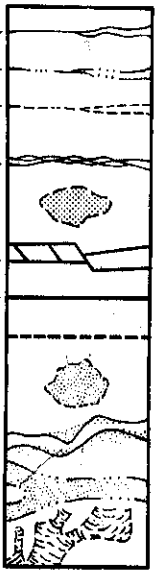
Contours { Reliable / Approximate / Depression
Levees or Eskers
Peaks or Buttes, isolated
Bluffs, Cliffs & Escarpments



Sand { Dunes / Areas / Ridges
Lava Flow

HYDROGRAPHIC FEATURES

Swamps & Marshes
Tidal Flats (Exposed at low tide)
Danger Line
Rocks Awash
Shoals (Exposed at low tide)
Springs
Wells & Water Holes
Reefs, Coral & Rocky Ledges (Awash at low tide)



Streams & Rivers { Perennial / Intermittent / Probable or Unsurveyed / Braided
Intermittent Lakes (blue stipple)
Drainage Ditches
Canals { In use / Abandoned
Dry Lake Beds (brown stipple)
Sand Deposits in river bed
Dry Washes (brown stipple)
Glaciers and Ice Caps

The non-man made features located at coordinates 33°04'-100°27'are

a. beacon lights.
b. isolated buttes.
c. depressions in the ground.

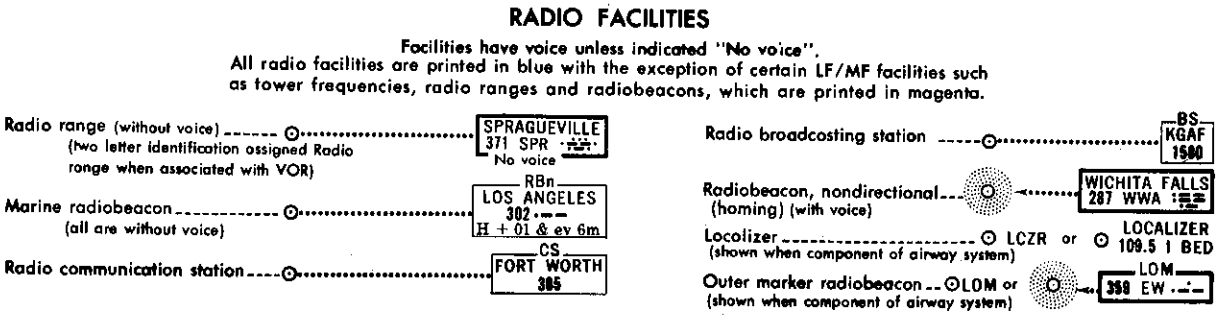
Further west of the previous location, one could locate at coordinates 33°15'-101°45'

a. a lake within a depression.
b. a dry lake within a depression.
c. a small sand dune.

ANSWER: c. Elevation 2561, lighting available sunset to sunrise, GCA available and tower transmits and receives on 289.6.
NOTE: Tower also transmits and receives on 120.3 and 126.2.

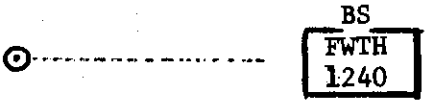
FRAME 7

The various types of radio facilities are shown in the legend in the following manner:



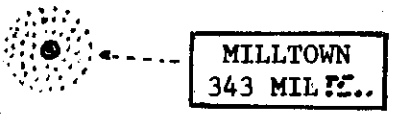
NOTE: The above Radio Facilities are used for radio navigation and not for voice communication.

The following symbol represents



a. a locater outer marker.
b. a marine Radio Beacon.
c. a radio range (without voice).
d. a radio broadcasting station.

If we saw the following symbol on our chart, we would recognize it as



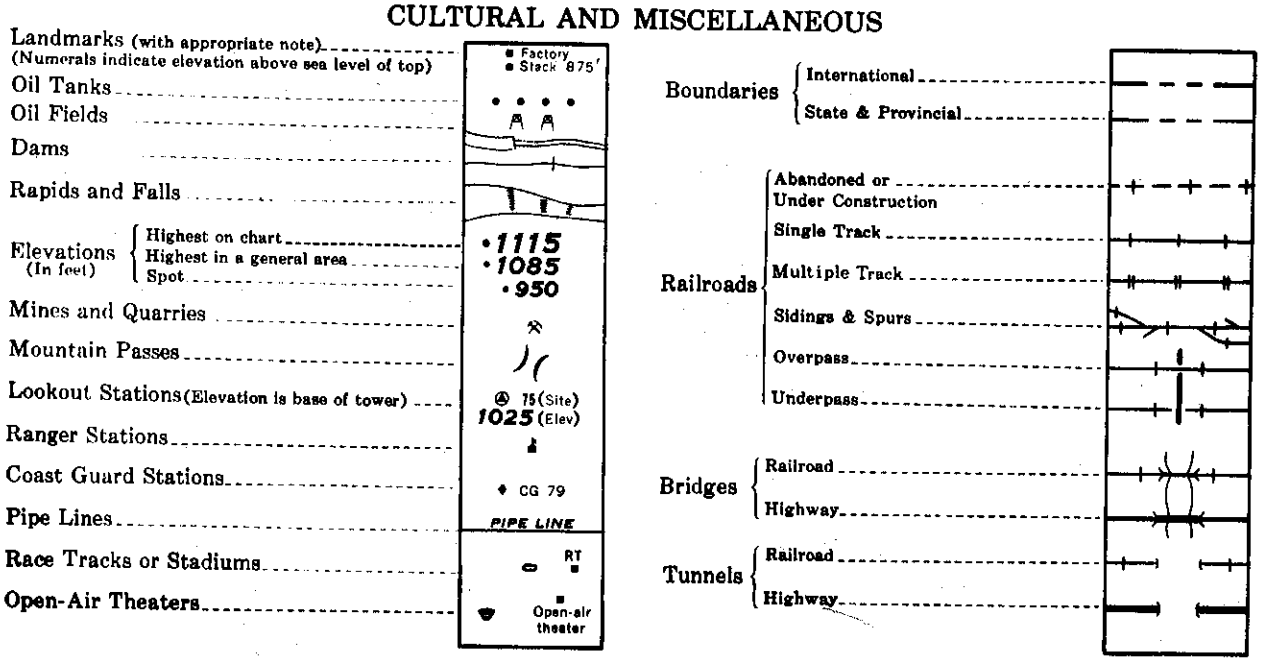
a. Milltown VOR.
b. Milltown nondirectional radio beacon.
c. Milltown radio communication station.
d. Milltown outer marker.

RETURN TO FRAME 8 PAGE 2

ANSWER: b. isolated buttes.
a. a lake within a depression.

FRAME 14

The Cultural and Miscellaneous Legend shows symbols for many natural and man-made landmarks which are invaluable to the aviator as check points.



On the Dallas Chart the dam at coordinates 32°52' - 98°25' would be an excellent check point to locate one's self over Possum Kingdom Lake.

The symbol approximately one mile west of Mineral Wells, at coordinates 32°48' - 98°09', depicts

a. an open air theater.
b. a fan shaped building.
c. the elementary school.

When flying over the town of Brock (coordinates 32°41' - 97°56') you would expect that about one mile east of town you would see

a. a large black dot on the ground.
b. an oil tank.
c. a round building.

INTENTIONALLY LEFT BLANK

ANSWER: dam

a. an open air theater.
b. an oil tank.

CONTINUE WITH THE SELF EVALUATION EXERCISE ON PAGE 17

SELF EVALUATION EXERCISE

1. Which of the following depicts a land based military aerodrome?

   a.

   b.

   c.

   d.

2. What is the elevation of the Abilene Municipal Airport (coordinates 32°25' - 99°41') and what type of lighting is available?

   a. 6000 feet, lighting available sunset to sunrise.
   b. 1778 feet, lighting available part of night only.
   c. 1778 feet, lighting available sunset to sunrise.
   d. 1201 feet, lighting available sunset to sunrise.

3. The length of the longest runway at Abilene Municipal is

   a. 60 feet.
   b. 6000 feet.
   c. 1201 feet.
   d. 1778 feet.

4. The Abilene Municipal Control Tower receives on the following frequencies:

   a. 120.1, 257.8, 122.7
   b. 120.1, 122.7
   c. 120.1, 257.8
   d. 257.8

5. The controlled airspace above the airport at Bridgeport (coordinates 33°16' - 97°48') begins at

   a. 700 feet above the earth's surface.
   b. 1200 feet above the earth's surface.
   c. the earth's surface.

6. The controlled airspace above the Mineral Wells Airport begins at

   a. 700 feet above the earth's surface.
   b. 1200 feet above the earth's surface.
   c. the earth's surface.

7. What does the symbol shown below depict?

4230

a. A 4230 foot high obstruction.
b. A rotating light on top of a 4230 foot high structure.
c. An abandoned airport with a 4230 foot long runway.

8. What does the symbol shown below depict?

a. Prohibited area.
b. Jet training area.
c. Restricted area.
d. All of the above.

9. What is located at coordinates 33°38' - 97°08'?

a. The sump area for the oil wells located to the east.
b. City of Gainesville.
c. A several sided atomic energy plant located at Gainesville.

10. How are the radio towers 2 miles east of Gainesville depicted on the map?

a. 1155

b. AAA

c. •••• Transmission towers

INTENTIONALLY LEFT BLANK

ANSWERS TO SELF EVALUATION EXERCISE

1. c
2. c.
3. b.
4. a.
5. a.
6. c.
7. b.
8. a.
9. b.
10. a.