

Figure 1

VFR

RADIO PROCEDURES

in the

USA

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1. Introduction

This 1997 manual is designed to consolidate key elements of radio procedures into one easy to use pocket reference.¹

This guide will improve your radio procedures and understanding of radio communications - and your ability to transmit clear, accurate and concise information in a variety of flying environments.²

Our guide covers radio procedures used when *arriving*, *departing* or *transiting* airports situated in Class B, Class C, Class D, Class E and Class G airspace (*Figure 1*) and TRSAs. We also consider the role of Air Route Traffic Control Centers and Flight Service Stations.

When appropriate, Federal Aviation Regulations (FAR) and Aeronautical Information Manual (AIM) sections are referenced.

For the benefit of the student pilot, the manual begins with an overview of the basics of the pattern. More experienced flyers may wish to move directly to Chapter 3: Class B Airspace.

As in other aeronautical publications, the top of the page is oriented north unless otherwise indicated.

¹Special thanks for their helpful comments to Dave Allen, Keith Alves, Al Bieck, Elaine Bieck, David Fosdick, Robert Hann, John Kall and Kenneth Woitaszek.

²The examples used in this guide are for illustration purposes only. We have tried to provide the reader with a wide, though not exhaustive, range of radio calls that may be used and heard in the flying environment.

2. The Traffic Pattern

2.1 Traffic Pattern Basics

Good radio work requires an understanding of situational awareness and traffic pattern procedures.

The recommended pattern altitude is 1000 feet above ground level, unless established otherwise. (Pattern altitudes for airports are located in the Airport/Facility Directory). However, traffic pattern altitudes may extend from 600 feet to as high as 1,500 feet above the ground for propeller driven aircraft. AIM 4-3-4 A satellite airport underlying Class C airspace, for example, may have a lower traffic pattern altitude because of proximity to the primary airport.

A traffic *pattern* (*Figure 2*) has 5 specific legs: AIM 4-3-2

- upwind leg
- crosswind leg
- downwind leg
- base leg
- final approach

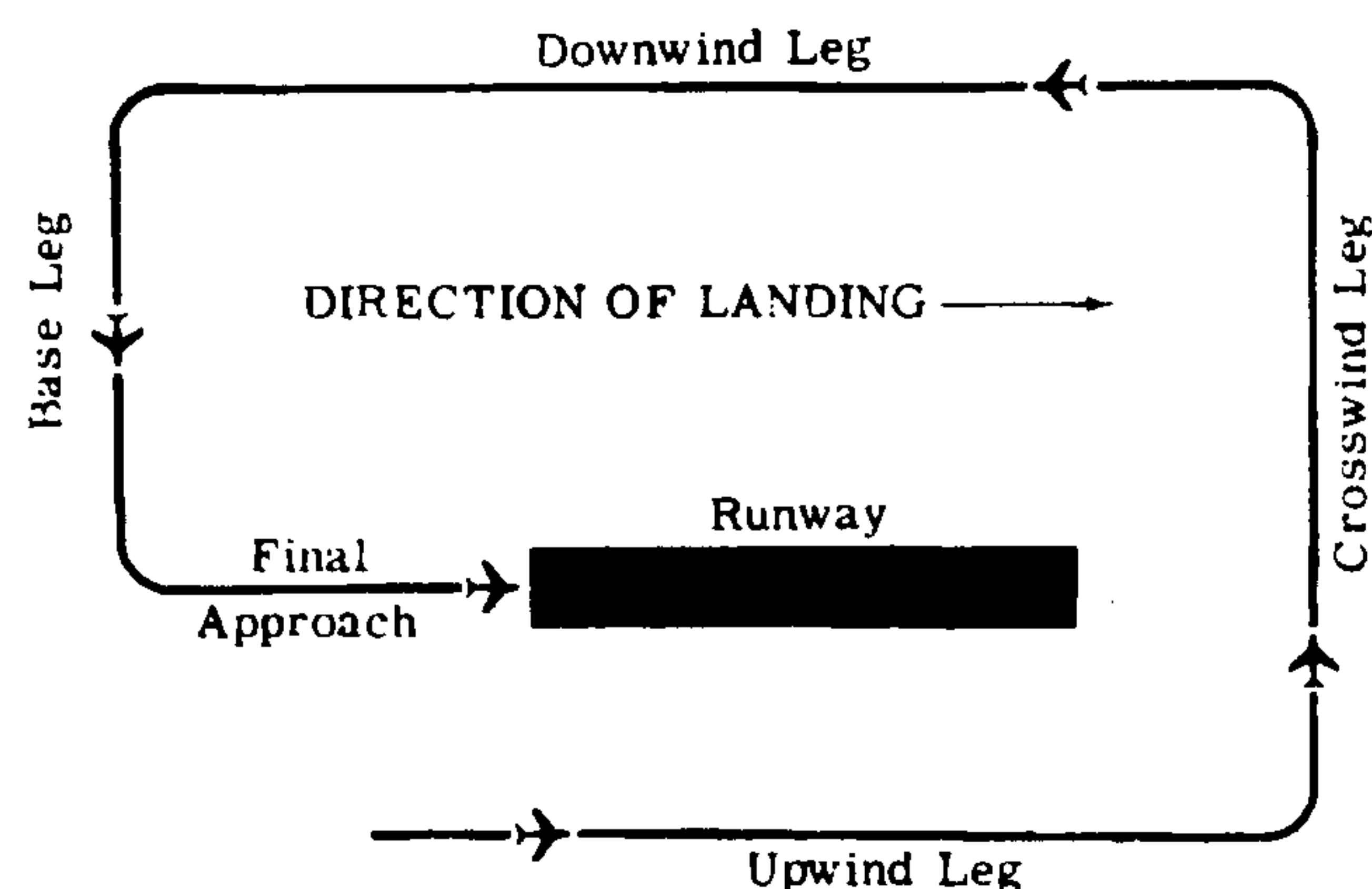


Figure 2

If a right hand pattern is designated, the opposite of this diagram is applicable

Pilots should "enter (the) pattern in level flight, abeam the midpoint of the runway, at pattern altitude..." AIM 4-3-4 Entering the pattern at a 45° angle abeam the midpoint of the runway allows the pilot a good view of the takeoff and departure ends of the runway.

It is important to know in advance the pattern altitude of the destination airport. If there is a Tower, a pilot may receive a clearance when inbound to "descend at your discretion"- which means to descend to a height not lower than pattern altitude.

Airport runways normally have a left hand pattern unless noted in the Airport/Facility Directory. All turns, when approaching to land at an airport without an operating Control Tower, must be to the left while operating in the pattern, unless a right-hand pattern has been designated. FAR 91.126 and 91.127 Factors which may dictate a right-hand pattern include geography (e.g., an escarpment near the airport) or noise abatement.

Figure 3 and Figure 4 show the traffic pattern operations at airports with single and parallel runways. AIM 4-3-4: Figures 4-3-2, 4-3-3

TRAFFIC PATTERN OPERATIONS — SINGLE RUNWAY

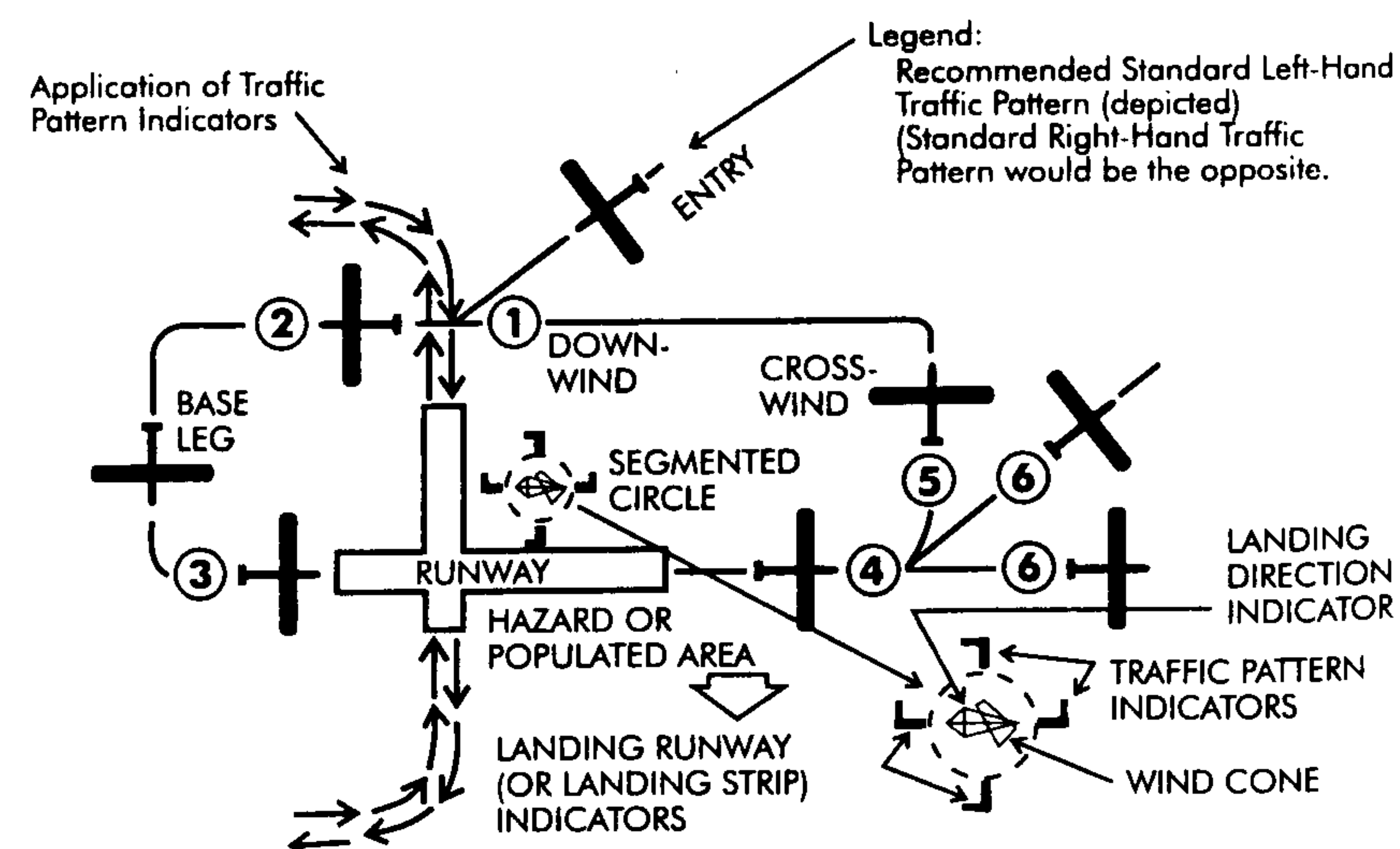


Figure 3

TRAFFIC PATTERN OPERATIONS — PARALLEL RUNWAYS

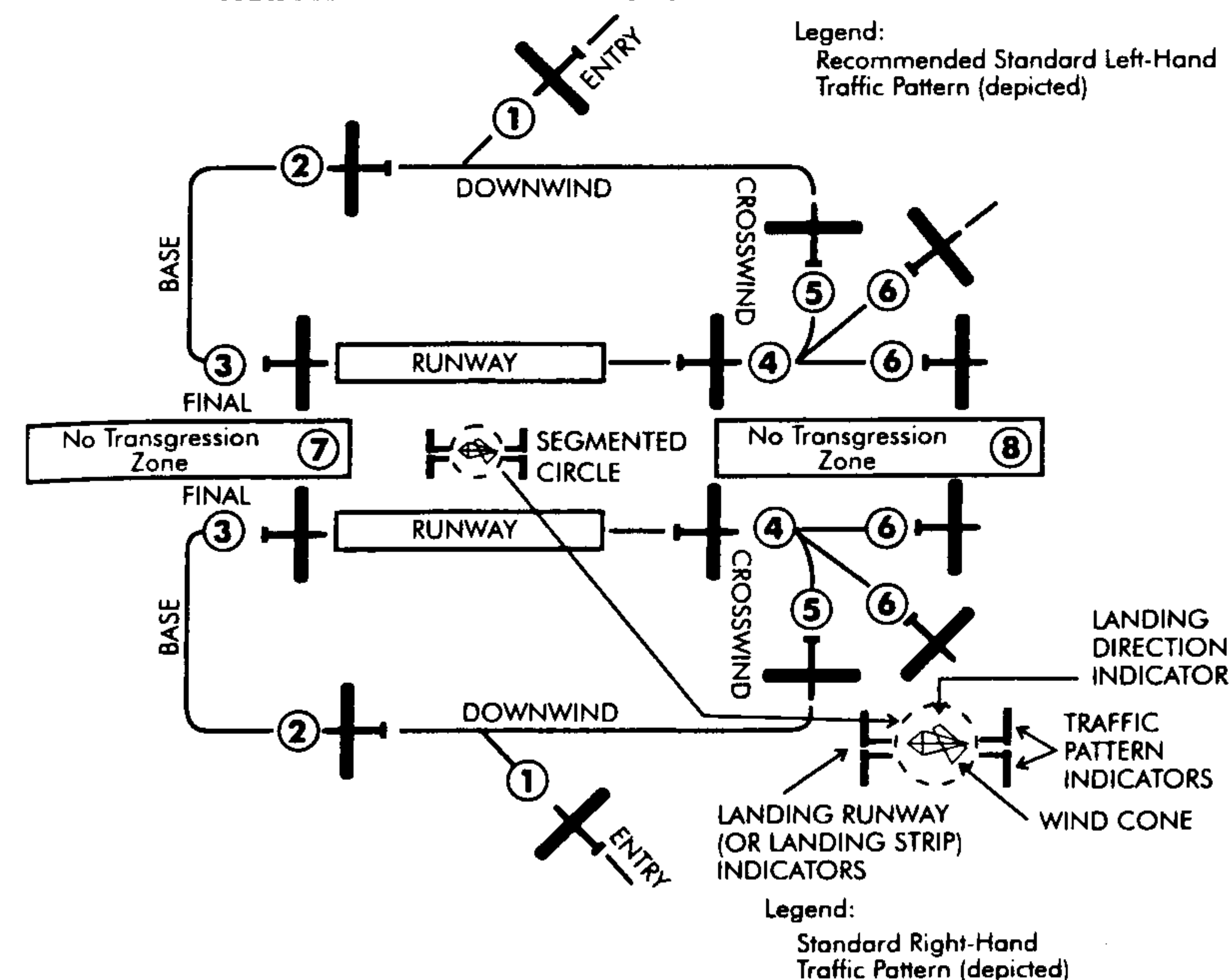


Figure 4

"If departing the traffic pattern, continue straight out, or exit with a 45° turn (to the left when in a left-hand traffic pattern; to the right when in a right-hand traffic pattern) beyond the departure end of the runway, after reaching pattern altitude." AIM 4-3-4 (Figure 3 and Figure 4)

Example #2

You are northwest of the airport on a heading of 150. You know the active runway is 3. Look at your heading indicator and draw an imaginary runway extending out from 030 on your heading indicator. (Figure 7)

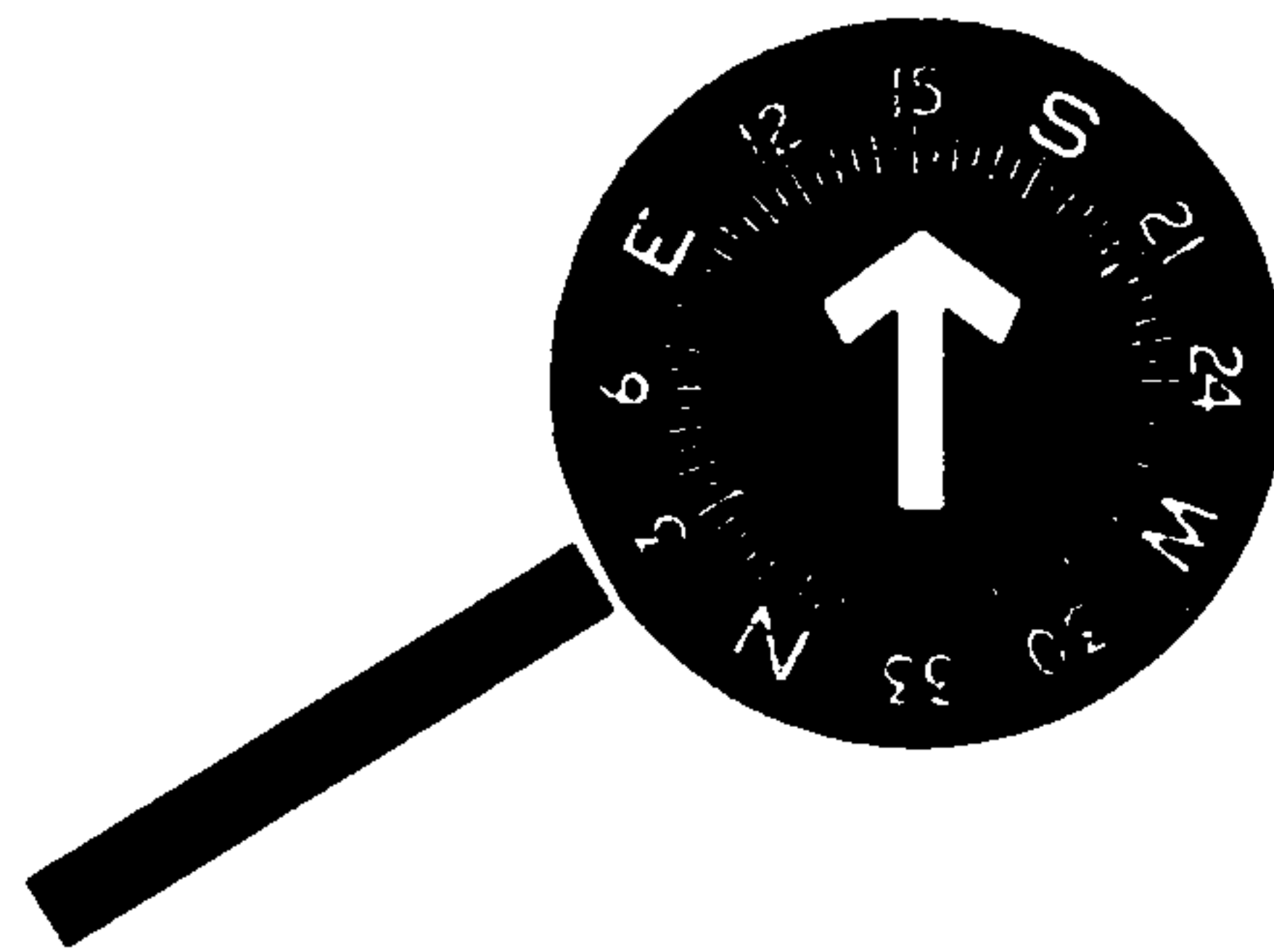


Figure 7

Next visualize the runway off the nose of the aircraft at the same angle that you visualized it on your heading indicator. (Figure 8)

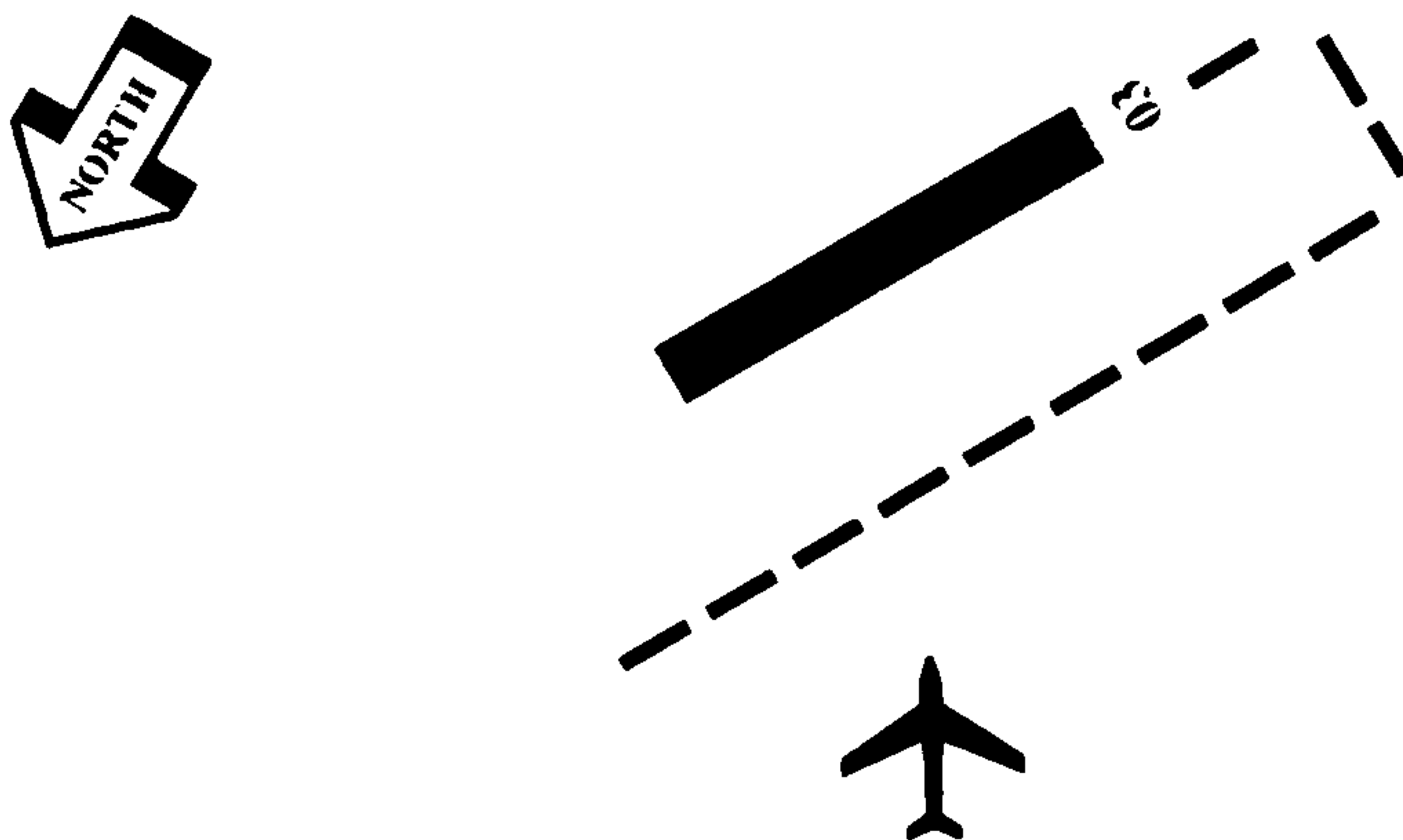


Figure 8

Now that you are aware of the runway position relative to your heading, maneuver your aircraft to enter the pattern in an organized manner.

3. Airports in Class B Airspace

3.1 What is Class B Airspace?

Class B Airspace is "generally, that airspace from the surface to 10,000 feet MSL surrounding the nation's busiest airports in terms of IFR operations or passenger enplanements. The configuration of each Class B airspace area is individually tailored and consists of a surface area and two or more layers..." AIM 3-2-3

A pilot **MUST BE CLEARED TO ENTER CLASS B AIRSPACE**, have a functioning Mode C transponder and the pilot in command must hold at least a private pilot certificate. **Prior to entry, two-way communication must be established and maintained with the ATC facility.**

"When an ATC clearance has been obtained, no pilot in command may deviate from that clearance unless an amended clearance is obtained, an emergency exists, or the deviation is in response to a traffic alert and collision avoidance system resolution advisory." FAR 91.123

The basic VFR weather minimums in Class B airspace are 3 statute miles flight visibility and clear of clouds. If you find yourself in a position that would violate these minimums, based on a clearance received by ATC, inform them immediately (e.g., "*unable due to weather, a heading of zero niner zero would keep us clear of cloud*").

Surrounding Class B airspace within 30 NM of the primary airport is an area known as the "**Mode C Veil**." The Mode C Veil extends from the surface to 10,000 feet MSL. Aircraft operating within this airspace must be equipped with a Mode C transponder, unless otherwise authorized by air traffic control. AIM 3-2-3

Class B airspace (*Figure 9*) is depicted on the Sectional Aeronautical Chart with multiple blue lines surrounding the primary airport. The outer thin blue line depicts the beginning of the "Mode C Veil."

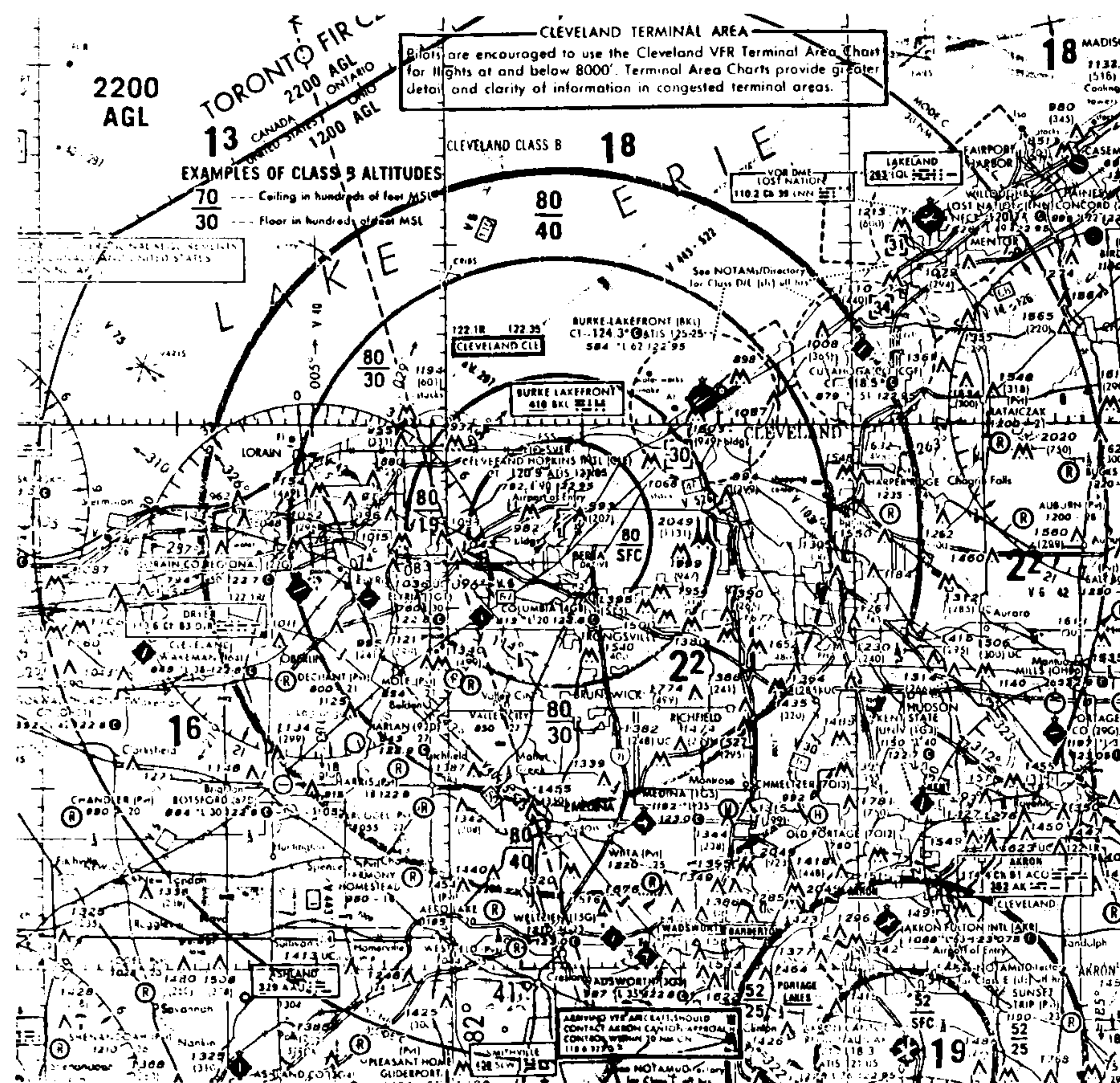


Figure 9

3.2 Arriving at the Primary Airport in Class B Airspace

When flying in Class B airspace, pilots should use the VFR Terminal Area Chart (rather than the Sectional Aeronautical Chart) as it provides greater detail and clarity of information.

The initial contact before entering Class B airspace should be made **10 miles** prior to the boundary level you wish to enter.

When making the initial contact, pilots should provide the following information:

- Aircraft Identification - type and full registration;³
- Location - relative to the airport;
- Altitude;
- Destination and/or request;
- Squawk - the code you are squawking⁴; and
- ATIS - phonetic designation

In the event that entry into Class B airspace is denied, be sure to have an alternate route planned in advance.

i. ATIS

Prior to contacting Approach Control, monitor the ATIS⁵ frequency which is found on the Sectional Aeronautical Chart, the VFR Terminal Area Chart or in the Airport/Facility Directory. If for any reason you are unable to receive the ATIS - or the transmission is garbled - conclude your initial call with "negative ATIS" or "ATIS garbled."

An ATIS provides information such as the following:

³On initial contact with any Ground facility (i.e., Tower, Approach, Departure, Center, FSS) remember to use the full aircraft registration. Only abbreviate the registration once the Ground facility has done so.

⁴It is generally assumed by ATC that you are squawking 1200 on initial contact if you state you are VFR and do not provide a squawk code.

⁵An Automatic Terminal Information Service (ATIS) broadcasts on a continual basis information related to local weather, winds, runway in use, NOTAMS affecting the airport etc. A phonetic alphabetic code letter identifies each recording, starting with Alpha. As conditions change and the recordings are updated, successive letters of the alphabet are utilized (i.e., Bravo, Charlie, Delta).

Cleveland Hopkins International information Alpha. Time one two five four Zulu. Wind three two zero at ten, visibility one zero, three thousand scattered, measured ceiling eight thousand overcast, temperature two zero, dew point one six, altimeter three zero zero one. ILS Runway Five Right approach in use, Landing Five Right, Departure Runway Five Left. Notice to airmen, caution advised for bird activity in the vicinity of the airport. Pilots, read back all runway hold short instructions. Advise on initial contact you have Alpha.

As identified in the Airport/Facility Directory under APC/DEP, some airports with a high volume of traffic have more than one Approach and Departure frequency.

For example:

At Dallas-Fort Worth International, arrivals from the northwest contact Approach on 118.1, from the northeast on 124.3, from the southwest on 120.5 and from the southeast on 125.2. (The ATIS sometimes includes this information.)

ii. Approach Control

Reset your directional gyro to agree with your magnetic compass.

(Pilot) *Cleveland Approach, Cessna 172 Four Three Two One Mike.*

(Approach) *Cessna Three Two One Mike, Cleveland Approach.*

(Pilot) *Cleveland Approach, Cessna Three Two One Mike, over Norwalk, at five thousand five hundred, VFR landing Cleveland, squawking one two zero zero, with Alpha.*

(Approach) *Cessna Three Two One Mike, remain outside Cleveland Bravo airspace⁶, squawk two one one six.*

⁶VFR entry to Class B airspace may be denied by ATC based on workload, operational limitations and traffic conditions.

(Pilot) *Cessna Three Two One Mike, two one one six, remaining clear of Cleveland Bravo airspace.*

(Approach) *Cessna Three Two One Mike, radar contact, fifteen miles west of Dryer, cleared to enter Cleveland Bravo airspace, maintain VFR, Cleveland altimeter three zero one one, expect runway five right, turn left heading zero eight zero, descend and maintain two thousand.*

(Pilot) *Cessna Three Two One Mike, cleared to enter Cleveland Bravo airspace, left zero eight zero, expect five right, maintain VFR, descend and maintain two thousand, altimeter three zero one one.*

(Approach) *Cessna Three Two One Mike, turn left zero five zero, contact Cleveland Tower one two four point five.*

(Pilot) *Cessna Three Two One Mike, left zero five zero, Tower one two four five.*

iii. Tower

On initial contact with the Tower, the airport controller will inform the pilot of the runway in use, wind direction and speed and any other pertinent information.

(Pilot) *Cleveland Tower, Cessna Four Three Two One Mike, inbound five right.*

(Tower) *Cessna Three Two One Mike, Cleveland Tower, runway five right, cleared to land, wind two five zero at five.*

(Pilot) *Cessna Three Two One Mike, cleared to land runway five right.*

You have touched down:

(Tower) *Cessna Three Two One Mike, turn right at Kilo, contact Ground point seven.⁷*

(Pilot) *Cessna Three Two One Mike, right at Kilo, Ground point seven.*

Other types of instructions that Tower might issue to aircraft inbound for landing are:

(Tower) *Cessna Three Two One Mike, Cleveland Tower, number two, follow Cessna two ten now on base leg.*

(Tower) *Cessna Three Two One Mike, Cleveland Tower, go around, traffic still on the runway.*

iv. Ground

Once you turn onto Kilo taxiway, stop after crossing the hold line and contact Ground control.

(Pilot) *Cleveland Ground, Cessna 172 Three Two One Mike, clearing runway five right on taxiway Kilo, request taxi to Air Services.*

(Ground) *Cessna Three Two One Mike, Cleveland Ground, taxi to Air Services via Kilo, Juliett.*

(Pilot) *Cessna Three Two One Mike, taxi Kilo, Juliett.*

⁷Ground control frequencies are for the most part 121.7, 121.8 or 121.9. "A controller may omit the ground or local control frequency if the controller believes the pilot knows which frequency is in use. If the ground control frequency is in the 121 MHz bandwidth the controller may omit the numbers preceding the decimal point; e.g., 121.7, "CONTACT GROUND POINT SEVEN"." AIM 4-3-14.c.

If you find yourself at an unfamiliar airport you may wish to ask Ground for progressive taxi instructions (i.e., step-by-step routing instructions, such as "turn right next intersection").

3.3 Departing the Primary Airport in Class B Airspace

Aircraft departing the primary airport in Class B airspace **MUST BE CLEARED TO ENTER CLASS B AIRSPACE** and this occurs when you contact Clearance Delivery prior to taxi. The clearance must be received prior to engine start-up. AIM 4-3-14

i. ATIS

Prior to calling Clearance Delivery, monitor the ATIS.

ii. Clearance Delivery

(Pilot) *Clearance Delivery, Cessna 172 Four Three Two One Mike, at Air Services with Alpha, VFR Lansdowne, request five thousand five hundred and flight following⁸.*

(Clearance) *Cessna Three Two One Mike, cleared out of Cleveland Bravo airspace, maintain four thousand, expect higher within ten minutes of departure, Departure frequency one one eight point one five, squawk six two one six⁹.*

(Pilot) *Cessna Three Two One Mike, cleared out of Cleveland Bravo airspace, maintain four thousand, expect higher in ten minutes, one one eight one five, squawking six two one six.*

(Clearance) *Cessna Three Two One Mike, read back is correct, contact Ground one two one point seven for taxi.*

⁸You should request flight following in your initial contact with Clearance Delivery.

⁹Do not switch your transponder to the on/alt position until you are at the runway.

iii. Ground

Before taxiing to the active runway you must receive Ground clearance. AIM 4-3-18

"When ATC clears an aircraft to "taxi to" an assigned takeoff runway, the absence of holding instructions authorizes the aircraft to "cross" all runways which the taxi route intersects except the assigned takeoff runway. It does not include authorization to "taxi onto" or "cross" the assigned takeoff runway at any point." AIM 4-3-18.a.5.

(Pilot) *Cleveland Ground, Cessna 172 Four Three Two One Mike, at Air Services, ready to taxi, VFR to Lansdowne.*

(Ground) *Cessna Three Two One Mike, Cleveland Ground, taxi to runway five left via Juliett, Kilo, Lima, November, hold short five right, contact Tower.*

(Pilot) *Cessna Three Two One Mike, taxi five left, Juliett, Kilo, Lima, November, hold short five right, contact Tower.*

iv. Tower

When you reach the hold short position on taxiway November for runway 5R, contact Tower. A takeoff clearance must be received. Do not forget to switch your transponder to the "ON/ALT" position.

(Pilot) *Cleveland Tower, Cessna Four Three Two One Mike, holding short five right.*

(Tower) *Cessna Three Two One Mike, Cleveland Tower, taxi across runway five right via November, hold short five left.*

(Pilot) *Cessna Three Two One Mike, taxi November across five right, hold short five left.*

(Pilot) *Cleveland Tower, Cessna 172 Three Two One Mike, ready for takeoff five left.*

(Tower) *Cessna Three Two One Mike, Cleveland Tower, fly runway heading runway five left, cleared for takeoff.*

(Pilot) *Roger, Cessna Three Two One Mike, cleared for takeoff five left, runway heading.*

After departure, Tower calls:

(Tower) *Cessna Three Two One Mike, contact Departure, Good day.*

(Pilot) *Cessna Three Two One Mike, over to Departure.*

v. Departure Control

(Pilot) *Cleveland Departure, Cessna 172 Four Three Two One Mike, leaving one thousand four hundred, climbing four thousand.*

(Departure) *Cessna Three Two One Mike, Cleveland Departure, radar contact, climb and maintain five thousand five hundred.*

(Pilot) *Cessna Three Two One Mike, climb and maintain five thousand five hundred.*

(Departure) *Cessna Three Two One Mike, turn right heading one four zero.*

(Pilot) *Cessna Three Two One Mike, right one four zero.*

(Departure) *Cessna Three Two One Mike, proceed on course to Lansdowne.*

(Pilot) *Cessna Three Two One Mike, on course to Lansdowne.*

(Departure) *Cessna Three Two One Mike, position twenty miles southeast of Cleveland, leaving Cleveland Bravo airspace, radar service terminated, contact Cleveland Center one two zero point seven seven five, Good day.*

(Pilot) *Cessna Three Two One Mike, Center one two zero point seven seven five, Thanks.*

vi. Going from Departure to Center

(Pilot) *Cleveland Center, Cessna 172 Four Three Two One Mike, at five thousand five hundred, VFR Lansdowne, squawking four two one six.*

(Center) *Cessna Three Two One Mike, Cleveland Center, maintain VFR, maintain five thousand five hundred.*

(Pilot) *Cessna Three Two One Mike, five thousand five hundred, maintain VFR.*

(Center) *Cessna Three Two One Mike, position twenty miles southwest of Lansdowne, radar service terminated, contact Youngstown Approach one two seven point one five.*

(Pilot) *Cessna Three Two One Mike, Youngstown one two seven one five.*

Not all requests for enroute advisories (i.e., flight following) will be approved by Center. (See [Chapter 9](#) for a detailed discussion of Air Route Traffic Control Centers.)

In some areas, airspace is structured to the extent that adjoining Approach Control facilities handle air traffic advisories without enroute (Center) facility involvement.

3.4 Transiting Class B Airspace

"Published VFR routes for transitioning around, under and through complex airspace such as Class B airspace were developed through a number of FAA and industry initiatives. All of the following terms, i.e., "VFR Flyway", "VFR Corridor", "Class B airspace VFR Transition Route" and "Terminal Area VFR Route" have been used when referring to the same or different types of routes or airspace." [AIM 3-5-6](#) A detailed discussion of these terms

and the various clearance requirements, if any, that are required by the VFR pilot when using the VFR routes are found in [AIM 3-5-6.a.b.c.d.](#)

The reverse side of the VFR Terminal Area Chart provides the published VFR routes that help VFR pilots avoid major controlled traffic flows. For example, on the reverse of the Detroit VFR Terminal Area Chart, you will find the "Detroit Charted VFR Flyway Planning Chart" for use by transiting VFR aircraft.

In the event that entry into Class B airspace is denied, be sure to have an alternate route planned in advance.

i. ATIS

To obtain radar service when transiting through Class B airspace, monitor the ATIS frequency located on the Sectional Aeronautical Chart, the VFR Terminal Area Chart or in the Airport/Facility Directory prior to contacting Approach Control. Plan ahead!

ii. Approach Control

Reset your directional gyro to agree with your magnetic compass.

(Pilot) *Cleveland Approach, Cessna 172 Four Three Two One Mike.*

(Approach) *Cessna Three Two One Mike, Cleveland Approach.*

(Pilot) *Cleveland Approach, Cessna Three Two One Mike, over Chardon VOR, at six thousand five hundred, VFR Fremont Airport, squawking one two zero zero, with Alpha, request vectors through Cleveland Bravo airspace.*

(Approach) *Cessna Three Two One Mike, remain outside Cleveland Bravo airspace, squawk two four three two.*

(Pilot) *Cessna Three Two One Mike, remaining outside Cleveland Bravo airspace, squawking two four three two.*

- (Approach)** *Cessna Three Two One Mike, radar contact, thirty two miles east of Cleveland, cleared to enter Cleveland Bravo airspace, maintain six thousand five hundred while in Bravo airspace, maintain VFR, Cleveland altimeter two niner two eight, proceed on course.*
- (Pilot)** *Cessna Three Two One Mike, cleared to enter Cleveland Bravo airspace, maintain VFR at six thousand five hundred, on course, altimeter two niner two eight.*
- (Approach)** *Cessna Three Two One Mike, position twenty miles west of Cleveland, leaving Cleveland Bravo airspace, radar service terminated, frequency change approved, squawk one two zero zero.*
- (Pilot)** *Cessna Three Two One Mike, one two zero zero, Thanks.*

3.5 Landing at a Satellite Airport

A satellite (or secondary) airport is located within the boundaries of Class B, Class C or TRSA airspace. (e.g., See Figure 9: Burke Lakefront)

i. ATIS

Prior to contacting Approach Control, monitor the ATIS frequency located on the Sectional Aeronautical Chart, the VFR Terminal Area Chart or in the Airport/Facility Directory. Make sure you understand the structure and altitude limits of Class Bravo airspace.

ii. Approach Control

Reset your directional gyro to agree with your magnetic compass.

- (Pilot)** *Cleveland Approach, Cessna 172 Four Three Two One Mike.*
- (Approach)** *Cessna Three Two One Mike, Cleveland Approach.*

- (Pilot)** *Cessna Three Two One Mike, over Norwalk, at five thousand five hundred, VFR landing at Cuyahoga, squawking one two zero zero, with Alpha.*
- (Approach)** *Cessna Three Two One Mike, remain outside Cleveland Bravo airspace, squawk two one one six.*
- (Pilot)** *Cessna Three Two One Mike, squawking two one one six, remaining outside Cleveland Bravo airspace.*
- (Approach)** *Cessna Three Two One Mike, radar contact, eighteen miles west of Dryer, cleared to enter Cleveland Bravo airspace, maintain VFR, Cleveland altimeter two niner two eight, turn left heading zero eight zero, descend and maintain three thousand.*
- (Pilot)** *Roger, Cessna Three Two One Mike, cleared to enter Cleveland Bravo airspace, left zero eight zero, descend and maintain three thousand, maintain VFR, altimeter two niner two eight.*
- (Approach)** *Cessna Three Two One Mike, position ten miles west of Cuyahoga airport, descend and maintain two thousand, Cuyahoga altimeter two niner two eight, contact Cuyahoga Tower one one eight point five.*
- (Pilot)** *Cessna Three Two One Mike, descend and maintain two thousand, altimeter two niner two eight, switching to Cuyahoga Tower one one eight five.*

3.6 Departing from a Satellite Airport

When departing a satellite airport (underlying Class B airspace) and you wish to transit Class B airspace, check the Airport/Facility Directory for the appropriate controlling agency to contact, usually Approach Control, as you must be cleared to enter Class B airspace.

In the event that entry into Class B airspace is denied, know in advance the structure and altitudes necessary to remain outside Class B airspace.

i. ATIS

Prior to contacting Approach Control, monitor the ATIS frequency located on the Sectional Aeronautical Chart, the VFR Terminal Area Chart or in the Airport/Facility Directory.

ii. Approach Control

In the example that follows, you are ready to depart Burke Lakefront Airport (in Class D airspace) underlying Cleveland Hopkins International (in Class B airspace).

Reset your directional gyro to agree with your magnetic compass.

(Pilot) *Burke Tower, Cessna 172 Four Three Two One Mike, ready for takeoff, southbound.*

(Tower) *Cessna Three Two One Mike, Burke Tower, runway six right, cleared for takeoff southbound.*

(Pilot) *Cessna Three Two One Mike, cleared for takeoff, runway six right, southbound.*

After departure, Tower calls:

(Tower) *Cessna Three Two One Mike, contact Cleveland Approach, one two four point zero.*

(Pilot) *Cessna Three Two One Mike, Cleveland Approach, one two four point zero.*

(Pilot) *Cleveland Approach, Cessna 172 Four Three Two One Mike.*

(Approach) *Cessna Three Two One Mike, Cleveland Approach.*

(Pilot) *Cessna Three Two One Mike, off Burke Lakefront, leaving one thousand, VFR Akron-Canton Regional, squawking one two zero zero, with Alpha, request five thousand five hundred.*

(Approach) *Cessna Three Two One Mike, remain outside Cleveland Bravo airspace, squawk two four three two.*

(Pilot) *Cessna Three Two One Mike, two four three two, remaining outside Cleveland Bravo airspace.*

(Approach) *Cessna Three Two One Mike, radar contact, fourteen miles northeast of Cleveland, cleared through Cleveland Bravo airspace, maintain VFR, Cleveland altimeter two niner eight eight, climb and maintain five thousand five hundred while in Bravo airspace.*

(Pilot) *Cessna Three Two One Mike, cleared through Bravo airspace, climb and maintain five thousand five hundred, maintain VFR, altimeter two niner eight eight.*

(Approach) *Cessna Three Two One Mike, position twenty miles southeast of Cleveland, leaving Cleveland Bravo airspace, resume own navigation, radar service terminated, frequency change approved, squawk one two zero zero.*

(Pilot) *Cessna Three Two One Mike, squawking one two zero zero, Thanks.*

4. Airports in Class C Airspace

4.1 What is Class C Airspace?

Class C airspace is "generally, that airspace from the surface to 4,000 feet above the airport elevation (charted in MSL) surrounding those airports that have an operational control tower, are serviced by a radar approach control, and that have a certain number of IFR operations or passenger enplanements." AIM 3-2-4

As with Class B airspace, Class C airspace is also individually tailored. However Class C airspace usually consists of a 5 NM radius core surface area that extends from the surface up to 4,000 feet above airport elevation (inner circle). A shelf area with a 10 NM radius extends from 1,200 feet to 4,000 feet above the airport elevation (outer circle). (*Figure 10*) Extending out from the 10 NM shelf is another 10 NM mile radius that extends from the lower limits of radar/radio coverage up to the same approximate 4,000 foot AGL ceiling. This is referred to as the outer area and is not marked on sectional or terminal area charts. This area is non-regulatory and merely defines the additional airspace in which ATC services are available.

Unless otherwise authorized by ATC, a functioning Mode C transponder is required to enter Class C airspace. **Prior to entry, two-way communication must be established and maintained with the ATC facility.** "When an ATC clearance has been obtained, no pilot in command may deviate from that clearance unless an amended clearance is obtained, an emergency exists, or the deviation is in response to a traffic alert and collision avoidance system resolution advisory." FAR 91.123

The basic VFR weather minimums in Class C airspace are 3 statute miles flight visibility and 500 feet below, 1,000 feet above and 2,000 feet horizontal distance from clouds. If you find yourself in a position that would violate these minimums based on a clearance received by ATC, inform them immediately (e.g., "unable due to weather, a heading of zero niner zero would keep us clear of cloud").

Class C airspace (Figure 10) is depicted on the Sectional Aeronautical Chart with two magenta lines surrounding the primary airport. The outer ring extends 10 NM, while the inner ring extends 5 NM from the primary airport.

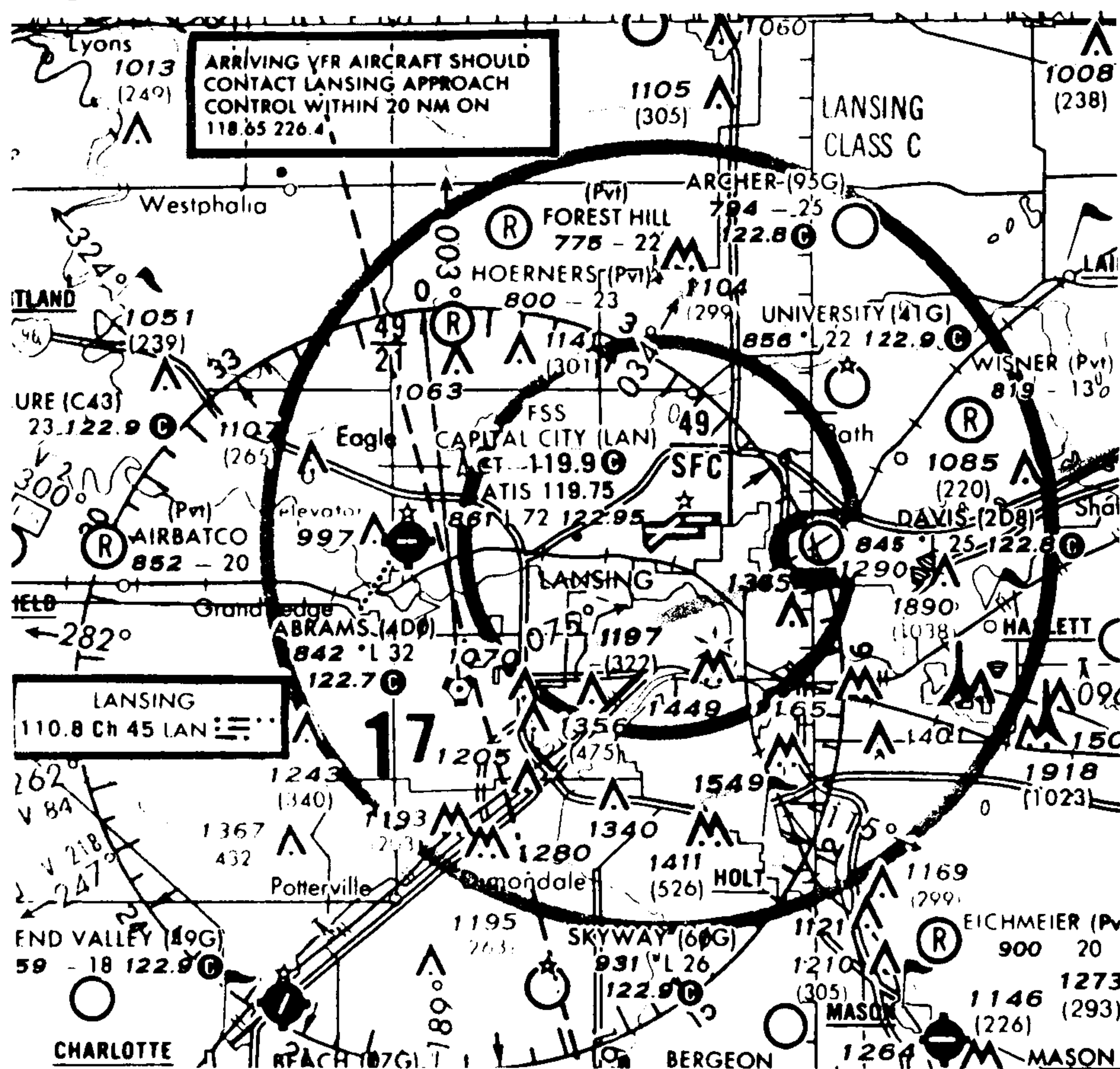


Figure 10

4.2 Arriving at the Primary Airport in Class C Airspace

The Aeronautical Information Manual (3-2-4) suggests that pilots of arriving aircraft make initial contact "far enough from the Class C airspace" to ensure the establishment of two-way communications prior to entry. Usually, contact with ATC in Class C airspace is made to Approach Control within 20 NM of the primary airport. On the Sectional Aeronautical Chart, you will find a magenta-colored rectangular box (in close proximity to the Class C airspace boundary) that has information concerning to whom and when to make the initial contact. (Figure 11)

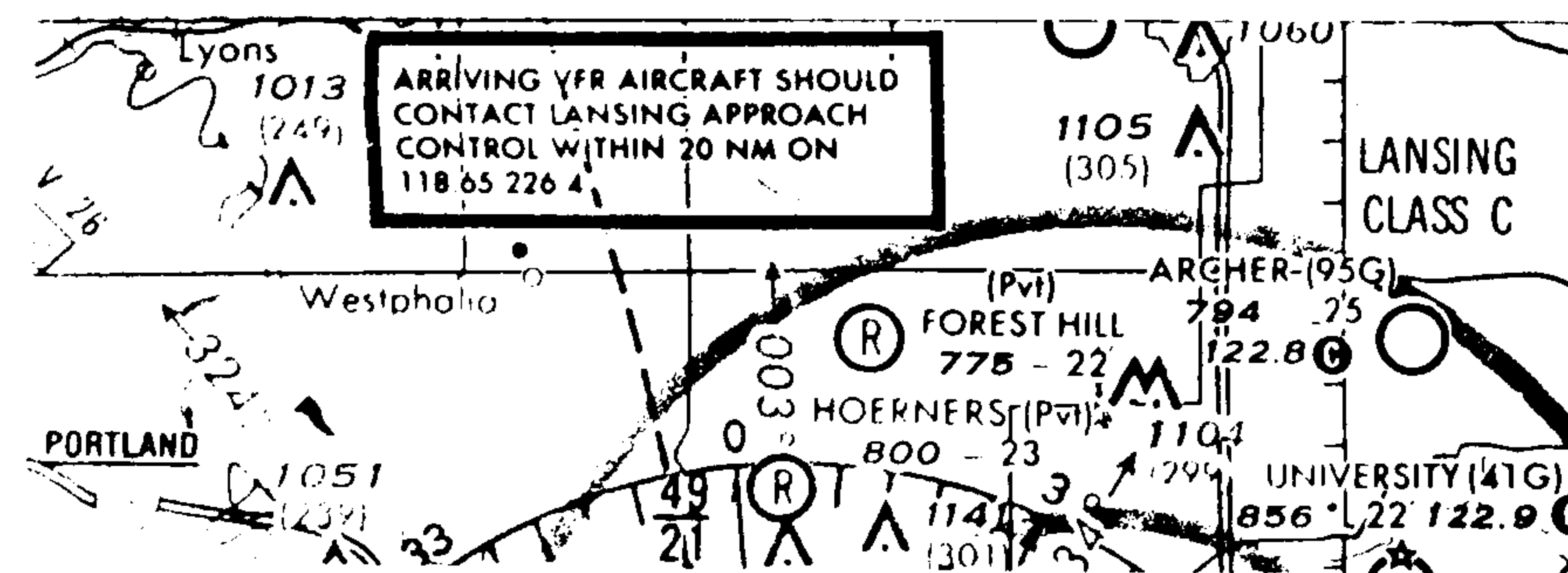


Figure 11

When making the initial contact, pilots should provide the following information:

- Aircraft Identification - type and full registration;¹⁰
- Location - relative to the airport;
- Altitude;
- Destination and/or request;
- Squawk - the code you are squawking¹¹; and
- ATIS - phonetic designation

¹⁰On initial contact with any ground facility (i.e., Tower, Approach, Departure, Center, FSS) remember to use the full aircraft registration. Only abbreviate the registration once the Ground facility has done so.

¹¹It is generally assumed by ATC that you are squawking 1200 on initial contact if you state you are VFR and do not provide a squawk code.

i. ATIS

Pilots should check the Airport/Facility Directory or the Sectional Aeronautical Chart for the appropriate controlling facility (usually Approach Control) to contact and be sure to monitor the ATIS prior to contacting the controlling facility.

An ATIS provides information such as the following:

Toledo Express information Foxtrot. Time one three five six Zulu. Wind three two zero at ten, visibility one zero, haze and smoke, measured ceiling niner thousand overcast, temperature two zero, dew point one six, altimeter two niner niner six. VOR/DME Runway Three Four, Landing Three Four, Departure Runway Three Four. Notice to airmen, use caution, workers and equipment on the field. Pilots, read back all runway hold short instructions. Advise on initial contact you have Foxtrot.

As identified in the Airport/Facility Directory under APC/DEP, some airports with a high volume of traffic have more than one Approach and Departure frequency.

For example:

At Toledo Express Airport, arrivals from the west contact Approach on 126.1, from the east on 134.35 and from the south on 123.975. (The ATIS sometimes includes this information).

ii. Approach Control

Reset your directional gyro to agree with your magnetic compass.

(Pilot) *Toledo Approach, Cessna 172 Four Three Two One Mike.*

(Approach) *Cessna Three Two One Mike, Toledo Approach.*

(Pilot) *Toledo Approach, Cessna Three Two One Mike, twenty-five miles east, at four thousand five hundred, VFR landing Toledo Express, with Foxtrot.*

(Approach) *Cessna Three Two One Mike, Standby.*

"If the controller responds to a radio call with, "(aircraft call sign) STANDBY", radio communications have been established and the pilot can enter the Class C airspace." AIM 3-2-4 A major distinction between Class B and C airspace is that in Class C airspace, once radio communications have been established a pilot can legally enter whereas in Class B airspace, a pilot must be cleared to enter.

Entry to Class C airspace would be **prohibited** if the controller: does not respond to a radio call, specifically identifies the aircraft call sign and advises to remain outside Class C airspace, or responds to the initial radio call *without* using the aircraft identification.

(Approach) *Cessna Three Two One Mike, Toledo Approach, squawk two four three two ident.*

(Pilot) *Cessna Three Two One Mike, two four three two ident.*

(Approach) *Cessna Three Two One Mike, radar contact, twenty-five miles east of Toledo, plan runway three four, maintain VFR, Toledo altimeter three zero one one.*

(Pilot) *Cessna Three Two One Mike, plan runway three four, maintain VFR, altimeter three zero one one.*

(Approach) *Cessna Three Two One Mike, descend at your discretion¹², fly heading two six zero for right base.*

(Pilot) *Three Two One Mike, heading two six zero for right base, starting descent.*

(Approach) *Cessna Three Two One Mike, airport two o'clock, three miles, report airport in sight.*

(Pilot) *Cessna Three Two One Mike, airport in sight.*

(Approach) *Cessna Three Two One Mike, contact Toledo Tower, one one eight point one.*

¹²In this situation, you would descend to pattern altitude for the base leg.

(Pilot) *Cessna Three Two One Mike, Tower one one eight one.*

iii. Tower

On initial contact with the Tower, the airport controller will advise the pilot of the runway in use, wind direction and speed and any other pertinent information.

(Pilot) *Toledo Tower, Four Three Two One Mike, on a three mile final, runway three four.*

(Tower) *Cessna Three Two One Mike, Toledo Tower, runway three four, cleared to land, wind three three zero at ten.*

(Pilot) *Cessna Three Two One Mike, cleared to land three four.*

You have touched down:

(Tower) *Cessna Three Two One Mike, right at Delta, contact Ground point niner.*

(Pilot) *Cessna Three Two One Mike, right at Delta, Ground point niner.¹³*

iv. Ground

Once you turn onto Delta taxiway, stop after crossing the hold line and contact Ground Control:

(Pilot) *Toledo Ground, Cessna 172 Four Three Two One Mike, clearing runway three four on Delta, request taxi to National Service.*

¹³Ground control frequencies are for the most part 121.7, 121.8 or 121.9. "A controller may omit the ground or local control frequency if the controller believes the pilot knows which frequency is in use. If the ground control frequency is in the 121 MHz bandwidth the controller may omit the numbers preceding the decimal point; e.g., 121.7, "CONTACT GROUND POINT SEVEN". AIM 4-3-14.c.

(Ground) *Cessna Three Two One Mike, Toledo Ground, taxi to National Service via Delta, Bravo One.*

(Pilot) *Cessna Three Two One Mike, taxi Delta, Bravo One.*

If you find yourself at an unfamiliar airport you may wish to ask Ground for progressive (step-by-step) taxi instructions.

4.3 Departing the Primary Airport in Class C Airspace

i. ATIS

Prior to calling Clearance Delivery, monitor the ATIS frequency.

ii. Clearance Delivery

(Pilot) *Clearance Delivery, Cessna 172 Four Three Two One Mike, at National Service with Foxtrot, VFR Williams County, request heading two four zero, at six thousand five hundred.*

(Clearance) *Cessna Three Two One Mike, on departure fly runway heading, maintain four thousand, Departure frequency one two six point one, squawk four two one six.*

(Pilot) *Cessna Three Two One Mike, runway heading, maintain four thousand, Departure one two six one, squawking four two one six.*

(Clearance) *Cessna Three Two One Mike, read back is correct, contact Ground, one two one point niner for taxi.*

iii. Ground

Before taxiing to the active runway, you must receive Ground clearance.

AIM 4-3-18

(Pilot) *Toledo Ground, Cessna Three Two One Mike, at National Service ready to taxi, VFR Williams County.*

(Ground) *Cessna Three Two One Mike, Toledo Ground, taxi to runway three four via Bravo Niner, Charlie, Bravo Four, November.*

(Pilot) *Cessna Three Two One Mike, taxi three four, Bravo Niner, Charlie, Bravo Four, November.*

"When ATC clears an aircraft to "taxi to" an assigned takeoff runway, the absence of holding instructions authorizes the aircraft to "cross" all runways which the taxi route intersects except the assigned takeoff runway. It does not include authorization to "taxi onto" or "cross" the assigned takeoff runway at any point." AIM 4-3-18.a.5.

iv. Tower

When you reach the hold short position on taxiway November for runway 34, contact Tower. A takeoff clearance must be received.

(Pilot) *Toledo Tower, Cessna 172 Four Three Two One Mike, ready for takeoff three four.*

(Tower) *Cessna Three Two One Mike, runway three four, taxi into position and hold, service vehicle just clearing the runway.*

(Pilot) *Roger, Cessna Three Two One Mike, position and hold, runway three four.*

(Tower) *Cessna Three Two One Mike, fly runway heading, runway three four, cleared for takeoff.*

(Pilot) *Cessna Three Two One Mike, runway heading, cleared for takeoff.*

After departure, Tower calls:

(Tower) *Cessna Three Two One Mike, contact Departure.*

(Pilot) *Cessna Three Two One Mike, over to Departure.*

v. Departure Control

(Pilot) *Toledo Departure, Cessna Three Two One Mike, leaving one thousand two hundred climbing four thousand.*

(Departure) *Cessna Three Two One Mike, Toledo Departure, radar contact, turn left two four zero, climb and maintain six thousand five hundred, proceed on course.*

(Pilot) *Cessna Three Two One Mike, left two four zero, six thousand five hundred on course.*

(Departure) *Cessna Three Two One Mike, position twenty miles southwest of Toledo, radar service terminated, frequency change approved, squawk one two zero zero, Good day.*

(Pilot) *Cessna Three Two One Mike, one two zero zero, Good day.*

vi. Going from Departure to Center

A pilot who neglects to request flight following on the initial contact with Clearance Delivery may request it from Departure Control.

(Departure) *Cessna Three Two One Mike, position twenty miles southwest of Toledo, radar service terminated, frequency change approved, squawk one two zero zero, Good day.*

(Pilot) *Cessna Three Two One Mike, request handoff to Center.*

(Departure) *Cessna Three Two One Mike, standby.*

(Departure) *Cessna Three Two One Mike, contact Cleveland Center, one two zero point seven seven five.*

- (Pilot)** *Cessna Three Two One Mike, Center one two zero seven seven five, Thanks.*
- (Pilot)** *Cleveland Center, Cessna 172 Four Three Two One Mike, at six thousand five hundred, VFR Williams County, squawking four two one six.*
- (Center)** *Cessna Three Two One Mike, Cleveland Center, maintain six thousand five hundred, maintain VFR.*
- (Pilot)** *Cessna Three Two One Mike, six thousand five hundred, will maintain VFR.*

Not all requests for enroute advisories (i.e., flight following) will be approved by Center. (See Chapter 9 for a detailed discussion of Air Route Traffic Control Centers.)

In some areas, airspace is structured to the extent that adjoining Approach Control facilities handle air traffic advisories without enroute (Center) facility involvement.

4.4 Transiting Class C Airspace

i. ATIS

Prior to contacting Approach Control, monitor the ATIS frequency located on the Sectional Aeronautical Chart or in the Airport/Facility Directory.

ii. Approach Control

The typical ceiling for Class C airspace is 4,000 feet above airport elevation. An aircraft flying over Class C airspace is required to have a functioning Mode C transponder. Although communication with Air Traffic Control is optional for pilots who are flying over Class C airspace at an altitude greater than 4,000 feet above airport elevation, controllers would prefer to communicate with pilots (i.e., issue transponder codes) in order to

maximize safety (e.g., to provide advisories regarding IFR aircraft descending from, or climbing to, higher altitudes in their vicinity).

Reset your directional gyro to agree with your magnetic compass.

- (Pilot)** *Toledo Approach, Cessna 172 Four Three Two One Mike.*
- (Approach)** *Cessna Three Two One Mike, Toledo Approach.*
- (Pilot)** *Toledo Approach, Cessna Three Two One Mike, over Blissfield, at three thousand five hundred, VFR Bordner Airport, with Papa, request traffic advisories.*
- (Approach)** *Cessna Three Two One Mike, squawk two four three two.*
- (Pilot)** *Cessna Three Two One Mike, squawking two four three two.*
- (Approach)** *Cessna Three Two One Mike, radar contact, twenty five miles north, maintain VFR, Toledo altimeter three zero one one, turn right heading one seven five.*
- (Pilot)** *Cessna Three Two One Mike, right one seven five, maintain VFR, altimeter three zero one one.*
- (Approach)** *Cessna Three Two One Mike, traffic ten o'clock three miles, westbound four thousand five hundred.*
- (Pilot)** *Cessna Three Two One Mike, looking for traffic.*
- (Approach)** *Cessna Three Two One Mike, traffic no longer a factor.*
- (Pilot)** *Cessna Three Two One Mike, Thanks.*
- (Approach)** *Cessna Three Two One Mike, position twenty miles south of Toledo, radar service terminated, frequency change approved, squawk one two zero zero.*
- (Pilot)** *Cessna Three Two One Mike, one two zero zero, Thanks.*

4.5 Landing at a Satellite Airport

A satellite (or secondary) airport is located within the boundaries of Class B, Class C or TRSA airspace. (e.g., See Figure 10: Abrams Municipal)

i. ATIS

Prior to contacting Approach Control, monitor the ATIS frequency located on the Sectional Aeronautical Chart or in the Airport/Facility Directory.

ii. Approach Control

Reset your directional gyro to agree with your magnetic compass.

(Pilot) *Akron-Canton Approach, Cessna 172 Four Three Two One Mike.*

(Approach) *Cessna Three Two One Mike, Akron-Canton Approach.*

(Pilot) *Akron-Canton Approach, Cessna Three Two One Mike, five miles southeast of Paris, at six thousand five hundred, VFR landing Akron-Fulton, with Papa.*

(Approach) *Cessna Three Two One Mike, squawk two one one six.*

(Pilot) *Cessna Three Two One Mike, two one one six.*

(Approach) *Cessna Three Two One Mike, radar contact, twenty- eight miles southeast of Akron-Canton, maintain VFR, Akron-Canton altimeter two niner niner three, advise any change in altitude.*

(Pilot) *Cessna Three Two One Mike, two niner niner three, maintain VFR, will advise any change in altitude.*

(Approach) *Cessna Three Two One Mike, position ten miles southeast of Akron-Fulton airport, radar service terminated, descend at your discretion, contact Akron-Fulton Unicom, one two three point zero seven five, squawk one two zero zero.*

(Pilot) *Cessna Three Two One Mike, will be descending, Unicom one two three point zero seven five, squawking one two zero zero.*

4.6 Departing from a Satellite Airport

Consult the Airport/Facility Directory for the controlling agency to contact when departing from a satellite (secondary) airport.

i. ATIS

Prior to contacting Approach Control, monitor the ATIS frequency on the Sectional Aeronautical Chart or in the Airport/Facility Directory.

ii. Departure Control

You have just departed from a satellite airport in Class E airspace.

(Pilot) *Akron-Canton Departure, Cessna 172 Four Three Two One Mike.*

(Departure) *Cessna Three Two One Mike, Akron-Canton Departure.*

(Pilot) *Cessna Three Two One Mike, off Akron-Fulton, leaving one thousand two hundred, climbing seven thousand five hundred, VFR Pittsburgh, with Charlie, request advisories.*

(Departure) *Cessna Three Two One Mike, squawk three four three four.*

(Pilot) *Cessna Three Two One Mike, squawking three four three four.*

- (Departure) *Cessna Three Two One Mike, radar contact, twelve miles north of Akron-Canton, cleared to seven thousand five hundred, proceed on course.*
- (Pilot) *Cessna Three Two One Mike, cleared to seven thousand five hundred, proceed on course.*
- (Departure) *Cessna Three Two One Mike, position twenty miles southeast of Akron-Canton, radar service terminated, frequency change approved, squawk one two zero zero, Good day.*
- (Pilot) *Cessna Three Two One Mike, one two zero zero, Good day.*

5. Terminal Radar Service Area (TRSA)

5.1 What is a Terminal Radar Service Area?

The Aeronautical Information Manual (3-5-7, 4-1-17) provides a detailed discussion of the Terminal Radar Service Area (TRSA). Few TRSAs remain - most having either been upgraded to Class C airspace or downgraded to Class D airspace.

The primary airport within the TRSA is Class D airspace. **Prior to entry into Class D airspace, two-way radio communication must be established and maintained with the ATC facility.** (See Chapter 6 for a detailed discussion of Class D airspace.)

"The remaining portion of the TRSA overlies other controlled airspace which is normally Class E airspace beginning at 700 or 1,200 feet and established to transition to/from the enroute/terminal environment." AIM 3-5-7

Pilots operating outside the Class D ring within the TRSA area are encouraged to avail themselves of TRSA services (although participation is voluntary). Services provided in a TRSA are:

- Safety Alerts;
- Traffic Advisories;
- Limited Radar Vectoring; and
- Sequencing where applicable.

If you fly VFR into a TRSA and avail yourself of the services provided, radio procedures are similar to Class C Airspace, (e.g., landing/departing the primary airport, transiting, and landing/departing the satellite airport). (See Chapter 4)

TRSAs are depicted on the Sectional Aeronautical Chart with two solid black lines (an inner line and an outer line) surrounding the primary airport. In close proximity to the inner black line you will notice a blue segmented line indicating that the primary airport is in Class D airspace. (Figure 12)

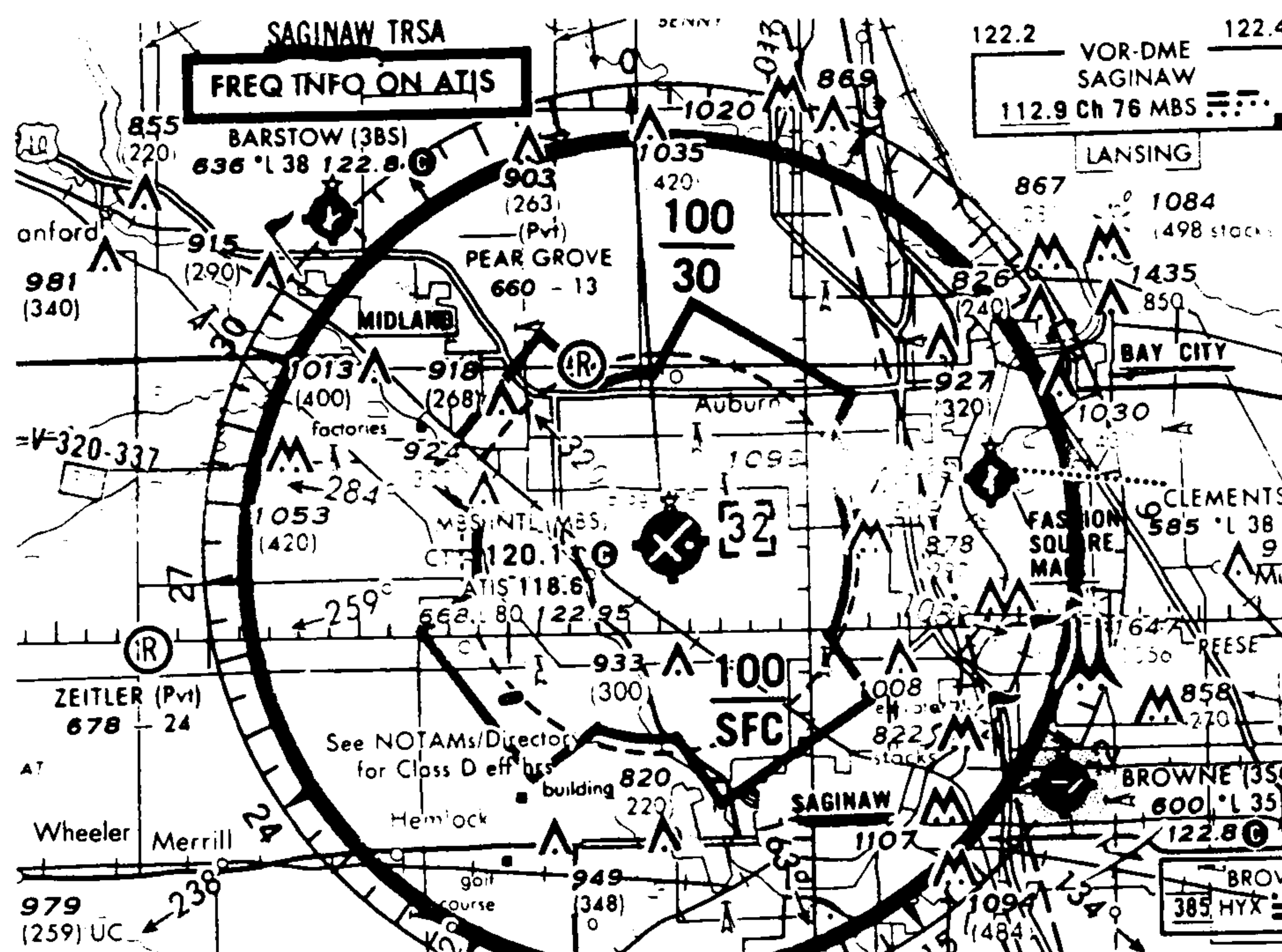


Figure 12

5.2 Arriving at the Primary Airport in a TRSA.

Reset your directional gyro to agree with your magnetic compass.

(Pilot) *Saginaw Approach, Cessna 172 Four Three Two One Mike.*

(Approach) *Cessna Three Two One Mike, Saginaw Approach.*

(Pilot) *Cessna Three Two One Mike, twelve miles northeast over Bay City, at four thousand five hundred, VFR landing Saginaw, with Delta.*

(Approach) *Cessna Three Two One Mike, squawk three one three one.*

(Pilot) *Cessna Three Two One Mike, three one three one.*

(Approach) *Cessna Three Two One Mike, radar contact, twelve miles northeast, plan right base runway three two, Saginaw altimeter three zero one zero, descend at your discretion.*

(Pilot) *Cessna Three Two One Mike, plan right base three two, altimeter three zero one zero, starting descent now.*

(Approach) *Cessna Three Two One Mike, airport two o'clock five miles, advise airport in sight.*

(Pilot) *Cessna Three Two One Mike, airport in sight.*

(Approach) *Cessna Three Two One Mike, contact Saginaw Tower, one two zero point one.*

If you had requested a landing at a satellite airport within the TRSA, Saginaw Approach would release you to the Common Traffic Advisory Frequency or hand you over to Tower if applicable.

5.3 Departing the Primary Airport in a TRSA

You have departed Saginaw airport and the Tower has authorized a frequency change to Saginaw Departure.

(Pilot) *Saginaw Departure, Cessna Four Three Two One Mike, leaving one thousand five hundred climbing five thousand five hundred, VFR Flint.*

(Departure) *Cessna Three Two One Mike, Saginaw Departure, radar contact, climb and maintain five thousand five hundred, proceed on course.*

(Pilot) *Cessna Three Two One Mike, climb and maintain five thousand five hundred, proceed on course.*

- (Departure) *Cessna Three Two One Mike, position ten miles southeast, leaving Saginaw TRSA, radar service terminated, frequency change approved, squawk one two zero zero.*
- (Pilot) *Cessna Three Two One Mike, one two zero zero, Thanks.*

5.4 Transiting a TRSA

Reset your directional gyro to agree with your magnetic compass.

- (Pilot) *Saginaw Approach, Cessna 172 Four Three Two One Mike.*
- (Approach) *Cessna Three Two One Mike, Saginaw Approach.*
- (Pilot) *Cessna Three Two One Mike, twelve miles northeast over Bay City, at six thousand five hundred, VFR Lansing, with Echo, request traffic advisories.*
- (Approach) *Cessna Three Two One Mike, squawk three one three one.*
- (Pilot) *Cessna Three Two One Mike, squawking three one three one.*
- (Approach) *Cessna Three Two One Mike, radar contact, twelve miles northeast, Saginaw altimeter three zero two one, proceed on course.*
- (Pilot) *Cessna Three Two One Mike, altimeter three zero two one, proceed on course.*
- (Approach) *Cessna Three Two One Mike, position ten miles southwest, leaving Saginaw TRSA, radar service terminated, frequency change approved, squawk one two zero zero.*
- (Pilot) *Cessna Three Two One Mike, one two zero zero.*

6. Airports in Class D Airspace

6.1 What is Class D Airspace

Class D Airspace is "generally that airspace from the surface to 2,500 feet above the airport elevation (charted in MSL) surrounding those airports that have an operational control tower." AIM 3-2-5 As with Class B and Class C airspace, Class D airspace is also individually tailored.

Prior to entering Class D airspace, two-way radio communication must be established and maintained with the ATC facility. Contact the Tower "far enough from the Class D airspace boundary to preclude entering the Class D airspace before two-way communications are established." AIM 3-2-5

An ATC clearance is required for all aircraft operating in Class D airspace. Aircraft are subject to instructions issued by the air traffic controller. "When an ATC clearance has been obtained, no pilot in command may deviate from that clearance unless an amended clearance is obtained, an emergency exists, or the deviation is in response to a traffic alert and collision avoidance system resolution advisory." FAR 91.123

The basic VFR weather minimums in Class D airspace are 3 statute miles flight visibility and 500 feet below, 1,000 feet above and 2,000 feet horizontal distance from clouds.

If the Tower is closed, the Class D airspace could change to either Class E or Class G airspace. To confirm the airspace designation when the Tower is closed, check the Airport/Facility Directory.

Class D airspace (*Figure 13*) is depicted on the Sectional Aeronautical Chart with a single blue segmented line surrounding the primary airport. The radius of the ring is usually 5 statute miles (4.3 NM).

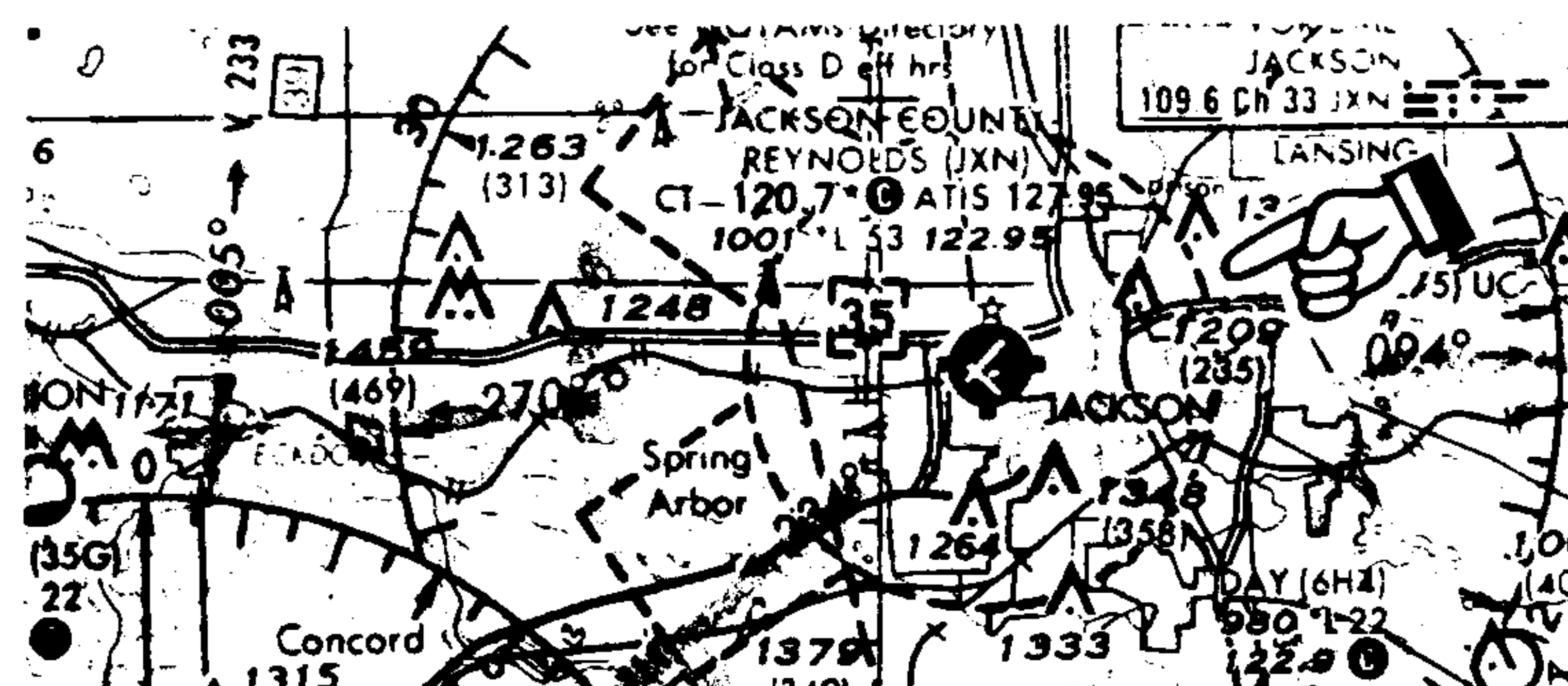


Figure 13

6.2 Arriving at the Primary Airport in Class D Airspace

Not all airports in Class D airspace have an ATIS or a separate Ground Control. If an ATIS is not available, Tower will advise the local altimeter setting along with other pertinent information. At the less busy airports, the Tower will also handle the Ground frequency.

When making the initial contact, pilots should provide the following information:

- Aircraft Identification - type and full registration;¹⁴
- Location - relative to the airport;
- Altitude;
- Destination and/or request;
- Squawk - the code you are squawking¹⁵; and
- ATIS - phonetic designation

"If the controller responds to a radio call with, "(aircraft call sign) STANDBY", radio communications have been established and the pilot can enter the Class D airspace." AIM 3-2-5

Entry to Class D airspace would be prohibited if the controller: does not

¹⁴On initial contact with any ground facility (i.e., Tower, Approach, Departure, Center, FSS) remember to use the full aircraft registration. Only abbreviate the registration once the Ground facility has done so.

¹⁵It is generally assumed by ATC that you are squawking 1200 on initial contact if you state you are VFR and do not provide a squawk code.

respond to a radio call, specifically identifies the aircraft call sign and advises to remain clear or outside Class D airspace, or responds to the initial radio call *without* using the aircraft identification.

i. ATIS

Prior to contacting Tower, monitor the ATIS frequency located on the Sectional Aeronautical Chart or in the Airport/Facility Directory.

ii. Tower

On initial contact with the Tower, the airport controller will advise the pilot of the runway in use, wind direction and speed, and any other pertinent information. ATC in Class D airspace may or may not issue a discrete transponder code to VFR traffic. Reset your directional gyro to agree with your magnetic compass.

- | | |
|----------------|--|
| (Pilot) | <i>Jackson Tower, Cessna 172 Four Three Two One Mike.</i> |
| (Tower) | <i>Cessna Three Two One Mike, Jackson Tower.</i> |
| (Pilot) | <i>Cessna Three Two One Mike, fifteen miles northeast over Winters, at six thousand five hundred, VFR landing Jackson, with Bravo, unfamiliar with airport.</i> |
| (Tower) | <i>Cessna Three Two One Mike, Jackson altimeter three zero point one zero, wind three three zero at twenty, landing runway three two, report right downwind runway three two, squawk one two zero zero ident.</i> |
| (Pilot) | <i>Cessna Three Two One Mike, will report right downwind runway three two, altimeter three zero one zero, squawk ident one two zero zero.</i> |
| (Pilot) | <i>Jackson Tower, Cessna Three Two One Mike, entering right downwind runway three two.</i> |
| (Tower) | <i>Cessna Three Two One Mike, Jackson Tower, watch for Piper Warrior just turning final runway three two, report final runway three two.</i> |

(Pilot) *Cessna Three Two One Mike, have traffic, will report final runway three two.*

(Pilot) *Jackson Tower, Cessna Three Two One Mike, final runway three two.*

(Tower) *Cessna Three Two One Mike, runway three two, cleared to land, wind three three zero at twenty.*

(Pilot) *Cessna Three Two One Mike, cleared to land three two.*

After landing Tower calls:

(Tower) *Cessna Three Two One Mike, backtaxi¹⁶ and exit Charlie, contact Ground, one two one point niner.*

(Pilot) *Cessna Three Two One Mike, backtaxi and exit Charlie, Ground one two one niner.*

Based on your position relative to the airport when inbound for landing, you may ask the Tower for a specific entry into the pattern:

(Pilot) *Jackson Tower, Cessna Three Two One Mike, fifteen miles northeast over Winters, at six thousand five hundred, VFR landing Jackson, with Bravo, request right base for three two.*

iii. Ground

Once you turn onto Charlie taxiway, stop after crossing the hold line and contact Ground Control:

¹⁶"A term used by air traffic controllers to taxi an aircraft on the runway opposite to the traffic flow. The aircraft may be instructed to backtaxi to the beginning of the runway or at some point before reaching the runway end for the purpose of departure or to exit the runway." AIM Pilot/Controller Glossary

(Pilot) *Jackson Ground, Cessna 172 Four Three Two One Mike, clearing runway three two on taxiway Charlie, request taxi to Terminal.*

(Ground) *Cessna Three Two one Mike, Jackson Ground, taxi to Terminal via Charlie, Bravo.*

(Pilot) *Cessna Three Two One Mike, Charlie, Bravo.*

If you find yourself at an unfamiliar airport you may wish to ask Ground for progressive (step-by-step) taxi instructions.

6.3 Departing the Primary Airport in Class D Airspace

i. ATIS

Prior to contacting Ground Control, monitor the ATIS frequency.

ii. Ground

Before taxiing to the active runway, you must receive Ground clearance.
AIM 4-3-18

(Pilot) *Jackson Ground, Cessna 172 Four Three Two One Mike.*

(Ground) *Cessna Three Two one Mike, Jackson Ground.*

(Pilot) *Cessna Three Two One Mike, at the Terminal, ready for taxi, VFR Detroit, with Alpha, request right turn.*

(Ground) *Cessna Three Two One Mike, taxi to runway three two via Bravo, Foxtrot.*

(Pilot) *Cessna Three Two One Mike, taxi runway three two, Bravo, Foxtrot.*

iii. Tower

- (Pilot) *Jackson Tower, Cessna 172 Four Three Two One Mike, holding short three two, ready for take-off.*
- (Tower) *Cessna Three Two One Mike, Jackson Tower, cleared for takeoff runway three two, right turn approved.*
- (Pilot) *Cessna Three Two One Mike, cleared for takeoff, right turn.*
- (Pilot) *Jackson Tower, Cessna Three Two One Mike, leaving Delta airspace to the northeast.*
- (Tower) *Cessna Three Two One Mike, Good day.*

6.4 Transiting an Airport in Class D Airspace

- (Pilot) *Jackson Tower, Cessna 172 Four Three Two One Mike, fifteen miles north, at two thousand five hundred, VFR, wish to transit southbound.*
- (Tower) *Cessna Three Two One Mike, Jackson Tower, over flight approved, Jackson altimeter two niner two niner, report five miles north, squawk one two zero zero ident.*
- (Pilot) *Cessna Three Two One Mike, over flight approved, will report five miles north, altimeter two niner two niner, squawk ident one two zero zero.*
- (Pilot) *Jackson Tower, Cessna Three Two One Mike, five miles north.*
- (Tower) *Cessna Three Two One Mike, proceed on course.*
- (Pilot) *Cessna Three Two One Mike, proceed on course.*

7. Airports in Class E Airspace

7.1 What is Class E Airspace?

Class E airspace is controlled airspace. "When designated as a surface area for an airport, the airspace will be configured to contain all instrument approach procedures." AIM 3-2-6.e.1. Class E airspace does not impose a communications requirement on pilots operating VFR. "There are Class E airspace areas beginning at either 700 or 1,200 feet AGL used to transition to/from the terminal or enroute environment." AIM 3-2-6.e.

You will notice the VFR weather minimums are higher at airports in Class E versus Class G airspace. (*Appendix E*) The basic VFR weather minimums in Class E airspace are 3 statute miles flight visibility and 500 feet below, 1,000 feet above and 2,000 feet horizontal distance from clouds when *less* than 10,000 feet MSL. When *at or above* 10,000 feet MSL flight visibility is 5 statute miles and 1,000 feet below, 1,000 feet above and 1 statute mile horizontal distance from clouds.

The main reason for the higher weather minimums in Class E (versus Class G) airspace is to protect IFR traffic landing at Class E airports. With the higher weather minimums, conflict between IFR and VFR traffic close to the airport in marginal weather is less likely.

For the most part, pilots arriving or departing airports in Class E airspace will use the UNICOM, MULTICOM, or the FSS frequency, if applicable. (*see Figure 17: page 56*) The Sectional Aeronautical Chart or the Airport/Facility Directory provides the correct frequency to use. The radio calls used when arriving at, or departing from, an airport in Class E airspace are similar to those used in Class G airspace. (*see Chapter 8*)

Always keep a good look out for aircraft legally flying NORDO (no radio) in Class E airspace. See and avoid!

All turns, when approaching to land at an airport without an operating control tower must be to the left while operating in the pattern, unless a right-hand pattern has been designated. FAR 91.127

An airport in Class E airspace is depicted on a Sectional Aeronautical Chart with a single magenta segmented line surrounding the airport. (Figure 14)

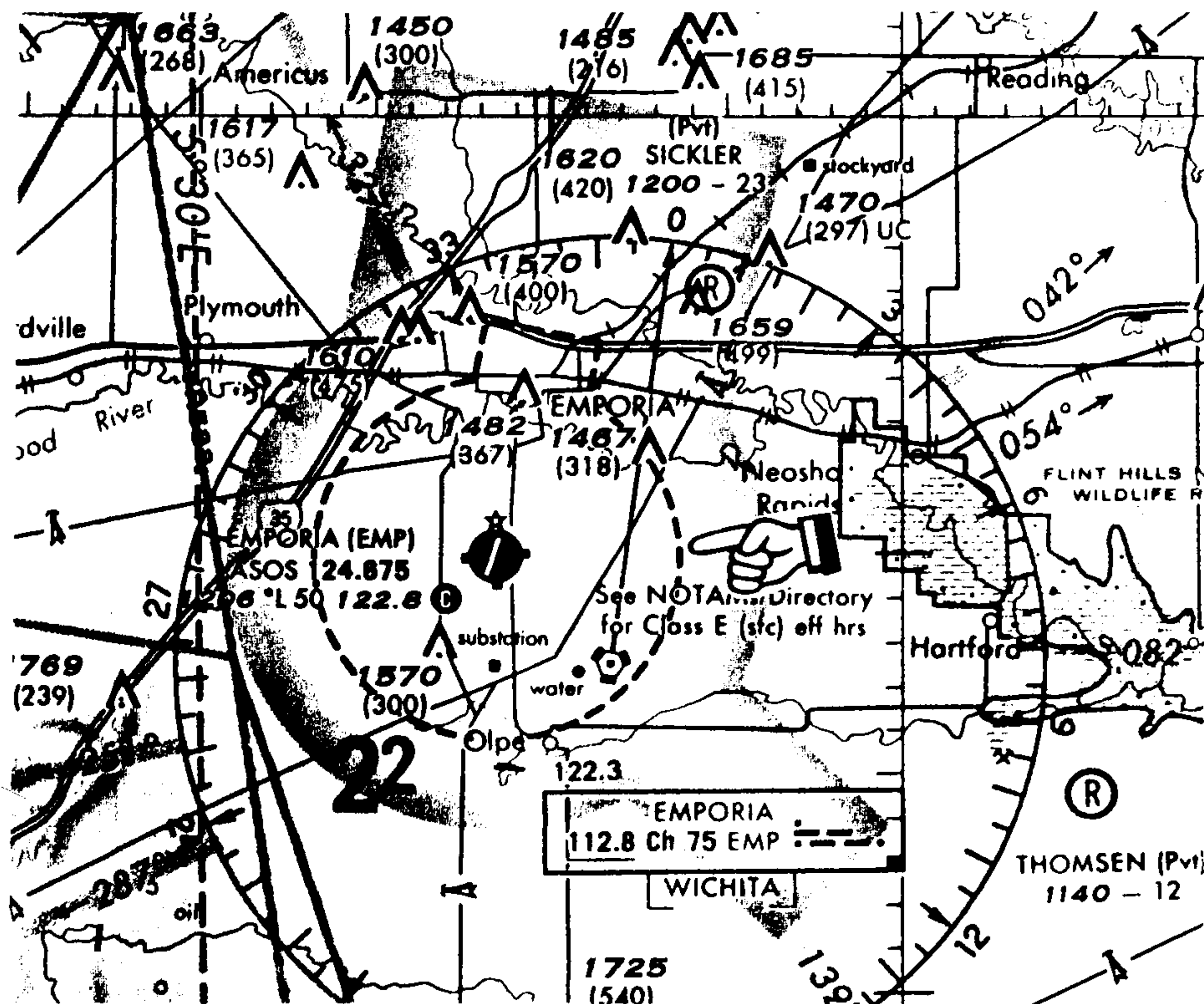


Figure 14

8. Airports in Class G Airspace

8.1 What is Class G Airspace?

"Class G airspace (uncontrolled) is that portion of the airspace that has not been designated as Class A, Class B, Class C, Class D and Class E airspace." AIM 3-3-1 Class G airspace exists from the surface to either 700 feet or 1,200 feet above the surface (with a few exceptions where it extends up to 14,500 feet).

The basic VFR weather minimums during the day at 1,200 feet or less above the surface are 1 statute mile flight visibility and clear of cloud. When more than 1,200 feet above the surface but less than 10,000 feet MSL, flight visibility must be a minimum of 1 statute mile and 500 feet below, 1,000 feet above and 2,000 feet horizontal distance from cloud. For a more detailed discussion of weather minimums in Class G airspace including night weather minimums and flight above 10,000 feet MSL. (Appendix E)

All turns, when approaching to land at an airport without an operating Control Tower must be to the left while operating in the pattern, unless a right-hand pattern has been designated. FAR 91.126

An airport in Class G airspace is depicted on the Sectional Aeronautical Chart with a thick magenta ring surrounding it (Figure 15). In this situation, the airspace extends up to 700 feet above the ground and then changes to Class E airspace. If Class G airspace extends up to 1,200 feet before changing to Class E airspace, it is depicted without any distinguishing colors or lines surrounding the airport. (Figure 16)

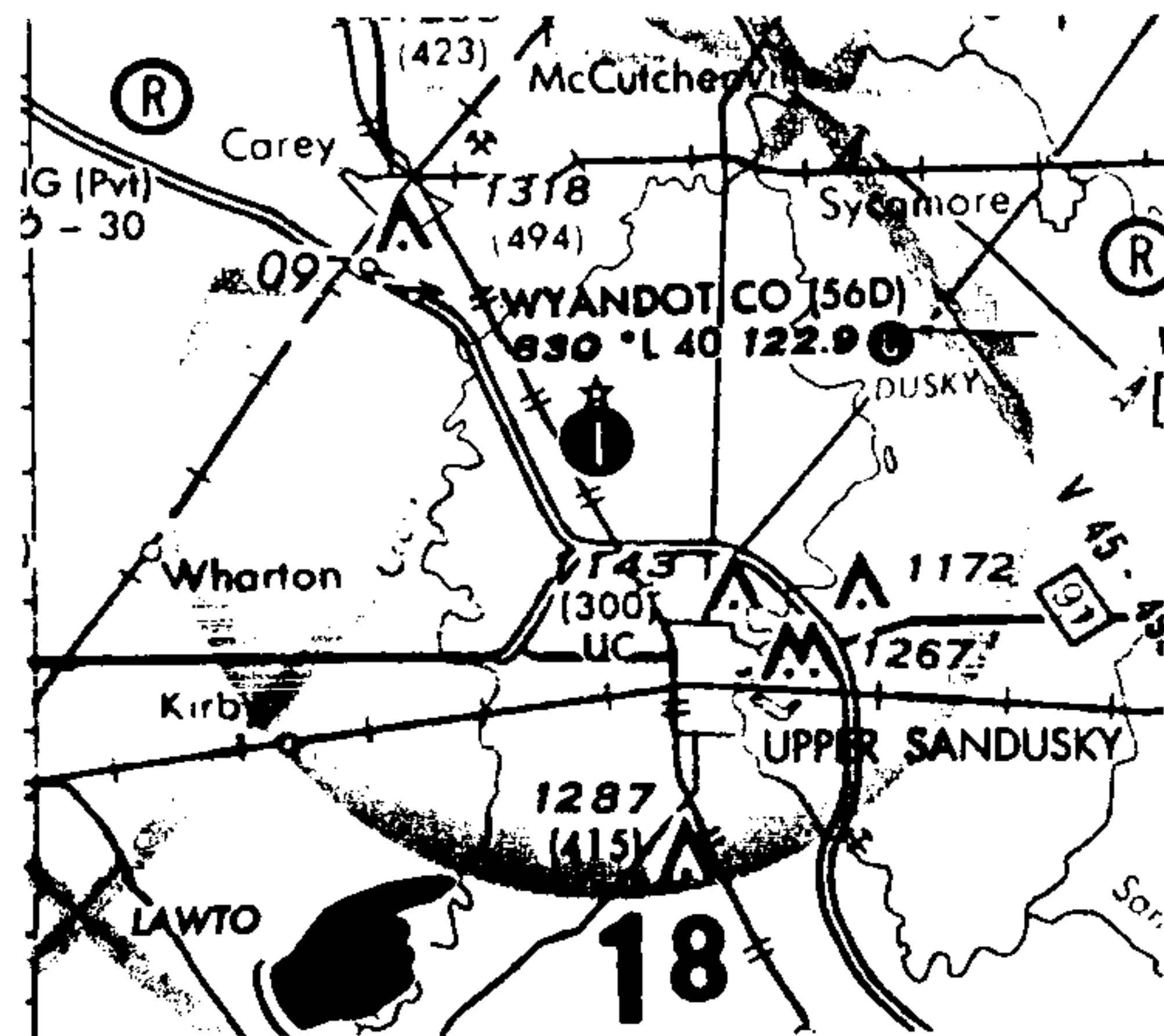


Figure 15

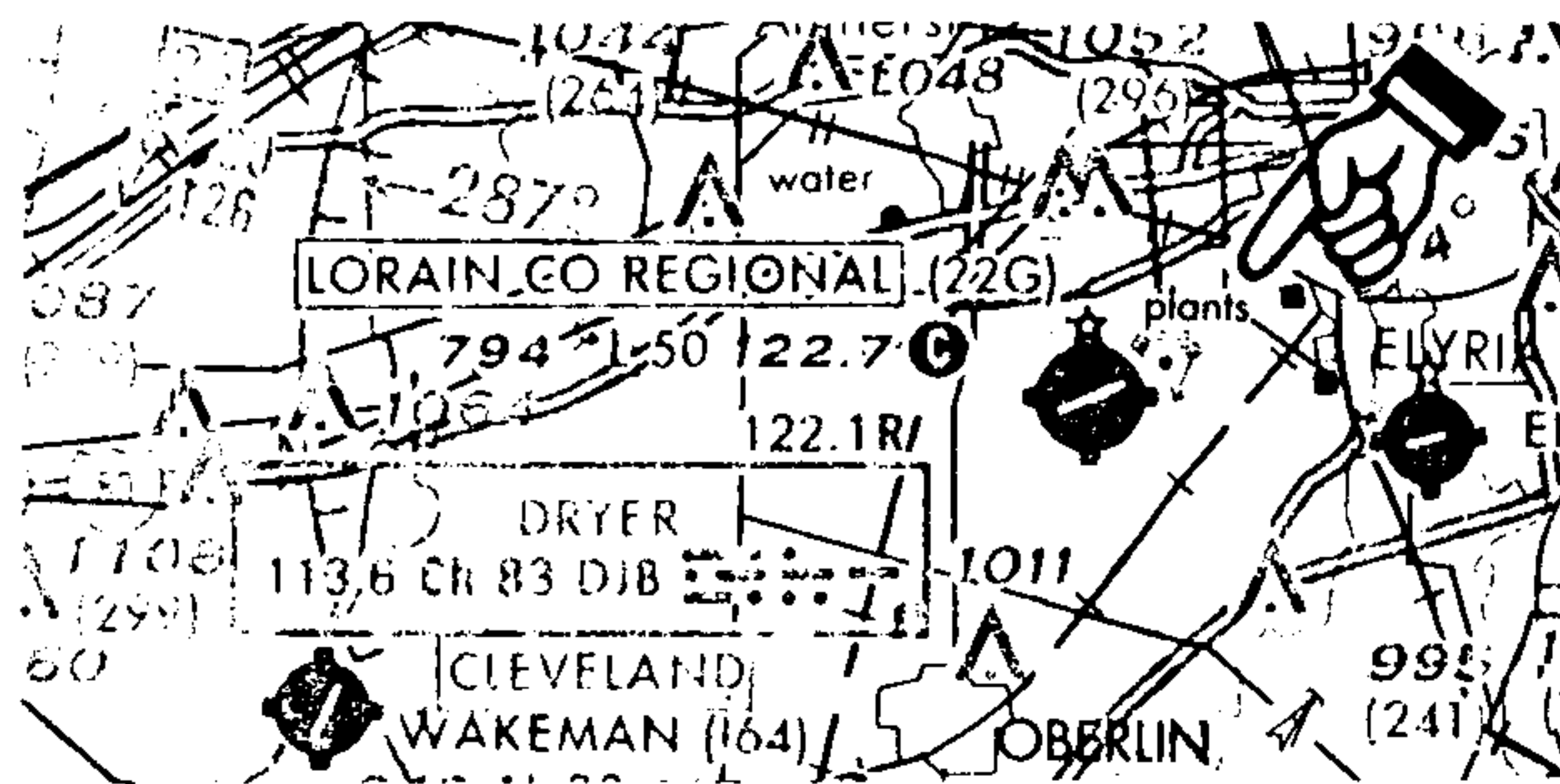


Figure 16

8.2 Common Traffic Advisory Frequency.

A Common Traffic Advisory Frequency (CTAF) is found at airports in Class E and Class G airspace, and may be UNICOM or MULTICOM. If a UNICOM exists, trained vehicle operators will provide information such as position of vehicles or other aircraft on the maneuvering area and runway conditions if known.

Pilots would communicate advisories with UNICOM Stations on the published CTAF frequency. The Sectional Aeronautical Chart or the Airport/Facility Directory provides the correct frequency to use. If no UNICOM exists, pilots should use self-announce procedures on the MULTICOM frequency (122.9) or the FSS frequency (123.6), if applicable.

When 10 miles from the airport, pilots should maintain a listening watch on the CTAF and announce the following: airport name, aircraft identification and type, position, altitude and arrival procedure intentions. When ready to enter the traffic pattern, enter in level flight at pattern altitude. Pilots should self-announce when they are on downwind, base, final approach and when clear of the active runway. AIM 4-1-9.g.

"To help identify one airport from another, the airport name should be spoken at the beginning and end of each self-announce transmission." AIM 4-1-9.f.

Always keep a good look out for aircraft legally flying NORDO (no radio) in Class G airspace. See and avoid!

8.3 Arriving at an Airport in Class G Airspace

i. Radio Calls

For purposes of illustration, this section provides the sequence of *eight* radio transmissions recommended when approaching to land at Franklin Airport, an airport in Class G airspace with a UNICOM. Transmissions begin 10 miles northwest of the airport at 2400 feet and conclude once your aircraft has cleared the active runway.

First, monitor the published Franklin frequency 122.7 to determine the active runway and a sense of traffic volume in the area. If you do not hear any transmissions, ask UNICOM for an airport advisory.

(Pilot) *Franklin Unicom, Cessna 172 Four Three Two One Mike, ten miles northwest, at two thousand four hundred, VFR landing Franklin, request wind and runway information, Franklin.*

(Unicom) *Cessna Three Two One Mike, active runway is three three, wind three five zero at one five, Franklin altimeter three zero one four, with several in the pattern.*

- (Pilot)** *Franklin Traffic, Cessna Three Two One Mike, ten miles northwest at two thousand four hundred, will enter downwind¹⁷ for runway three three, Franklin.*
- (Pilot)** *Franklin Traffic, Cessna Three Two One Mike, five miles northwest passing through two thousand, will enter downwind for runway three three, Franklin.*
- (Pilot)** *Franklin Traffic, Cessna Three Two One Mike, entering downwind runway three three, Franklin.*
- (Pilot)** *Franklin Traffic, Cessna Three Two One Mike, turning base runway three three, Franklin.*
- (Pilot)** *Franklin Traffic, Cessna Three Two One Mike, turning final runway three three, full stop, Franklin.*
- (Pilot)** *Franklin Traffic, Cessna Three Two One Mike, clear of runway three three, Franklin.*

The eight transmissions described above would also be typical of those used when landing at an airport using a MULTICOM frequency.

8.4 Departing an Airport in Class G Airspace

After start-up, you should receive a departure advisory from the UNICOM frequency, if available.

- (Pilot)** *Franklin Unicom, Cessna 172 Four Three Two One Mike, on the ramp taxiing to runway three three, request wind and traffic information, Franklin.*

¹⁷It would be assumed entry to the downwind leg is at pattern altitude in level flight at a 45° angle abeam the midpoint of the runway. (See Figure 3 and Figure 4 on page 5).

- (Unicom)** *Cessna Three Two One Mike, active runway three three, wind three three zero at ten, Franklin altimeter three zero one two, with several in the pattern.*

When your run-up is complete, taxi to the hold short position for the active runway. If there is no traffic on final and you are ready to depart, your next radio transmission should include your intentions on departure.

"If departing the traffic pattern, continue straight out, or exit with a 45° turn (to the left when in a left-hand traffic pattern; to the right when in a right-hand traffic pattern) beyond the departure end of the runway, after reaching pattern altitude." AIM 4-3-4

If you are departing straight out:

- (Pilot)** *Franklin Traffic, Cessna Three Two One Mike, departing runway three three straight out, Franklin.*

If you are departing to fly patterns:

- (Pilot)** *Franklin Traffic, Cessna Three Two One Mike, departing runway three three to enter the pattern, Franklin.*

If you are departing the airport other than straight out you might say:

- (Pilot)** *Franklin Traffic, Cessna Three Two One Mike, departing runway three three to the west, Franklin.*

Monitor the airport frequency until you are 10 miles from the departure airport, unless Federal Aviation Regulations (FAR) or local procedures require otherwise.

Figure 17 (an abbreviated version of Table 4-1-1 from AIM 4-1-9) provides a summary of recommended communication procedures when landing at, or departing from, airports without operating Control Towers.

SUMMARY OF RECOMMENDED COMMUNICATION PROCEDURES			
FACILITY AT AIRPORT	FREQUENCY USE	COMMUNICATION/ BROADCAST PROCEDURES	
		OUTBOUND	INBOUND
Unicom (No Tower or FSS)	Communicate with UNICOM station on published CTAF frequency (122.7, 122.8, 122.725, 122.975, or 123.0). If unable to contact UNICOM station, use self-announce procedures on CTAF.	Before taxiing and before taxiing on the runway for departure.	10 miles out. Entering downwind, base and final. Leaving the runway.
No Tower, FSS, or Unicom	Self-announce on MULTICOM frequency 122.9	As Above	As Above
No Tower in operation, FSS open	Communicate with FSS on CTAF frequency.	As above	As Above

Figure 17

9. Air Route Traffic Control Centers

9.1 What is an Air Route Traffic Control Center?

Air Route Traffic Control Centers, normally called by their geographical location followed by the word Center (e.g., Cleveland Center) provide "flight following" (i.e., VFR radar surveillance). When operating in areas where radar coverage exists, pilots of transponder equipped VFR aircraft may request radar traffic information. ATC will provide this information, traffic (or workload) permitting.

The advantage of using any type of flight following when arriving at Class B, Class C, or Class D airports is the "hand-off" Center will provide, if requested. The Tower or Approach controller will be anticipating your arrival when you make your initial call. Frequencies for Centers are located in the Airport/Facility Directory or by calling FSS. The following Centers cover the Continental United States:

Albuquerque, Atlanta, Boston, Chicago, Cleveland, Denver, Fort Worth, Houston, Indianapolis, Jacksonville, Kansas City, Los Angeles, Memphis, Miami, Minneapolis, New York, Oakland, Salt Lake City, Seattle and Washington.

i. Radio Calls (Hand-off from Departure Control)

If you are in radio contact with Approach or Departure Control and they advise "radar service terminated", you may request a hand-off to Center for "flight following."

- (Departure) *Cessna Three Two One Mike, position twenty miles southwest of Cleveland, leaving Cleveland Bravo airspace, resume own navigation, radar service terminated, frequency change approved, squawk one two zero zero.*
- (Pilot) *Cessna Three Two One Mike, request hand-off for flight following.*
- (Departure) *Cessna Three Two One Mike, standby.*
- (Departure) *Cessna Three Two One Mike, contact Cleveland Center, one three three point three.*
- (Pilot) *Cessna Three Two One Mike, Cleveland Center one three three point three.*
- (Pilot) *Cleveland Center, Cessna Four Three Two One Mike, at six thousand five hundred, VFR Columbus, squawking three two one six.*

ii. Radio Calls (Hand-off from Center to Approach Control)

When handed over to Approach Control in Class B airspace, this is not authorization to enter Class B airspace. The Approach Controller must clear you to enter Class B airspace prior to entry.

- (Center) *Cessna Three Two One Mike, Cleveland Center, position twenty-five miles southeast of Cleveland, radar service terminated, contact Cleveland Approach one two six point five five, Good day.*
- (Pilot) *Cessna Three Two One Mike, Cleveland Approach, one two six five five.*
- (Pilot) *Cleveland Approach, Cessna 172 Four Three Two One Mike, at six thousand five hundred, VFR landing Cleveland, squawking two one three two, with Bravo.*
- (Approach) *Cessna Three Two One Mike, remain outside Cleveland Bravo airspace, until identified.*

- (Pilot) *Cessna Three Two One Mike, remaining outside Cleveland Bravo airspace.*
- (Approach) *Cessna Three Two One Mike, twenty-five miles southeast of Cleveland, cleared to enter Cleveland Bravo airspace, maintain VFR, Cleveland altimeter three zero one two, expect five right, descend and maintain four thousand.*
- (Pilot) *Cessna Three Two One Mike, cleared to enter Cleveland Bravo airspace, expect five right, maintain VFR, descend and maintain four thousand, altimeter three zero one two.*

iii. Radio Calls (Pilot-initiated)

If you are not in radio contact with ATC but wish flight following, and you know the appropriate frequency, contact Center.

- (Pilot) *Cleveland Center, Cessna 172 Four Three Two One Mike.*
- (Center) *Cessna Three Two One Mike, Cleveland Center.*
- (Pilot) *Cessna Three Two One Mike, thirty miles southwest of Cleveland, at eight thousand five hundred, VFR Columbus, request flight following.*
- (Center) *Cessna Three Two One Mike, squawk four three one two.*
- (Pilot) *Cessna Three Two One Mike, four three one two.*
- (Center) *Cessna Three Two One Mike, radar contact, maintain eight thousand five hundred, advise any altitude change, maintain VFR, proceed on course.*
- (Pilot) *Cessna Three Two One Mike, eight thousand five hundred on course, will remain VFR and advise any altitude change.*

iv. Radio Calls (When you Do Not know the Frequency)

Contact the closest FSS and a Flight Service Specialist will identify the appropriate Center and frequency for your present location.

- (Pilot) *Cleveland Radio, Cessna 172 Four Three Two One Mike.*
- (FSS) *Cessna Three Two One Mike, Cleveland Radio.*
- (Pilot) *Cessna Three Two One Mike, twenty miles southwest of Cleveland, what is the Center frequency in this area?*
- (FSS) *Cessna Three Two One Mike, contact Cleveland Center, one three three point three.*
- (Pilot) *Cessna Three Two One Mike, Centre one three three three, Thanks.*
- (Pilot) *Cleveland Center, Cessna 172 Four Three Two One Mike.*
- (Center) *Cessna Three Two One Mike, Cleveland Center.*
- (Pilot) *Cessna Three Two One Mike, twenty miles southwest of Cleveland, at seven thousand five hundred, VFR Pittsburgh, request flight following.*
- (Center) *Cessna Three Two One Mike, squawk six two six two.*
- (Pilot) *Cessna Three Two One Mike, squawking six two six two.*
- (Center) *Cessna Three Two One Mike, radar contact, maintain seven thousand five hundred, advise any altitude change, maintain VFR, proceed on course.*

10. Communicating with Flight Service Stations

10.1 What is a Flight Service Station?

A Flight Service Station (FSS) is an office which provides a broad range of information and communication services to pilots in the air and on the ground.

Flight Service Specialists provide en route flight information, weather and other flight planning information, handle flight plans and are an integral part of the search and rescue system. We strongly urge all pilots to visit an FSS and discover the fine service they provide. The common FSS frequency is 122.2. However, in an emergency 121.5 should be used.

When calling an FSS, you refer to it by its station name and the word "Radio". For example, the AFSS (Automated Flight Service Station) located at Buffalo, New York, is called "Buffalo Radio". If it is the St. Louis FSS you wish to contact, call "St. Louis Radio", etc.

10.2 Remote Communications Outlets

Remote communications outlets allow pilots to contact FSS. The pilot transmits on one frequency and the FSS transmits on a VOR frequency. You must remember to turn the volume up on the nav-comm and identify the name of the VOR you are monitoring.

In *Figure 18*, you will notice on the top of the Geneseo VOR box the number 122.1R. To contact the FSS, which in this case is Buffalo, you would transmit on 122.1

Buffalo Radio, Cessna Four Three Two One Mike, listening Geneseo, one zero eight point two.

Buffalo Flight Service would transmit on the VOR frequency (108.2) that you are monitoring.

If you do not receive an immediate response, wait 15 to 20 seconds and try again. The Automated Flight Service Stations (AFSS) monitor up to 50 frequencies and staff may be on another call.

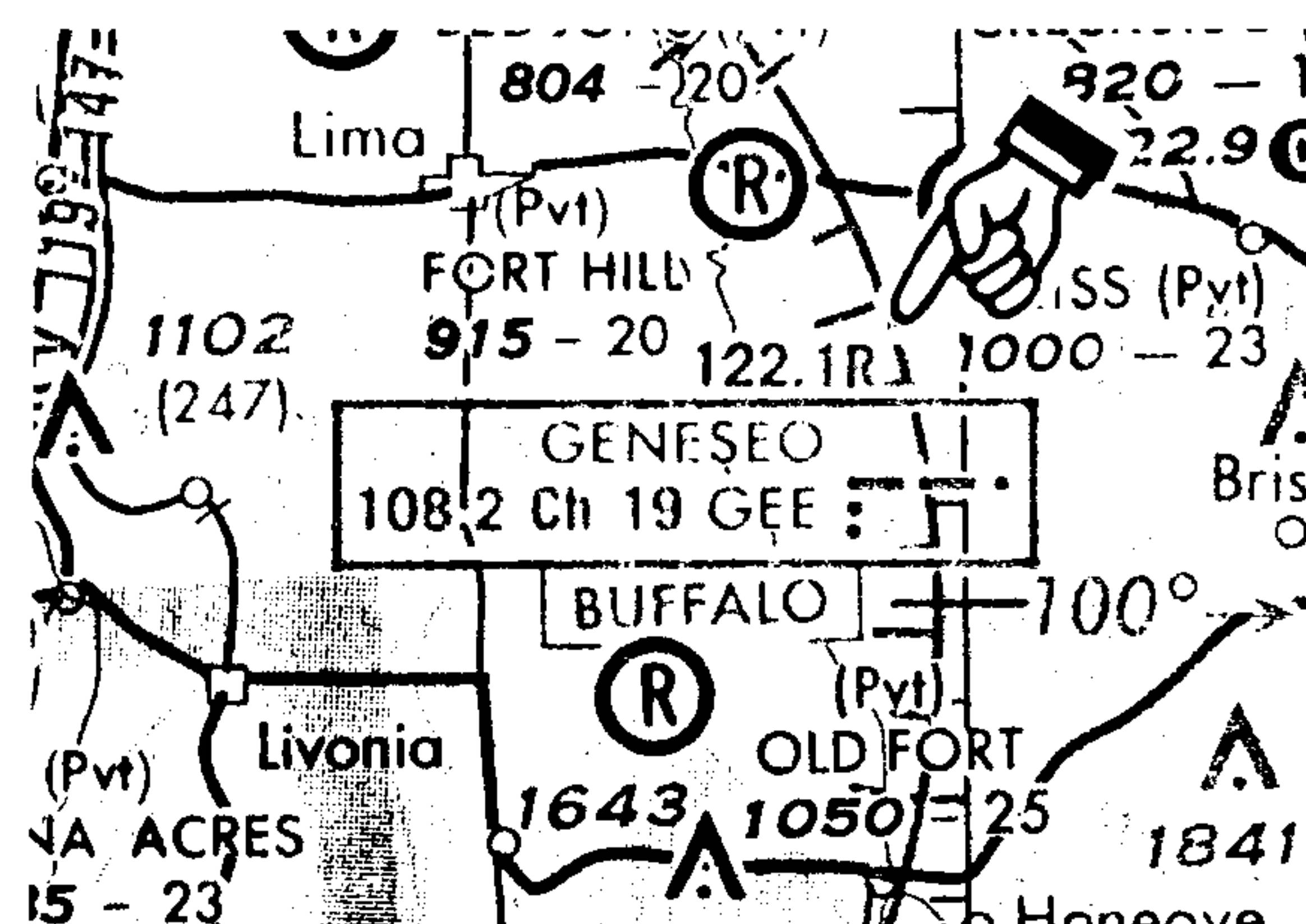


Figure 18

10.3 Opening and Closing Flight Plans

Your airborne communications with a Flight Service Station will generally involve opening and closing flight plans.

i. Opening a Flight Plan

(Pilot) *Buffalo Radio, Cessna 172 Four Three Two One Mike.*

(FSS) *Cessna Three Two One Mike, Buffalo Radio.*

(Pilot) *Buffalo Radio, Cessna Three Two One Mike, airborne off Pine Hill, at one two four five Zulu, request you activate my VFR flight plan.*

(FSS) *Cessna Three Two One Mike, current Buffalo altimeter two niner eight three, flight plan activated at one two four niner Zulu.*

(Pilot) *Cessna Three Two One Mike, altimeter two niner eight three, Thanks.*

If you are delayed in activating your flight plan, the computer will hold the flight plan for 2 hours past the "proposed time".

ii. Closing a Flight Plan

(Pilot) *St. Louis Radio, Cessna 172 Four Three Two One Mike.*

(FSS) *Cessna Three Two One Mike, St. Louis Radio.*

(Pilot) *Cessna Three Two One Mike, has Bowling Green Airport in sight, request you close my VFR flight plan.*

(FSS) *Cessna Three Two One Mike, St. Louis Radio, the current time is one four four five Zulu, your VFR flight plan is closed, current St. Louis altimeter three zero one three.*

(Pilot) *Cessna Three Two One Mike, altimeter three zero one three, Thanks.*

If you file a VFR flight plan, remember to cancel it. If the weather deteriorates during your flight and you are licensed to file IFR and receive an IFR clearance, you must cancel the VFR flight plan.

10.4 Weather Information

i. Contacting The Nearest FSS

During your flight, you may obtain the most recent weather reports or forecasts simply by requesting the information from the nearest Flight Service Station:

(Pilot) *Columbia Radio, Cessna 172 Four Three Two One Mike.*

(FSS) *Cessna Three Two One Mike, Columbia Radio.*

(Pilot) *Cessna Three Two One Mike, request the latest weather for Kansas City.*

(FSS) *Cessna Three Two One Mike, the one eight zero zero Zulu sequence for Kansas City is...*

ii. Enroute Flight Advisory Service (EFAS)

Also known as "Flight Watch", the Enroute Flight Advisory Service provides weather information to pilots on frequency 122.0 from 0600 to 2200 local time. If you do not have an Airport/Facility Directory which contains a map of Flight Watch stations and their remote outlets, call on 122.0 (preferably at 6,000 feet above ground or higher for optimal reception) and address your call to Flight Watch. Give your position to the closest VOR.

(Pilot) *Flight Watch, Cessna 172 Four Three Two One Mike, Appleton VOR.*

(FSS) *Cessna Three Two One Mike, Cleveland Flight Watch.*

(Pilot) *Cleveland Flight Watch, Cessna Three Two One Mike, may I have the latest Dover observation please?*

iii. Hazardous Inflight Weather Advisory Service (HIWAS)

If there is a small square in the lower right corner of a VOR identification box on a Sectional Aeronautical Chart (*Figure 19*), you may tune in the VOR frequency for a recorded transmission of hazardous weather within a 400 NM radius of the VOR outlet.

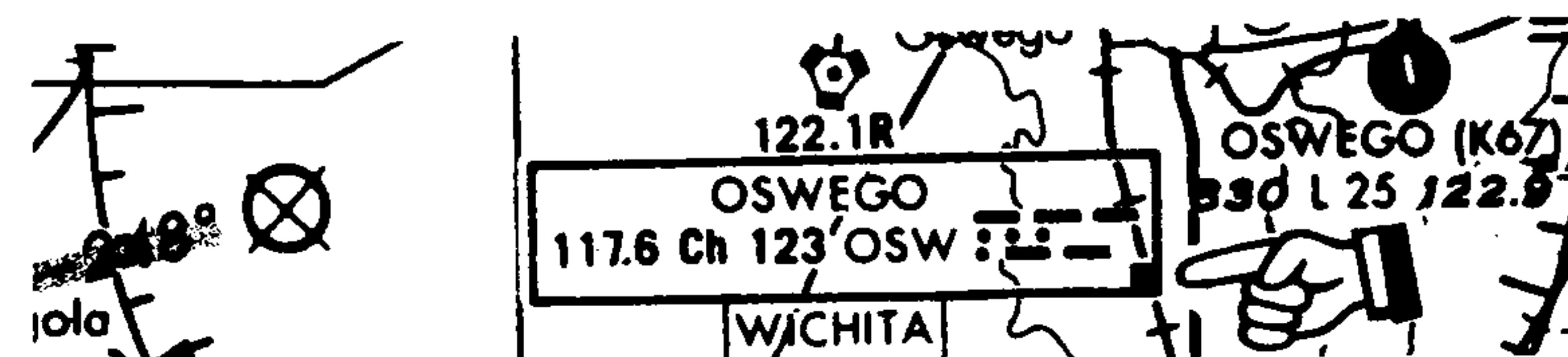


Figure 19

10.5 VHF Direction Finding Service - DF Steer

VHF Direction Finding Service - DF Steer VHF (very high frequency) direction finding equipment uses your radio transmissions to provide directional guidance or bearing information in times of navigational difficulty (e.g., if you are lost). The equipment is available at many FSS and control tower facilities.

As you transmit (on FSS frequency 122.2), the Flight Service Specialist or Air Traffic Controller will determine your direction from their station based on the DF (direction finding) equipment and can provide you with a bearing to the station.

If you request a DF steer, you must provide the operator with the following information:

- your approximate position, if known;
- your altitude; and
- your present heading.

Before making your request, remember to **reset your directional gyro to agree with your magnetic compass**. Once the homing procedure begins, do not reset your heading indicator without informing the DF operator.

i. Radio Calls

- (Pilot) *Dayton Radio, Cessna 172 Four Three Two One Mike*
- (FSS) *Cessna Three Two One Mike, Dayton Radio.*
- (Pilot) *Dayton Radio, Cessna Three Two One Mike, approximately ten miles east of Harvey, four thousand five hundred, heading two four zero, request DF Steer.*
- (FSS) *Cessna Three Two One Mike, Dayton Radio, reset your directional gyro and standby to transmit for homing.*
- (Pilot) *Cessna Three Two One Mike, gyro set, standing-by.*
- (FSS) *Cessna Three Two One Mike, transmit for homing.*
- (Pilot) *Three Two One Mike, Three Two one Mike, Three Two One Mike.*
- (FSS) *Cessna Three Two One Mike, steer heading two six zero for homing to Dayton.*
- (Pilot) *Cessna Three Two One Mike, two six zero for Dayton, Thanks.*

If the FSS is having difficulty with the homing equipment, and Flight Service staff know your approximate location, they will advise the name and frequency of the radar facility to contact. Once you tune in the radar facility frequency, radar vectors will be provided.

11. Emergency Assistance

Never hesitate to call ATC in an actual or developing emergency situation - and especially, **do not wait until a situation worsens before seeking help.** Controllers are friendly, helpful people who are never too busy to assist a pilot in distress (e.g., if you find yourself in deteriorating weather, ATC has the means to vector you to VFR weather if it exists close to your location; if you are short on fuel, ATC usually knows the local terrain and could direct you to a suitable area for a forced landing). ATC can provide numerous examples of pilots who hesitated to call - the result being an actual, rather than averted, emergency.

- A general rule in an emergency situation is to **CLIMB** if possible. This not only improves communication and radar detection - but also provides greater obstacle clearance (which is especially important if you are unfamiliar with the terrain).
- The emergency code **7700** will immediately alert ATC to your emergency through flashing block data on radar displays.
- If you find yourself unable to contact a specific ATC facility, transmit a distress message on **121.5 MHz**.
- To assist a pilot in distress, ATC initially needs *three* types of information:
 - (i) Aircraft identification and type,
 - (ii) Nature of distress or urgency, and
 - (iii) Pilot's request.
- You should comply with ATC instructions and advice. Ask for clarification of points that are confusing or cannot be followed. But remember: the pilot has the final responsibility for the operation and safety of the aircraft, so "fly the airplane **FIRST**."

12. Concluding Comments

We hope that this guide has improved your understanding of radio communications - and your ability to transmit clear, accurate and concise information in a variety of flying environments.

To further enhance your radio communication capability, we would recommend that you practice your new skills by flying to the range of airports described in this guide. Do not hesitate to ask for guidance when needed. Always remember that ground stations are there to help pilots and should not be considered adversaries. If you find yourself in a position of not clearly understanding ATC instructions, ask for an explanation. At times, you may ask ATC to rephrase their instruction if you are not familiar with the terminology used.

We would also recommend that you visit a Control Tower or Flight Service Station - and also monitor radio communications on terminal frequencies on which you are likely to hear professional pilots.

Safe flying!

13. Appendices

Appendix A

SELECTED STANDARD PHRASES (SEE AIM PILOT/CONTROLLER GLOSSARY)

MEANING	USE
• "No"	<i>Negative</i>
• "Yes"	<i>Affirmative</i>
• "I have received your message, understand it and will comply with it."	<i>Wilco</i>
• "I have received all of your last transmission." (<u>Never</u> to be used to answer a question requiring a "yes" or "no" answer.)	<i>Roger</i>
• "I have made a mistake."	<i>Correction</i>
• "Did you get that?"	<i>Confirm</i>
• "Proceed with your message."	<i>Go ahead</i>
• "The understanding you have is correct."	<i>That is correct</i>
• "Begin your message."	<i>Go ahead</i>
• "Would you repeat that?"	<i>Say again</i>
• "Repeat my message to me."	<i>Read back</i>
• "I must pause briefly."	<i>Stand by</i>
• "Check this out"	<i>Verify</i>
• "I have called you more than once - please confirm that you are receiving me."	<i>Do you read?</i>
• "Tell me if you received and understood the message."	<i>Acknowledge</i>
• "Tell me what you plan to do."	<i>Advise intentions</i>
• "I have received the runway, wind and altimeter information only." (NOT ATIS)	<i>Have numbers</i>
• "How well is this transmission being received?"	<i>How do you hear me?</i>

Appendix B

PRONUNCIATIONS (SEE AIM 4-2-8 → 4-2-12)

NUMBERS

9	niner
10	one zero
19	one niner
700	seven zero zero
11300	one one thousand three hundred
12000	one two thousand

TIME (24 Hour system)

0745Z	zero seven four five zulu
0230Z	zero two three zero zulu
0945Z	zero niner four five zulu
2350Z	two three five zero zulu
midnight	zero zero zero zero zulu

AIRWAYS

Victor 373	Victor three seven three
------------	--------------------------

ALTITUDES

1,000 feet MSL	one thousand
3,500 feet MSL	three thousand five hundred
12,000 feet MSL	one two thousand
13,500 feet MSL	one three thousand five hundred
FL 180	flight level one eight zero
FL 320	flight level three two zero

HEADINGS

080°	heading zero eight zero
275°	heading two seven five
259°	heading two five niner

RADIO FREQUENCIES

126.7	one two six point seven (megahertz)
121.5	one two one point five

SPEEDS

250	two five zero knots
195	one niner five knots

Appendix C

VFR CRUISING ALTITUDES AND FLIGHT LEVELS (SEE AIM 3-1-4)

IF YOUR MAGNETIC COURSE (GROUND TRACK) IS:	AND YOU ARE MORE THAN 3,000 FEET ABOVE THE SURFACE BUT BELOW 18,000 FEET MSL, FLY:	AND YOU ARE ABOVE 18,000 FEET MSL TO FL 290 FLY:
0° to 179°	Odd thousands MSL, plus 500 feet (3,500 5,500, 7,500, etc.)	Odd Flight Levels plus 500 feet (FL 195, FL 215, FL 235, etc.)
180° to 359°	Even thousands MSL, plus 500 feet (4,500, 6,500, 8,500, etc.)	Even Flight Levels plus 500 feet (FL 185, FL 205, FL 225, etc.)

Appendix D

TRANSPONDER CODES

1200 VFR	7600 Lost Communication
7700 Emergency	7500 Hijack

Transponder ON in controlled airspace
MODE C REQUIRED:
above 10,000 feet, in Class B airspace, & in and above Class C

RADIO BEACON PHRASEOLOGY

- SQUAWK (number) Operate radar beacon transponder on designated code in Mode C
- IDENT Engage the "IDENT" feature of the transponder
- SQUAWK (number) & IDENT Operate transponder on specified code & engage the IDENT feature
- SQUAWK STANDBY Switch transponder to standby position
- SQUAWK VFR Operate radar beacon transponder on code 1200

Appendix E

BASIC VFR WEATHER MINIMUMS (SEE AIM 3-1-3)		
Airspace	Flight Visibility	Distance from Clouds
CLASS A	Not applicable	Not applicable
CLASS B	3 statute miles	Clear of clouds
CLASS C	3 statute miles	500 feet below 1,000 feet above 2,000 feet horizontal
CLASS D	3 statute miles	500 feet below 1,000 feet above 2,000 feet horizontal
CLASS E Less than 10,000 feet MSL	3 statute miles	500 feet below 1,000 feet above 2,000 feet horizontal
At or above 10,000 feet MSL	5 statute miles	1,000 feet below 1,000 feet above 1 SM horizontal
CLASS G 1,200 feet or less above the surface (regardless of MSL altitude) Day, except as provided in section 91.155(b)	1 statute mile	Clear of clouds
Night, except as provided in section 91.155(b)	3 statute miles	500 feet below 1,000 feet above 2,000 feet horizontal
More than 1,200 feet above the surface but less than 10,000 feet MSL - Day	1 statute mile	500 feet below 1,000 feet above 2,000 feet horizontal
Night	3 statute miles	500 feet below 1,000 feet above 2,000 feet horizontal
More than 1,200 feet above the surface and at or above 10,000 feet MSL	5 statute miles	1,000 feet below 1,000 feet above 1 SM mile horizontal

THE PHONETIC ALPHABET					
Letter	Word	Pronunciation	Letter	Word	Pronunciation
A	Alfa	AL fah	N	November	no VEM ber
B	Bravo	BRAH VOH	O	Oscar	OSS cah
C	Charlie	CHAR lee	P	Papa	pah PAH
D	Delta	DELL tah	Q	Quebec	keh BECK
E	Echo	ECK oh	R	Romeo	ROW me oh
F	Foxtrot	FOKS trot	S	Sierra	see AIR rah
G	Golf	GOLF	T	Tango	TANG go
H	Hotel	hoh TELL	U	Uniform	YOU nec form
I	India	In dee ah	V	Victor	VIK tah
J	Juliett	JEW lee ETT	W	Whiskey	WISS key
K	Kilo	KEY loh	X	X-Ray	ECKS RAY
L	Lima	LEE mah	Y	Yankee	YANG key
M	Mike	MIKE	Z	Zulu	ZOO loo

ATC LIGHT SIGNALS TO AIRCRAFT IN FLIGHT FAR 91.125		
1	Steady Green	Cleared to land.
2	Steady Red	Give way to other aircraft and continue circling.
3	Flashing Green	Return for landing (to be followed by a steady green light at the proper time).
4	Flashing Red	Airport unsafe - do not land.
5	Alternating Red & Green	Exercise extreme caution.

ATC LIGHT SIGNALS TO AIRCRAFT ON THE GROUND FAR 91.125		
1	Steady Green	Cleared for takeoff.
2	Steady Red	STOP.
3	Flashing Green	Cleared to taxi.
4	Flashing Red	Taxi clear of the runway in use.
5	Flashing White	Return to starting point on airport.
6	Alternating Red & Green	Exercise extreme caution.