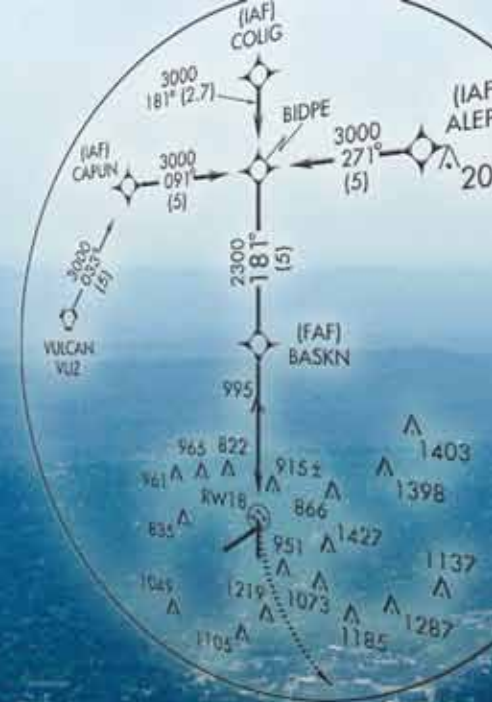


## Chapter 10

# IFR Flight

### Introduction

This chapter is a discussion of conducting a flight under instrument flight rules (IFR). It also explains the sources for flight planning, the conditions associated with instrument flight, and the procedures used for each phase of IFR flight: departure, en route, and approach. The chapter concludes with an example of an IFR flight which applies many of the procedures discussed in the chapter.



## Sources of Flight Planning Information

The following resources are available for a pilot planning a flight conducted under instrument flight rules (IFR).

National Aeronautical Charting Group (NACG) publications:

- IFR en route charts
- area charts
- United States (U.S.) Terminal Procedures Publications (TPP)

The Federal Aviation Administration (FAA) publications:

- AIM
- Airport/Facility Directory (A/FD)
- Notices to Airmen Publication (NTAP) for flight planning in the National Airspace System (NAS)

Pilots should also consult the Pilot's Operating Handbook/Airplane Flight Manual (POH/AFM) for flight planning information pertinent to the aircraft to be flown.

A review of the contents of all the listed publications will help determine which material should be referenced for each flight. As a pilot becomes more familiar with these publications, the flight planning process becomes quicker and easier.

### Aeronautical Information Manual (AIM)

The AIM provides the aviation community with basic flight information and air traffic control (ATC) procedures used in the United States NAS. An international version called the Aeronautical Information Publication contains parallel information, as well as specific information on the international airports used by the international community.

### Airport/Facility Directory (A/FD)

The A/FD contains information on airports, communications, and navigation aids pertinent to IFR flight. It also includes very-high frequency omnidirectional range (VOR) receiver checkpoints, automated flight service station (AFSS), weather service telephone numbers, and air route traffic control center (ARTCC) frequencies. Various special notices essential to flight are also included, such as land-and-hold-short operations (LAHSO) data, the civil use of military fields, continuous power facilities, and special flight procedures.

In the major terminal and en route environments, preferred routes have been established to guide pilots in planning their routes of flight, to minimize route changes, and to aid in the orderly management of air traffic using the federal airways. The A/FD lists both high and low altitude preferred routes.

## Notices to Airmen Publication (NTAP)

The NTAP is a publication containing current Notices to Airmen (NOTAMs) which are essential to the safety of flight, as well as supplemental data affecting the other operational publications listed. It also includes current Flight Data Center (FDC) NOTAMs, which are regulatory in nature, issued to establish restrictions to flight or to amend charts or published instrument approach procedures (IAPs).

### POH/AFM

The POH/AFM contain operating limitations, performance, normal and emergency procedures, and a variety of other operational information for the respective aircraft. Aircraft manufacturers have done considerable testing to gather and substantiate the information in the aircraft manual. Pilots should refer to it for information relevant to a proposed flight.

## IFR Flight Plan

As specified in Title 14 of the Code of Federal Regulations (14 CFR) part 91, no person may operate an aircraft in controlled airspace under IFR unless that person has filed an IFR flight plan. Flight plans may be submitted to the nearest AFSS or air traffic control tower (ATCT) either in person, by telephone (1-800-WX-BRIEF), by computer (using the direct user access terminal system (DUATS)), or by radio if no other means are available. Pilots should file IFR flight plans at least 30 minutes prior to estimated time of departure to preclude possible delay in receiving a departure clearance from ATC. The AIM provides guidance for completing and filing FAA Form 7233-1, Flight Plan. These forms are available at flight service stations (FSSs), and are generally found in flight planning rooms at airport terminal buildings.

*[Figure 10-1]*

### Filing in Flight

IFR flight plans may be filed from the air under various conditions, including:

1. A flight outside controlled airspace before proceeding into IFR conditions in controlled airspace.
2. A VFR flight expecting IFR weather conditions en route in controlled airspace.

In either of these situations, the flight plan may be filed with the nearest AFSS or directly with the ARTCC. A pilot who files with the AFSS submits the information normally entered during preflight filing, except for "point of departure," together with present position and altitude. AFSS then relays this information to the ARTCC. The ARTCC will then clear the pilot from present position or from a specified navigation fix.



A pilot who files directly with the ARTCC reports present position and altitude, and submits only the flight plan information normally relayed from the AFSS to the ARTCC. Be aware that traffic saturation frequently prevents ARTCC personnel from accepting flight plans by radio. In such cases, a pilot is advised to contact the nearest AFSS to file the flight plan.

### Cancelling IFR Flight Plans

An IFR flight plan may be cancelled any time a pilot is operating in VFR conditions outside Class A airspace by stating “cancel my IFR flight plan” to the controller or air-to-ground station. After cancelling an IFR flight plan, the pilot should change to the appropriate air-to-ground frequency, transponder code as directed, and VFR altitude/flight level.

ATC separation and information services (including radar services, where applicable) are discontinued when an IFR flight plan is cancelled. If VFR radar advisory service is desired, a pilot must specifically request it. Be aware that other procedures may apply when cancelling an IFR flight plan within areas such as Class C or Class B airspace.

When operating on an IFR flight plan to an airport with an operating control tower, a flight plan is cancelled

automatically upon landing. If operating on an IFR flight plan to an airport without an operating control tower, the pilot is responsible for cancelling the flight plan. This can be done by telephone after landing if there is no operating FSS or other means of direct communications with ATC. When there is no FSS or air-to-ground communications are not possible below a certain altitude, a pilot may cancel an IFR flight plan while still airborne and able to communicate with ATC by radio. If using this procedure, be certain the remainder of the flight can be conducted under VFR. It is essential that IFR flight plans be cancelled expeditiously. This allows other IFR traffic to utilize the airspace.

### Clearances

An ATC clearance allows an aircraft to proceed under specified traffic conditions within controlled airspace for the purpose of providing separation between known aircraft.

### Examples

A flight filed for a short distance at a relatively low altitude in an area of low traffic density might receive a clearance as follows:

“Cessna 1230 Alpha, cleared to Doeville airport direct, cruise 5,000.”

U.S. DEPARTMENT OF TRANSPORTATION FEDERAL AVIATION ADMINISTRATION		(FAA USE ONLY) <input type="checkbox"/> PILOT BRIEFING <input type="checkbox"/> VNR			TIME STARTED		SPECIALIST INITIALS
FLIGHT PLAN		<input type="checkbox"/> STOPOVER					
1. TYPE	2. AIRCRAFT IDENTIFICATION		3. AIRCRAFT TYPE/SPECIAL EQUIPMENT	4. TRUE AIRSPEED	5. DEPARTURE POINT		6. DEPARTURE TIME
VFR							
IFR							
DVFR				KTS			
7. CRUISING ALTITUDE							
8. ROUTE OF FLIGHT							
9. DESTINATION (Name of airport and city)			10. EST. TIME ENROUTE		11. REMARKS		
			HOURS MINUTES				
12. FUEL ON BOARD		13. ALTERNATE AIRPORT(S)		14. PILOT'S NAME, ADDRESS & TELEPHONE NUMBER & AIRCRAFT HOME BASE			15. NUMBER ABOARD
HOURS MINUTES							
				17. DESTINATION CONTACT/TELEPHONE (OPTIONAL)			
16. COLOR OF AIRCRAFT		CIVIL AIRCRAFT PILOTS. 14 CFR Part 91 requires you file an IFR flight plan to operate under instrument flight rules in controlled airspace. Failure to file could result in a civil penalty not to exceed \$1,000 for each violation (Section 901 of the Federal Aviation Act of 1958, as amended). Filing of a VFR flight plan is recommended as a good operating practice. See also Part 99 for requirements concerning DVFR flight plans.					

Form Approved OMB No. 2120-0026

FAA Form 7233-1 (8-82) CLOSE VFR FLIGHT PLAN WITH \_\_\_\_\_ FSS ON ARRIVAL

Figure 10-1. Flight Plan Form.

The term “cruise” in this clearance means a pilot is authorized to fly at any altitude from the minimum IFR altitude up to and including 5,000 feet, and may level off at any altitude within this block of airspace. A climb or descent within the block may be made at the pilot’s discretion. However, once a pilot reports leaving an altitude within the block, the pilot may not return to that altitude without further ATC clearance.

When ATC issues a cruise clearance in conjunction with an unpublished route, an appropriate crossing altitude will be specified to ensure terrain clearance until the aircraft reaches a fix, point, or route where the altitude information is available. The crossing altitude ensures IFR obstruction clearance to the point at which the aircraft enters a segment of a published route or IAP.

Once a flight plan is filed, ATC will issue the clearance with appropriate instructions, such as the following:

“Cessna 1230 Alpha is cleared to Skyline airport via the Crossville 055 radial, Victor 18, maintain 5,000. Clearance void if not off by 1330.”

Or a more complex clearance, such as:

“Cessna 1230 Alpha is cleared to Wichita Mid-continent airport via Victor 77, left turn after takeoff, proceed direct to the Oklahoma City VORTAC. Hold west on the Oklahoma City 277 radial, climb to 5,000 in holding pattern before proceeding on course. Maintain 5,000 to CASHION intersection. Climb to and maintain 7,000. Departure control frequency will be 121.05, Squawk 0412.”

Clearance delivery may issue the following “abbreviated clearance” which includes a departure procedure (DP):

“Cessna 1230 Alpha, cleared to La Guardia as filed, RINGOES 8 departure Phillipsburg transition, maintain 8,000. Departure control frequency will be 120.4, Squawk 0700.”

This clearance may be readily copied in shorthand as follows:

“CAF RNGO8 PSB M80 DPC 120.4 SQ 0700.”

The information contained in this DP clearance is abbreviated using clearance shorthand (see appendix 1). The pilot should know the locations of the specified navigation facilities, together with the route and point-to-point time, before accepting the clearance.

The DP enables a pilot to study and understand the details of a departure before filing an IFR flight plan. It provides the information necessary to set up communication and

navigation equipment and be ready for departure before requesting an IFR clearance.

Once the clearance is accepted, a pilot is required to comply with ATC instructions. A clearance different from that issued may be requested if the pilot considers another course of action more practicable or if aircraft equipment limitations or other considerations make acceptance of the clearance inadvisable.

A pilot should also request clarification or amendment, as appropriate, any time a clearance is not fully understood or considered unacceptable for safety of flight. The pilot is responsible for requesting an amended clearance if ATC issues a clearance that would cause a pilot to deviate from a rule or regulation or would place the aircraft in jeopardy.

### Clearance Separations

ATC will provide the pilot on an IFR clearance with separation from other IFR traffic. This separation is provided:

1. Vertically—by assignment of different altitudes.
2. Longitudinally—by controlling time separation between aircraft on the same course.
3. Laterally—by assignment of different flight paths.
4. By radar—including all of the above.

ATC does not provide separation for an aircraft operating:

1. Outside controlled airspace.
2. On an IFR clearance:
  - a) With “VFR-On-Top” authorized instead of a specific assigned altitude.
  - b) Specifying climb or descent in “VFR conditions.”
  - c) At any time in VFR conditions, since uncontrolled VFR flights may be operating in the same airspace.

In addition to heading and altitude assignments, ATC will occasionally issue speed adjustments to maintain the required separations. For example:

“Cessna 30 Alpha, slow to 100 knots.”

A pilot who receives speed adjustments is expected to maintain that speed plus or minus 10 knots. If for any reason the pilot is not able to accept a speed restriction, the pilot should advise ATC.

At times, ATC may also employ visual separation techniques to keep aircraft safely separated. A pilot who obtains visual contact with another aircraft may be asked to maintain visual separation or to follow the aircraft. For example:

“Cessna 30 Alpha, maintain visual separation with that traffic, climb and maintain 7,000.”

The pilot’s acceptance of instructions to maintain visual separation or to follow another aircraft is an acknowledgment that the aircraft will be maneuvered as necessary, to maintain safe separation. It is also an acknowledgment that the pilot accepts the responsibility for wake turbulence avoidance.

In the absence of radar contact, ATC will rely on position reports to assist in maintaining proper separation. Using the data transmitted by the pilot, the controller follows the progress of each flight. ATC must correlate the pilots’ reports to provide separation; therefore, the accuracy of each pilot’s report can affect the progress and safety of every other aircraft operating in the area on an IFR flight plan.

### Departure Procedures (DPs)

Instrument departure procedures are preplanned instrument flight rule (IFR) procedures, which provide obstruction clearance from the terminal area to the appropriate en route structure and provide the pilot with a way to depart the airport and transition to the en route structure safely. Pilots operating under 14 CFR part 91 are strongly encouraged to file and fly a DP when one is available. *[Figure 10-2]*

There are two types of DPs, Obstacle Departure Procedures (ODP), printed either textually or graphically, and Standard Instrument Departures (SID), always printed graphically. All DPs, either textual or graphic, may be designed using either conventional or RNAV criteria. RNAV procedures will have RNAV printed in the title, e.g., SHEAD TWO DEPARTURE (RNAV).

#### Obstacle Departure Procedures (ODP)

ODPs provide obstruction clearance via the least onerous route from the terminal area to the appropriate en route structure. ODPs are recommended for obstruction clearance and may be flown without ATC clearance unless an alternate departure procedure (SID or radar vector) has been specifically assigned by ATC. Graphic ODPs will have (OBSTACLE) printed in the procedure title, e.g., GEYSR THREE DEPARTURE (OBSTACLE), CROWN ONE DEPARTURE (RNAV)(OBSTACLE).

#### Standard Instrument Departures

Standard Instrument Departures (SID) are air traffic control (ATC) procedures printed for pilot/controller use in graphic form to provide obstruction clearance and a transition from the terminal area to the appropriate en route structure. SIDs are primarily designed for system enhancement and to reduce pilot/controller workload. ATC clearance must be received prior to flying a SID.

ODPs are found in section C of each booklet published regionally by the NACG, TPP, along with “IFR Take-off Minimums” while SIDs are collocated with the approach procedures for the applicable airport. Additional information on the development of DPs can be found in paragraph 5-2-7 of the AIM. However, the following points are important to remember.

1. The pilot of IFR aircraft operating from locations where DP procedures are effective may expect an ATC clearance containing a DP. The use of a DP requires pilot possession of at least the textual description of the approved DP.
2. If a pilot does not possess a preprinted DP or for any other reason does not wish to use a DP, he or she is expected to advise ATC. Notification may be accomplished by filing “NO DP” in the remarks section of the filed flight plan, or by advising ATC.
3. If a DP is accepted in a clearance, a pilot must comply with it.

#### Radar Controlled Departures

On IFR departures from airports in congested areas, a pilot will normally receive navigational guidance from departure control by radar vector. When a departure is to be vectored immediately following takeoff, the pilot will be advised before takeoff of the initial heading to be flown. This information is vital in the event of a loss of two-way radio communications during departure.

The radar departure is normally simple. Following takeoff, contact departure control on the assigned frequency when advised to do so by the control tower. At this time departure control verifies radar contact, and gives headings, altitude, and climb instructions to move an aircraft quickly and safely out of the terminal area. A pilot is expected to fly the assigned headings and altitudes until informed by the controller of the aircraft’s position with respect to the route given in the clearance, whom to contact next, and to “resume own navigation.”

Departure control will provide vectors to either a navigation facility, or an en route position appropriate to the departure clearance, or transfer to another controller with further radar surveillance capabilities. *[Figure 10-2]*

A radar controlled departure does not relieve the pilot of responsibilities as pilot-in-command. Be prepared before takeoff to conduct navigation according to the ATC clearance, with navigation receivers checked and properly tuned. While under radar control, monitor instruments to ensure continuous orientation to the route specified in the clearance, and record the time over designated checkpoints.

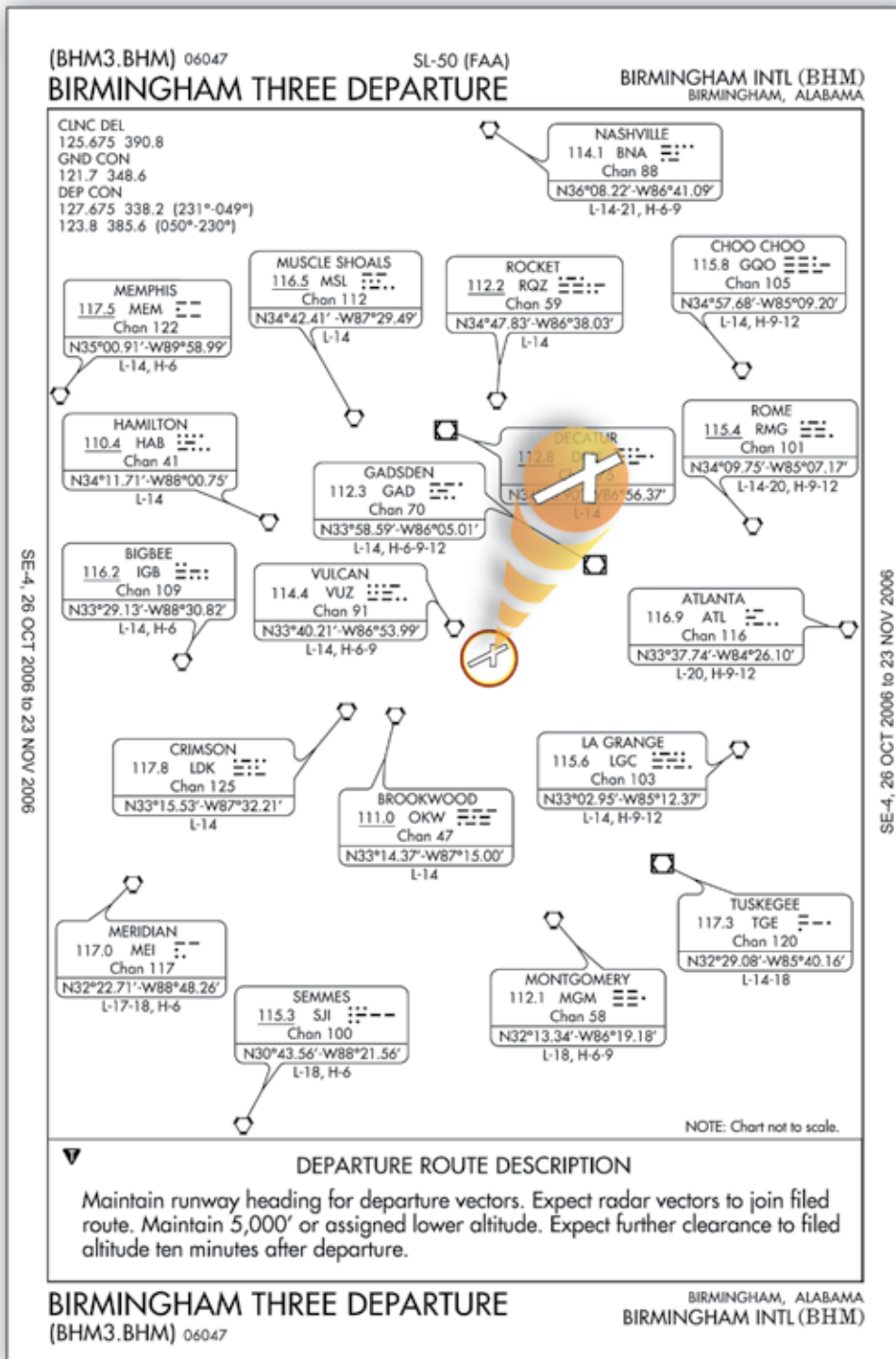


Figure 10-2. Departure Procedure (DP).

## Departures From Airports Without an Operating Control Tower

When departing from airports that have neither an operating tower nor an FSS, a pilot should telephone the flight plan to the nearest ATC facility at least 30 minutes before the estimated departure time. If weather conditions permit, depart VFR and request IFR clearance as soon as radio contact is established with ATC.

If weather conditions make it undesirable to fly VFR, telephone clearance request. In this case, the controller would probably issue a short-range clearance pending establishment of radio contact, and might restrict the departure time to a certain period. For example:

“Clearance void if not off by 0900.”

This would authorize departure within the allotted period and permit a pilot to proceed in accordance with the clearance. In the absence of any specific departure instructions, a pilot would be expected to proceed on course via the most direct route.

## En Route Procedures

Procedures en route will vary according to the proposed route, the traffic environment, and the ATC facilities controlling the flight. Some IFR flights are under radar surveillance and controlled from departure to arrival, and others rely entirely on pilot navigation.

Where ATC has no jurisdiction, it does not issue an IFR clearance. It has no control over the flight, nor does the pilot have any assurance of separation from other traffic.

## ATC Reports

All pilots are required to report unforecast weather conditions or other information related to safety of flight to ATC. The pilot-in-command of each aircraft operated in controlled airspace under IFR shall report as soon as practical to ATC any malfunctions of navigational, approach, or communication equipment occurring in flight:

1. Loss of VOR, tactical air navigation (TACAN) or automatic direction finder (ADF) receiver capability.
2. Complete or partial loss of instrument landing system (ILS) receiver capability.
3. Impairment of air-to-ground communications capability.

The pilot-in-command shall include within the report (1) Aircraft identification, (2) Equipment affected, (3) Degree to which the pilot to operate under IFR within the ATC system is impaired, and (4) Nature and extent of assistance desired from ATC.

## Position Reports

Position reports are required over each compulsory reporting point (shown on the chart as a solid triangle) along the route being flown regardless of altitude, including those with a VFR-on-top clearance. Along direct routes, reports are required of all IFR flights over each point used to define the route of flight. Reports at reporting points (shown as an open triangle) are made only when requested by ATC. A pilot should discontinue position reporting over designated reporting points when informed by ATC that the aircraft is in “RADAR CONTACT.” Position reporting should be resumed when ATC advises “RADAR CONTACT LOST” or “RADAR SERVICE TERMINATED.”

Position reports should include the following items:

1. Identification
2. Position
3. Time
4. Altitude or flight level (include actual altitude or flight level when operating on a clearance specifying VFR-on-top)
5. Type of flight plan (not required in IFR position reports made directly to ARTCCs or approach control)
6. ETA and name of next reporting point
7. The name only of the next succeeding reporting point along the route of flight
8. Pertinent remarks

En route position reports are submitted normally to the ARTCC controllers via direct controller-to-pilot communications channels, using the appropriate ARTCC frequencies listed on the en route chart.

Whenever an initial contact with a controller is to be followed by a position report, the name of the reporting point should be included in the call-up. This alerts the controller that such information is forthcoming. For example:

“Atlanta Center, Cessna 1230 Alpha at JAILS intersection.”

“Cessna 1230 Alpha Atlanta Center.”

“Atlanta Center, Cessna 1230 Alpha at JAILS intersection, 5,000, estimating Monroeville at 1730.”

## Additional Reports

In addition to required position reports, the following reports should be made to ATC without a specific request.

1. At all times:

- a) When vacating any previously assigned altitude or flight level for a newly assigned altitude or flight level
- b) When an altitude change will be made if operating on a clearance specifying VFR-on-top
- c) When unable to climb/descend at a rate of at least 500 feet per minute (fpm)
- d) When an approach has been missed (Request clearance for specific action (to alternative airport, another approach, etc.))
- e) Change in average true airspeed (at cruising altitude) when it varies by 5 percent or ten knots (whichever is greater) from that filed in the flight plan
- f) The time and altitude upon reaching a holding fix or point to which cleared
- g) When leaving any assigned holding fix or point  
NOTE - The reports in (f) and (g) may be omitted by pilots of aircraft involved in instrument training at military terminal area facilities when radar service is being provided.
- h) Any loss in controlled airspace of VOR, TACAN, ADF, low frequency navigation receiver capability, GPS anomalies while using installed IFR-certified GPS/GNSS receivers, complete or partial loss of ILS receiver capability, or impairment of air/ground communications capability. Reports should include aircraft identification, equipment affected, degree to which the capability to operate under IFR in the ATC system is impaired, and the nature and extent of assistance desired from ATC.
- i) Any information relating to the safety of flight.

2. When not in radar contact:

- a) When leaving the final approach fix inbound on final approach (nonprecision approach), or when leaving the outer marker or fix used in lieu of the outer marker inbound on final approach (precision approach).
- b) A corrected estimate at any time it becomes apparent that an estimate as previously submitted is in error in excess of 3 minutes.

Any pilot who encounters weather conditions that have not been forecast, or hazardous conditions which have been forecast, is expected to forward a report of such weather to ATC.

## Planning the Descent and Approach

ATC arrival procedures and flight deck workload are affected by weather conditions, traffic density, aircraft equipment, and radar availability.

When landing at an airport with approach control services and where two or more IAPs are published, information on the type of approach to expect will be provided in advance of arrival or vectors will be provided to a visual approach. This information will be broadcast either on automated terminal information service (ATIS) or by a controller. It will not be furnished when the visibility is 3 miles or more and the ceiling is at or above the highest initial approach altitude established for any low altitude IAP for the airport.

The purpose of this information is to help the pilot plan arrival actions; however, it is not an ATC clearance or commitment and is subject to change. Fluctuating weather, shifting winds, blocked runway, etc., are conditions that may result in changes to the approach information previously received. It is important for a pilot to advise ATC immediately if he or she is unable to execute the approach or prefers another type of approach.

If the destination is an airport without an operating control tower, and has automated weather data with broadcast capability, the pilot should monitor the automated surface observing system/automated weather observing system (ASOS/AWOS) frequency to ascertain the current weather for the airport. ATC should be advised that weather information has been received and what the pilot's intentions are.

When the approach to be executed has been determined, the pilot should plan for and request a descent to the appropriate altitude prior to the initial approach fix (IAF) or transition route depicted on the IAP. When flying the transition route, a pilot should maintain the last assigned altitude until ATC gives the instructions "cleared for the approach." Lower altitudes can be requested to bring the transition route altitude closer to the required altitude at the initial approach fix. When ATC uses the phrase "at pilot's discretion" in the altitude information of a clearance, the pilot has the option to start a descent at any rate, and may level off temporarily at any intermediate altitude. However, once an altitude has been vacated, return to that altitude is not authorized without a clearance. When ATC has not used the term "at pilot's discretion" nor imposed any descent restrictions, initiate descent promptly upon acknowledgment of the clearance.

Descend at an optimum rate (consistent with the operating characteristics of the aircraft) to 1,000 feet above the assigned altitude. Then attempt to descend at a rate of between 500 and



1,500 fpm until the assigned altitude is reached. If at anytime a pilot is unable to maintain a descent rate of at least 500 fpm, advise ATC. Also advise ATC if it is necessary to level off at an intermediate altitude during descent. An exception to this is when leveling off at 10,000 feet mean sea level (MSL) on descent, or 2,500 feet above airport elevation (prior to entering a Class B, Class C, or Class D surface area) when required for speed reduction.

### Standard Terminal Arrival Routes (STARs)

Standard terminal arrival routes (as described in Chapter 8) have been established to simplify clearance delivery procedures for arriving aircraft at certain areas having high density traffic. A STAR serves a purpose parallel to that of a DP for departing traffic. [Figure 10-3] The following points regarding STARs are important to remember:

1. All STARs are contained in the TPP, along with the IAP charts for the destination airport. The AIM also describes STAR procedures.
2. If the destination is a location for which STARs have been published, a pilot may be issued a clearance containing a STAR whenever ATC deems it appropriate. To accept the clearance, a pilot must possess at least the approved textual description.
3. It is the pilot's responsibility to either accept or refuse an issued STAR. If a STAR will not or cannot be used, advise ATC by placing "NO STAR" in the remarks section of the filed flight plan or by advising ATC.
4. If a STAR is accepted in a clearance, compliance is mandatory.

### Substitutes for Inoperative or Unusable Components

The basic ground components of an ILS are the localizer, glide slope, outer marker, middle marker, and inner marker (when installed). A compass locator or precision radar may be substituted for the outer or middle marker. Distance measuring equipment (DME), VOR, or nondirectional beacon (NDB) fixes authorized in the standard IAP or surveillance radar may be substituted for the outer marker.

Additionally, IFR-certified global positioning system (GPS) equipment, operated in accordance with Advisory Circular (AC) 90-94, Guidelines for Using Global Positioning System Equipment for IFR En Route and Terminal Operations and for Nonprecision Instrument Approaches in the United States National Airspace System, may be substituted for ADF and DME equipment, except when flying NDB IAP. Specifically, GPS can be substituted for ADF and DME equipment when:

1. Flying a DME arc;

2. Navigating TO/FROM an NDB;
3. Determining the aircraft position over an NDB;
4. Determining the aircraft position over a fix made up of a crossing NDB bearing;
5. Holding over an NDB;
6. Determining aircraft position over a DME fix.

## Holding Procedures

Depending upon traffic and weather conditions, holding may be required. Holding is a predetermined maneuver which keeps aircraft within a specified airspace while awaiting further clearance from ATC. A standard holding pattern uses right turns, and a nonstandard holding pattern uses left turns. The ATC clearance will always specify left turns when a nonstandard pattern is to be flown.

### Standard Holding Pattern (No Wind)

In a standard holding pattern with no winds, [Figure 10-4] the aircraft follows the specified course inbound to the holding fix, turns 180° to the right, flies a parallel straight course outbound for 1 minute, turns 180° to the right, and flies the inbound course to the fix.

### Standard Holding Pattern (With Wind)

A standard symmetrical holding pattern cannot be flown when winds exist. In those situations, the pilot is expected to:

1. Compensate for the effect of a known wind except when turning.
2. Adjust outbound timing to achieve a 1-minute (1-1/2 minutes above 14,000 feet) inbound leg.

Figure 10-5 illustrates the holding track followed with a left crosswind. The effect of wind is counteracted by applying drift corrections to the inbound and outbound legs and by applying time allowances to the outbound leg.

### Holding Instructions

If an aircraft arrives at a clearance limit before receiving clearance beyond the fix, ATC expects the pilot to maintain the last assigned altitude and begin holding in accordance with the charted holding pattern. If no holding pattern is charted and holding instructions have not been issued, enter a standard holding pattern on the course on which the aircraft approached the fix and request further clearance as soon as possible. Normally, when no delay is anticipated, ATC will issue holding instructions at least 5 minutes before the

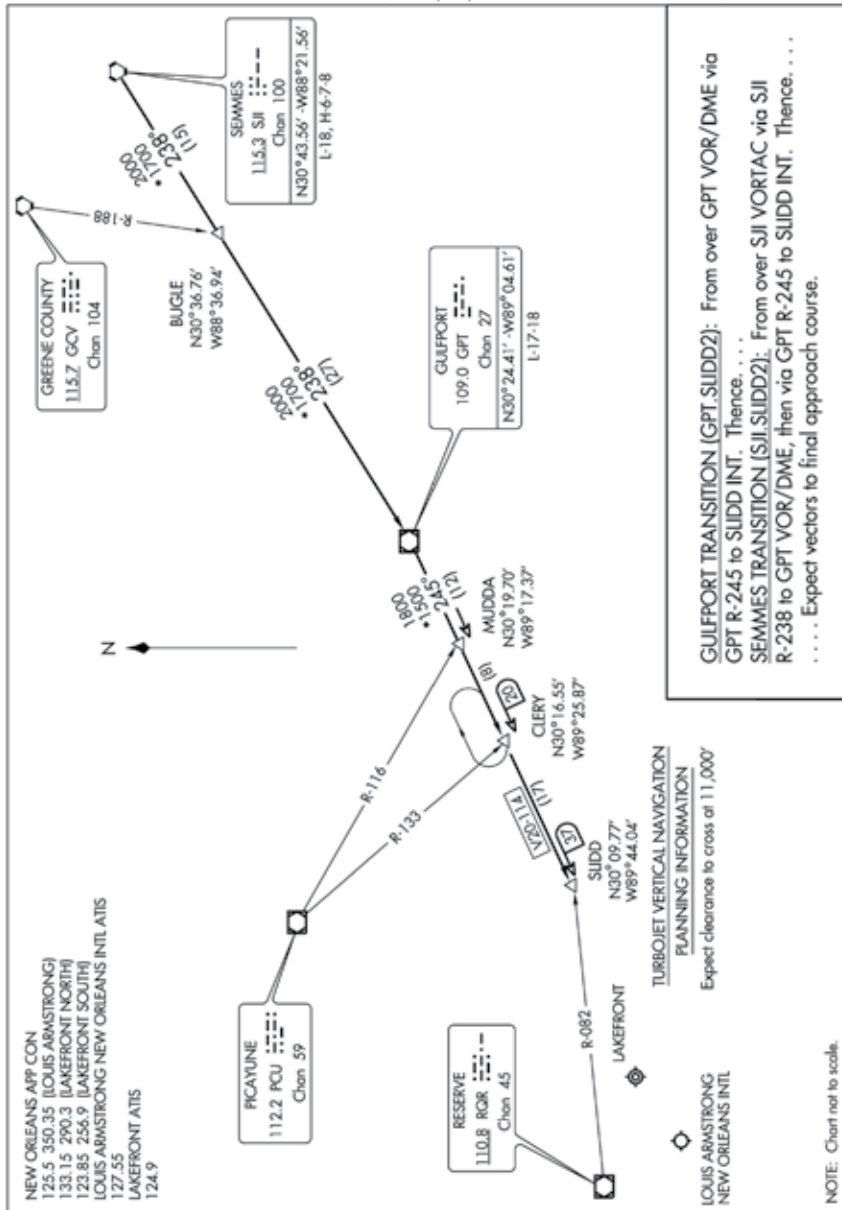
(SLIDD.SLIDD2) 06271

### SLIDD TWO ARRIVAL

ST-609 (FAA)

NEW ORLEANS, LOUISIANA

SC-4, 26 OCT 2006 to 23 NOV 2006



**GULFPORT TRANSITION [GPT.SLIDD2]:** From over GPT VOR/DME via GPT R-245 to SLIDD INT. Thence, . . .

**SEMMES TRANSITION [SJI.SLIDD2]:** From over SJI VORTAC via SJI R-238 to GPT VOR/DME, then via GPT R-245 to SLIDD INT. Thence, . . .

. . . . Expect vectors to final approach course.

SC-4, 26 OCT 2006 to 23 NOV 2006

### SLIDD TWO ARRIVAL

(SLIDD.SLIDD2) 06271

NEW ORLEANS, LOUISIANA

Figure 10-3. Standard Terminal Arrival Route (STAR).

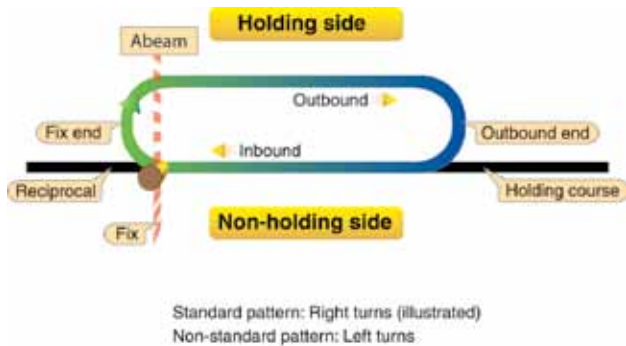


Figure 10-4. Standard Holding Pattern—No Wind.

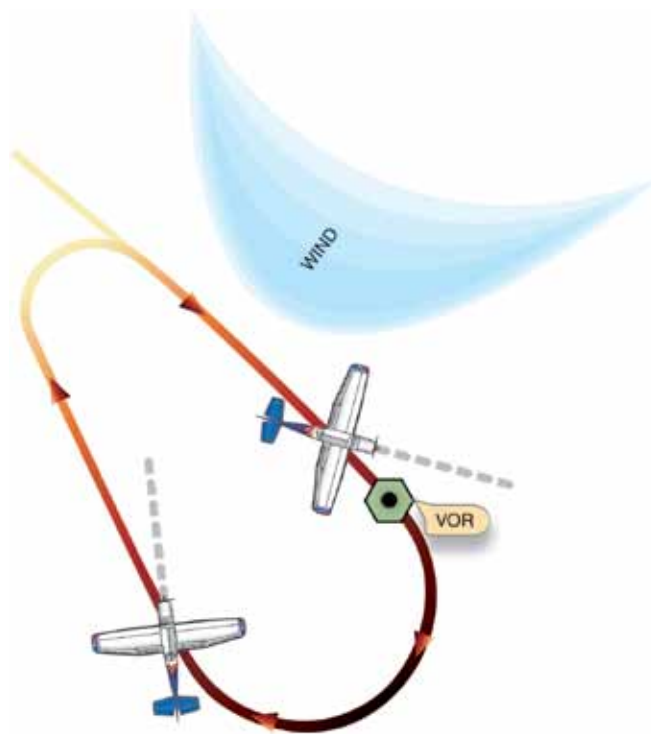


Figure 10-5. Drift Correction in Holding Pattern.

estimated arrival at the fix. Where a holding pattern is not charted, the ATC clearance will specify the following:

1. Direction of holding from the fix in terms of the eight cardinal compass points (N, NE, E, SE, etc.)
2. Holding fix (the fix may be omitted if included at the beginning of the transmission as the clearance limit)
3. Radial, course, bearing, airway, or route on which the aircraft is to hold.
4. Leg length in miles if DME or area navigation (RNAV) is to be used (leg length will be specified in minutes on pilot request or if the controller considers it necessary).

5. Direction of turn, if left turns are to be made, because the pilot requests or the controller considers it necessary.
6. Time to expect-further-clearance (EFC) and any pertinent additional delay information.

ATC instructions will also be issued whenever:

1. It is determined that a delay will exceed 1 hour.
2. A revised EFC is necessary.
3. In a terminal area having a number of navigation aids and approach procedures, a clearance limit may not indicate clearly which approach procedures will be used. On initial contact, or as soon as possible thereafter, approach control will advise the pilot of the type of approach to expect.
4. Ceiling and/or visibility is reported as being at or below the highest “circling minimums” established for the airport concerned. ATC will transmit a report of current weather conditions and subsequent changes, as necessary.
5. An aircraft is holding while awaiting approach clearance, and the pilot advises ATC that reported weather conditions are below minimums applicable to the operation. In this event, ATC will issue suitable instructions to aircraft desiring either to continue holding while awaiting weather improvement or proceed to another airport.

### Standard Entry Procedures

The entry procedures given in the AIM evolved from extensive experimentation under a wide range of operational conditions. The standardized procedures should be followed to ensure that an aircraft remains within the boundaries of the prescribed holding airspace.

When a speed reduction is required, start the reduction when 3 minutes or less from the holding fix. Cross the holding fix initially at or below the maximum holding airspeed (MHA). The purpose of the speed reduction is to prevent overshooting the holding airspace limits, especially at locations where adjacent holding patterns are close together.

All aircraft may hold at the following altitudes and maximum holding airspeeds:

Altitude Mean Sea Level (MSL)	Airspeed (KIAS)
Up to 6,000 feet	200
6,001 – 14,000 feet	230
14,001 feet and above	265

The following are exceptions to the maximum holding airspeeds:

1. Holding patterns from 6,001 to 14,000 feet may be restricted to a maximum airspeed of 210 knots indicated airspeed (KIAS). This nonstandard pattern is depicted by an icon.
2. Holding patterns may be restricted to a maximum airspeed of 175 KIAS. This nonstandard pattern is depicted by an icon. Holding patterns restricted to 175 KIAS are generally found on IAPs applicable to category A and B aircraft only.
3. Holding patterns at Air Force airfields only—310 KIAS maximum, unless otherwise depicted.
4. Holding patterns at Navy airfields only—230 KIAS maximum, unless otherwise depicted.
5. The pilot of an aircraft unable to comply with maximum airspeed restrictions should notify ATC.

While other entry procedures may enable the aircraft to enter the holding pattern and remain within protected airspace, the parallel, teardrop, and direct entries are the procedures for entry and holding recommended by the FAA. Additionally, paragraph 5-3-7 in the AIM should be reviewed. [Figure 10-6]

1. Parallel Procedure. When approaching the holding fix from anywhere in sector (a), fly to the fix. Afterwards, turn to a heading to parallel the holding course outbound. Fly outbound for 1 minute, turn in the direction of the holding pattern through more than 180°, and return to the holding fix or intercept the holding course inbound.
2. Teardrop Procedure. When approaching the holding fix from anywhere in sector (b), the teardrop entry procedure would be to fly to the fix, turn outbound to a heading for a 30° teardrop entry within the pattern

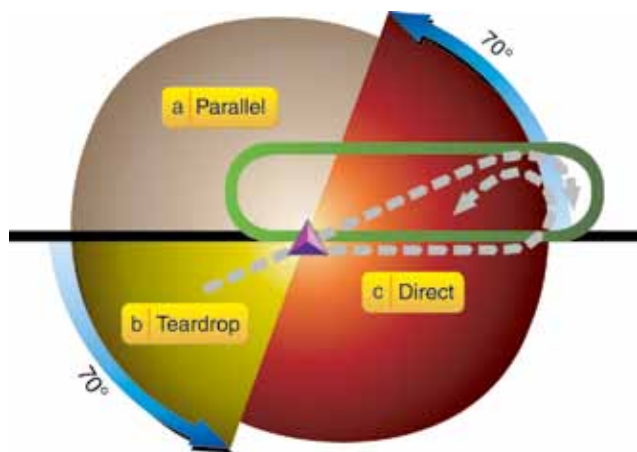


Figure 10-6. Holding Pattern Entry Procedures.

(on the holding side) for a period of 1 minute, then turn in the direction of the holding pattern to intercept the inbound holding course.

3. Direct Entry Procedure. When approaching the holding fix from anywhere in sector (c), the direct entry procedure would be to fly directly to the fix and turn to follow the holding pattern.

A pilot should make all turns during entry and while holding at:

1. 3° per second, or
2. 30° bank angle, or
3. A bank angle provided by a flight director system.

### Time Factors

The holding pattern entry time reported to ATC is the initial time of arrival over the fix. Upon entering a holding pattern, the initial outbound leg is flown for 1 minute at or below 14,000 feet MSL, and for 1-1/2 minutes above 14,000 feet MSL. Timing for subsequent outbound legs should be adjusted as necessary to achieve proper inbound leg time. The pilot should begin outbound timing over or abeam the fix, whichever occurs later. If the abeam position cannot be determined, start timing when the turn to outbound is completed. [Figure 10-7]

Time leaving the holding fix must be known to ATC before succeeding aircraft can be cleared to the vacated airspace. Leave the holding fix:

1. When ATC issues either further clearance en route or approach clearance;
2. As prescribed in 14 CFR part 91 (for IFR operations; two-way radio communications failure, and responsibility and authority of the pilot-in-command); or
3. After the IFR flight plan has been cancelled, if the aircraft is holding in VFR conditions.

### DME Holding

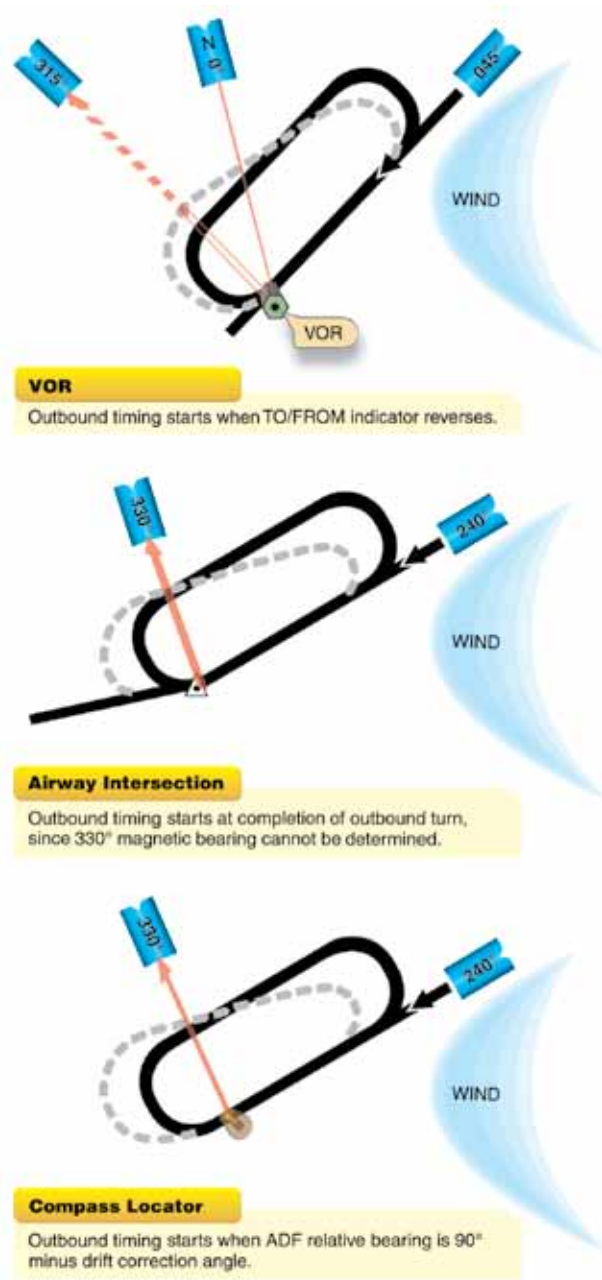
The same entry and holding procedures apply to DME holding, but distances (nautical miles) are used instead of time values. The length of the outbound leg will be specified by the controller, and the end of this leg is determined by the DME readout.

### Approaches

#### Compliance With Published Standard Instrument Approach Procedures

Compliance with the approach procedures shown on the approach charts provides necessary navigation guidance information for alignment with the final approach courses,





**Figure 10-7.** Holding—Outbound Timing.

as well as obstruction clearance. Under certain conditions, a course reversal maneuver or procedure turn may be necessary. However, this procedure is not authorized when:

1. The symbol “NoPT” appears on the approach course on the plan view of the approach chart.
2. Radar vectoring is provided to the final approach course.
3. A holding pattern is published in lieu of a procedure turn.
4. Executing a timed approach from a holding fix.

5. Otherwise directed by ATC.

### Instrument Approaches to Civil Airports

Unless otherwise authorized, when an instrument letdown to an airport is necessary, the pilot should use a standard IAP prescribed for that airport. IAPs are depicted on IAP charts and are found in the TPP.

ATC approach procedures depend upon the facilities available at the terminal area, the type of instrument approach executed, and the existing weather conditions. The ATC facilities, navigation aids (NAVAIDs), and associated frequencies appropriate to each standard instrument approach are given on the approach chart. Individual charts are published for standard approach procedures associated with the following types of facilities:

1. Nondirectional beacon (NDB)
2. Very-high frequency omnirange (VOR)
3. Very-high frequency omnirange with distance measuring equipment (VORTAC or VOR/DME)
4. Localizer (LOC)
5. Instrument landing system (ILS)
6. Localizer-type directional aid (LDA)
7. Simplified directional facility (SDF)
8. Area navigation (RNAV)
9. Global positioning system (GPS)

An IAP can be flown in one of two ways: as a full approach or with the assistance of radar vectors. When the IAP is flown as a full approach, pilots conduct their own navigation using the routes and altitudes depicted on the instrument approach chart. A full approach allows the pilot to transition from the en route phase, to the instrument approach, and then to a landing with minimal assistance from ATC. This type of procedure may be requested by the pilot but is most often used in areas without radar coverage. A full approach also provides the pilot with a means of completing an instrument approach in the event of a communications failure.

When an approach is flown with the assistance of radar vectors, ATC provides guidance in the form of headings and altitudes which position the aircraft to intercept the final approach. From this point, the pilot resumes navigation, intercepts the final approach course, and completes the approach using the IAP chart. This is often a more expedient method of flying the approach, as opposed to the full approach, and allows ATC to sequence arriving traffic. A pilot operating in radar contact can generally expect the assistance of radar vectors to the final approach course.

### ***Approach to Airport Without an Operating Control Tower***

Figure 10-8 shows an approach procedure at an airport without an operating control tower. When approaching such a facility, the pilot should monitor the AWOS/ASOS if available for the latest weather conditions. When direct communication between the pilot and controller is no longer required, the ARTCC or approach controller will issue a clearance for an instrument approach and advise “change to advisory frequency approved.” When the aircraft arrives on a “cruise” clearance, ATC will not issue further clearance for approach and landing.

If an approach clearance is required, ATC will authorize the pilot to execute his or her choice of standard instrument approach (if more than one is published for the airport) with the phrase “Cleared for the approach” and the communications frequency change required, if any. From this point on, there will be no contact with ATC. The pilot is responsible for closing the IFR flight plan before landing, if in VFR conditions, or by telephone after landing.

Unless otherwise authorized by ATC, a pilot is expected to execute the complete IAP shown on the chart.

### ***Approach to Airport With an Operating Tower, With No Approach Control***

When an aircraft approaches an airport with an operating control tower, but no approach control, ATC will issue a clearance to an approach/outer fix with the appropriate information and instructions as follows:

1. Name of the fix
2. Altitude to be maintained
3. Holding information and expected approach clearance time, if appropriate
4. Instructions regarding further communications, including:
  - a) facility to be contacted
  - b) time and place of contact
  - c) frequency/ies to be used

If ATIS is available, a pilot should monitor that frequency for information such as ceiling, visibility, wind direction and velocity, altimeter setting, instrument approach, and runways in use prior to initial radio contact with the tower. If ATIS is not available, ATC will provide weather information from the nearest reporting station.

### ***Approach to an Airport With an Operating Tower, With an Approach Control***

Where radar is approved for approach control service, it is used to provide vectors in conjunction with published IAPs. Radar vectors can provide course guidance and expedite traffic to the final approach course of any established IAP. Figure 10-9 shows an IAP chart with maximum ATC facilities available.

Approach control facilities that provide this radar service operate in the following manner:

1. Arriving aircraft are either cleared to an outer fix most appropriate to the route being flown with vertical separation and, if required, given holding information; or,
2. When radar hand-offs are effected between ARTCC and approach control, or between two approach control facilities, aircraft are cleared to the airport, or to a fix so located that the hand-off will be completed prior to the time the aircraft reaches the fix.
  - a) When the radar hand-offs are utilized, successive arriving flights may be handed off to approach control with radar separation in lieu of vertical separation.
  - b) After hand-off to approach control, an aircraft is vectored to the appropriate final approach course.
3. Radar vectors and altitude/flight levels are issued as required for spacing and separating aircraft; do not deviate from the headings issued by approach control.
4. Aircraft are normally informed when it becomes necessary to be vectored across the final approach course for spacing or other reasons. If approach course crossing is imminent and the pilot has not been informed that the aircraft will be vectored across the final approach course, the pilot should query the controller. The pilot is not expected to turn inbound on the final approach course unless an approach clearance has been issued. This clearance is normally issued with the final vector for interception of the final approach course, and the vector enables the pilot to establish the aircraft on the final approach course prior to reaching the final approach fix.
5. Once the aircraft is established inbound on the final approach course, radar separation is maintained with other aircraft, and the pilot is expected to complete the approach using the NAVAID designated in the clearance (ILS, VOR, NDB, GPS, etc.) as the primary means of navigation.

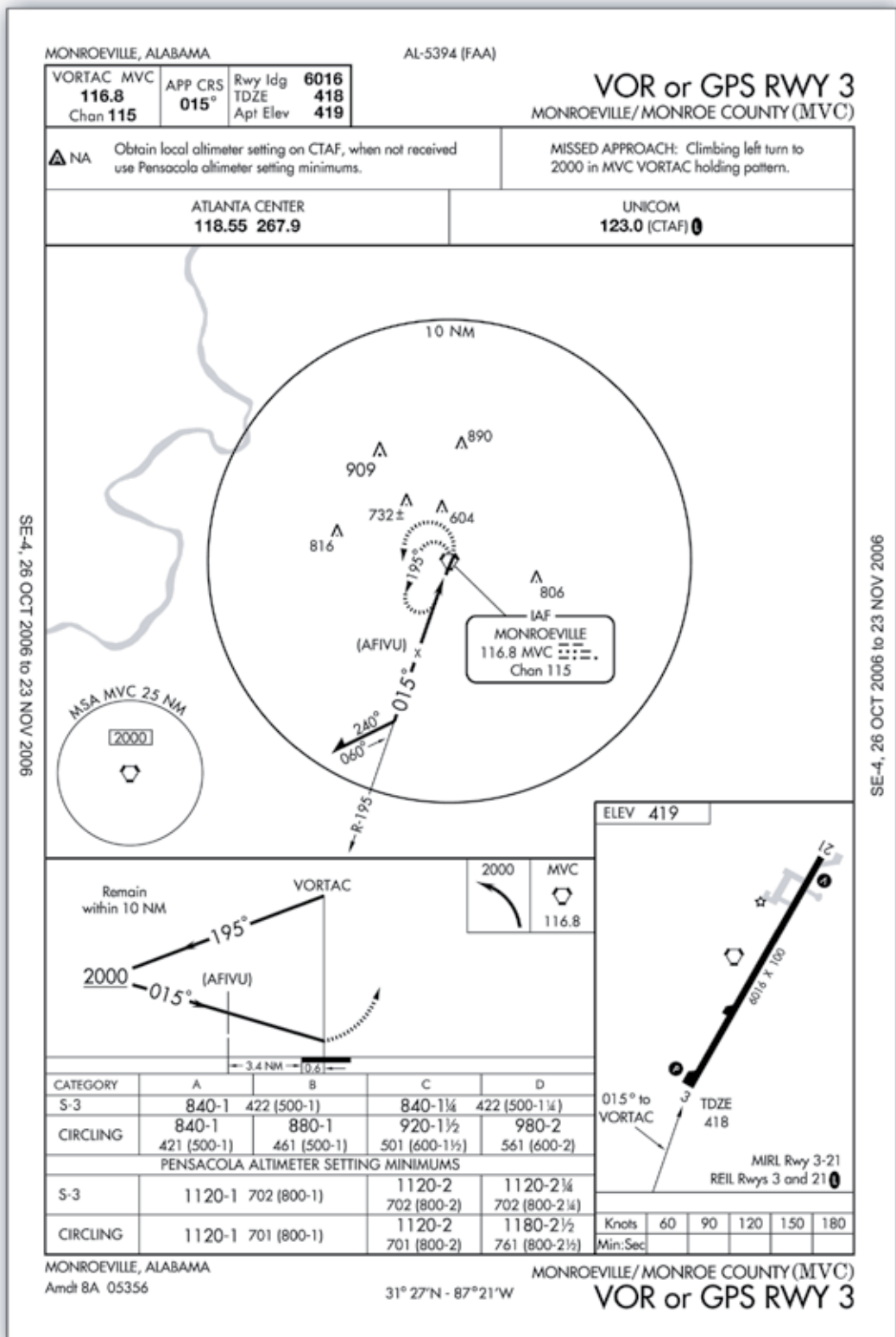


Figure 10-8. Monroeville, AL (MVC) VOR or GPS Rwy 3 Approach: An Approach Procedure at an Airport Without an Operating Control Tower.

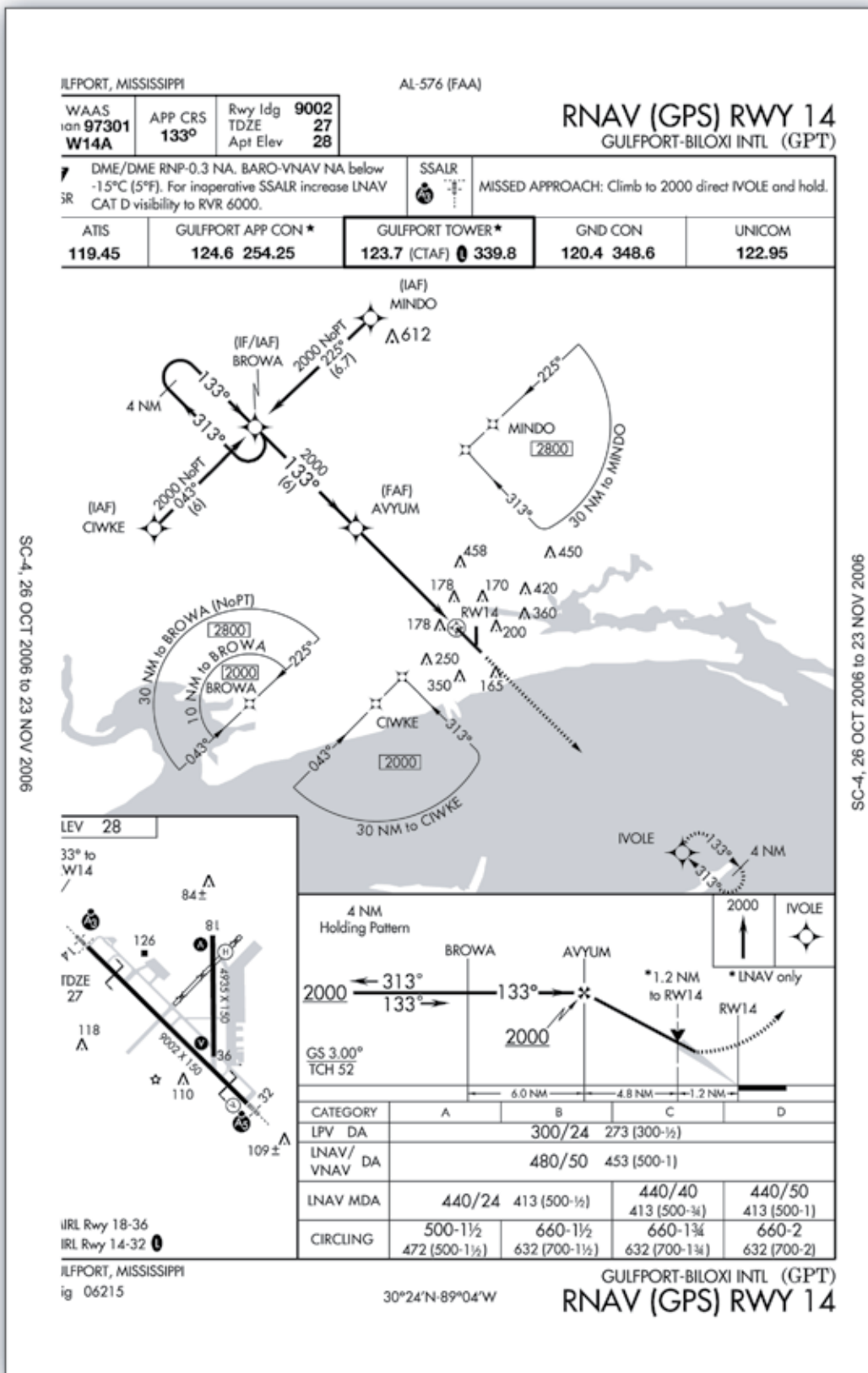


Figure 10-9. Gulfport, MS (GPT) ILS or LOC Rwy 14 Approach: An Instrument Procedure Chart With Maximum ATC Facilities Available.



6. After passing the final approach fix inbound, the pilot is expected to proceed direct to the airport and complete the approach, or to execute the published missed approach procedure.
7. Radar service is automatically terminated when the landing is completed or when the pilot is instructed to change to advisory frequency at uncontrolled airports, whichever occurs first.

### Radar Approaches

With a radar approach, the pilot receives course and altitude guidance from a controller who monitors the progress of the flight with radar. This is an option should the pilot experience an emergency or distress situation.

The only airborne radio equipment required for radar approaches is a functioning radio transmitter and receiver. The radar controller vectors the aircraft to align it with the runway centerline. The controller continues the vectors to keep the aircraft on course until the pilot can complete the approach and landing by visual reference to the surface. There are two types of radar approaches: Precision (PAR) and Surveillance (ASR).

A radar approach may be given to any aircraft upon request and may be offered to pilots of aircraft in distress or to expedite traffic; however, an ASR might not be approved unless there is an ATC operational requirement, or in an unusual or emergency situation. Acceptance of a PAR or ASR by a pilot does not waive the prescribed weather minimums for the airport or for the particular aircraft operator concerned. The

decision to make a radar approach when the reported weather is below the established minimums rests with the pilot.

PAR and ASR minimums are published on separate pages in the FAA Terminal Procedures Publication (TPP). *Figure 10-10.*

Precision Approach (PAR) is one in which a controller provides highly accurate navigational guidance in azimuth and elevation to a pilot.

The controller gives the pilot headings to fly that direct the aircraft to, and keep the aircraft aligned with, the extended centerline of the landing runway. The pilot is told to anticipate glide path interception approximately 10 to 30 seconds before it occurs and when to start descent. The published decision height (DH) will be given only if the pilot requests it. If the aircraft is observed to deviate above or below the glide path, the pilot is given the relative amount of deviation by use of terms “slightly” or “well” and is expected to adjust the aircraft’s rate of descent/ascent to return to the glide path. Trend information is also issued with respect to the elevation of the aircraft and may be modified by the terms “rapidly” and “slowly”; e.g., “well above glide path, coming down rapidly.”

Range from touchdown is given at least once each mile. If an aircraft is observed by the controller to proceed outside of specified safety zone limits in azimuth and/or elevation and continue to operate outside these prescribed limits, the pilot will be directed to execute a missed approach or to fly a

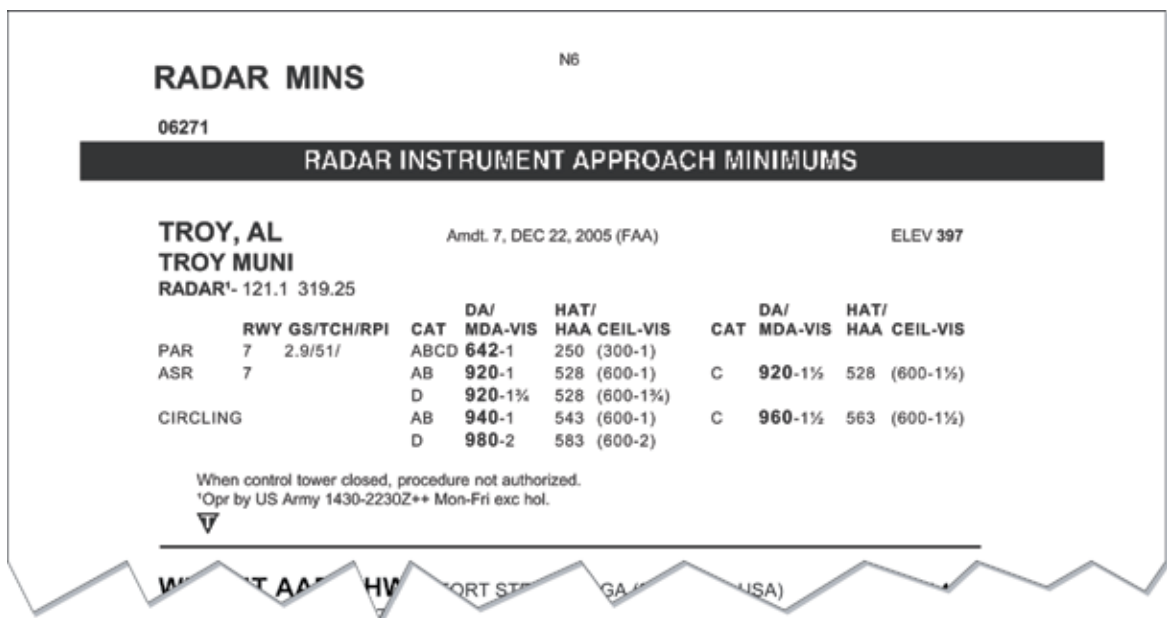


Figure 10-10. Radar Instrument Approach Minimums for Troy, AL.

specified course unless the pilot has the runway environment (runway, approach lights, etc.) in sight. Navigational guidance in azimuth and elevation is provided to the pilot until the aircraft reaches the published DH. Advisory course and glide path information is furnished by the controller until the aircraft passes over the landing threshold. At this point the pilot is advised of any deviation from the runway centerline. Radar service is automatically terminated upon completion of the approach.

Surveillance Approach (ASR) is one in which a controller provides navigational guidance in azimuth only.

The controller furnishes the pilot with headings to fly to align the aircraft with the extended centerline of the landing runway. Since the radar information used for a surveillance approach is considerably less precise than that used for a precision approach, the accuracy of the approach will not be as great and higher minimums will apply. Guidance in elevation is not possible but the pilot will be advised when to commence descent to the Minimum Descent Altitude (MDA) or, if appropriate, to an intermediate step-down fix Minimum Crossing Altitude and subsequently to the prescribed MDA. In addition, the pilot will be advised of the location of the Missed Approach Point (MAP) prescribed for the procedure and the aircraft's position each mile on final from the runway, airport or heliport or MAP, as appropriate.

If requested by the pilot, recommended altitudes will be issued at each mile, based on the descent gradient established for the procedure, down to the last mile that is at or above the MDA. Normally, navigational guidance will be provided until the aircraft reaches the MAP.

Radar service is automatically terminated at the completion of a radar approach.

No-Gyro Approach is available to a pilot under radar control who experiences circumstances wherein the directional gyro or other stabilized compass is inoperative or inaccurate. When this occurs, the pilot should so advise ATC and request a no-gyro vector or approach. The pilot of an aircraft not equipped with a directional gyro or other stabilized compass who desires radar handling may also request a no-gyro vector or approach. The pilot should make all turns at standard rate and should execute the turn immediately upon receipt of instructions. For example, "TURN RIGHT," "STOP TURN." When a surveillance or precision approach is made, the pilot will be advised after the aircraft has been turned onto final approach to make turns at half standard rate.

## **Radar Monitoring of Instrument Approaches**

PAR facilities operated by the FAA and the military services at some joint-use (civil and military) and military installations monitor aircraft on instrument approaches and issue radar advisories to the pilot when weather is below VFR minimums (1,000 and 3), at night, or when requested by a pilot. This service is provided only when the PAR Final Approach Course coincides with the final approach of the navigational aid and only during the operational hours of the PAR. The radar advisories serve only as a secondary aid since the pilot has selected the navigational aid as the primary aid for the approach.

Prior to starting final approach, the pilot will be advised of the frequency on which the advisories will be transmitted. If, for any reason, radar advisories cannot be furnished, the pilot will be so advised.

Advisory information, derived from radar observations, includes information on:

1. Passing the final approach fix inbound (nonprecision approach) or passing the outer marker or fix used in lieu of the outer marker inbound (precision approach).
2. Trend advisories with respect to elevation and/or azimuth radar position and movement will be provided.
3. If, after repeated advisories, the aircraft proceeds outside the PAR safety limit or if a radical deviation is observed, the pilot will be advised to execute a missed approach unless the prescribed visual reference with the surface is established.

Radar service is automatically terminated upon completion of the approach. *[Figure 10-11]*

## **Timed Approaches From a Holding Fix**

Timed approaches from a holding fix are conducted when many aircraft are waiting for an approach clearance. Although the controller will not specifically state "timed approaches are in progress," the assigning of a time to depart the FAF inbound (nonprecision approach), or the outer marker or fix used in lieu of the outer marker inbound (precision approach), indicates that timed approach procedures are being utilized.

TROY, ALABAMA

AL-5720 (FAA)

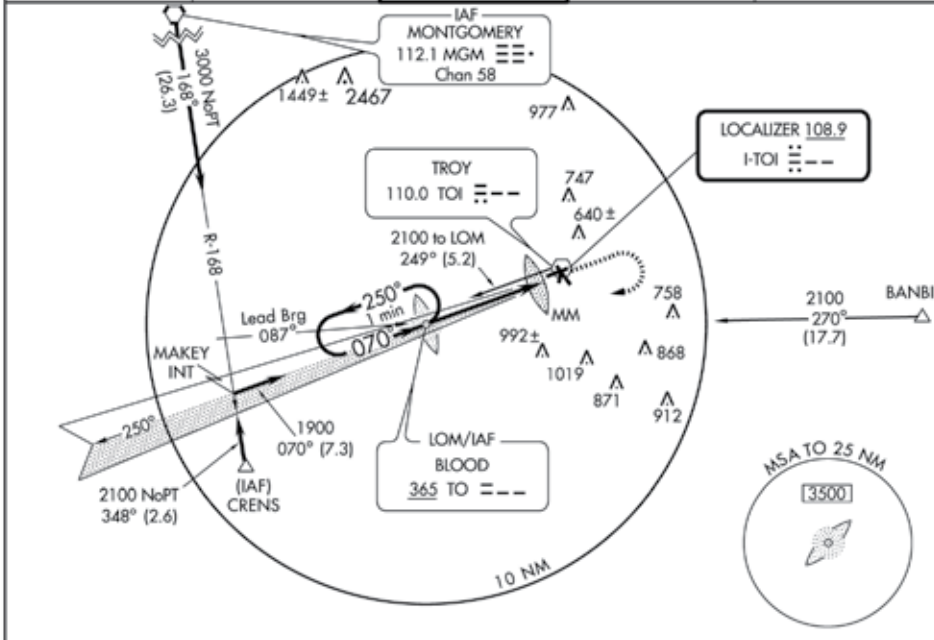
**ILS RWY 7**  
TROY MUNI (TOI)

LOC I-TOI <b>108.9</b>	APP CRS <b>070°</b>	Rwy Idg <b>5009</b>
		TDZE <b>392</b>
		Apt Elev <b>397</b>

When local altimeter setting not received use Montgomery altimeter setting.  
ASR/PAR ADF REQUIRED

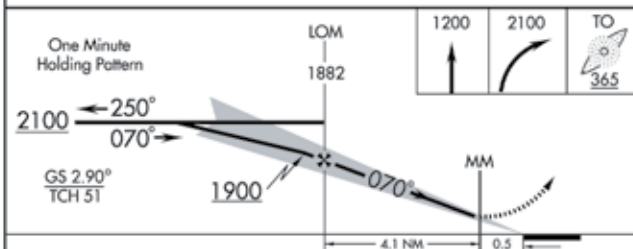
MISSED APPROACH: Climb to 1200 then climbing right turn to 2100 direct BLOOD LOM and hold.

ATIS <b>120.925</b>	CAIRNS APP CON* <b>121.1 319.25</b>	TROY TOWER <b>124.3 306.9</b>	GND CON <b>121.9 263.125</b>	UNICOM <b>122.8 (CTAF) 0</b>
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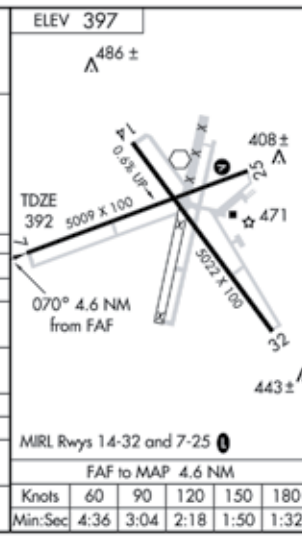


SE-4, 23 NOV 2006 to 21 DEC 2006

SE-4, 23 NOV 2006 to 21 DEC 2006



CATEGORY	A	B	C	D
S-ILS 7		642-3/4	250 (300-3/4)	
S-LOC 7	880-1	488 (500-1)	880-1 1/4 488 (500-1 1/4)	880-1 1/2 488 (500-1 1/2)
CIRCLING	940-1	543 (600-1)	960-1 1/2 563 (600-1 1/2)	980-2 583 (600-2)
MONTGOMERY ALTIMETER SETTING MINIMUMS				
S-ILS 7		781-1 1/2	389 (400-1 1/2)	
S-LOC 7	1020-1	628 (700-1)	1020-1 3/4 628 (700-1 3/4)	1020-2 628 (700-2)
CIRCLING	1080-1	683 (700-1)	1100-2 703 (800-2)	1120-2 1/4 723 (800-2 1/4)



TROY, ALABAMA  
Amdt 7B 06159

31° 52'N-86° 01'W

TROY MUNI (TOI)  
**ILS RWY 7**

MIRL Rwy's 14-32 and 7-25 0					
FAF to MAP 4.6 NM					
Knots	60	90	120	150	180
Min:Sec	4:36	3:04	2:18	1:50	1:32

Figure 10-11. ILS RWY 7 Troy, AL.

In lieu of holding, the controller may use radar vectors to the final approach course to establish a distance between aircraft that will ensure the appropriate time sequence between the FAF and outer marker, or fix used in lieu of the outer marker and the airport. Each pilot in the approach sequence will be given advance notice of the time they should leave the holding point on approach to the airport. When a time to leave the holding point is received, the pilot should adjust the flight path in order to leave the fix as closely as possible to the designated time.

Timed approaches may be conducted when the following conditions are met:

1. A control tower is in operation at the airport where the approaches are conducted.
2. Direct communications are maintained between the pilot and the Center or approach controller until the pilot is instructed to contact the tower.
3. If more than one missed approach procedure is available, none require a course reversal.
4. If only one missed approach procedure is available, the following conditions are met:
  - a) Course reversal is not required; and
  - b) Reported ceiling and visibility are equal to or greater than the highest prescribed circling minimums for the IAP.
5. When cleared for the approach, pilots should not execute a procedure turn.

### **Approaches to Parallel Runways**

Procedures permit ILS instrument approach operations to dual or triple parallel runway configurations. A parallel approach is an ATC procedure that permits parallel ILS approach to airports with parallel runways separated by at least 2,500 feet between centerlines. Wherever parallel approaches are in progress, pilots are informed that approaches to both runways are in use.

Simultaneous approaches are permitted to runways:

1. With centerlines separated by 4,300 to 9,000 feet;
2. That are equipped with final monitor controllers;
3. That require radar monitoring to ensure separation between aircraft on the adjacent parallel approach course.

The approach procedure chart will include the note “simultaneous approaches authorized RWYS 14L and 14R,” identifying the appropriate runways. When advised that simultaneous parallel approaches are in progress, pilots must

advise approach control immediately of malfunctioning or inoperative components.

Parallel approach operations demand heightened pilot situational awareness. The close proximity of adjacent aircraft conducting simultaneous parallel approaches mandates strict compliance with all ATC clearances and approach procedures. Pilots should pay particular attention to the following approach chart information: name and number of the approach, localizer frequency, inbound course, glide slope intercept altitude, DA/DH, missed approach instructions, special notes/procedures, and the assigned runway location and proximity to adjacent runways. Pilots also need to exercise strict radio discipline, which includes continuous monitoring of communications and the avoidance of lengthy, unnecessary radio transmissions.

### **Side-Step Maneuver**

ATC may authorize a side-step maneuver to either one of two parallel runways that are separated by 1,200 feet or less, followed by a straight-in landing on the adjacent runway. Aircraft executing a side-step maneuver will be cleared for a specified nonprecision approach and landing on the adjacent parallel runway. For example, “Cleared ILS runway 7 left approach, side-step to runway 7 right.” The pilot is expected to commence the side-step maneuver as soon as possible after the runway or runway environment is in sight. Landing minimums to the adjacent runway will be based on nonprecision criteria and therefore higher than the precision minimums to the primary runway, but will normally be lower than the published circling minimums.

### **Circling Approaches**

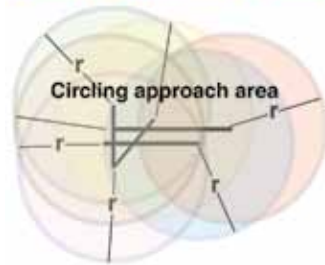
Landing minimums listed on the approach chart under “CIRCLING” apply when it is necessary to circle the airport, maneuver for landing, or when no straight-in minimums are specified on the approach chart. *[Figure 10-11]*

The circling minimums published on the instrument approach chart provide a minimum of 300 feet of obstacle clearance in the circling area. *[Figure 10-12]* During a circling approach, the pilot should maintain visual contact with the runway of intended landing and fly no lower than the circling minimums until positioned to make a final descent for a landing. It is important to remember that circling minimums are only minimums. If the ceiling allows it, fly at an altitude that more nearly approximates VFR traffic pattern altitude. This will make any maneuvering safer and bring the view of the landing runway into a more normal perspective.

*Figure 10-13* shows patterns that can be used for circling approaches. Pattern “A” can be flown when the final approach



Approach Category	Radius(miles)
Class A	1.3
Class B	1.5
Class C	1.7
Class D	2.3
Class E	4.5



Defining size of areas, radii (r) vary with the approach category

Figure 10-12. Circling Approach Area Radii.

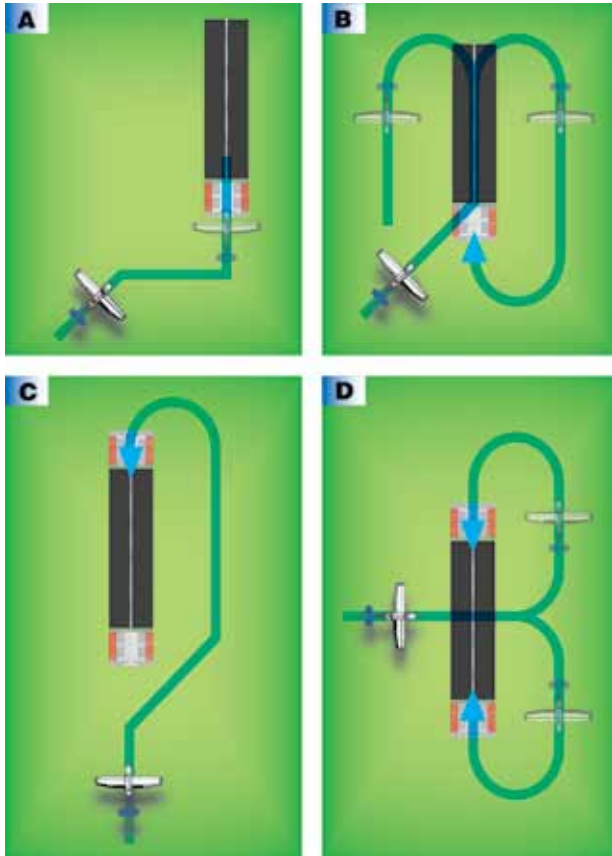


Figure 10-13. Circling Approaches.

course intersects the runway centerline at less than a 90° angle, and the runway is in sight early enough to establish a base leg. If the runway becomes visible too late to fly pattern “A,” circle as shown in “B.” Fly pattern “C” if it is desirable to land opposite the direction of the final approach, and the

runway is sighted in time for a turn to downwind leg. If the runway is sighted too late for a turn to downwind, fly pattern “D.” Regardless of the pattern flown, the pilot must maneuver the aircraft to remain within the designated circling area. Refer to section A (“Terms and Landing Minima Data”) in the front of each TPP for a description of circling approach categories.

The criteria for determining the pattern to be flown are based on personal flying capabilities and knowledge of the performance characteristics of the aircraft. In each instance, the pilot must consider all factors: airport design, ceiling and visibility, wind direction and velocity, final approach course alignment, distance from the final approach fix to the runway, and ATC instructions.

### IAP Minimums

Pilots may not operate an aircraft at any airport below the authorized MDA or continue an approach below the authorized DA/DH unless:

1. The aircraft is continuously in a position from which a descent to a landing on the intended runway can be made at a normal descent rate using normal maneuvers;
2. The flight visibility is not less than that prescribed for the approach procedure being used; and
3. At least one of the following visual references for the intended runway is visible and identifiable to the pilot:
  - a) Approach light system
  - b) Threshold
  - c) Threshold markings
  - d) Threshold lights
  - e) Runway end identifier lights (REIL)
  - f) Visual approach slope indicator (VASI)
  - g) Touchdown zone or touchdown zone markings
  - h) Touchdown zone lights
  - i) Runway or runway markings
  - j) Runway lights

### Missed Approaches

A missed approach procedure is formulated for each published instrument approach and allows the pilot to return to the airway structure while remaining clear of obstacles. The procedure is shown on the approach chart in text and graphic form. Since the execution of a missed approach occurs when the flight deck workload is at a maximum, the

procedure should be studied and mastered before beginning the approach.

When a missed approach procedure is initiated, a climb pitch attitude should be established while setting climb power. Configure the aircraft for climb, turn to the appropriate heading, advise ATC that a missed approach is being executed, and request further clearances.

If the missed approach is initiated prior to reaching the missed approach point (MAP), unless otherwise cleared by ATC, continue to fly the IAP as specified on the approach chart. Fly to the MAP at or above the MDA or DA/DH before beginning a turn.

If visual reference is lost while circling-to-land from an instrument approach, execute the appropriate missed approach procedure. Make the initial climbing turn toward the landing runway and then maneuver to intercept and fly the missed approach course.

Pilots should immediately execute the missed approach procedure:

1. Whenever the requirements for operating below DA/DH or MDA are not met when the aircraft is below MDA, or upon arrival at the MAP and at any time after that until touchdown;
2. Whenever an identifiable part of the airport is not visible to the pilot during a circling maneuver at or above MDA; or
3. When so directed by ATC.

## **Landing**

According to 14 CFR part 91, no pilot may land when the flight visibility is less than the visibility prescribed in the standard IAP being used. ATC will provide the pilot with the current visibility reports appropriate to the runway in use. This may be in the form of prevailing visibility, runway visual value (RVV), or runway visual range (RVR). However, only the pilot can determine if the flight visibility meets the landing requirements indicated on the approach chart. If the flight visibility meets the minimum prescribed for the approach, then the approach may be continued to a landing. If the flight visibility is less than that prescribed for the approach, then the pilot must execute a missed approach, regardless of the reported visibility.

The landing minimums published on IAP charts are based on full operation of all components and visual aids associated with the instrument approach chart being used. Higher minimums are required with inoperative components or visual aids. For example, if the ALSF-1 approach lighting system were inoperative, the visibility minimums for an ILS

would need to be increased by one-quarter mile. If more than one component is inoperative, each minimum is raised to the highest minimum required by any single component that is inoperative. ILS glide slope inoperative minimums are published on instrument approach charts as localizer minimums. Consult the "Inoperative Components or Visual Aids Table" (printed on the inside front cover of each TPP), for a complete description of the effect of inoperative components on approach minimums.

## **Instrument Weather Flying**

### **Flying Experience**

The more experience a pilot has in VFR and IFR flight, the more proficient a pilot becomes. VFR experience can be gained by flying in terminal areas with high traffic activity. This type of flying forces the pilot to polish the skill of dividing his or her attention between aircraft control, navigation, communications, and other flight deck duties. IFR experience can be gained through night flying which also promotes both instrument proficiency and confidence. The progression from flying at night under clear, moonlit conditions to flying at night without moonlight, natural horizon, or familiar landmarks teaches a pilot to trust the aircraft instruments with minimal dependence upon what can be seen outside the aircraft. It is a pilot's decision to proceed with an IFR flight or to wait for more acceptable weather conditions.

### ***Recency of Experience***

Currency as an instrument pilot is an equally important consideration. No person may act as pilot in command of an aircraft under IFR or in weather conditions less than VFR minimums unless he or she has met the requirements of part 91. Remember, these are minimum requirements.

### ***Airborne Equipment and Ground Facilities***

Regulations specify minimum equipment for filing an IFR flight plan. It is the pilot's responsibility to determine the adequacy of the aircraft and navigation/communication (NAV/COM) equipment for the proposed IFR flight. Performance limitations, accessories, and general condition of the equipment are directly related to the weather, route, altitude, and ground facilities pertinent to the flight, as well as to the flight deck workload.

### **Weather Conditions**

In addition to the weather conditions that might affect a VFR flight, an IFR pilot must consider the effects of other weather phenomena (e.g., thunderstorms, turbulence, icing, and visibility).

## ***Turbulence***

Inflight turbulence can range from occasional light bumps to extreme airspeed and altitude variations that make aircraft control difficult. To reduce the risk factors associated with turbulence, pilots must learn methods of avoidance, as well as piloting techniques for dealing with an inadvertent encounter.

Turbulence avoidance begins with a thorough preflight weather briefing. Many reports and forecasts are available to assist the pilot in determining areas of potential turbulence. These include the Severe Weather Warning (WW), SIGMET (WS), Convective SIGMET (WST), AIRMET (WA), Severe Weather Outlook (AC), Center Weather Advisory (CWA), Area Forecast (FA), and Pilot Reports (UA or PIREPs). Since thunderstorms are always indicative of turbulence, areas of known and forecast thunderstorm activity will always be of interest to the pilot. In addition, clear air turbulence (CAT) associated with jet streams, strong winds over rough terrain, and fast moving cold fronts are good indicators of turbulence.

Pilots should be alert while in flight for the signposts of turbulence. For example, clouds with vertical development such as cumulus, towering cumulus, and cumulonimbus are indicators of atmospheric instability and possible turbulence. Standing lenticular clouds lack vertical development but indicate strong mountain wave turbulence. While en route, pilots can monitor hazardous inflight weather advisory

service (HIWAS) broadcast for updated weather advisories, or contact the nearest AFSS or En Route Flight Advisory Service (EFAS) for the latest turbulence-related PIREPs.

To avoid turbulence associated with strong thunderstorms, circumnavigate cells by at least 20 miles. Turbulence may also be present in the clear air above a thunderstorm. To avoid this, fly at least 1,000 feet above the top for every 10 knots of wind at that level, or fly around the storm. Finally, do not underestimate the turbulence beneath a thunderstorm. Never attempt to fly under a thunderstorm. The possible results of turbulence and wind shear under the storm could be disastrous.

When moderate to severe turbulence is encountered, aircraft control is difficult, and a great deal of concentration is required to maintain an instrument scan. *[Figure 10-14]* Pilots should immediately reduce power and slow the aircraft to the recommended turbulence penetration speed as described in the POH/AFM. To minimize the load factor imposed on the aircraft, the wings should be kept level and the aircraft's pitch attitude should be held constant. The aircraft is allowed to fluctuate up and down, because maneuvering to maintain a constant altitude only increases the stress on the aircraft. If necessary, the pilot should advise ATC of the fluctuations and request a block altitude clearance. In addition, the power should remain constant at a setting that will maintain the recommended turbulence penetration airspeed.



**Figure 10-14.** *Maintaining an instrument scan in severe turbulence can be difficult.*

The best source of information on the location and intensity of turbulence are PIREPs. Therefore, pilots are encouraged to familiarize themselves with the turbulence reporting criteria found in the AIM, which also describes the procedure for volunteering PIREPs relating to turbulence.

### Structural Icing

The very nature of flight in Instrument Meteorological Conditions means operating in visible moisture such as clouds. At the right temperatures, this moisture can freeze on the aircraft, causing increased weight, degraded performance, and unpredictable aerodynamic characteristics. Understanding, avoidance, and early recognition followed by prompt action are the keys to avoiding this potentially hazardous situation.

Structural icing refers to the accumulation of ice on the exterior of the aircraft and is broken down into three classifications: rime ice, clear ice, and mixed ice. For ice to form, there must be moisture present in the air, and the air must be cooled to a temperature of 0° C (32° F) or less. Aerodynamic cooling can lower the surface temperature of an airfoil and cause ice to form on the airframe even though the ambient temperature is slightly above freezing.

Rime ice forms if the droplets are small and freeze immediately when contacting the aircraft surface. This type of ice usually forms on areas such as the leading edges of wings or struts. It has a somewhat rough-looking appearance and a milky-white color.

Clear ice is usually formed from larger water droplets or freezing rain that can spread over a surface. This is the most dangerous type of ice since it is clear, hard to see, and can change the shape of the airfoil.

Mixed ice is a mixture of clear ice and rime ice. It has the bad characteristics of both types and can form rapidly. Ice particles become embedded in clear ice, building a very rough accumulation. The table in *Figure 10-15* lists the temperatures at which the various types of ice will form.

Outside Air Temperature Range	Icing Type
0 °C to -10 °C	Clear
-10 °C to -15 °C	Mixed clear and rime
-15 °C to -20 °C	Rime

**Figure 10-15.** Temperature Ranges for Ice Formation.

Structural icing is a condition that can only get worse. Therefore, during an inadvertent icing encounter, it is important the pilot act to prevent additional ice accumulation. Regardless of the level of anti-ice or deice protection offered

by the aircraft, the first course of action should be to leave the area of visible moisture. This might mean descending to an altitude below the cloud bases, climbing to an altitude that is above the cloud tops, or turning to a different course. If this is not possible, then the pilot must move to an altitude where the temperature is above freezing. Pilots should report icing conditions to ATC and request new routing or altitude if icing will be a hazard. Refer to the AIM for information on reporting icing intensities.

### Fog

Instrument pilots must learn to anticipate conditions leading to the formation of fog and take appropriate action early in the progress of the flight. Before a flight, close examination of current and forecast weather should alert the pilot to the possibility of fog formation. When fog is a consideration, pilots should plan adequate fuel reserves and alternate landing sites. En route, the pilot must stay alert for fog formation through weather updates from EFAS, ATIS, and ASOS/AWOS sites.

Two conditions will lead to the formation of fog. Either the air is cooled to saturation, or sufficient moisture is added to the air until saturation occurs. In either case, fog can form when the temperature/dewpoint spread is 5° or less. Pilots planning to arrive at their destination near dusk with decreasing temperatures should be particularly concerned about the possibility of fog formation.

### Volcanic Ash

Volcanic eruptions create volcanic ash clouds containing an abrasive dust that poses a serious safety threat to flight operations. Adding to the danger is the fact that these ash clouds are not easily discernible from ordinary clouds when encountered at some distance from the volcanic eruption.

When an aircraft enters a volcanic ash cloud, dust particles and smoke may become evident in the cabin, often along with the odor of an electrical fire. Inside the volcanic ash cloud, the aircraft may also experience lightning and St. Elmo's fire on the windscreen. The abrasive nature of the volcanic ash can pit the windscreens, thus reducing or eliminating forward visibility. The pitot-static system may become clogged, causing instrument failure. Severe engine damage is probable in both piston and jet-powered aircraft.

Every effort must be made to avoid volcanic ash. Since volcanic ash clouds are carried by the wind, pilots should plan their flights to remain upwind of the ash-producing volcano. Visual detection and airborne radar are not considered a reliable means of avoiding volcanic ash clouds. Pilots witnessing volcanic eruptions or encountering volcanic ash should immediately pass this information along in the form of a pilot report. The National Weather Service



monitors volcanic eruptions and estimates ash trajectories. This information is passed along to pilots in the form of SIGMETs.

As for many other hazards to flight, the best source of volcanic information comes from PIREPs. Pilots who witness a volcanic eruption or encounter volcanic ash in flight should immediately inform the nearest agency. Volcanic Ash Forecast Transport and Dispersion (VAFTAD) charts are also available; these depict volcanic ash cloud locations in the atmosphere following an eruption, and also forecast dispersion of the ash concentrations over 6- and 12-hour time intervals. See AC 00-45, Aviation Weather Services.

### ***Thunderstorms***

A thunderstorm packs just about every weather hazard known to aviation into one vicious bundle. Turbulence, hail, rain, snow, lightning, sustained updrafts and downdrafts, and icing conditions are all present in thunderstorms. Do not take off in the face of an approaching thunderstorm or fly an aircraft that is not equipped with thunderstorm detection in clouds or at night in areas of suspected thunderstorm activity. [Figure 10-16]

There is no useful correlation between the external visual appearance of thunderstorms and the severity or amount of turbulence or hail within them. All thunderstorms should be



**Figure 10-16.** A thunderstorm packs just about every weather hazard known to aviation into one vicious bundle.

considered hazardous, and thunderstorms with tops above 35,000 feet should be considered extremely hazardous.

Weather radar, airborne or ground based, will normally reflect the areas of moderate to heavy precipitation (radar does not detect turbulence). The frequency and severity of turbulence generally increases with the radar reflectivity closely associated with the areas of highest liquid water content of the storm. A flight path through an area of strong or very strong radar echoes separated by 20 to 30 miles or less may not be considered free of severe turbulence.

The probability of lightning strikes occurring to aircraft is greatest when operating at altitudes where temperatures are between -5 ° C and +5 ° C. In addition, an aircraft flying in the clear air near a thunderstorm is also susceptible to lightning strikes. Thunderstorm avoidance is always the best policy.

### ***Wind Shear***

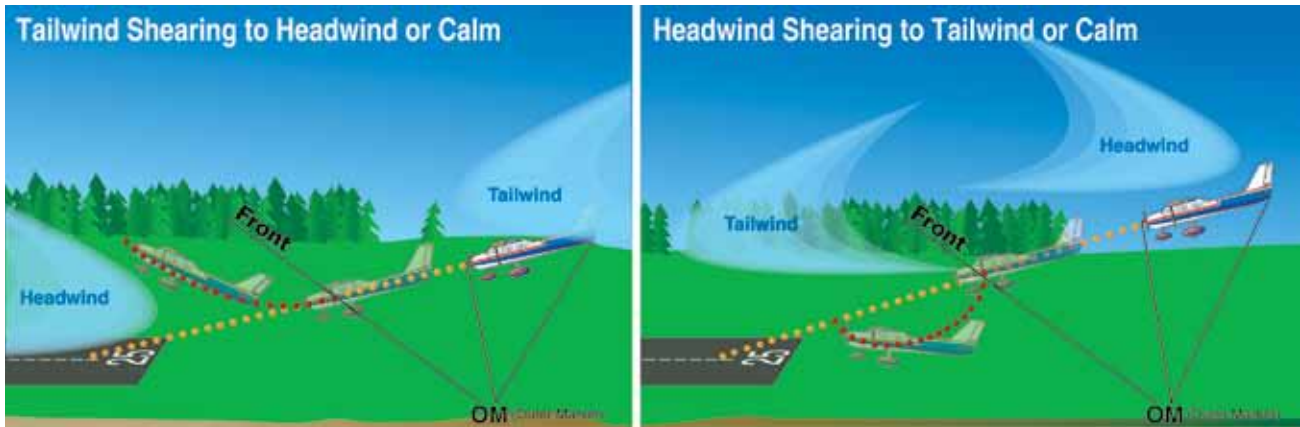
Wind shear can be defined as a change in wind speed and/or wind direction in a short distance. It can exist in a horizontal or vertical direction and occasionally in both. Wind shear can occur at all levels of the atmosphere but is of greatest concern during takeoffs and landings. It is typically associated with thunderstorms and low-level temperature inversions; however, the jet stream and weather fronts are also sources of wind shear.

As Figure 10-17 illustrates, while an aircraft is on an instrument approach, a shear from a tailwind to a headwind causes the airspeed to increase and the nose to pitch up with a corresponding balloon above the glide path. A shear from a headwind to a tailwind has the opposite effect, and the aircraft will sink below the glide path.

A headwind shear followed by a tailwind/downdraft shear is particularly dangerous because the pilot has reduced power and lowered the nose in response to the headwind shear. This leaves the aircraft in a nose-low, power-low configuration when the tailwind shear occurs, which makes recovery more difficult, particularly near the ground. This type of wind shear scenario is likely while making an approach in the face of an oncoming thunderstorm. Pilots should be alert for indications of wind shear early in the approach phase and be ready to initiate a missed approach at the first indication. It may be impossible to recover from a wind shear encounter at low altitude.

To inform pilots of hazardous wind shear activity, some airports have installed a Low-Level Wind Shear Alert System (LLWAS) consisting of a centerfield wind indicator and several surrounding boundary-wind indicators. With





**Figure 10-17.** *Glide slope Deviations Due to Wind Shear Encounter.*

this system, controllers are alerted of wind discrepancies (an indicator of wind shear possibility) and provide this information to pilots. A typical wind shear alert issued to a pilot would be:

“Runway 27 arrival, wind shear alert, 20 knot loss 3 mile final, threshold wind 200 at 15”

In plain language, the controller is advising aircraft arriving on runway 27 that at about 3 miles out they can expect a wind shear condition that will decrease their airspeed by 20 knots and possibly encounter turbulence. Additionally, the airport surface winds for landing runway 27 are reported as 200° at 15 knots.

Pilots encountering wind shear are encouraged to pass along pilot reports. Refer to AIM for additional information on wind shear PIREPs.

### VFR-On-Top

Pilots on IFR flight plans operating in VFR weather conditions may request VFR-on-top in lieu of an assigned altitude. This permits them to select an altitude or flight level of their choice (subject to any ATC restrictions).

Pilots desiring to climb through a cloud, haze, smoke, or other meteorological formation and then either cancel their IFR flight plan or operate VFR-on-top may request a climb to VFR-on-top. The ATC authorization will contain a top report (or a statement that no top report is available) and a request to report upon reaching VFR-on-top. Additionally, the ATC authorization may contain a clearance limit, routing, and an alternative clearance if VFR-on-top is not reached by a specified altitude.

A pilot on an IFR flight plan, operating in VFR conditions, may request to climb/descend in VFR conditions. When operating in VFR conditions with an ATC authorization to

“maintain VFR-on-top/maintain VFR conditions,” pilots on IFR flight plans must:

1. Fly at the appropriate VFR altitude as prescribed in 14 CFR part 91.
2. Comply with the VFR visibility and distance-from-cloud criteria in 14 CFR part 91.
3. Comply with instrument flight rules applicable to this flight (minimum IFR altitudes, position reporting, radio communications, course to be flown, adherence to ATC clearance, etc.).

Pilots operating on a VFR-on-top clearance should advise ATC before any altitude change to ensure the exchange of accurate traffic information.

ATC authorization to “maintain VFR-on-top” is not intended to restrict pilots to operating only above an obscuring meteorological formation (layer). Rather, it permits operation above, below, between layers, or in areas where there is no meteorological obstruction. It is imperative pilots understand, however, that clearance to operate “VFR-on-top/VFR conditions” does not imply cancellation of the IFR flight plan.

Pilots operating VFR-on-top/VFR conditions may receive traffic information from ATC on other pertinent IFR or VFR aircraft. However, when operating in VFR weather conditions, it is the pilot’s responsibility to be vigilant to see and avoid other aircraft.

This clearance must be requested by the pilot on an IFR flight plan. VFR-on-top is not permitted in certain areas, such as Class A airspace. Consequently, IFR flights operating VFR-on-top must avoid such airspace.

## VFR Over-The-Top

VFR over-the-top must not be confused with VFR-on-top. VFR-on-top is an IFR clearance that allows the pilot to fly VFR altitudes. VFR over-the-top is strictly a VFR operation in which the pilot maintains VFR cloud clearance requirements while operating on top of an undercast layer. This situation might occur when the departure airport and the destination airport are reporting clear conditions, but a low overcast layer is present in between. The pilot could conduct a VFR departure, fly over the top of the undercast in VFR conditions, then complete a VFR descent and landing at the destination. VFR cloud clearance requirements would be maintained at all times, and an IFR clearance would not be required for any part of the flight.

## Conducting an IFR Flight

To illustrate some of the concepts introduced in this chapter, follow along on a typical IFR flight from the Birmingham International Airport (BHM), Birmingham, Alabama to Gulfport-Biloxi International Airport (GPT), Gulfport, Mississippi. [Figure 10-18] For this trip, a Cessna 182 with a call sign of N1230A will be flown. The aircraft is equipped with dual navigation and communication radios, a transponder, and a GPS system approved for IFR en route, terminal, and approach operations.

### Preflight

The success of the flight depends largely upon the thoroughness of the preflight planning. The evening before the flight, pay close attention to the weather forecast and begin planning the flight.

The Weather Channel indicates a large, low-pressure system has settled in over the Midwest, pulling moisture up from the Gulf of Mexico and causing low ceilings and visibility with little chance for improvement over the next couple of days. To begin planning, gather all the necessary charts and materials, and verify everything is current. This includes en route charts, approach charts, DPs, STAR charts, the GPS database, as well as an A/FD, some navigation logs, and the aircraft's POH/AFM. The charts cover both the departure and arrival airports and any contingency airports that will be needed if the flight cannot be completed as planned. This is also a good time for the pilot to consider recent flight experience, pilot proficiency, fitness, and personal weather minimums to fly this particular flight.

Check the A/FD to become familiar with the departure and arrival airport, and check for any preferred routing between BHM and GPT. Next, review the approach charts and any DP or STAR that pertains to the flight. Finally, review the en route charts for potential routing, paying close attention to the minimum en route and obstacle clearance altitudes.

After this review, select the best option. For this flight, the Birmingham Three Departure [Figure 10-2] to Brookwood VORTAC, V 209 to Kewanee VORTAC, direct to Gulfport using GPS would be a logical route. An altitude of 4,000 feet meets all the regulatory requirements and falls well within the performance capabilities of the aircraft.

Next, call 1-800-WX-BRIEF to obtain an outlook-type weather briefing for the proposed flight. This provides forecast conditions for departure and arrival airports, as well as the en route portion of the flight including forecast winds aloft. This also is a good opportunity to check the available NOTAMs.

The weather briefer confirms the predictions of the weather channel giving forecast conditions that are at or near minimum landing minimums at both BHM and GPT for the proposed departure time. The briefer provides NOTAM information for GPT indicating that the localizer to runway 32 is scheduled to be out of service and that runway 18/36 is closed until further notice. Also check for temporary flight restrictions (TFRs) along the proposed route.

After receiving a weather briefing, continue flight planning and begin to transfer some preliminary information onto the navigation log, listing each fix along the route and the distances, frequencies, and altitudes. Consolidating this information onto an organized navigation log will keep the workload to a minimum during the flight.

Next, obtain a standard weather briefing online for the proposed route. A check of current conditions indicates low IFR conditions at both the departure airport and the destination, with visibility of one-quarter mile:

#### SURFACE WEATHER OBSERVATIONS

METAR KBHM 111155Z VRB04KT ¼ SM FG –RA VV004  
06/05 A2994 RMK A02 SLP140

METAR KGPT 111156Z 24003KT ¼ SM FG OVC001 08/07  
A2962 RMK A02 SLP033

The small temperature/dewpoint spread is causing the low visibility and ceilings. Conditions should improve later in the day as temperatures increase. A check of the terminal forecast confirms this theory:

#### TERMINAL FORECASTS

TAF KBHM 111156Z 111212 VRB04KT ¼ SM FG VV004  
TEMPO1316 ¾ SM OVC004

FM1600 VRB05KT 2SM BR OVC007 TEMPO 1720 3SM  
DZ BKN009

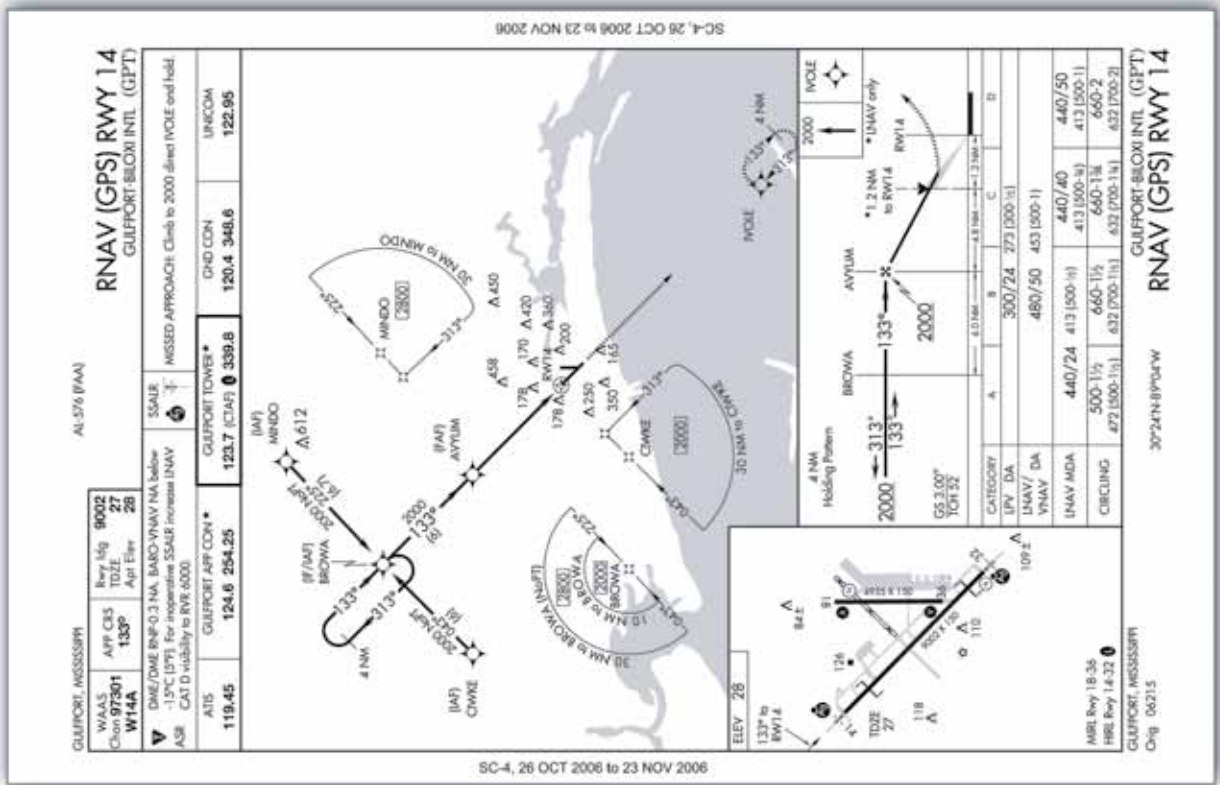


Figure 10-18. Route Planning.

FM2000 22008KT 3SM -RA OVC015 TEMP 2205 3SM  
-RA OVC025 FM0500 23013KT P6SM OVC025

FM0800 23013KT P6SM BKN030 PROB40 1012 2SM BR  
OVC030

TAF KGPT 111153Z 111212 24004KT ¼ SM FG OVC001  
BECMG 1317 3SM BR OVC004

FM1700 24010KT 4SM -RA OVC006 FM0400 24010 5SM  
SCT080 TEMPO 0612 P6SM SKC

In addition to the terminal forecast, the area forecast also indicates gradual improvement along the route. Since the terminal forecast only provides information for a 5-mile radius around a terminal area, checking the area forecast provides a better understanding of the overall weather picture along the route, as well as potential hazards:

SYNOPSIS AND VFR CLOUDS/WEATHER FORECASTS  
SYNOPSIS... AREA OF LOW PRESSURE CNTD OV AL  
RMNG GENLY STNRY BRNGNG MSTR AND WD SPRD  
IFR TO E TN. ALF...LOW PRES TROF ACRS CNTR PTN  
OF THE DFW FA WILL GDLY MOV EWD DURG PD.

NRN LA, AR, NRN MS  
SWLY WND THRUT THE PD. 16Z CIG OVC006. SCT  
-SHRA. OTLK... IFR SRN ½ ... CIG SCT - BKN015  
TOPS TO FL250 SWLY WND THRUT THE PD. 17Z AGL  
BKN040. OTLK...MVFR CIG VIS.

LA MS CSTL WTRS  
CIG OVC001 - OVC006. TOPS TO FL240. VIS ¼ - ¾ SM  
FG. SWLY WND. 16Z CIG OVC010 VIS 2 SM BR. OCNL  
VIS 3-5SM -RN BR OVC009. OTLK...MVFR CIG VIS.

FL  
CIG BKN020 TOPS TO FL180. VIS 1-3 SM BR. SWLY  
WND. 18Z BRK030. OTLK...MVFR CIG.

At this time, there are no SIGMETs or PIREPs reported. However, there are several AIRMETs, one for IFR conditions, one for turbulence that covers the entire route, and another for icing conditions which covers an area just north of the route:

WAUS44 KPCI 111150

DFWS WA 011150

AIRMET SIERRA FOR IFR VALID UNTIL 111800

AIRMET IFR...OK TX LA AR MS AL FL

TS IMPLY SEV OR GTR TURB SEV ICE LLWS AND  
IFR CONDS.

NON MSL HGHTS DENOTED BY AGL OR CIG.

A recheck of NOTAMs for Gulfport confirms that the localizer to runway 32 is out of service until further notice and runway 18/36 is closed. If runway 6 is planned for the departure, confirm that the climb restriction for the departure can be met.

GPT 12/006 GPT LOC OS UFN

GPT 12/008 GPT MIRL RWY 18/36 OS UFN

Since the weather is substantially better to the east, Pensacola Regional Airport is a good alternate with current conditions and a forecast of marginal VFR.

METAR KPNS 111150Z 21010Z 3SM BKN014 OVC025  
09/03 A2973

TAF KPNS 111152Z 111212 22010KT 3 SM BR OVC020  
BECMG 1317 4 SM BR OVC025

FM1700 23010KT 4SM -RA OVC030

FM 0400 25014KT 5SM OVC050 TEMPO1612 P6SM  
OVC080

If weather minimums are below a pilot's personal minimums, a delay in departure to wait for improved conditions is a good decision. This time can be used to complete the navigation log which is the next step in planning an IFR flight. [Figure 10-19]

Use the POH/AFM to compute a true airspeed, cruise power setting, and fuel burn based on the forecast temperatures aloft and cruising pressure altitude. Also, compute weight-and-balance information and determine takeoff and landing distances. There will be a crosswind if weather conditions require a straight-in landing on runway 14 at GPT. Therefore, compute the landing distance assuming a 10-knot crosswind and determine if the runway length is adequate to allow landing. Determine the estimated flight time and fuel burn using the winds aloft forecast and considering Pensacola Regional Airport as an alternate airport. With full tanks, the flight can be made nonstop with adequate fuel for flight to the destination, alternate, and the reserve requirement.

Next, check the surface analysis chart which shows where the pressure systems will be found. The weather depiction chart shows areas of IFR conditions and can be used to find areas



FLIGHT LOG							
TIME		DISTANCE		FUEL			
TAKE OFF	LANDING		TOTAL	REQUIRED		AVAILABLE	
1600 E			228	51 Gal		87 Gal	
ROUTE (Check Point)	IDENT	MAG CRSE	LEG	ETE ATE	ETE	ALTITUDE	REMARKS
	FREQ		REMAINING		ATE	GND SPD	
Brookwood	OKW	230	31	+16	16:16	4000	3 Gal
	111.0		197			120	
Kewanee	EWA	225	80	+40	16:56	4000	8 Gal
	113.8		117			120	
Mindo		195	110	+54	17:50	4000	12 Gal
			17			125	
Appr			17	+08	17:58		2 Gal
			0				
				118			
Rascagoula Regional	PNS	085	91	+35	1+58	3000	18 Gal
			0			158	

ATIS			
DEPARTURE		ARRIVAL	
INFORMATION		INFORMATION	
CEILING		CEILING	
VISIBILITY		VISIBILITY	
TEMP / DEWPOINT	/	TEMP / DEWPOINT	/
WINDS		WINDS	
ALTIMETER		ALTIMETER	
RWY IN USE		RWY IN USE	
REMARKS		REMARKS	

Figure 10-19. Navigation Log.

of improving conditions. These charts provide information a pilot will need should a diversion to VFR conditions be required. For this flight, the radar depicts precipitation along the route, and the latest satellite photo confirms what the weather depiction chart showed.

Call an AFSS for an updated weather briefing, Birmingham INTL airport is now reporting 700 overcast with 3 miles visibility, and Gulfport-Biloxi is now 400 overcast with 2 miles visibility. The alternate, Pensacola Regional Airport, continues to report adequate weather conditions with 2,000 overcast and 3 miles visibility in light rain.

When the navigation log is finished, complete the flight plan in preparation for filing with flight service. [Figure 10-20]



U.S. DEPARTMENT OF TRANSPORTATION FEDERAL AVIATION ADMINISTRATION		(FAA USE ONLY) <input type="checkbox"/> PILOT BRIEFING <input type="checkbox"/> VNR			TIME STARTED		SPECIALIST INITIALS	
FLIGHT PLAN				<input type="checkbox"/> STOPOVER				
1. TYPE	2. AIRCRAFT IDENTIFICATION	3. AIRCRAFT TYPE/SPECIAL EQUIPMENT	4. TRUE AIRSPEED	5. DEPARTURE POINT		6. DEPARTURE TIME		7. CRUISING ALTITUDE
<input checked="" type="checkbox"/> VFR <input checked="" type="checkbox"/> IFR <input type="checkbox"/> DVFR	n/230A	C182/G	140 KTS	BHM		PROPOSED (Z) 1600	ACTUAL (Z)	4000
8. ROUTE OF FLIGHT  OKW V 209 EWA MINDO								
9. DESTINATION (Name of airport and city)			10. EST. TIME ENROUTE		11. REMARKS			
Gulfport, Biloxi			HOURS 1	MINUTES 58				
12. FUEL ON BOARD		13. ALTERNATE AIRPORT(S)		14. PILOT'S NAME, ADDRESS & TELEPHONE NUMBER & AIRCRAFT HOME BASE			15. NUMBER ABOARD	
HOURS 04	MINUTES 20	PNS		James Jones, 841 Oak St. Gadsden, Al. 205-555-6028			2	
16. COLOR OF AIRCRAFT	17. DESTINATION CONTACT/TELEPHONE (OPTIONAL)							
blue/white								
<small>CIVIL AIRCRAFT PILOTS. FAR Part 91 requires you file an IFR flight plan to operate under instrument flight rules in controlled airspace. Failure to file could result in a civil penalty not to exceed \$1,000 for each violation (Section 901 of the Federal Aviation Act of 1958, as amended). Filing of a VFR flight plan is recommended as a good operating practice. See also Part 99 for requirements concerning DVFR flight plans.</small>								

FAA Form 7233-1 (8-82)      CLOSE VFR FLIGHT PLAN WITH \_\_\_\_\_ FSS ON ARRIVAL

Figure 10-20. Flight Plan Form.

Several pilot reports have been submitted for light icing conditions; however, all the reports are north of the route of flight and correspond to the AIRMET that was issued earlier. No pilot reports have included cloud tops, but the area forecast predicted cloud tops to flight level 240. Since the weather conditions appear to be improving, a flight plan can be filed using the completed form.

Analyze the latest weather minimums to determine if they exceed personal minimums. With the absence of icing reported along the route and steadily rising temperatures, structural icing should not be a problem. Make a note to do an operational check of the pitot heat during preflight and to take evasive action immediately should even light icing conditions be encountered in flight. This may require returning to BHM or landing at an intermediate spot before reaching GPT. The go/no-go decision will be constantly reevaluated during the flight.

Once at the airport, conduct a thorough preflight inspection. A quick check of the logbooks indicates all airworthiness requirements have been met to conduct this IFR flight including an altimeter, static, and transponder test within the preceding 24 calendar months. In addition, a log on the clipboard indicates the VOR system has been checked

within the preceding 30 days. Turn on the master switch and pitot heat, and quickly check the heating element before it becomes too hot. Then, complete the rest of the walk-around procedure. Since this will be a flight in actual IFR conditions, place special emphasis on IFR equipment during the walk-around, including the alternator belt and antennas. After completing the preflight, organize charts, pencils, paper, and navigation log in the flight deck for quick, easy access. This is also the time to enter the planned flight into the GPS.

**Departure**

After starting the engine, tune in ATIS and copy the information to the navigation log. The conditions remain the same as the updated weather briefing with the ceiling at 700 overcast, and visibility at 3 miles. Call clearance delivery to receive a clearance:

“Clearance Delivery, Cessna 1230A IFR to Gulfport Biloxi with information Kilo, ready to copy.”

“Cessna 1230A is cleared to Gulfport-Biloxi via the Birmingham Three Departure, Brookwood, Victor 209 Kewanee then direct Mindo, Gulfport. Climb and maintain 4,000. Squawk 0321.”

Read back the clearance and review the DP. Although a departure frequency was not given in the clearance, note that on the DP, the departure control frequency is listed as 123.8 for the southern sector. Since a departure from runway 24 is anticipated, note the instruction to climb to 2,100 prior to turning. After tuning in the appropriate frequencies and setting up navigation equipment for the departure routing, contact ground control (noting that this is IFR) and receive the following clearance:

“Cessna 1230A taxi to runway 24 via taxiway Mike.”

Read back the clearance and aircraft call sign. After a review of the taxi instructions on the airport diagram, begin to taxi and check the flight instruments for proper indications.

Hold short of runway 24 and complete the before takeoff checklist and engine run-up. Advise the tower when ready for takeoff. The tower gives the following clearance:

“Cessna 30A cleared for takeoff runway 24. Caution wake turbulence from 737 departing to the northwest.”

Taxi into position. Note the time off on the navigation log, verify that the heading indicator and magnetic compass are in agreement, the transponder is in the ALT position, all the necessary lights, equipment, and pitot heat are on. Start the takeoff roll. To avoid the 737's wake turbulence, make note of its lift off point and take off prior to that point.

### En Route

After departure, climb straight ahead to 2,100 feet as directed by the Birmingham Three Departure. While continuing a climb to the assigned altitude of 4,000 feet, the following instructions are received from the tower:

“Cessna 30A contact Departure.”

Acknowledge the clearance and contact departure on the frequency designated by the DP. State the present altitude so the departure controller can check the encoded altitude against indicated altitude:

“Birmingham Departure Cessna 1230A climbing through 2,700 heading 240.”

Departure replies:

“Cessna 30A proceed direct to Brookwood and resume own navigation. Contact Atlanta Center on 134.05.”

Acknowledge the clearance, contact Atlanta Center and proceed direct to Brookwood VORTAC, using the IFR-approved GPS equipment. En route to Kewanee, VORTAC Atlanta Center issues the following instructions:

“Cessna 1230A contact Memphis Center on 125.975.”

Acknowledge the instructions and contact Memphis Center with aircraft ID and present altitude. Memphis Center acknowledges contact:

“Cessna 1230A, Meridian altimeter is 29.87. Traffic at your 2 o'clock and 6 miles is a King Air at 5,000 climbing to 12,000.”

Even when on an IFR flight plan, pilots are still responsible for seeing and avoiding other aircraft. Acknowledge the call from Memphis Center and inform them of negative contact with traffic due to IMC.

“Roger, altimeter setting 29.87. Cessna 1230A is in IMC negative contact with traffic.”

Continue the flight, and at each fix note the arrival time on the navigation log to monitor progress.

To get an update of the weather at the destination and issue a pilot report, contact the FSS servicing the area. To find the nearest AFSS, locate a nearby VOR and check above the VOR information box for a frequency. In this case, the nearest VOR is Kewanee VORTAC which lists a receive-only frequency of 122.1 for Greenwood FSS. Request a frequency change from Memphis and then attempt to contact Greenwood on 122.1 while listening over the Kewanee VORTAC frequency of 113.8:

“Greenwood Radio Cessna 1230A receiving on frequency 113.8, over.”

“Cessna 30A, this is Greenwood, go ahead.”

“Greenwood Radio, Cessna 30A is currently 30 miles south of the Kewanee VORTAC at 4,000 feet en route to Gulfport. Requesting an update of en route conditions and current weather at GPT, as well as PNS.”

“Cessna 30A, Greenwood Radio, current weather at Gulfport is 400 overcast with 3 miles visibility in light rain. The winds are from 140 at 7 and the altimeter is 29.86. Weather across your route is generally IFR in light rain with ceilings ranging from 300 to 1,000 overcast with visibilities between 1 and 3 miles. Pensacola weather is much better with ceilings now at 2,500 and visibility 6 miles. Checking current NOTAMs at GPT shows the localizer out of service and runway 18/36 closed.”

“Roger, Cessna 30A copies the weather. I have a PIREP when you are ready to copy.”

“Cessna 30A go ahead with your PIREP.”

“Cessna 30A is a Cessna 182 located on the Kewanee 195° radial at 30 miles level at 4,000 feet. I am currently in IMC conditions with a smooth ride. Outside air temperature is plus 1° Celsius. Negative icing.”

“Cessna 30A thank you for the PIREP.”

With the weather check and PIREP complete, return to Memphis Center:

“Memphis Center, Cessna 1230A is back on your frequency.”

“Cessna 1230A, Memphis Center, roger, contact Houston Center now on frequency 126.8.”

“Roger, contact Houston Center frequency 126.8, Cessna 1230A.”

“Houston Center, Cessna 1230A level at 4,000 feet.”

“Cessna 30A, Houston Center area altimeter 29.88.”

### Arrival

40 miles north of Gulfport, tune in ATIS on number two communication radio. The report reveals there has been no change in the weather and ATIS is advertising ILS runway 14 as the active approach.

Houston Center completes a hand off to Gulfport approach control with instructions to contact approach:

“Gulfport Approach, Cessna 1230A level 4,000 feet with information TANGO. Request GPS Runway 14 approach.”

“Cessna 30A, Gulfport Approach, descend and maintain 3,000 feet.”

“Descend to 3,000, Cessna 30A.”

Begin a descent to 3,000 and configure your navigation radios for the approach. The GPS will automatically change from the en route mode to the terminal mode. This change

will affect the sensitivity of the CDI. Tune in the VORTAC frequency of 109.0 on the number one navigation radio, and set in the final approach course of 133° on the OBS. This setup will help with situational awareness should the GPS lose signal.

“Cessna 30A your position is 7 miles from MINDO, maintain 3,000 feet until MINDO, cleared for the GPS runway 14 approach.”

Read back the clearance and concentrate on flying the aircraft. At MINDO descend to 2,000 as depicted on the approach chart. At BROWA turn to the final approach course of 133°. Just outside the Final Approach Way Point (FAWP) AVYUM, the GPS will change to the approach mode and the CDI will become even more sensitive. Gulfport approach control issues instructions to contact Gulfport tower:

“Cessna 30A contact Tower on 123.7.”

“123.7, Cessna 30A.”

“Tower, Cessna 1230A outside AVYUM on the GPS runway 14.”

“Cessna 30A Gulfport Tower, the ceiling is now 600 overcast and the visibility is 4 miles.”

“Cleared to land runway 14, Cessna 30A.”

Continue the approach, complete the appropriate checklists, cross AVYUM, and begin the final descent. At 700 feet MSL visual contact with the airport is possible. Slow the aircraft and configure it to allow a normal descent to landing. As touch down is completed, Gulfport Tower gives further instructions:

“Cessna 30A turn left at taxiway Bravo and contact ground on 120.4.”

“Roger, Cessna 30A.”

Taxi clear of the runway and complete the appropriate checklists. The Tower will automatically cancel the IFR flight plan.

