CHAPTER 4

INSTRUMENTS

SECTION A - GENERAL INFORMATION

4-1. SYNOPSIS. At the 1550 ATTW, we attempt to have you practice each maneuver and type of instrument approach that you may be exposed to in operational H-3 flying. VOR, TACAN, ILS, PAR, and ASR approaches will be flown in the simulator and the aircraft. ADF approaches will be flown in the simulator only. Basic instruments will review procedures you have already learned and familiarize you with the H-3. Complete maneuvers will be practiced under simulated or actual IFR conditions. A sample of instrument approach plates have been reproduced at the end of this chapter for your convenience.

SECTION B - ACADEMIC LESSONS

4-2. MODULE I-1, Basic Instrument Flight. (0.4 Hour)

a. Objective (Standard - D). Recognize the difference between control, performance, and navigational instruments and apply the four basic steps of instrument flight in the simulator/aircraft.

(1) Establish an attitude and/or power setting on the control instruments.

(2) Trim the aircraft.

(3) Crosscheck the performance instruments.

(5) Adjust the attitude and power setting as necessary.

b. Student Requirements and Tips. Prerequisite Training: Complete Academic Modules P-5 through P-8.

c. Source Reference. AFM 51-37, Instrument Flying, Chapter 7.

4-3. MODULE I-2, Basic Instrument Maneuvers. (0.9 Hour)

a. Objective (Standard - D). Understand the basic instrument maneuver parameters. Recognize deviations and know the corrective control inputs for basic instrument maneuvers.

(1) Straight and level.

(2) Level off.

(3) Turns.

(4) Steep turns.

(5) Unusual attitudes.

(6) Instrument autorotations.

b. Student Requirements and Tips:

(1) Prerequisite Training. Complete Academic Module I-1.

(2) Assignment. Read Supplemental Information.

c. Source Reference. AFM 51-37, Instrument Flying, Chapter 2.

d. Supplemental Information:

(1) Instrument Cruise. During IFR cruise, the H-3 should be handled in much the same manner as during VFR flight. To lessen the fatigue produced by long missions, full utilization should be made of the AFCS. The pilot should handle the cyclic with a loose grip and not make unnecessary collective pitch changes. Instrument cruise air speed should be established in a range where vibrations are at a minimum. With high gross weight and density altitudes, the vibration level increases, and power and resultant TAS must be reduced for comfort, ease of control, and reduced blade stall effects. BAR ALT may not be practical during turbulent conditions. While enroute, a check of the heading indicator should be made periodically with the standby compass.

(2) Spatial Disorientation. Situations can occur in which a pilot becomes confused regarding the attitude and performance of the helicopter. Vertigo may occur due to the flickering of the main rotor blades in the anti-collision beacon or navigation lights and operation of those lights in the flash position may further accentuate the problem. Other situations may occur due to such factors as turbulence, blade stall or carelessness in crosschecking the instruments, especially during instrument flying. If vertigo occurs, have the other pilot take control of the aircraft. Procedures for recovery from an unusual attitude are covered in AFM 51-37.

4-4. MODULE I-3, Navigation Instruments. (0.7 Hour)

a. Objective (Standard - D). Answer questions concerning the use of navigation instruments in ascertaining the position of an aircraft in relation to selected nvaigational aids (ADF, VOR, TACAN) and courses.

(1) Bearing, distance, heading indicator (BDHI).

(2) Course indicator.

b. Source Reference:

(1) AFM 51-37, Instrument Flying.

(2) TO 1H-3(C)E-1, Flight Manual.

4-5. MODULE I-4, Instrument Cockpit Check. (1.0 Hour)

a. Objective (Standard - D). Understand and answer questions pertaining to:

(1) Instrument cockpit check procedures IAW AFM 51-37.

(2) Function of the TACAN/VOR selector switches.

b. Student Requirements and Tips:

(1) Prerequisite Training. Complete Academic Module I-3.

(2) Assignment. Read Supplemental Information.

c. Source Reference:

(1) AFM 51-37, Instrument Flying.

(2) TO 1H-3(C)E-1, Flight Manual

d. Supplemental Information:

(1) Before takeoff the pilot should insure that all flight instruments and navigation equipment are checked during taxi and during the Before Takeoff Checklist. The actual method of making the checks will be IAW AFM 51-37.

(2) The navigation equipment on the H-3 is the same as that used on other aircraft throughout the Air Force. Let us consider each indicator separately to clarify the operation of the whole system.

(a) Bearing, Distance, Heading Indicator (BDHI). There are two BDHIs; one for each pilot. They contain:

1 The J-4 compass card.

2 Two bearing pointers referred to as the number one bearing pointer and the number two bearing pointer.

3 A distance reading to the TACAN station tuned. The distance information is always displayed on both indicators. Likewise, the number one bearing pointer, on both indicators, always displays DF information (either from the ADF or UHF radios). This is always a relative bearing, but if the J-4 compass card is operating properly this relative bearing is also displayed as a magnetic bearing. The number two bearing pointer displays a magnetic bearing to the VOR or TACAN station tuned. Whether VOR or TACAN information is displayed is determined by the respective (pilot or copilot) VOR/TACAN selector switch. If the J-4 compass card is operating properly the magnetic bearing displayed is also displayed as a relative bearing.

(b) Course Indicator (CI). There are two CIs; one for each pilot. These are standard instruments, with the exception that the course selector knob, course selector window, and TO/FROM indicator on the pilot's CI are attached to the VOR only; and the copilot's are attached to the TACAN only. The course deviation indicator and glide slope indicator on each CI are connected to both the VOR and TACAN through the VOR/TACAN selector switches.

(c) VOR/TACAN Selector Switches. The pilot's selector switch is labeled "VOR MASTER - TACAN SLAVE" and the copilot's selector switch is labeled "TACAN MASTER - VOR SLAVE". These switches select whether VOR information or TACAN information is displayed on the number two bearing pointer of the respective BDHI and on the respective CI - THAT IS ALL THAT THESE SWITCHES SELECT. To prevent both pilots from trying to select different desired radials from the same system (VOR or TACAN) at the same time, the pilot's course selector is attached to the VOR and the copilot's course selector is attached to the TACAN.

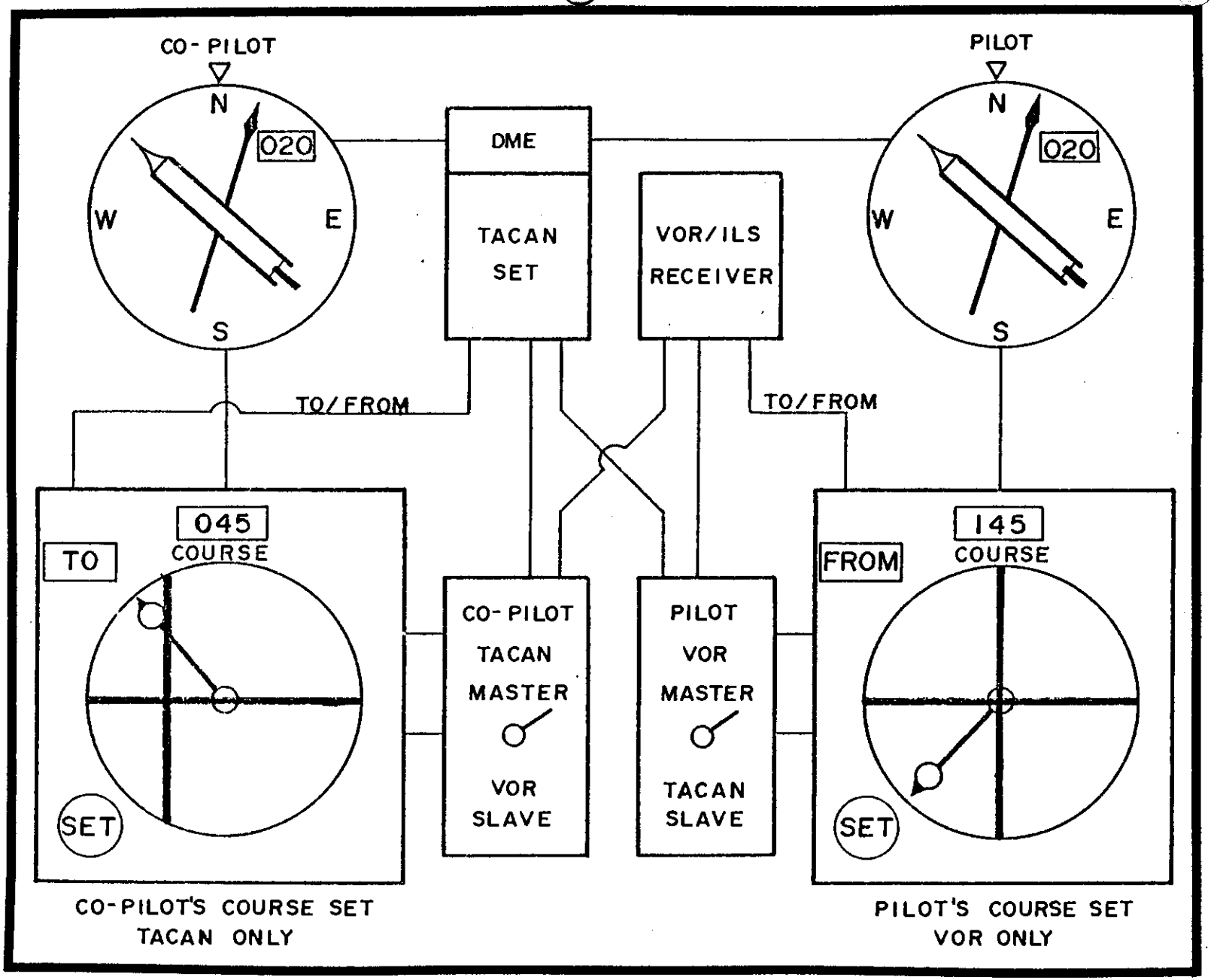

Figure 4-1. H-3 VOR/TACAN System (Simplified)

The words, "MASTER/SLAVE" are on the switches only to remind the pilot or copilot to which system (VOR or TACAN) his course selector knob, course selector window and TO/FROM indicator are connected. This means that the pilot is the only one who can select the desired radials on the VOR and the copilot is the only one that can select the desired TACAN radials. Either pilot can display the information supplied by either system by selecting the desired system with his VOR/TACAN selector switch. Therefore, if the copilot is flying a VOR approach with the pilot monitoring him, both would select VOR but the pilot would have to select the desired course on his CI. If the pilot is flying a TACAN approach with the copilot monitoring him, both would select TACAN, but the copilot would have to select the desired course on his CI. Finally, if the pilot is flying a TACAN approach, he would select TACAN and have the copilot select the desired TACAN radials - at the same time the copilot could back up the pilot with a VOR approach. To do this, he would select VOR and have the pilot select the desired VOR radials.

(3) Instrument Cockpit Check as applicable to H-3:

(a) Publications. Appropriate and up-to-date. A set of Flip Enroute publications is carried onboard the H-3 for each flight. The Flip publications should be checked along with the aircraft maintenance forms. The date, area coverage and number of volumes should be examined. Two Terminal Instrument Approach books should be available since the size of the H-3 cockpit precludes one pilot from monitoring the other pilot's let-down plate. When checking the aircraft discrepancies, especially note the condition of the flight instruments, navigation equipment and instruments, and the radios. Particular attention should be given to the anti-icing, pitot heat, windshield wipers and lighting systems.

(b) Clocks. Running and correct time.

(c) Altimeters. Set current altimeter setting. Should read field elevation $\pm$ 75 feet.

(d) Heading Indicator. Indicate correct movement in turns. Agree with each other and standby compass.

(e) Turn and Slip Indicator. Indicate correct needle and ball movement during taxi turns.

(f) Attitude Indicator. Erect, no warning flags, check pitch and trim set alignment.

(g) Magnetic Compass. Check accuracy and freedom of movement.

(h) VVI. Check pointer at zero.

(i) Airspeed Indicator. Check pointer at zero.

(j) Pitot Heat. Check for proper operation.

(4) Navigation Equipment and Instruments:

(a) Tune and identify.

(b) Bearing Pointer(s) - Point to Station. When checking the VOR/TACAN at a designated ground check point, the allowable error is $\pm$ 4°.

(c) Range Indicator - Range Warning Flag out of view and distance indicated within 1/2 mile or 3% of the distance to the facility, whichever is greater. A 1/4 NM fluctuation on the DME is acceptable.

(d) Course Indicator(s) - When checking the VOR/TACAN at a designated ground checkpoint, the allowable error is $\pm$ 4°.

(e) Rotate course set knob - Check for proper CI displacement (10° between outer dots and center).

(f) TO/FROM Indicator - Starting with the CI centered, rotate course set knob and check that the TO changes to a FROM indication after approximately 90 degrees of course selector change.

4-6. MODULE I-5, Instrument Departures. (0.3 Hour)

a. Objective (Standard - D). Answer questions pertaining to the requirements and procedures for:

(1) Normal instrument takeoff (ITO).

(2) Running ITO.

(3) Instrument climb.

(4) Instrument departures.

b. Student Requirements and Tips:

(1) Prerequisite Training. Complete Academic Module I-2.

(2) Assignment. Read Supplemental Information

c. Source Reference.

(1) AFM 51-37, Instrument Flying.

(2) TO 1H-3(C)E-1, Flight Manual.

d. Supplemental Information:

(1) In addition to the expected hazards of reduced visibility due to precipitation and ground fog, many H-3 missions are flown from unprepared areas and encounter dust, dirt, sand, or snow covered surfaces. Rotor downwash, as power is applied to hover, will cause the loose material to envelope the helicopter, resulting in the pilot losing outside visual reference. Night operations accentuate this effect since even a small amount of dust or snow diffuses the landing/searchlight beam and reflects the light back into the pilot's eyes, blinding him to outside visual references.

(2) Two methods of performing an instrument takeoff are described in the flight manual. The running method is accomplished much like a normal visual running takeoff and is used when runway or ground conditions permit and/or when sufficient power is not available for a hovering takeoff. Preparation for the ITO must begin long before the helicopter takes the runway. The pilots must be thoroughly familiar with the departure route, altitude restrictions, frequency requirements etc. A complete instrument cockpit check must be completed. Planning for the ITO should include the possibility of return to the field in case of emergency and suitable precautions should be taken including preparation for an instrument approach and monitoring of the ITO by GCA or other facility. Prior to liftoff, the pilot will accomplish the departure briefing and set all radios and navigation sets for departure to be flown. When initiating the takeoff, allow the aircraft to roll forward to align the nose gear prior to applying power for takeoff. Under actual weather conditions, visual references (such as the runway center line and runway lights) can be used initially to help maintain heading. In crosswinds, a slight amount of lateral cyclic may be used to help avoid crosswind drift. In actual weather (except for reporting an emergency condition), brief your crew to avoid interphone chatter and delay the After Takeoff Checklist until the instrument climb is established, a safe altitude is reached and departure instructions are received, acknowledged and complied with.

(3) The normal H-3 instrument takeoff resembles the visual maximum power takeoff and is used for departure from an unprepared surface if sufficient power is available. This maneuver is also practiced for use when an inadvertent brown/white-out is experienced during operational landings or takeoffs. In this hazardous situation, the

normal ITO may have to be modified so that it is initiated from a hover, or approach to a hover, rather than from the ground. Another modification of the normal ITO is accomplished from a prepared departure site where hover checks are completed prior to an immediate entry into IFR conditions on departure. For this takeoff, since normal flight instruments cannot register direction of flight or airspeed in other than forward flight, the control technique during the initial phase must ensure positive measures to prevent inadvertent sideward or backward flight or loss of altitude. Since the attitude indicator is the primary control instrument, its adjustment is critical. The attitude indicator should be adjusted by setting the pitch and roll adjustment knobs at the zero trim dots.

(4) As the helicopter becomes airborne, establish a three degree nose low pitch attitude while maintaining a level bank attitude. Maintain this attitude and crosscheck the vertical velocity indicator and altimeter for positive climb indications while accelerating to 70 knots IAS. Then raise the nose slowly to a nose up indication of approximately three degrees, reduce collective pitch to obtain the desired climb power and adjust attitude to maintain the desired climb airspeed of 80 knots. The recommended climb airspeed under instrument conditions is 70-80 knots IAS.

4-7. MODULE I-6, IFR Navigation. (1.0 Hour)

a. Objective (Standard - D). Understand and apply basic IFR navigation procedures IAW AFM 51-37 and FLIP.

(1) Intercept courses.

(2) Identify station passage.

(3) Home to a NAV fix.

(4) Track to a NAV fix.

(5) Navigate along airways.

b. Student Requirements and Tips:

(1) Prerequisite Training. Complete Academic Module I-4.

(2) Assignment. Read Supplemental Information.

(3) This module is in two parts.

c. Source Reference:

(1) AFM 51-37, Instrument Flying.

(2) FLIP, General Planning Section.

d. Supplemental Information:

(1) In radio navigation, a 30^{o} drift correction is not uncommon when encountering high winds and course interception angles up to 90^{o} may be necessary. Radio reception is poor when obstructions are between the helicopter and the station. When conducting low level flight in mountains and over terrain where poor reception is encountered, climb, if possible, until reliable communications are established. ADF is not usually as affected as VOR/TACAN under these conditions and has an additional advantage in that it can be used on broadcast stations when no other facility exists. However, The ADF is unreliable when the aircraft is in a turn or when operating in the vicinity of thunder storms.

(2) A word of caution when planning instrument flights: minimum enroute altitudes must be closely examined. Single engine flight altitude is limited by gross weight and density altitude. The inability to maintain terrain clearance, if the loss of an engine should occur, can result in a dangerous condition particularly when the ceiling does not permit transition to visual conditions before reaching a single engine flight altitude.

4-8. MODULE I-7, TACAN Navigation. (0.5 Hour)

a. Objective (Standard - D). Understand and apply TACAN navigation procedures IAW AFM 51-37.

(1) Arc.

(2) Navigating fix-to-fix.

(3) Intercept an Arc from a Radial.

(4) Intercept a Radial from an Arc.

b. Student Requirements and Tips. Assignment:

(1) Read AFM 51-37, Chapter 11, TACAN Characteristics.

(2) Read Supplemental Information.

c. Source Reference. AFM 51-37.

d. Supplemental Information. Precautionary Actions. Several precautionary actions should be taken by pilots to guard against in-flight use of erroneous navigation signals:

(1) Always check the identification of any navigational aid station and monitor it during flight.

(2) Always utilize ALL suitable navigation equipment on board the aircraft and crosscheck heading and bearing information.

(3) Never overfly an ETA without careful crosscheck of navigational aids and ground checkpoints.

4) Check NOTAMS and FLIP before flight for possible malfunctions or limitations on navigational aids to be used.

(5) Discontinue use of any suspected navigational aid and, if necessary, confirm aircraft position with radar or other equipment.

4-9. MODULE I-8, Holding. (0.5 Hour)

a. Objective (Standard - D). Understand and apply IFR holding procedures IAW AFM 51-37 and FLIP:

(1) ADF.

(2) VOR.

(3) TACAN.

b. Student Requirements and Tips. Read Supplemental Information.

c. Source Reference. AFM 51-37, Instrument Flying.

d. Supplemental Information. Holding airspeed is 90 KIAS unless weight and altitude require lower airspeed. If delays are anticipated, fuel may be conserved by reducing power, as desired, or by establishing maximum endurance cruise. Large drift correction angles (occasionally as much as 30°), should be anticipated.

4-10. MODULE I-9, IFR Communications/Altimeter Procedures. (0.7 Hour)

a. Objective (Standard - C). Answer questions concerning IFR communications/altimeter procedures.

(1) Radio communication in a non-radar environment.

(2) Communication in a radar environment/lost communication procedures.

(3) Reporting unusual weather or malfunctioning equipment.

(4) AIMS/IFF procedures.

(5) Altimeter procedures.

b. Student Requirements and Tips:

Assignment. Read Supplemental Information.

c. Source Reference:

(1) FLIP, General Planning Section, Pilot Procedures.

(2) FLIP IFR Enroute Supplement, Emergency Procedures Section and back cover.

d. Supplemental Information:

(1) The following is a list of required radio calls which you will be expected to make on all instrument flights:

(a) When leaving any assigned holding fix or point and not in radar contact.

(b) When vacating an assigned altitude/flight level for a newly assigned altitude/flight level.

(c) When vacating an assigned altitude when cleared for an approach.

(d) When leaving final approach fix inbound on final approach and not in radar contact.

(e) When approach has been missed (request clearance for specific action, i.e., to alternate airport, another approach, etc.).

(f) Prior to making an altitude change when operating on a clearance specifying "VFR conditions on-top."

(g) When changing TAS by more than 10 knots.

(2) In addition to (a) through (g) above, the following reports will also be made without request when not in radar contact.

(a) The time and altitude/flight level reaching a fix or point to which cleared.

(b) A corrected estimate at any time it becomes apparent that an estimate as previously submitted is in error in excess of three minutes.

(3) Pilots encountering weather conditions which have not been forecast, or hazardous conditions which have been forecast, shall forward

a report of such weather to air traffic control. The reporting of unanticipated weather or hazardous conditions may be of importance to the safety of other aircraft proposing flight within the area.

4-11. MODULE I-10, Instrument Approach Briefing. (0.6 Hour)

a. Objective (Standard - C). Correctly respond to questions pertaining to:

(1) Special instrument related briefing items as per MAC Sup to AFR 60-16.

(2) Instrument approach briefing using ARRSP 55-5, Aircrew Briefing Guide, Helicopters.

b. Student Requirements and Tips:

Assignment. Read Supplemental Information.

c. Source Reference. ARRSP 55-5, Aircrew Briefing Guide.

d. Required Materials/Equipment. ARRSP 55-5, Aircrew Briefing Guide, Instrument Approach Briefing (normally located in back of flight crew checklist).

e. Supplemental Information:

(1) A comprehensive instrument approach briefing is of paramount importance for completion of a safe and effective instrument approach. During your simulator and flight training, you will be flying a wide variety of instrument approaches. Prior to the first instrument approach of your flight, you will be expected to brief the approach in its entirety. Then, if you are flying multiple approaches at the same airfield, you need only brief the differences from your last approach.

(2) Prior to reaching the holding/initial approach fix, the latest weather should have been obtained and the instrument approach briefing completed. If an expected approach time has been given, plan to be in a position where you can most expeditiously execute the approach at that time.

(3) All checklists should be accomplished prior to the final approach fix so that full attention can be given to flying during the approach. Approach airspeed is usually 90 KIAS, weight and altitude permitting. In some instances, cruise airspeed may be required throughout an approach to expedite traffic flow.

(4) The academic module covering the approach briefing will expand on each of the following ARRSP 55-5 instrument approach briefing items:

(a) Type of approach.

(b) Enroute descent - minimum terrain clearance altitude.

(c) Minimum sector/safe altitudes.

(d) Terrain/obstacle hazards.

(e) DH/MDA.

(f) Visibility required/RVR.

(g) Missed approach point and intentions.

(h) Altimeter setting.

(i) Navigation and communication settings.

(j) Backup approach and frequency.

(k) Timing.

(l) For multiple approaches only, those items not previously briefed need be covered.

(5) Copies of various instrument approach plates have been provided at the end of this chapter for familiarization purposes.

4-12. MODULE I-11, ADF Approach. (0.8 Hour)

a. Objective (Standard - C). Answer questions to apply ADF approach procedures to specific approach plates IAW AFM 51-37 and FLIP.

(1) Procedure turn.

(2) Final approach.

(3) Missed approach.

(4) Communications.

b. Student Requirements and Tips. Prerequisite Training: Complete Academic Modules I-8 and I-10.

c. Source Reference:

(1) AFM 51-37, Instrument Flying.

(2) TO 1H-3(C)E-1, Flight Manual.

(3) FLIP.

4-13. MODULE I-12, VOR Approach. (0.9 Hour)

a. Objective (Standard - C). Answer questions to apply VOR approach procedures to specific approach plates IAW AFM 51-37 and FLIP:

(1) Procedure turn.

(2) Final approach.

(3) Missed approach.

b. Student Requirements and Tips. Prerequisite Training: Complete Academic Module I-11.

c. Source Reference:

(1) AFM 51-37, Instrument Flying.

(2) TO 1H-3(C)E-1, Flight Manual.

(3) FLIP.

4-14. MODULE I-13, TACAN Approach. (0.5 Hour)

a. Objective (Standard - C). Answer questions to apply TACAN approach procedures to specific approach plates IAW AFM 51-37 and FLIP:

(1) Initial approach portion.

(2) Final approach.

(3) Missed approach.

(4) Communications.

b. Student Requirements and Tips:

(1) Prerequisite Training. Complete Academic Modules I-7 and I-12.

(2) Assignment. Read Supplemental Information

c. Source Reference:

(1) AFM 51-37, Instrument Flying.

(2) TO 1H-3(C)E-1, Flight Manual.

(3) FLIP.

d. Supplemental Information. Like VOR, TACAN bearing and distance signals are subject to line of sight restrictions. The TACAN information is presented on the pilot's and copilot's number two bearing pointer of their respective BDHIs. The TACAN control panel consists of a power switch, volume control and channel selector. The power switch has three positions: OFF, REC and T/R. Select either the REC or T/R position when the set is turned ON. In the REC position, you are only presented bearing information and in the T/R position, both bearing and distance information is presented. This academic module will show you the procedures that must be followed to set up and fly a TACAN approach.

4-15. MODULE I-14, Radar Approaches. (0.7 Hour)

a. Objective (Standard - C). Answer questions concerning ASR and PAR approach procedures IAW AFM 51-37 and FLIP:

(1) Pattern.

(2) Final approach.

(3) Missed approach.

(4) Gyro out.

(5) Communications.

b. Student Requirements and Tips:

Prerequisite Training. Complete Academic Module I-10.

c. Source Reference:

(1) AFM 51-37, Instrument Flying.

(2) TO 1H-3(C)E-1, Flight Manual.

(3) FLIP.

(4) IFR Supplement.

4-16. MODULE I-15, ILS Equipment/Approaches. (0.7 Hour)

a. Objective (Standard - C). Answer questions to apply ILS approach procedures to specific approach plates IAW AFM 51-37 and FLIP:

(1) Non-precision:

(a) Localizer.

(b) Localizer back course.

(2) Precision:

(a) Front course.

(b) Back course.

(3) Communications.

(4) Missed approach.

b. Student Requirements and Tips:

(1) Prerequisite Training. Complete Academic Module I-10.

(2) Assignment. Read Supplemental Information.

c. Source Reference:

(1) TO 1H-3(C)E-1, Flight Manual.

(2) AFM 51-37, Instrument Flying.

(3) FLIP.

d. Supplemental Information. The Instrument Landing System (ILS) is designed to provide very accurate flight path guidance to a point on final approach from which a landing may be completed under low ceiling and visibility conditions. The marker beacons provide fix information in relationship to the end of the runway. Other associated equipment may include compass locators and at some sites, distance measuring equipment installed in conjunction with the localizer or glide slope transmitter. The number 2 bearing pointer does not provide any usable information in the ILS mode.

4-17. MODULE I-16, IFR Landing Procedures. (0.3 Hour)

a. Objective (Standard - C). Understand IFR landing procedures and apply these procedures in the simulator/aircraft.

(1) Landing from an instrument approach.

(2) Circling to land from an instrument approach.

(3) Missed approach.

b. Source Reference. AFM 51-37, Instrument Flying.

c. Supplemental Information. During night approaches, with the cockpit lights on high intensity, the pilot will not see the runway environment as soon as he would with the cockpit lights turned low. If visual contact has not been established upon reaching the missed approach point, execute a missed approach.

4-18. MODULE I-17, IFR Emergencies. (0.4 Hour)

a. Objective (Standard - C). Recognize the indication(s) and understand the corrective action(s) for IFR in-flight emergencies IAW TO 1H-3(C)E-1.

(1) Single engine approach and landing.

(2) Two engine failure.

(3) Windshield icing.

(5) Engine icing.

b. Source Reference. TO 1H-3(C)E-1, Flight Manual, Sections II and IX.

4-19. MODULE I-18, IFR Terrain Avoidance. (0.4 Hour)

a. Objective (Standard - C). Understand the precautions required by aircrews to assure IFR terrain and obstruction clearance under IFR conditions.

b. Source Reference. AFM 51-37, Instrument Flying

4-20. Instrument Seminar. (2.0 Hour)

a. Objective. The student will discuss and answer questions on the instrument phase of training.

b. Student Requirements and Tips:

(1) Prerequisite Training. Complete all "I" academic modules and Aircraft Lesson I-1 or Simulator Lesson SI-6.

(2) Assignment. Review Chapter 4 of this student guide.

(3) This seminar must be completed prior to Simulator Lesson SIC-1.

c. Source Reference:

(1) TO 1H-3(C)E-1, Flight Manual.

(2) AFM 51-37, Instrument Flying.

d. Required Materials/Equipment:

(1) TO 1H-3(C)E-1, Flight Manual.

(2) AFM 51-37, Instrument Flying.

(3) This student guide.

SECTION C - SIMULATOR LESSONS

4-21. SIMULATOR LESSON SI-1. (2.0 Hour)

a. Objectives:

(1) See Figure 4-2.

(2) Additional items to be covered:

(a) AFCS operation.

(b) Use of cyclic trim, CG Trim, BAR Alt, and RAD Alt.

(c) Gear warning system.

b. Student Requirements and Tips:

(1) Prerequisite Training. Academic Modules I-4, I-5, I-9, I-10, I-14, I-16, and Simulator Lesson SP-1.

(2) Assignment. Review maneuver parameters as required.

c. Source References:

(1) TO 1H-3(C)E-1, Flight Manual

(2) AFM 51-37, Instrument Flying

d. Supplemental Information. The primary purpose of this lesson is basic instrument/crosscheck practice. Also included will be radar approaches.

e. Instructor Guidance. This lesson may be combined with ST-1 if student proficiency warrants.

4-22. SIMULATOR LESSON SI-2. (2.0 Hour)

a. Objectives:

(1) See figure 4-2.

(2) You will also be required to combat the following emergency situations:

(a) APU fire.

(b) Pitot icing (verbally).

(c) Windshield icing (verbally).

(d) Engine icing.

b. Student Requirements and Tips:

(1) Prerequisite Training. Academic Modules I-6, I-7, I-11, I-17, and Simulator Lesson SI-1.

(2) Assignment. Review maneuver parameters as required.

c. Source References:

(1) TO 1H-3(C)E-1, Flight Manual.

(2) AFM 51-37, Instrument Flying.

d. Supplemental Information. This lesson will extend your instrument practice to ADF approaches and TACAN Fix-to-Fix.

e. Instructor Guidance. Subsequent simulator instrument missions may be combined if student proficiency warrants.

4-23. SIMULATOR LESSON SI-3. (2.0 Hour)

a. Objectives:

(1) See figure 4-2.

(2) You will also be required to combat the following emergency situations:

(a) Engine compartment fire.

(b) Fuselage fire.

(c) Electrical fire.

(d) Smoke, fume, and odor elimination.

(e) Bailout (verbally).

b. Student Requirements and Tips:

(1) Prerequisite Training. Academic Modules P-18, I-13, I-15, I-18, and Simulator Lesson SI-2.

(2) Assignment. Review maneuver parameters as required.

c. Source References:

(1) TO 1H-3(C)E-1, Flight Manual.

(2) AFM 51-37, Instrument Flying.

d. Supplemental Information. This lesson will include VOR and TACAN approaches.

4-24. SIMULATOR LESSON SI-4. (2.0 Hour)

a. Objectives:

(1) See figure 4-2.

(2) You will also be required to combat the following emergency situations:

(a) Use of external power to start the APU.

(b) No APU tachometer indication.

(c) Low APU oil pressure.

(d) APU clutch late engagement.

b. Student Requirements and Tips:

(1) Prerequisite Training. Simulator Lesson SI-3.

(2) Assignment. Review the maneuver parameters as required.

c. Source References:

(1) TO 1H-3(C)E-1, Flight Manual.

(2) AFM 51-37, Instrument Flying.

d. Supplemental Information. This lesson will include an ILS approach. Demonstration maneuvers will include the use of emergency fuel control and AFCS off flight. The emergency fuel control may be used in the event that an automatic fuel control unit malfunctions. Use of the emergency fuel control will be demonstrated by retarding a speed selector to attain a 15-20% torque split. Slowly advance the emergency fuel control lever of the affected engine until torques are matched. Retard the speed selector of affected engine to ground idle. The instructor pilot will initiate a series of climbs and descents then fly an approach to a landing with the student maintaining matched torque by use of the emergency fuel control level. To return to normal engine operation, retard the emergency fuel control lever to attain a 15-20% torque split. Advance the speed selector of the affected engine until torques are matched. Retard the emergency fuel control lever to the CLOSED position.

CAUTION. The emergency fuel control lever must be used with extreme caution as it has a positive control on fuel flow and misuse can cause engine overspeed or overtemperature. In all instances of emergency fuel control operation, the speed selectors must not be retarded beyond the ground idle position.

4-25. SIMULATOR LESSON SI-5. (2.0 Hour)

a. Objectives. See figure 4-2.

b. Student Requirements and Tips:

(1) Prerequisite Training. Simulator Lesson SI-4.

(2) Assignment. Review the maneuver parameters as required.

c. Source References:

(1) TO 1H-3(C)E-1, Flight Manual.

(2) AFM 51-37, Instrument Flying.

4-26. SIMULATOR LESSON SI-6. (2.0 Hour)

a. Objectives. See figure 4-2.

b. Student Requirements and Tips:

(1) Prerequisite Training. Simulator Lesson SI-5.

(2) Assignment. Review as required.

c. Source References:

(1) TO 1H-3(C)E-1, Flight Manual.

(2) AFM 51-37, Instrument Flying.

d. Supplemental Information. This lesson will be a review of all previous lessons.

4-27. SIMULATOR LESSON SI-C. (2.0 Hour)

a. Objectives:

(1) See figure 4-2.

(2) Be prepared to combat representative emergency situations.

b. Student Requirements and Tips:

(1) Prerequisite Training. Simulator Lesson SI-6 and Instrument Seminar.

(2) Assignment. Review as required.

c. Source References:

(1) TO 1H-3(C)E-1, Flight Manual.

(2) AFM 51-37, Instrument Flying.

d. Supplemental Information. This lesson will be an instrument check in the simulator. You will be required to perform representative instrument and emergency maneuvers in addition to normal flight preparation, TOLD, and a crew briefing.

SECTION D - AIRCRAFT LESSONS

4-28. Aircraft Lesson I-1. (1.5 Hour)

a. Objectives:

(1) See figure 3-1.

(2) Be prepared to discuss APU fires.

b. Student Requirements and Tips:

(1) Prerequisite Training. Simulator Lesson SI-3.

(2) Review as required.

c. Source References:

(1) TO 1H-3(C)E-1, Flight Manual.

(2) AFM 51-37, Instrument Flying.

4-29. Aircraft Lesson IC-1. (1.5 Hour)

a. Objectives:

(1) See figure 3-1.

(2) Be prepared to discuss emergency procedures covered previously.

b. Student Requirements and Tips:

(1) Prerequisite Training. Simulator Lesson SIC-1, and Aircraft Lesson I-1.

(2) Assignment. Review as required.

(3) Tips. The flight examiner will normally perform the following duties for you if you include them in your briefing:

(a) Fly the aircraft while you brief the approach.

(b) Accomplish timing.

(c) Call altitudes, headings, and courses IAW your copilot briefing.

(d) Make appropriate call at minimums.

c. Source References.

(1) TO 1H-3(C)E-1, Flight Manual.

(2) AFM 51-37, Instrument Flight.

TEST COURSE

COURSE NUMBER	H3P1	DESIGNATION	H-3 (TRAN/INSTM)(SIMULATOR)							TRAIN
FLIGHT TIME	HOURS	2	2	2	2	2	2	2	2	
	TENTHS	0	0	0	0	0	0	0	0	
LESSON	PHASE/SUBJECT	S	S	S	S	S	S	SI	SIC	
	NUMBER	1						6	1	
FLIGHT PREPARATION		2	2	2	3	3	3	3	3	
ENGINE START		2	2	3						
INSTRUMENT COCKPIT CHECK			2	3				3	3	
TAKEOFF: Maximum Performance		1								
Normal Running		2								
Minimum Roll Running		1								
TRAFFIC PATTERN		2								
SINGLE ENGINE: In Flight		2								
Approach and Landing		2								
AFCS OFF: Flight		1								
Landing		1								
ITO: Normal			2		3			3	3	
Running		2		2		3	3	3	3	
BASIC INSTRUMENTS		2	1	2	3	3	3	3	3	
STEEP TURNS			2	3					3	
UNUSUAL ATTITUDES				2		3			3	
INSTRUMENT AUTOROTATIONS					1	2				
HOLDING: ADF				2			3		3	
VOR					3			3	3	
TACAN					2		3		3	
RADAR APPROACHES: ASR			2	3					3	
PAR			2	3					3	
GYRO OUT							3			
ILS: Front Course					2		3		3	
Back Course						2		3		
Localizer Only						3				
ADF APPROACH				2			3		3	
VOR APPROACH					2	3			3	
TACAN: Maintaining an Arc					2		3		3	
Fix to Fix				1	2			3	3	
Approach					2			3	3	
MISSED APPROACH			2	3		3	3	3	3	
LANDING FROM INSTRUMENT APPROACH					2	3			3	
CIRCLING APPROACH PROCEDURES				2			3		3	
AFTER LANDING PROCEDURES		2	2					3	3	
COMMUNICATIONS		1	1	2	2	3	3	3	3	
USE OF CHECKLIST		2	2	2	3	3	3	3	3	
CREW COORDINATION		2	2	2	2	3	3	3	3	
ABNORMAL/EMERGENCY PROCEDURES		2	2	2	2	2	3	3	3	
AIRMANSHIP		S	S	S	S	S	S	S	S	

Figure 4-2. H-3 (Tran/Instm) (Simulator) - CPTS

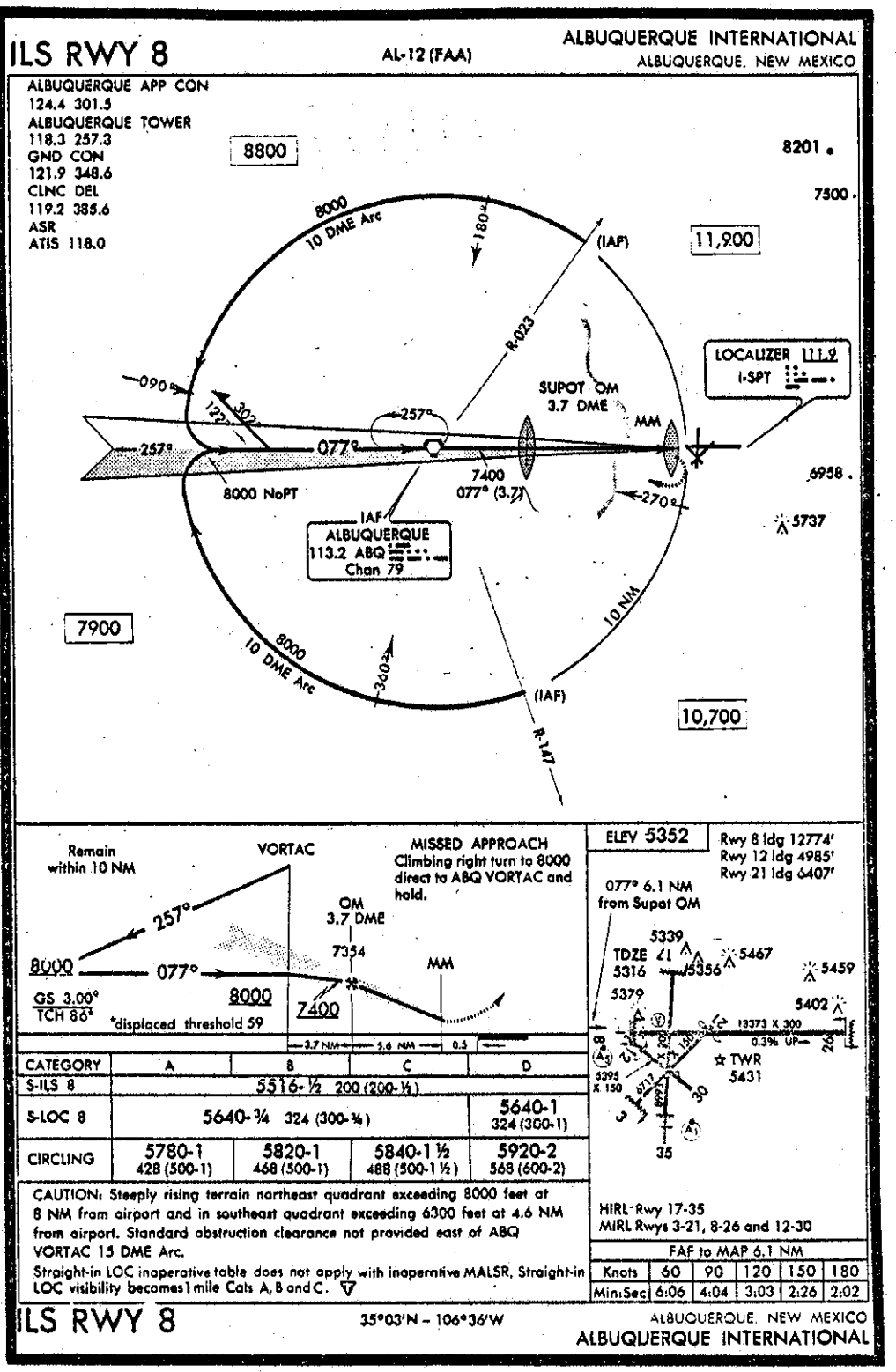

Figure 4-3. Albuquerque ILS/08

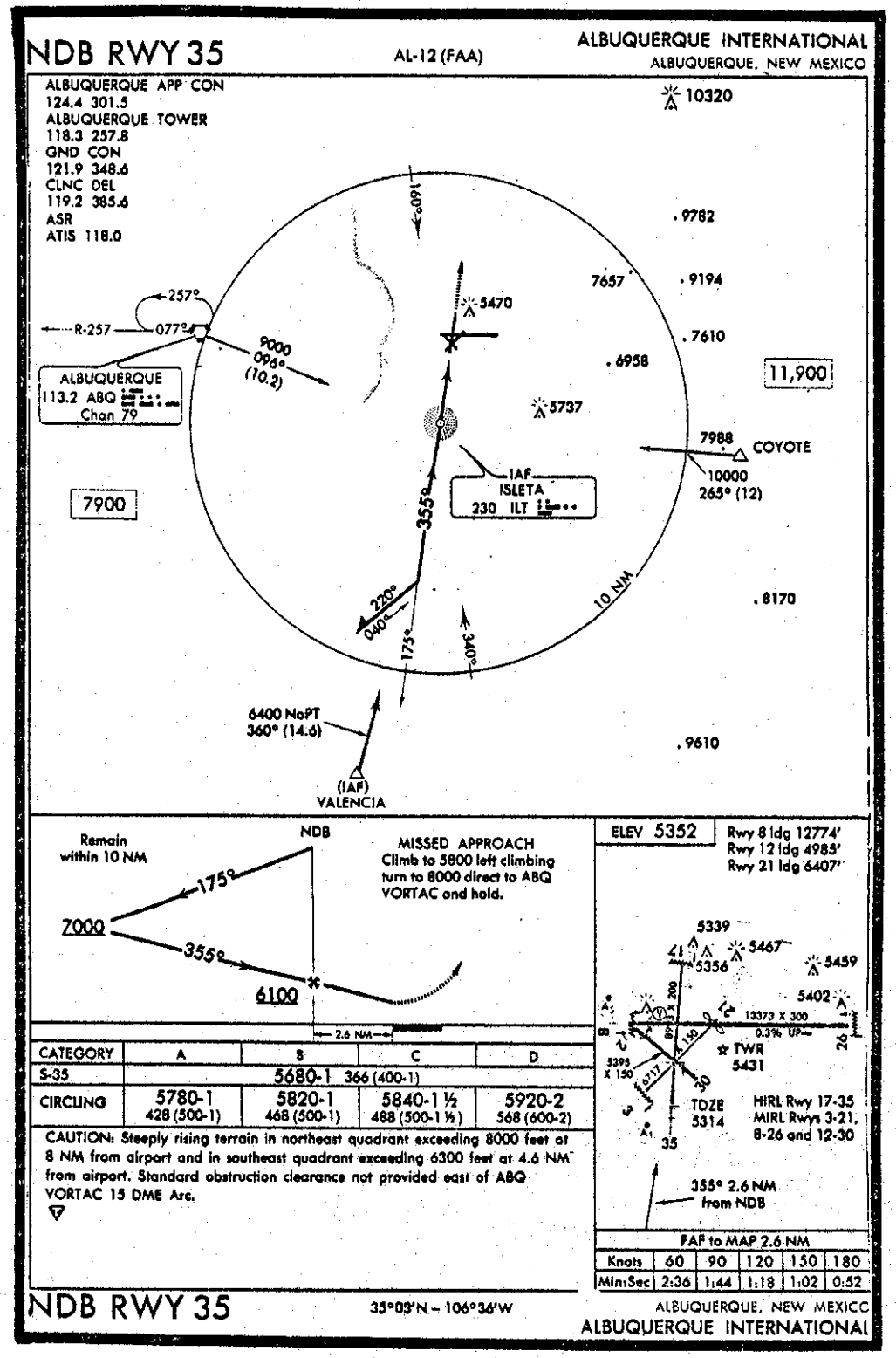

Figure 4-4. Albuquerque NDB/35

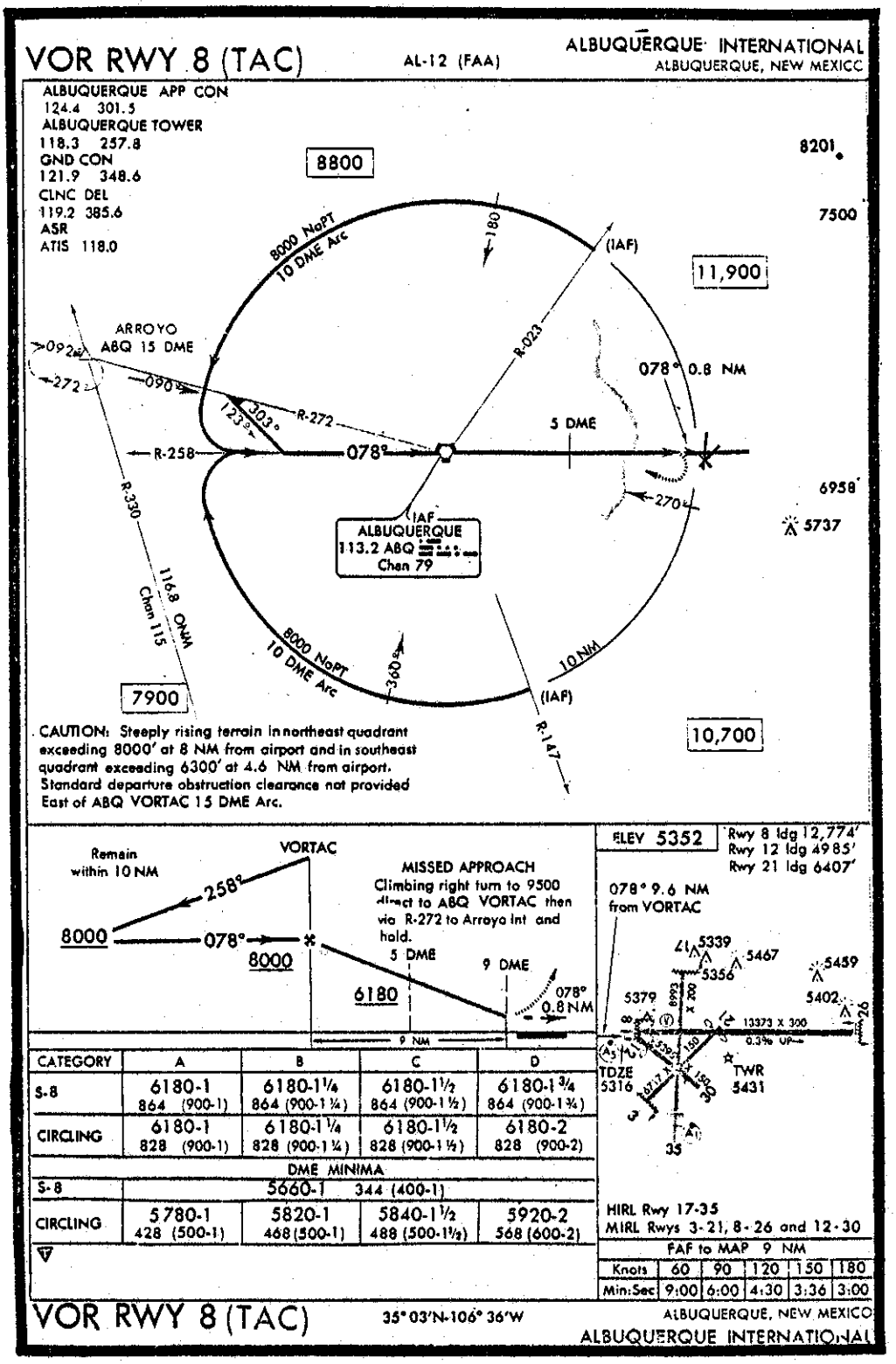

Figure 4-5. Albuquerque VOR/8

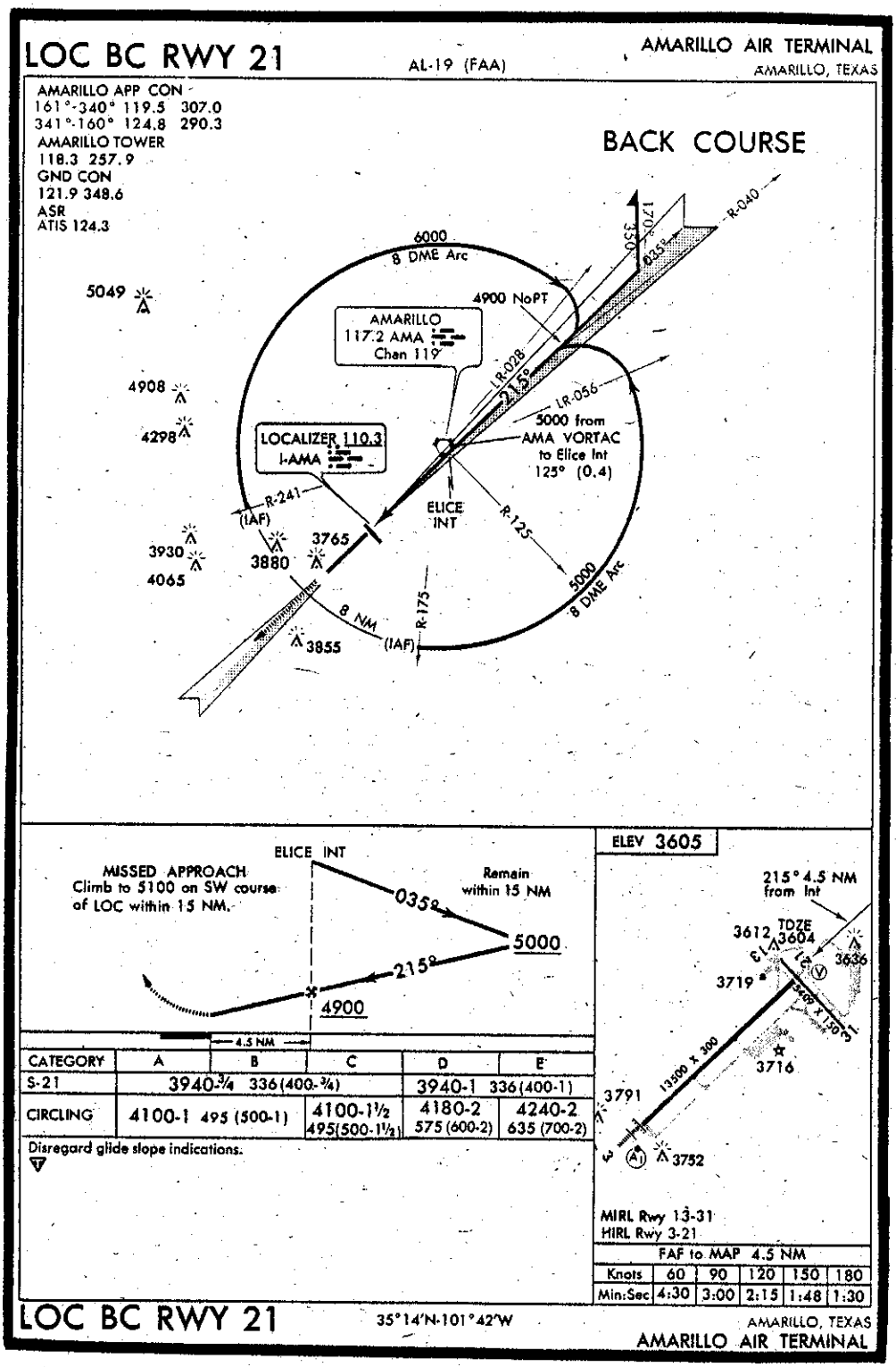

Figure 4-6. Amarillo Air Terminal LOC BC RWY 21

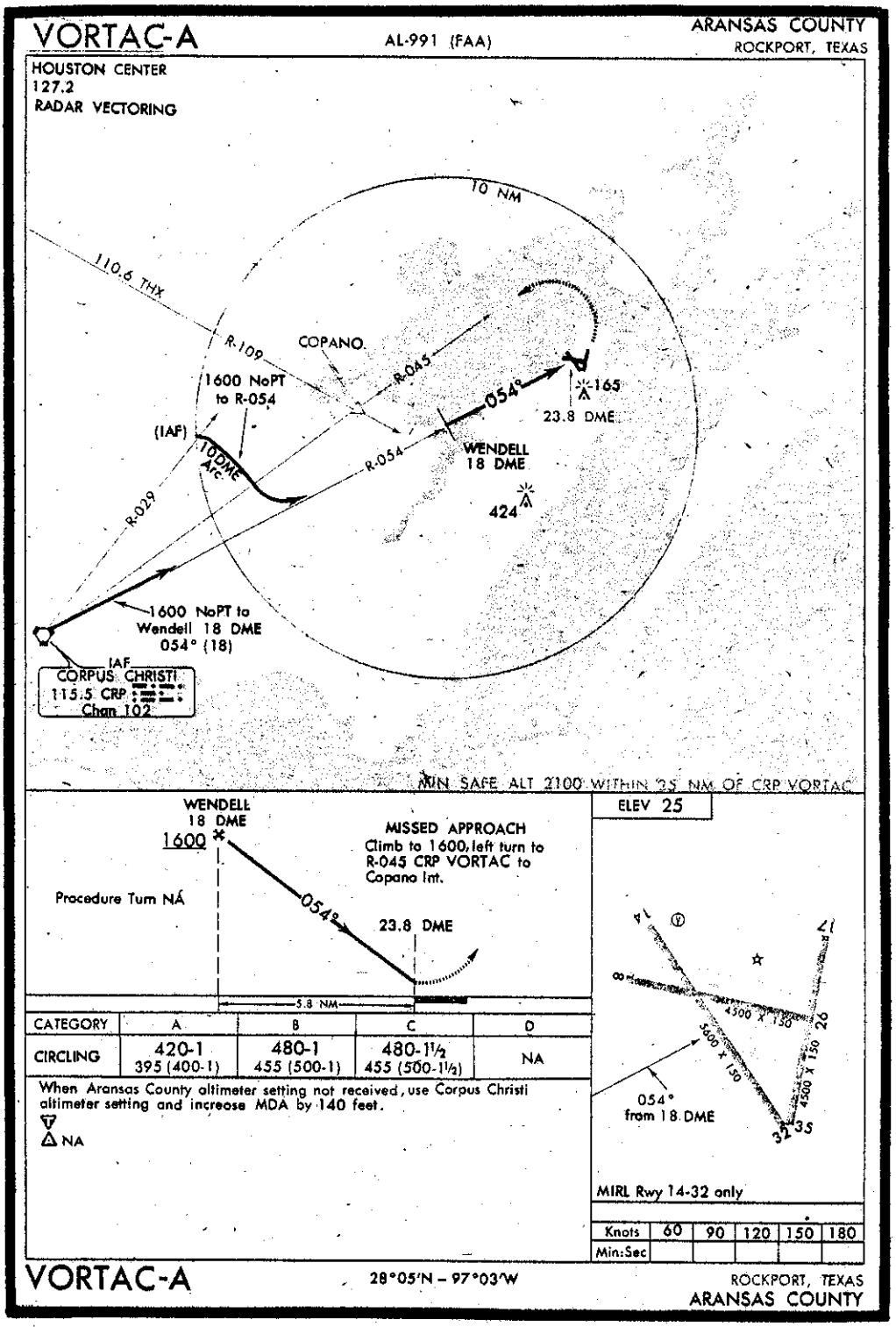

Figure 4-7. Aransas County VORTAC-A

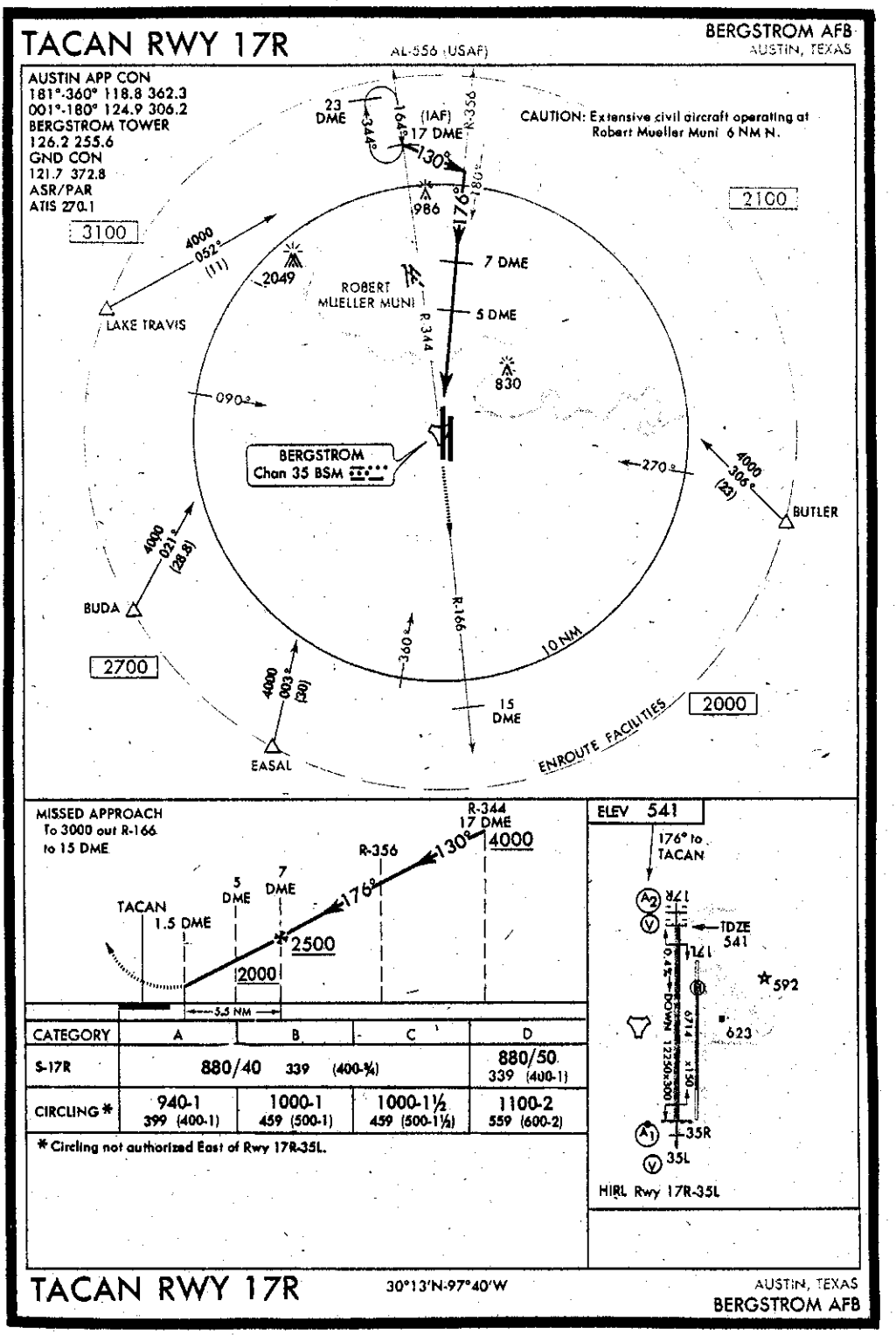

Figure 4-8. Bergstrom AFB TACAN RWY 17R

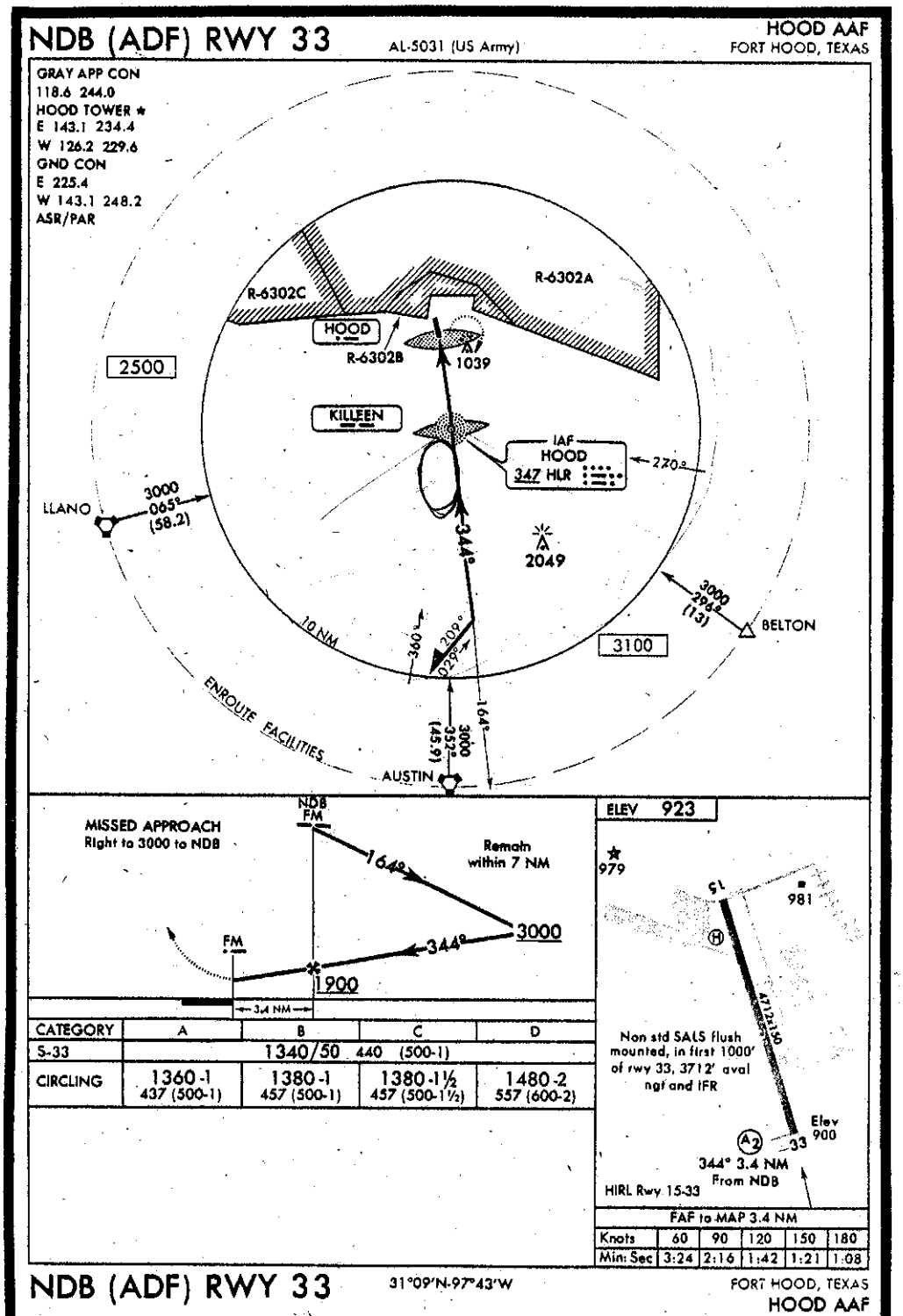

Figure 4-9. Hood AAF NDB (ADF) RWY 33

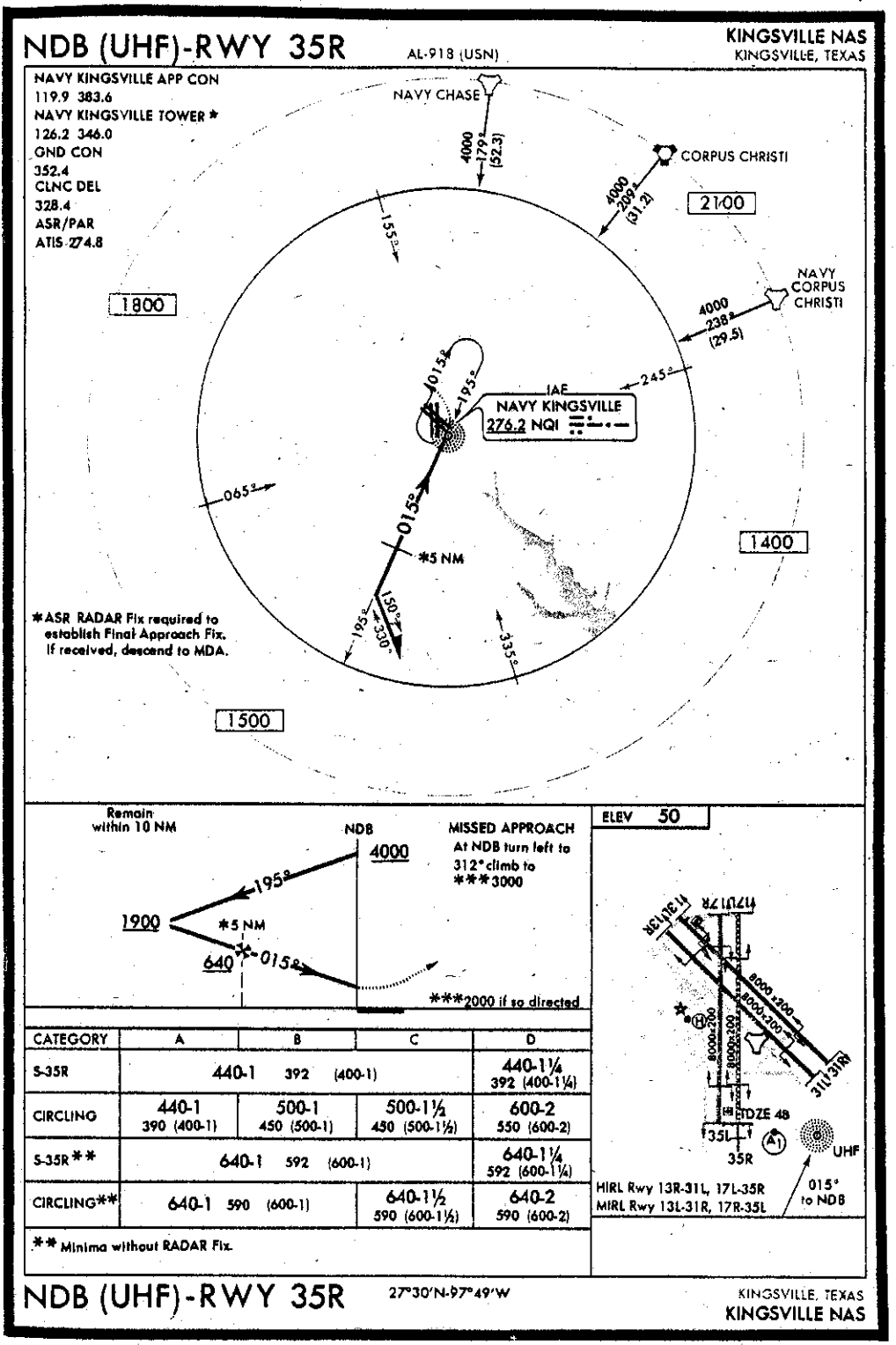

Figure 4-10. Kingsville NAS NDB (UHF)-RWY 35R

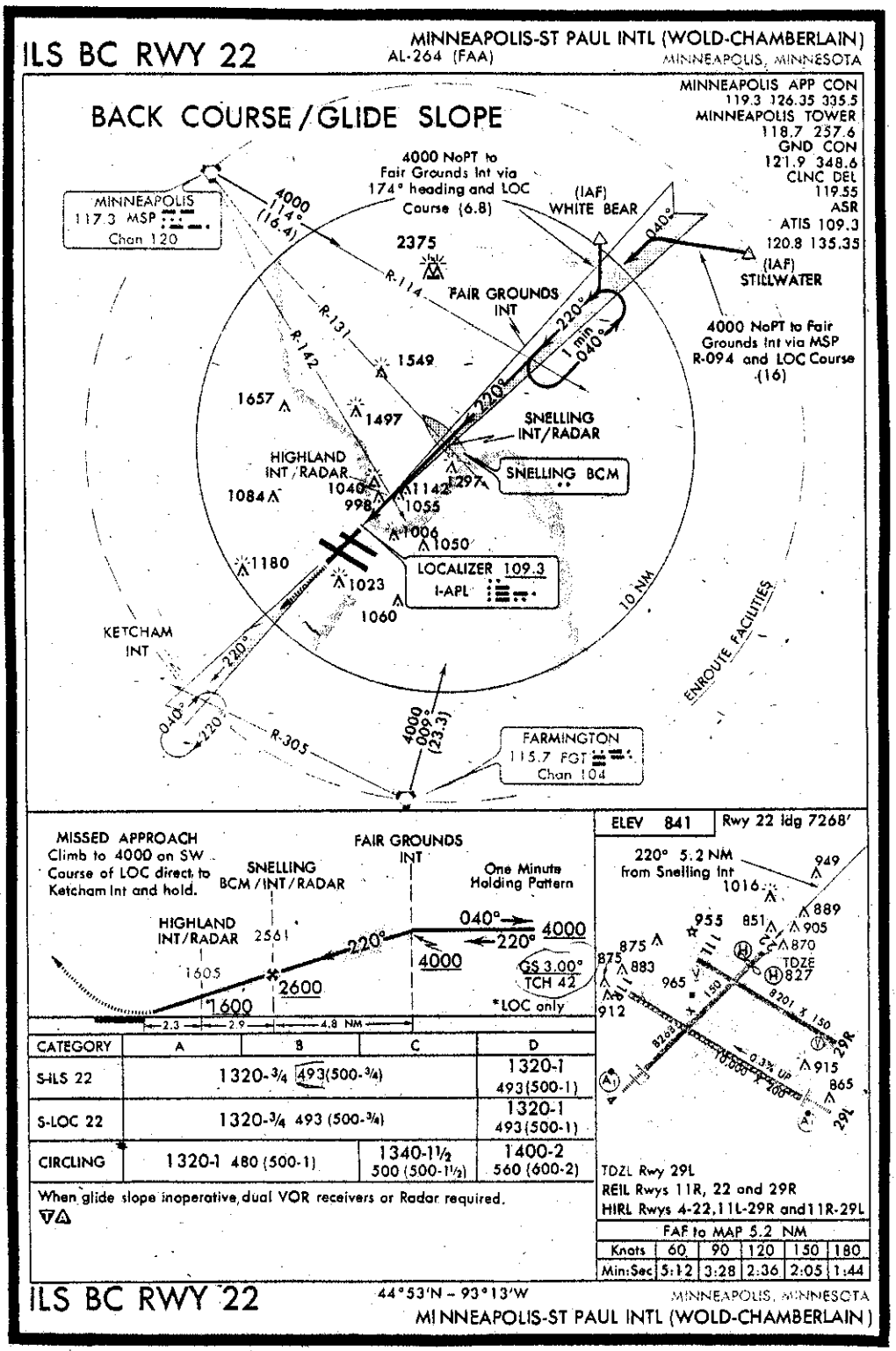

Figure 4-11. Minneapolis-St Paul ILS BC RWY 22

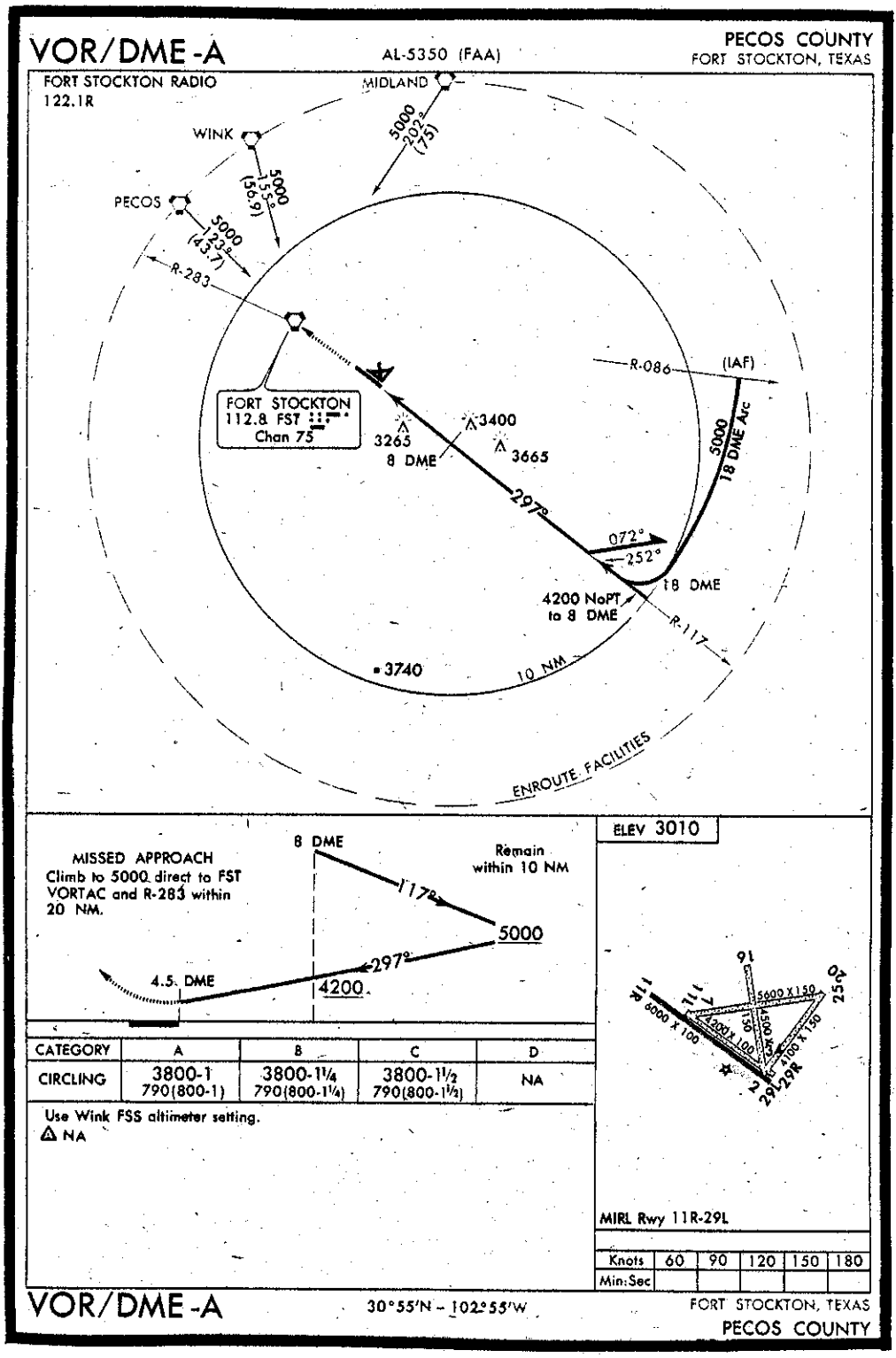

Figure 4-12. Pecos County VOR/DME-A

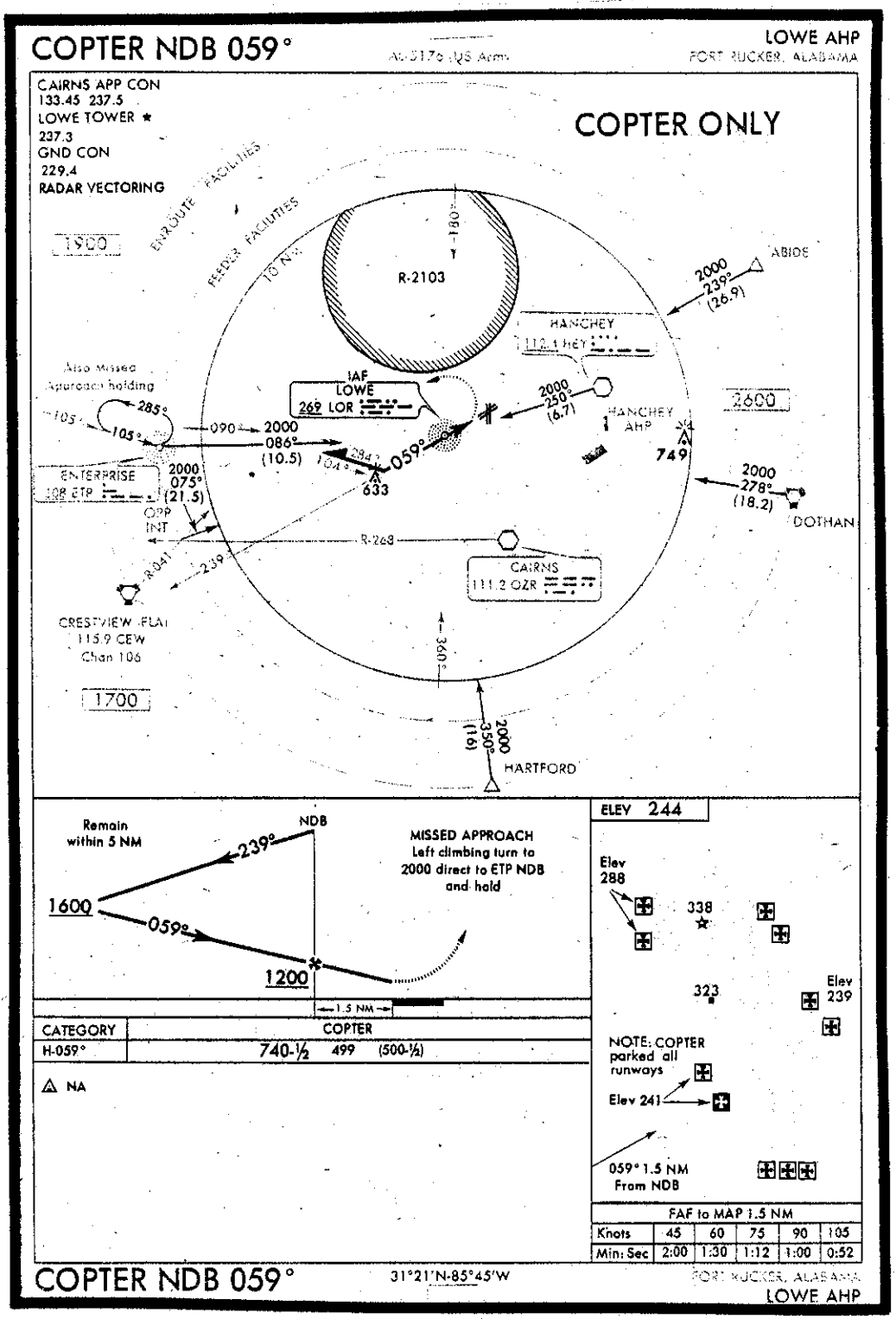

Figure 4-13. Lowe AHP Copter NDB 059°

NOTES, SKETCHES, ETC