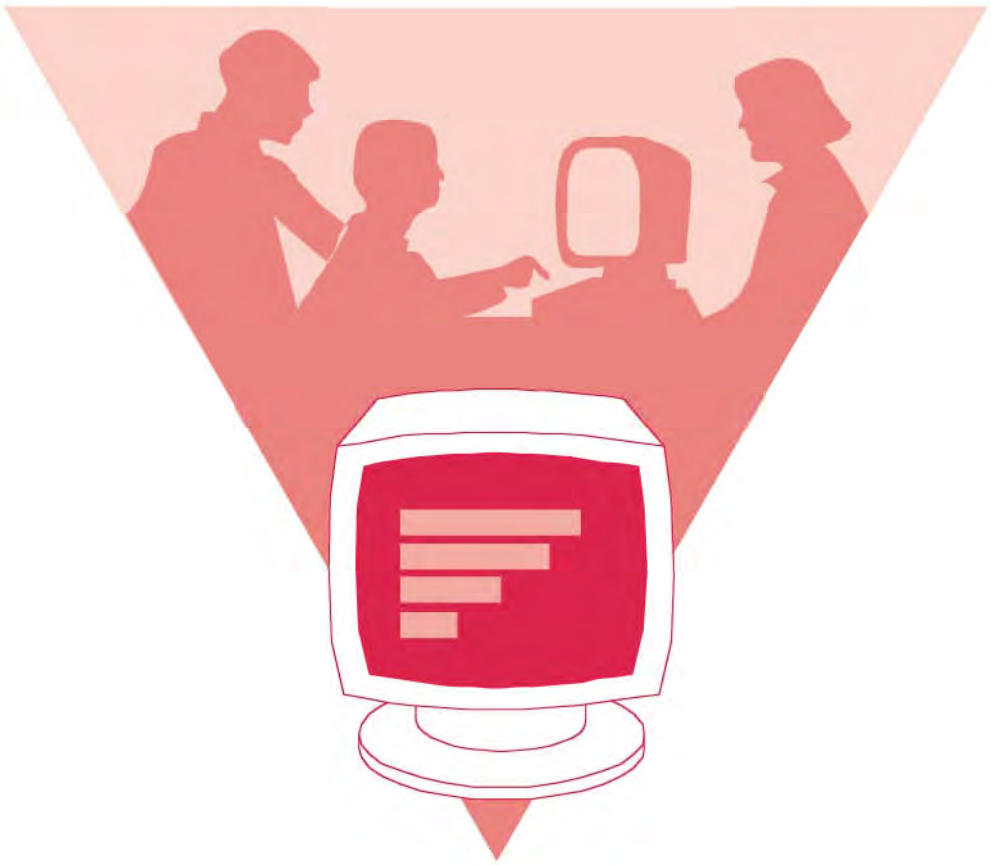
FAA-CT-8080-3E

COMPUTER TESTING SUPPLEMENT FOR INSTRUMENT RATING



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U.S. Department of Transportation
Federal Aviation Administration

COMPUTER TESTING SUPPLEMENT
FOR
INSTRUMENT RATING

2005

U.S. DEPARTMENT OF TRANSPORTATION
FEDERAL AVIATION ADMINISTRATION
Flight Standards Service

PREFACE

This computer testing supplement is designed by the Flight Standards Service of the Federal Aviation Administration (FAA) for use by computer testing designees (CTDs) and testing centers in the administration of airman knowledge tests in the following knowledge areas:

Instrument Rating—Airplane (IRA)
Instrument Rating—Rotorcraft/Helicopter (IRH)
Instrument Rating—Powered Lift (IPL)
Instrument Flight Instructor—Powered Lift (IPI)
Instrument Rating—Foreign Pilot (IFP)
Instrument Flight Instructor—Airplane (FII)
Instrument Flight Instructor—Rotorcraft/Helicopter - (FIH)
Instrument Flight Instructor—Airplane (added rating) (AIF)
Instrument Flight Instructor—Rotorcraft/Helicopter (added rating) (HIF)
Ground Instructor—Instrument (IGI)

FAA-CT-8080-3E supercedes FAA-CT-8080-3D, Computer Testing Supplement for Instrument Rating, dated 2000.

Comments regarding this supplement should be sent to:

U.S. Department of Transportation
Federal Aviation Administration
Flight Standards Service
Airman Testing Standards Branch, AFS-630
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Oklahoma City, OK 73125

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APPENDIX 1

ABBREVIATIONS

The following abbreviations are those commonly used within this Directory. Other abbreviations may be found in the Legend and are not duplicated below. The abbreviations presented are intended to represent grammatical variations of the basic form. (Example—"req" may mean "request," "requesting," "requested," or "requests").

abv	above	MSAW	minimum safe altitude warning
acft	aircraft	NFCT	non-federal control tower
AER	approach end rwy	ngt	night
AFSS	Automated Flight Service Station	npi	non precision instrument
AGL	above ground level	NSTD	nonstandard
apch	approach	ntc	notice
arpt	airport	opr	operate, operator, operational
avbl	available	ops	operations
bcn	beacon	OTS	out of service
blo	below	ovrn	overrun
byd	beyond	PAEW	personnel and equipment working
clsd	closed	p-line	power line
ctc	contact	PPR	prior permission required
dalgt	daylight	req	request
dsplcd	displaced	rgt tfc	right traffic
durn	duration	rqr	request
eff	effective	rwy	runway
emerg	emergency	SPB	Seaplane Base
extd	extend, extended	SR	sunrise
FBO	fixed-based operator	SS	sunset
FCT	FAA Contract Tower	svc	service
fld	field	tfc	traffic
FSS	Flight Service Station	thld	threshold
hr	hour	tkf	take-off
indef	indefinite	tmpry	temporary
ints	intensity	twr	tower
invof	in the vicinity of	twy	taxiway
LAA	Local Airport Advisory		
idg	landing		
lgtd	lighted		
lgts	lights		
med	medium		
MSL	mean sea level		

LEGEND 1.—Abbreviations.

DIRECTORY LEGEND

SAMPLE

(1) **CITY NAME**
AIRPORT NAME (ORL) (2) 4 E (3) UTC-5(-4DT) (4) N28°32.72' W81°21.17' (5)
200 B S4 (9)(10)(11) **FUEL** 100, JET A (12) 0X 1, 2, 3 (13) TPA—1000(800) (14) A0E (15) ARFF Index A (16) Not insp. (17) **JACKSONVILLE COPTER H-46, L-19C IAP** (6)(7)

(18) **RWY 18-36:** H12004X300 (CONC-GRVD) HIRL
RWY 18: LDIN. ALSF1. TDZL. REIL. PAPI(P2R)—GA 3.0° TCH 36'. Thld dsplcd 300'. Trees. Rgt tfc. Arresting device. 0.3% up.
RWY 36: ALSF1. 0.4% down.
RWY 09-27: H6000X150 (ASPH-PFC) S-90, D-160, DT-300-PCN 80 R/B/W/T HIRL CL 0.4% up E
RWY 09: ALSF1. Trees. **RWY 27:** REIL. Rgt tfc.
RUNWAY DECLARED DISTANCE INFORMATION
RWY 09: TORA-6000 TODA-6700 ASDA-5700 LDA-5500
RWY 27: TORA-6000 TODA-6000 ASDA-6000 LDA-5700

(19) **AIRPORT REMARKS:** Special Air Traffic Rules—Part 93, see Regulatory Notices. Attended 1200-0300Z‡. Parachute Jumping. CAUTION: Cattle and deer on arpt. Acft 100,000 lbs or over ctc Director of Aviation for approval 305-894-9831. Fee for all airline charters, travel clubs and certain revenue producing acft. Flight Notification Service (ADCUS) available.

(20) **WEATHER DATA SOURCES:** AWOS-1 120.3 (202) 426-8000. LLWAS.

(21) **COMMUNICATIONS: CTAF** 118.7 **ATIS** ARR 127.25 DEP 134.025
(303) 342-0820 **UNICOM** 122.95
NAME FSS (ORL) on arpt. 123.65 122.65 122.2.
TF 1-800-WX-BRIEF. NOTAM FILE ORL. (22)
NAME RCO 112.2T 112.1R (NAME FSS)
Ⓡ **NAME APP/DEP CON** 128.35 (1200-0400Z‡)
TOWER 118.7 NFCT (1200-0400Z‡) **GND CON** 121.7 **GCO** 135.075 (ORLANDO CLNC) **CLNC DEL** 125.55
PRE TAXI CLNC 125.5

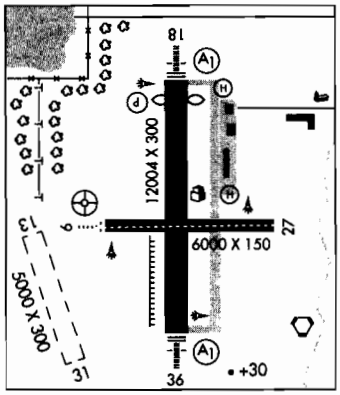
(23) **AIRSPACE: CLASS B** See VFR Terminal Area Chart.

(24) **RADIO AIDS TO NAVIGATION:** NOTAM FILE MCO. VHF/DF ctc FSS.
(H) ABVORTAC 112.2 MCO Chan 59 N28°32.55' W81°20.12' at fld. 1110/8E.
TWEB avbl 1300-0100Z‡. VOR unusable 050°-060° byd 15 NM blo 5000'.
HERNY NDB (LOM) 221 OR N28°37.40' W81°21.05' 177° 5.4 NM to fld.
ILS 109.9 I-ORL Rwy 18. LOM HERNY NDB.
ASR/PAR (1200-0400Z‡)

(25) **COMM/NAVAID REMARKS:** Emerg frequency 121.5 not avbl at twr.

HELIPAD H1: H100X75 (ASPH)
HELIPAD H2: H60X60 (ASPH)
HELIPORT REMARKS: Helipad H1 lctd on general aviation side and H2 lctd on air carrier side of arpt. (1)

187 TPA 1000(813)
WATERWAY 13-31: 5000X300 (WATER)
SEAPLANE REMARKS: Birds roosting and feeding areas along river banks. Seaplanes operating adjacent to NE side of arpt not visible from twr and are required to ctc twr.

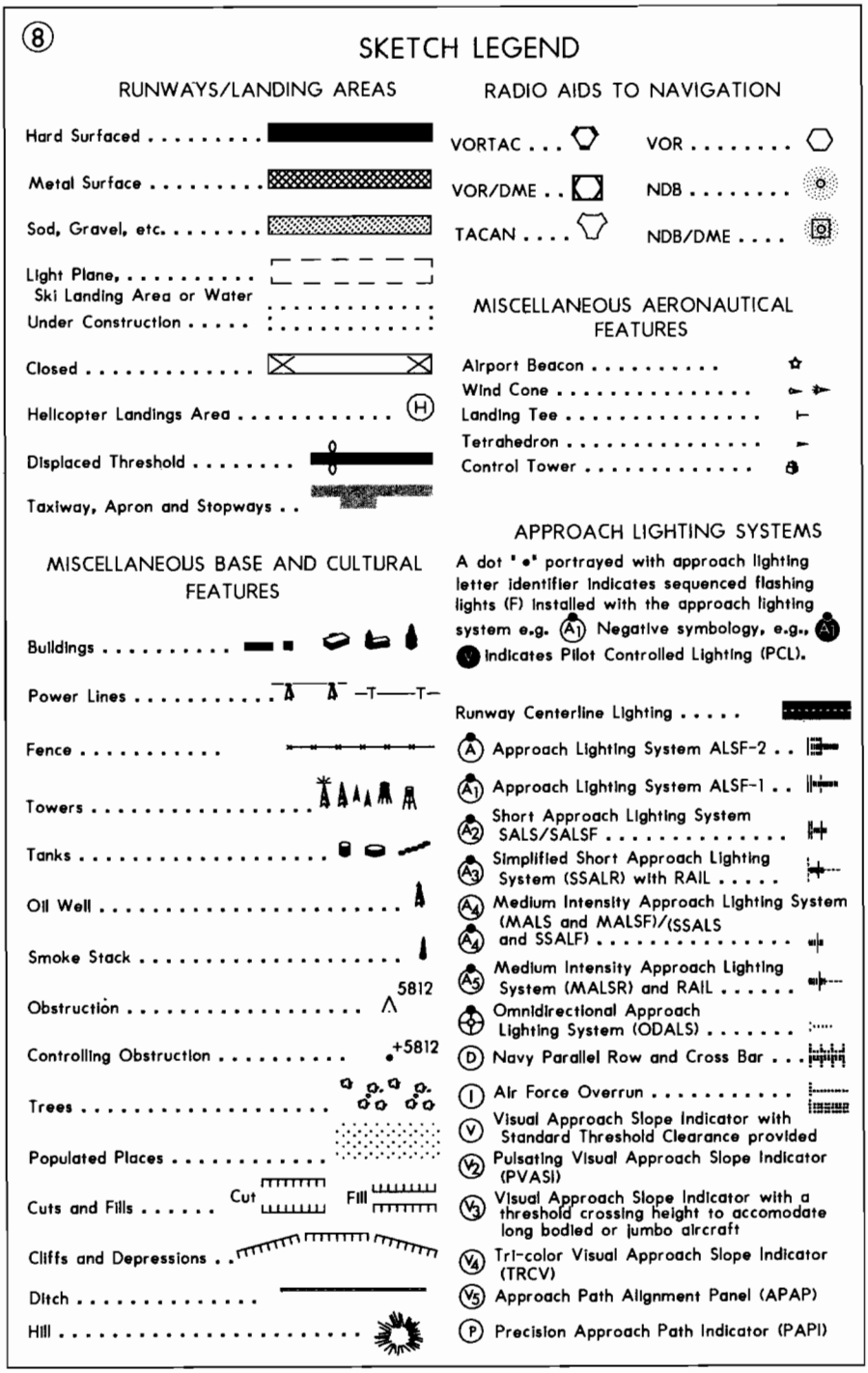


(8)

All Bearings and Radials are Magnetic unless otherwise specified.
All mileages are nautical unless otherwise noted.
All times are UTC except as noted.
The horizontal reference datum of this publication is North American Datum of 1983 (NAD83), which for charting purposes is considered equivalent to World Geodetic System 1984 (WGS 84).

LEGEND 2.—Airport/Facility Directory.

DIRECTORY LEGEND



LEGEND 3.—Airport/Facility Directory.

DIRECTORY LEGEND

LEGEND

This Directory is an alphabetical listing of data on record with the FAA on all airports that are open to the public, associated terminal control facilities, air route traffic control centers and radio aids to navigation within the conterminous United States, Puerto Rico and the Virgin Islands. Airports are listed alphabetically by associated city name and cross referenced by airport name. Facilities associated with an airport, but with a different name, are listed individually under their own name, as well as under the airport with which they are associated.

The listing of an airport in this directory merely indicates the airport operator's willingness to accommodate transient aircraft, and does not represent that the facility conforms with any Federal or local standards, or that it has been approved for use on the part of the general public.

The information on obstructions is taken from reports submitted to the FAA. It has not been verified in all cases. Pilots are cautioned that objects not indicated in this tabulation (or on charts) may exist which can create a hazard to flight operation.

Detailed specifics concerning services and facilities tabulated within this directory are contained in Aeronautical Information Manual, Basic Flight Information and ATC Procedures.

The legend items that follow explain in detail the contents of this Directory and are keyed to the circled numbers on the sample on the preceding pages.

① CITY/AIRPORT NAME

Airports and facilities in this directory are listed alphabetically by associated city and state. Where the city name is different from the airport name the city name will appear on the line above the airport name. Airports with the same associated city name will be listed alphabetically by airport name and will be separated by a dashed rule line. All others will be separated by a solid rule line. (Designated Helipads and Seaplane Landing Areas (Water) associated with a land airport will be separated by a dotted line.)

② LOCATION IDENTIFIER

A three or four character code assigned to airports. These identifiers are used by ATC in lieu of the airport name in flight plans, flight strips and other written records and computer operations.

③ AIRPORT LOCATION

Airport location is expressed as distance and direction from the center of the associated city in nautical miles and cardinal points, i.e., 4 NE.

④ TIME CONVERSION

Hours of operation of all facilities are expressed in Coordinated Universal Time (UTC) and shown as "Z" time. The directory indicates the number of hours to be subtracted from UTC to obtain local standard time and local daylight saving time UTC–5(–4DT). The symbol ‡ indicates that during periods of Daylight Saving Time effective hours will be one hour earlier than shown. In those areas where daylight saving time is not observed that (–4DT) and ‡ will not be shown. All states observe daylight savings time except Arizona, Hawaii and that portion of Indiana in the Eastern Time Zone and Puerto Rico and the Virgin Islands.

⑤ GEOGRAPHIC POSITION OF AIRPORT

Positions are shown in degrees, minutes and hundredths of a minute and represent the approximate center of mass of all usable runways.

⑥ CHARTS

The Sectional Chart and Low and High Altitude Enroute Chart and panel on which the airport or facility is located. Helicopter Chart locations will be indicated as, i.e., COPTER.

⑦ INSTRUMENT APPROACH PROCEDURES

IAP indicates an airport for which a prescribed (Public Use) FAA Instrument Approach Procedure has been published.

⑧ AIRPORT SKETCH

The airport sketch, when provided, depicts the airport and related topographical information as seen from the air and should be used in conjunction with the text. It is intended as a guide for pilots in VFR conditions. Symbology that is not self-explanatory will be reflected in the sketch legend. The airport sketch will be oriented with True North at the top. Airport sketches will be added incrementally.

⑨ ELEVATION

The highest point of an airport's usable runways measured in feet from mean sea level. When elevation is sea level it will be indicated as (00). When elevation is below sea level a minus (–) sign will precede the figure.

⑩ ROTATING LIGHT BEACON

B indicates rotating beacon is available. Rotating beacons operate dusk to dawn unless otherwise indicated in AIRPORT REMARKS.

⑪ SERVICING

S1: Minor airframe repairs.
S2: Minor airframe and minor powerplant repairs.
S3: Major airframe and minor powerplant repairs.
S4: Major airframe and major powerplant repairs.

LEGEND 4.—Airport/Facility Directory.

DIRECTORY LEGEND

⑫ FUEL

CODE	FUEL
80	Grade 80 gasoline (Red)
100	Grade 100 gasoline (Green)
100LL	100LL gasoline (low lead) (Blue)
115	Grade 115 gasoline
A	Jet A—Kerosene freeze point–40° C.
A1	Jet A-1—Kerosene freeze point–47°C.
A1+	Jet A-1—Kerosene with icing inhibitor, freeze point–47° C.
B	Jet B—Wide-cut turbine fuel, freeze point–50° C.
B+	Jet B—Wide-cut turbine fuel with icing inhibitor, freeze point–50° C.
J8	(JP–8 Military specification) Jet A–1, kerosene with icing inhibitor, freeze point –47°C.
J8+100	(JP–8 Mil spec) Jet A–1, Kerosene with FS–II*, FP** minus 47°C, with fuel additive package that improves thermo stability characteristics of JP–8.
MOGAS	Automobile gasoline which is to be used as aircraft fuel.

NOTE: Automobile Gasoline. Certain automobile gasoline may be used in specific aircraft engines if a FAA supplemental type certificate has been obtained. Automobile gasoline which is to be used in aircraft engines will be identified as "MOGAS", however, the grade/type and other octane rating will not be published.

Data shown on fuel availability represents the most recent information the publisher has been able to acquire. Because of a variety of factors, the fuel listed may not always be obtainable by transient civil pilots. Confirmation of availability of fuel should be made directly with fuel dispensers at locations where refueling is planned.

⑬ OXYGEN

OX 1 High Pressure
OX 2 Low Pressure
OX 3 High Pressure—Replacement Bottles
OX 4 Low Pressure—Replacement Bottles

⑭ TRAFFIC PATTERN ALTITUDE

Traffic Pattern Altitude (TPA)—The first figure shown is TPA above mean sea level. The second figure in parentheses is TPA above airport elevation.

⑮ AIRPORT OF ENTRY, LANDING RIGHTS, AND CUSTOMS USER FEE AIRPORTS

U.S. CUSTOMS USER FEE AIRPORT—Private Aircraft operators are frequently required to pay the costs associated with customs processing.

AOE—Airport of Entry—A customs Airport of Entry where permission from U.S. Customs is not required, however, at least one hour advance notice of arrival must be furnished.

LRA—Landing Rights Airport—Application for permission to land must be submitted in advance to U.S. Customs. At least one hour advance notice of arrival must be furnished.

NOTE: Advance notice of arrival at both an AOE and LRA airport may be included in the flight plan when filed in Canada or Mexico, where Flight Notification Service (ADCUS) is available the airport remark will indicate this service. This notice will also be treated as an application for permission to land in the case of an LRA. Although advance notice of arrival may be relayed to Customs through Mexico, Canadian, and U.S. Communications facilities by flight plan, the aircraft operator is solely responsible for insuring that Customs receives the notification. (See Customs, Immigration and Naturalization, Public Health and Agriculture Department requirements in the International Flight Information Manual for further details.)

⑯ CERTIFICATED AIRPORT (FAR 139)

Airports serving Department of Transportation certified carriers and certified under FAR, Part 139, are indicated by the ARFF index; i.e., ARFF Index A, which relates to the availability of crash, fire, rescue equipment.

FAR–PART 139 CERTIFICATED AIRPORTS

INDICES AND AIRCRAFT RESCUE AND FIRE FIGHTING EQUIPMENT REQUIREMENTS

Airport Index	*Required No. Vehicles*	*Aircraft Length*	*Scheduled Departures*	*Agent + Water for Foam*
A	1	<90′	≥1	500#DC or HALON 1211 or 450#DC + 100 gal H_2O
B	1 or 2	≥90′, <126′	≥5	Index A + 1500 gal H_2O
		≥126′, <159′	<5	
C	2 or 3	≥126′, <159′	≥5	Index A + 3000 gal H_2O
		≥159′, <200′	<5	
D	3	≥159′, <200′	≥5	Index A + 4000 gal H_2O
		>200′	<5	
E	3	≥200′	≥5	Index A + 6000 gal H_2O

> Greater Than; < Less Than; ≥ Equal or Greater Than; ≤ Equal or Less Than; H_2O–Water; DC–Dry Chemical.

NOTE: The listing of ARFF index does not necessarily assure coverage for non-air carrier operations or at other than prescribed times for air carrier. ARFF Index Ltd.—indicates ARFF coverage may or may not be available, for information contact airport manager prior to flight.

LEGEND 5.—Airport/Facility Directory.

DIRECTORY LEGEND

(17) FAA INSPECTION

All airports not inspected by FAA will be identified by the note: Not insp. This indicates that the airport information has been provided by the owner or operator of the field.

(18) RUNWAY DATA

Runway information is shown on two lines. That information common to the entire runway is shown on the first line while information concerning the runway ends are shown on the second or following line. Lengthy information will be placed in the Airport Remarks.

Runway direction, surface, length, width, weight bearing capacity, lighting, slope and appropriate remarks are shown for each runway. Direction, length, width, lighting and remarks are shown for sealanes. The full dimensions of helipads are shown, i.e., 50X150.

RUNWAY SURFACE AND LENGTH

Runway lengths prefixed by the letter "H" indicate that the runways are hard surfaced (concrete, asphalt). If the runway length is not prefixed, the surface is sod, clay, etc. The runway surface composition is indicated in parentheses after runway length as follows:

(AFSC)—Aggregate friction seal coat
(ASPH)—Asphalt
(CONC)—Concrete
(DIRT)—Dirt
(GRVD)—Grooved
(GRVL)—Gravel, or cinders
(PFC)—Porous friction courses
(PSP)—Pierced steel plank
(RFSC)—Rubberized friction seal coat
(TURF)—Turf
(TRTD)—Treated
(WC)—Wire combed

RUNWAY WEIGHT BEARING CAPACITY

Runway strength data shown in this publication is derived from available information and is a realistic estimate of capability at an average level of activity. It is not intended as a maximum allowable weight or as an operating limitation. Many airport pavements are capable of supporting limited operations with gross weights of 25-50% in excess of the published figures. Permissible operating weights, insofar as runway strengths are concerned, are a matter of agreement between the owner and user. When desiring to operate into any airport at weights in excess of those published in the publication, users should contact the airport management for permission. Add 000 to figure following S, D, DT, DDT, AUW, etc., for gross weight capacity:

S—Single-wheel type landing gear. (DC-3), (C-47), (F-15), etc.
D—Dual-wheel type landing gear. (DC-6), etc.
T—Twin-wheel type landing gear. (DC-6), (C-9A), etc.
ST—Single-tandem type landing gear. (C-130).
SBTT—Single-belly twin tandem landing gear (KC-10).
DT—Dual-tandem type landing gear, (707), etc.
TT—Twin-tandem type (includes quadricycle) landing gear (707), (B-52), (C-135), etc.
TRT—Triple-tandem landing gear, (C-17)
DDT—Double dual-tandem landing gear. (E4A/747).
TDT—Twin delta-tandem landing gear. (C-5, Concorde).
AUW—All up weight. Maximum weight bearing capacity for any aircraft irrespective of landing gear configuration.
SWL—Single Wheel Loading. (This includes information submitted in terms of Equivalent Single Wheel Loading (ESWL) and Single Isolated Wheel Loading). SWL figures are shown in thousands of pounds with the last three figures being omitted.
PSI—Pounds per square inch. PSI is the actual figure expressing maximum pounds per square inch runway will support, e.g., (SWL 000/PSI 535).

Quadricycle and dual-tandem are considered virtually equal for runway weight bearing consideration, as are single-tandem and dual-wheel. Omission of weight bearing capacity indicates information unknown.

The ACN/PCN System is the ICAO method of reporting pavement strength for pavements with bearing strengths greater than 12,500 pounds. The Pavement Classification Number (PCN) is established by an engineering assessment of the runway. The PCN is for use in conjunction with an Aircraft Classification Number (ACN). Consult the Aircraft Flight Manual or other appropriate source for ACN tables or charts. Currently, ACN data may not be available for all aircraft. If an ACN table or chart is available, the ACN can be calculated by taking into account the aircraft weight, the pavement type, and the subgrade category. For runways that have been evaluated under the ACN/PCN system, the PCN will be shown as a five part code (e.g. PCN 80 R/B/W/T). Details of the coded format are as follows:

(1) The PCN NUMBER—The reported PCN indicates that an aircraft with an ACN equal or less than the reported PCN can operate on the pavement subject to any limitation on the tire pressure.

(2) The type of pavement:
R — Rigid
F — Flexible

(3) The pavement subgrade category:
A — High
B — Medium
C — Low
D — Ultra-low

(4) The maximum tire pressure authorized for the pavement:
W — High, no limit
X — Medium, limited to 217 psi
Y — Low, limited to 145 psi
Z — Very low, limited to 73 psi

(5) Pavement evaluation method:
T — Technical evaluation
U — By experience of aircraft using the pavement

NOTE: Prior permission from the airport controlling authority is required when the ACN of the aircraft exceeds the published PCN or aircraft tire pressure exceeds the published limits.

LEGEND 6.—Airport/Facility Directory.

8 **DIRECTORY LEGEND**

RUNWAY DECLARED DISTANCE INFORMATION

TORA—Take-off Run Available
TODA—Take-off Distance Available
ASDA—Accelerate-Stop Distance Available
LDA—Landing Distance Available

⑲ AIRPORT REMARKS

Landing Fee indicates landing charges for private or non-revenue producing aircraft, in addition, fees may be charged for planes that remain over a couple of hours and buy no services, or at major airline terminals for all aircraft.
Remarks—Data is confined to operational items affecting the status and usability of the airport.
Parachute Jumping.—See "PARACHUTE" tabulation for details.
Unless otherwise stated, remarks including runway ends refer to the runway's approach end.

⑳ WEATHER DATA SOURCES

ASOS—Automated Surface Observing System. Reports the same as an AWOS-3 plus precipitation identification and intensity, and freezing rain occurrence (future enhancement).
AWOS—Automated Weather Observing System
AWOS-A—reports altimeter setting.
AWOS-1—reports altimeter setting, wind data and usually temperature, dewpoint and density altitude.
AWOS-2—reports the same as AWOS-1 plus visibility.
AWOS-3—reports the same as AWOS-1 plus visibility and cloud/ceiling data.
See AIM, Basic Flight Information and ATC Procedures for detailed description of AWOS.
HIWAS—See RADIO AIDS TO NAVIGATION
LAWRS—Limited Aviation Weather Reporting Station where observers report cloud height, weather, obstructions to vision, temperature and dewpoint (in most cases), surface wind, altimeter and pertinent remarks.
LLWAS—indicates a Low Level Wind Shear Alert System consisting of a center field and several field perimeter anemometers.
SAWRS—identifies airports that have a Supplemental Aviation Weather Reporting Station available to pilots for current weather information.
SWSL—Supplemental Weather Service Location providing current local weather information via radio and telephone.
TDWR—indicates airports that have Terminal Doppler Weather Radar.

㉑ COMMUNICATIONS

Communications will be listed in sequence in the order shown below:
Common Traffic Advisory Frequency (CTAF), Automatic Terminal Information Service (ATIS) and Aeronautical Advisory Stations (UNICOM) along with their frequency is shown, where available, on the line following the heading "COMMUNICATIONS." When the CTAF and UNICOM is the same frequency, the frequency will be shown as CTAF/UNICOM freq.
Flight Service Station (FSS) information. The associated FSS will be shown followed by the identifier and information concerning availability of telephone service, e.g., Direct Line (DL), Local Call (LC-384-2341), Toll free call, dial (TF 800-852-7036 or TF 1-800-227-7160), Long Distance (LD 202-426-8800 or LD 1-202-555-1212) etc. The airport NOTAM file identifier will be shown as "NOTAM FILE IAD." Where the FSS is located on the field it will be indicated as "on arpt" following the identifier. Frequencies available will follow. The FSS telephone number will follow along with any significant operational information. FSS's whose name is not the same as the airport on which located will also be listed in the normal alphabetical name listing for the state in which located. Remote Communications Outlet (RCO) providing service to the airport followed by the frequency and name of the Controlling FSS.
FSS's provide information on airport conditions, radio aids and other facilities, and process flight plans. Local Airport Advisory Service is provided on the CTAF by FSS's located at non-tower airports or airports where the tower is not in operation.
(See AIM, Par. 157/158 Traffic Advisory Practices at airports where a tower is not in operation or AC 90 - 42C.)
Aviation weather briefing service is provided by FSS specialists. Flight and weather briefing services are also available by calling the telephone numbers listed.
Remote Communications Outlet (RCO)—An unmanned air/ground communications facility, remotely controlled and providing UHF or VHF communications capability to extend the service range of an FSS.
Civil Communications Frequencies—Civil communications frequencies used in the FSS air/ground system are now operated simplex on 122.0, 122.2, 122.3, 122.4, 122.6, 123.6; emergency 121.5; plus receive-only on 122.05, 122.1, 122.15, and 123.6.

a. 122.0 is assigned as the Enroute Flight Advisory Service channel at selected FSS's,
b. 122.2 is assigned to most FSS's as a common enroute simplex service.
c. 123.6 is assigned as the airport advisory channel at non-tower FSS locations, however, it is still in commission at some FSS's collocated with towers to provide part time Local Airport Advisory Service.
d. 122.1 is the primary receive-only frequency at VOR's. 122.05, 122.15 and 123.6 are assigned at selected VOR's meeting certain criteria.
e. Some FSS's are assigned 50 kHz channels for simplex operation in the 122-123 MHz band (e.g. 122.35). Pilots using the FSS A/G system should refer to this directory or appropriate charts to determine frequencies available at the FSS or remoted facility through which they wish to communicate.

Part time FSS hours of operation are shown in remarks under facility name.

Emergency frequency 121.5 is available at all Flight Service Stations, Towers, Approach Control and RADAR facilities, unless indicated as not available.
Frequencies published followed by the letter "T" or "R", indicate that the facility will only transmit or receive respectively on that frequency. All radio aids to navigation frequencies are transmit only.

LEGEND 7.—Airport/Facility Directory.

DIRECTORY LEGEND 9

TERMINAL SERVICES

CTAF—A program designed to get all vehicles and aircraft at uncontrolled airports on a common frequency.
ATIS—A continuous broadcast of recorded non-control information in selected areas of high activity.
UNICOM—A non-government air/ground radio communications facility utilized to provide general airport advisory service.
APP CON —Approach Control. The symbol Ⓡ indicates radar approach control.
TOWER—Control tower.
GND CON—Ground Control.
GCO—GROUND COMMUNICATION OUTLET—An unstaffed, remotely controlled, ground/ground communications facility. Pilots at uncontrolled airports may contact ATC and FSS via VHF to a telephone connection to obtain an instrument clearance or close a VFR or IFR flight plan. They may also get an updated weather briefing prior to takeoff. Pilots will use four "key clicks" on the VHF radio to contact the appropriate ATC facility or six "key clicks" to contact the FSS. The GCO system is intended to be used only on the ground.
DEP CON—Departure Control. The symbol Ⓡ indicates radar departure control.
CLNC DEL—Clearance Delivery.
PRE TAXI CLNC—Pre taxi clearance.
VFR ADVSY SVC—VFR Advisory Service. Service provided by Non-Radar Approach Control.
Advisory Service for VFR aircraft (upon a workload basis) ctc APP CON.
TOWER, APP CON and DEP CON RADIO CALL will be the same as the airport name unless indicated otherwise.

(22) NOTAM SERVICE

All public use landing areas are provided NOTAM "D" (distant dissemination) and NOTAM "L" (local dissemination) service. Airport NOTAM file identifier is shown following the associated FSS data for individual airports, e.g. "NOTAM FILE IAD". See AIM, Basic Flight Information and ATC Procedures for detailed description of NOTAM's.

(23) AIRSPACE

CLASS B—Radar Sequencing and Separation Service for all aircraft in CLASS B airspace
TRSA—Radar Sequencing and Separation Service for participating VFR Aircraft within a Terminal Radar Service Area

Class C, D, and E airspace described in this publication is that airspace usually consisting of a 5 NM radius core surface area that begins at the surface and extends upward to an altitude above the airport elevation (charted in MSL for Class C and Class D).

When CLASS C airspace defaults to CLASS E, the core surface area becomes CLASS E. This will be formatted as: **AIRSPACE: CLASS C** svc "times" ctc **APP CON** other times CLASS E.

When Class C airspace defaults to Class G, the core surface area becomes Class G up to but not including the overlying controlled airspace. There are Class E airspace areas beginning at either 700' or 1200' AGL used to transition to/from the terminal or enroute environment. This will be formatted as: **AIRSPACE: CLASS C** svc "times" ctc **APP CON** other times CLASS G, CLASS E 700' (or 1200') AGL & abv.

NOTE: AIRSPACE SVC "TIMES" INCLUDE ALL ASSOCIATED EXTENSIONS. Arrival extensions for instrument approach procedures become part of the primary core surface area. These extensions may be either Class D or Class E airspace and are effective concurrent with the times of the primary core surface area.

(See CLASS AIRSPACE in the Aeronautical Information Manual for further details)

(24) RADIO AIDS TO NAVIGATION

The Airport Facility Directory lists by facility name all Radio Aids to Navigation, except Military TACANS, that appear on National Ocean Service Visual or IFR Aeronautical Charts and those upon which the FAA has approved an Instrument Approach Procedure. All VOR, VORTAC ILS and MLS equipment in the National Airspace System has an automatic monitoring and shutdown feature in the event of malfunction. Unmonitored, as used in this publication for any navigational aid, means that FSS or tower personnel cannot observe the malfunction or shutdown signal. The NAVAID NOTAM file identifier will be shown as "NOTAM FILE IAD" and will be listed on the Radio Aids to Navigation line. When two or more NAVAIDS are listed and the NOTAM file identifier is different than shown on the Radio Aids to Navigation line, then it will be shown with the NAVAID listing. NOTAM file identifiers for ILS's and their components (e.g., NDB (LOM) are the same as the identifiers for the associated airports and are not repeated. Hazardous Inflight Weather Advisory Service (HIWAS) will be shown where this service is broadcast over selected VOR's.
NAVAID information is tabulated as indicated in the following sample:

TACAN/DME Channel — Geographical Position — Site Elevation

NAME (L) ABVDRTAC 117.55 ABE Chan 122(Y) N40°43.60' W75°27.30' 180° 4.1 NM to fld. 1110/8E. **HIWAS.**

Class — Frequency — Identifier — Bearing and distance facility to center of airport — Magnetic Variation — Hazardous Inflight Weather Advisory Service

VOR unusable 020°-060° byd 26 NM blo 3,500'

Restriction within the normal altitude/range of the navigational aid (See primary alphabetical listing for restrictions on VORTAC and VOR/DME).

Note: Those DME channel numbers with a (Y) suffix require TACAN to be placed in the "Y" mode to receive distance information.

LEGEND 8.—Airport/Facility Directory.

10 DIRECTORY LEGEND

HIWAS—Hazardous Inflight Weather Advisory Service is a continuous broadcast of inflight weather advisories including summarized SIGMETs, convective SIGMETs, AIRMETs and urgent PIREPs. HIWAS is presently broadcast over selected VOR's and will be implemented throughout the conterminous U.S.

ASR/PAR—Indicates that Surveillance (ASR) or Precision (PAR) radar instrument approach minimums are published in the U.S. Terminal Procedures. Only part-time hours of operation will be shown.

RADIO CLASS DESIGNATIONS

VOR/DME/TACAN Standard Service Volume (SSV) Classifications

SSV Class	Altitudes	Distance (NM)
(T) Terminal	1000′ to 12,000′	25
(L) Low Altitude	1000′ to 18,000′	40
(H) High Altitude	1000′ to 14,500′	40
	14,500′ to 18,000′	100
	18,000′ to 45,000′	130
	45,000′ to 60,000′	100

NOTE: Additionally, (H) facilities provide (L) and (T) service volume and (L) facilities provide (T) service. Altitudes are with respect to the station's site elevation. Coverage is not available in a cone of airspace directly above the facility.

The term VOR is, operationally, a general term covering the VHF omnidirectional bearing type of facility without regard to the fact that the power, the frequency protected service volume, the equipment configuration, and operational requirements may vary between facilities at different locations.

AB	Automatic Weather Broadcast.
DF	Direction Finding Service.
DME	UHF standard (TACAN compatible) distance measuring equipment.
DME(Y)	UHF standard (TACAN compatible) distance measuring equipment that require TACAN to be placed in the "Y" mode to receive DME.
GS	Glide slope.
H	Non-directional radio beacon (homing), power 50 watts to less than 2,000 watts (50 NM at all altitudes).
HH	Non-directional radio beacon (homing), power 2,000 watts or more (75 NM at all altitudes).
H-SAB	Non-directional radio beacons providing automatic transcribed weather service.
ILS	Instrument Landing System (voice, where available, on localizer channel).
IM	Inner marker.
ISMLS	Interim Standard Microwave Landing System.
LDA	Localizer Directional Aid.
LMM	Compass locator station when installed at middle marker site (15 NM at all altitudes).
LOM	Compass locator station when installed at outer marker site (15 NM at all altitudes).
MH	Non-directional radio beacon (homing) power less than 50 watts (25 NM at all altitudes).
MLS	Microwave Landing System.
MM	Middle marker.
OM	Outer marker.
S	Simultaneous range homing signal and/or voice.
SABH	Non-directional radio beacon not authorized for IFR or ATC. Provides automatic weather broadcasts.
SDF	Simplified Direction Facility.
TACAN	UHF navigational facility-omnidirectional course and distance information.
VOR	VHF navigational facility-omnidirectional course only.
VOR/DME	Collocated VOR navigational facility and UHF standard distance measuring equipment.
VORTAC	Collocated VOR and TACAN navigational facilities.
W	Without voice on radio facility frequency.
Z	VHF station location marker at a LF radio facility.

LEGEND 9.—Airport/Facility Directory.

TERMS ...NDING MINI... DATA

IFR LANDING MINIMA

The United States Standard for Terminal Instrument Procedures (TERPS) is the approved criteria for formulating instrument approach procedures. Landing minima are established for six aircraft approach categories (ABCDE and COPTER).
In the absence of COPTER MINIMA, helicopters may use the CAT A minimums of other procedures.
The standard format for RNAV minima and landing minima portrayal follows:

RNAV MINIMA

CATEGORY	A	B	C	D
GLS PA DA	1382/24 200 (200-½)			
LNAV/ DA VNAV	1500/24 318 (400-½)			1500/40 318 (400-¾)
LNAV MDA	1700/24 518 (600-½)		1700/50 518 (600-1)	1700/60 518 (600-1¼)
CIRCLING	1760-1 578 (600-1)		1760-1½ 578 (600-1½)	1760-2 578 (600-2)

RNAV minimums are dependent on navigation equipment capability, as stated in the applicable AFM or AFMS and as outlined below.

GLS (GLobal Navigation System (GNSS) Landing System)

Must have WAAS (Wide Area Augmentation System) equipment approved for precise approach.
Note: "PA" indicates that the runway environment, i.e., runway markings, runway lights, parallel taxiway, etc., meets precision approach requirements. If the GLS minimums line does not contain "PA", then the runway environment does not support precision requirements.

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LNAV/VNAV (Lateral Navigation/Vertical Navigation)

Must have WAAS equipment approved for precision approach, or RNP-0.3 system based on GPS or DME/DME, with an IFR approach approved Baro-VNAV system. Other RNAV approach systems require special approval.
Use of Baro-VNAV systems is limited by temperature, i.e., "Baro-VNAV NA below -20 C(-4 F)".
(Not applicable if chart is annotated "Baro-VNAV NA".)
NOTE: DME/DME based RNP-0.3 systems may be used only when a chart note indicates DME/DME availability, for example, "DME/DME RNP-0.3 Authorized." Specific DME facilities may be required, for example: "DME/DME RNP-0.3 Authorized. ABC, XYZ required."

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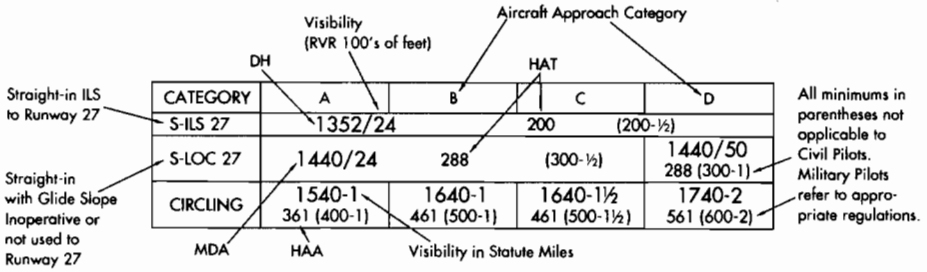
LNAV (Lateral Navigation)

Must have IFR approach approved WAAS, GPS, GPS based FMS systems, or RNP-0.3 systems based on GPS or DME/DME. Other RNAV approach systems require special approval.
NOTE: DME/DME based RNP-0.3 systems may be used only when a chart note indicates DME/DME availability, for example, "DME/DME RNP-0.3 Authorized." Specific DME facilities may be required, for example: "DME/DME RNP-0.3 Authorized. ABC, XYZ required."

LANDING MINIMA FORMAT

In this example airport elevation is 1179, and runway touchdown zone elevation is 1152.



TERMS/LANDING MINIMA DATA

A1

LEGEND 10.—Instrument Approach Procedures Explanation of Terms.

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TERMS/LANDING MINIMA DATA

COPTER MINIMA ONLY

CATEGORY	COPTER
H-176°	680-½ 363 (400-½)

Copter Approach Direction

Height of MDA/DH Above Landing Area (HAL)

No circling minimums are provided

RADAR MINIMA

										Visibility (RVR 100's of feet)	
PAR (c)	10	2.5°/42/1000	ABCDE	**195**/16	100	(100-¼)					
(d)	28	2.5°/48/1068	ABCDE	**187**/16	100	(100-¼)					
ASR	10		ABC	**560**/40	463	(500-⅜)	D	**560**/50	463	(500-1)	
			E	**580**/60	463	(500-1¼)					
	28		AB	**600**/50	513	(600-1)	C	**600**/60	513	(600-1¼)	
			DE	**600**-1½	513	(600-1½)					
CIR (b)	10		AB	**560**-1¼	463	(500-1¼)	C	**560**-1½	463	(500-1½)	
	28		AB	**600**-1¼	503	(600-1¼)	C	**600**-1½	503	(600-1½)	
	10, 28		DE	**660**-2	563	(600-2)					

All minimums in parentheses not applicable to Civil Pilots. Military Pilots refer to appropriate regulations.

Visibility in Statute Miles

Radar Minima:

1. Minima shown are the lowest permitted by established criteria. Pilots should consult applicable directives for their category of aircraft.
2. The circling MDA and weather minima to be used are those for the runway to which the final approach is flown - not the landing runway. In the above RADAR MINIMA example, a category C aircraft flying a radar approach to runway 10, circling to land on runway 28, must use an MDA of 560 feet with weather minima of 500-1½ .

A Alternate Minimums not standard. Civil users refer to tabulation. USA/USN/USAF pilots refer to appropriate regulations.

A NA Alternate minimums are Not Authorized due to unmonitored facility or absence of weather reporting service.

T Take-off Minimums not standard and/or Departure Procedures are published. Refer to tabulation.

AIRCRAFT APPROACH CATEGORIES

Speeds are based on 1.3 times the stall speed in the landing configuration of maximum gross landing weight. An aircraft shall fit in only one category. If it is necessary to maneuver at speeds in excess of the upper limit of a speed range for a category, the minimums for the next higher category should be used. For example, an aircraft which falls in Category A, but is circling to land at a speed in excess of 91 knots, should use the approoch Cotegory B minimums when circling to land. See following cotegary limits:

MANEUVERING TABLE

Approach Cdtegory	A	B	C	D	E
Speed (Knots)	0-90	91-120	121-140	141-165	Abv 165

RVR/ Meteorological Visibility Comparable Values

The following table shall be used for converting RVR to meteorological visibility when RVR is not reported far the runway of intended operation. Adjustments of landing minima may be required - see Inoperative Components Table.

RVR (feet)	Visibility (stotute miles)	RVR (feet)	Visibility (statute miles)
1600	¼	4000	¾
2000	⅜	4500	⅞
2400	½	5000	1
3200	⅝	6000	1¼

TERMS/ NDING MINIM DATA

LEGEND 11.—Instrument Approach Procedures Explanation of Terms.

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GENERAL INFO

GENERAL INFORMATION

This publication includes Instrument Approach Procedures (IAPs), Departure Procedures (DPs), and Standard Terminal Arrivals (STARs) for use by both civil and military aviation and is issued every 56 days.

STANDARD TERMINAL ARRIVALS AND DEPARTURE PROCEDURES

The use of the associated codified STAR/DP and transition identifiers are requested of users when filing flight plans via teletype and are required for users filing flight plans via computer interface. It must be noted that when filing a STAR/DP with a transition, the first three coded characters of the STAR and the last three coded characters of the DP are replaced by the transition code. Examples: ACTON SIX ARRIVAL, file (AQN.AQN6); ACTON SIX ARRIVAL, EDNAS TRANSITION, file (EDNAS.AQN6). FREEHOLD THREE DEPARTURE, file (FREH3.RBV), FREEHOLD THREE DEPARTURE, ELWOOD CITY TRANSITION, file (FREH3.EWC).

PILOT CONTROLLED AIRPORT LIGHTING SYSTEMS

Available pilot controlled lighting (PCL) systems are indicated as follows:

1. Approach lighting systems that bear a system identification are symbolized using negative symbology, e.g., ◉, ●, ✪
2. Approach lighting systems that do not bear a system identification are indicated with a negative "◉" besides the name.

A star (*) indicates non-standard PCL, consult Directory/Supplement, e.g., ◉*

To activate lights use frequency indicated in the communication section of the chart with a ◉ or the appropriate lighting system identification e.g., UNICOM 122.8 ◉, ◉, ●

KEY MIKE	FUNCTION
7 times within 5 seconds	Highest intensity available
5 times within 5 seconds	Medium or lower intensity (Lower REIL or REIL-off)
3 times within 5 seconds	Lowest intensity available (Lower REIL or REIL-off)

CHART CURRENCY INFORMATION

FAA procedure amendment number → Amdt 11A 99365 → Date of latest change
FAA procedure amendment number → Orig 00365 → Date of latest change

The Chart Date identifies the Julian date the chart was added to the volume or last revised for any reason. The first two digits indicate the year, the last three digits indicate the day of the year (001 to 365/6) in which the latest addition or change was first published.

The Procedure Amendment Number precedes the Chart Date, and changes any time instrument information (e.g., DH, MDA, approach routing, etc.) changes. Procedure changes also cause the Chart Date to change.

MISCELLANEOUS

* Indicates a non-continuously operating facility, see A/FD or flight supplement.
# Indicates control tower temporarily closed UFN.

"Radar required" on the chart indicates that radar vectoring is required for the approach.

Distances in nautical miles (except visibility in statute miles and Runway Visual Range in hundreds of feet). Runway Dimensions in feet. Elevations in feet. Mean Sea Level (MSL). Ceilings in feet above airport elevation. Radials/bearings/headings/courses are magnetic. Horizontal Datum: Unless otherwise noted on the chart, all coordinates are referenced to North American Datum 1983 (NAD 83), which for charting purposes is considered equivalent to World Geodetic System 1984 (WGS 84).

LEGEND 12.—General Information.

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GENERAL INFO

ABBREVIATIONS

ADF..... Automatic Direction Finder
ALS..... Approach Light System
ALSF..... Approach Light System with Sequenced Flashing Lights
APP CON..... Approach Control
ARR..... Arrival
ASOS..... Automated Surface Observing System
ASR/PAR..... Published Radar Minimums at this Airport
ATIS..... Automatic Terminal Information Service
AWOS..... Automated Weather Observing System
AZ..... Azimuth
BC..... Back Course
C..... Circling
CAT..... Category
CCW..... Counter Clockwise
Chan..... Channel
CLNC DEL..... Clearance Delivery
CNF..... Computer Navigation Fix
CTAF..... Common Traffic Advisory Frequency
CW..... Clockwise
DH..... Decision Height
DME..... Distance Measuring Equipment
DR..... Dead Reckoning
ELEV..... Elevation
FAF..... Final Approach Fix
FM..... Fan Marker
FMS..... Flight Management System
GCO..... Ground Communications Outlet
GPI..... Ground Point of Interception
GPS..... Global Positioning System
GS..... Glide Slope
HAA..... Height abave Airport
HAL..... Height above Landing
HAT..... Height above Touchdown
HIRL..... High Intensity Runway Lights
IAF..... Initial Approach Fix
ICAO..... International Civil Aviation Organization
IM..... Inner Marker
Intcp..... Intercept
INT..... Intersection
LDA..... Localizer Type Directional Aid
Ldg..... Landing
LDIN..... Lead in Light System
LIRL..... Law Intensity Runway Lights
LOC..... Localizer
LR..... Lead Radial. Pravides at least 2 NM (Copter 1 NM) of lead to assist in turning onto the intermediate/final course.
MALS..... Medium Intensity Approach Light System
MALSR..... Medium Intensity Approach Light System with RAIL
MAP..... Missed Approach Point
MDA..... Minimum Descent Altitude
MIRL..... Medium Intensity Runway Lights
MLS..... Microwave Landing System
MM..... Middle Marker
NA..... Not Authorized
NDB..... Non-directionol Radio Beacon
NM..... Nautical Mile
NoPT..... No Procedure Turn Required (Procedure Turn sholl not be executed without ATC clearance)
ODALS..... Omnidirectional Approach Light System
OM..... Outer Marker
R..... Radiol
RA..... Radio Altimeter setting height
RAIL..... Runway Alignment Indicator Lights
RBn..... Radio Beacon
RCLS..... Runway Centerline Light System
REIL..... Runway End Identifier Lights
RNAV..... Area Navigation
RNP..... Required Navigation Performance
RPI..... Runway Point of Intercept(ion)
RRL..... Runway Remaining Lights
Rwy..... Runway
RVR..... Runway Visual Range
S..... Straight-in
SALS..... Short Approach Light System
SSALR..... Simplified Short Approach Light System with RAIL
SDF..... Simplified Directional Facility
TA..... Transition Altitude
TAC..... TACAN
TCH..... Threshold Crossing Height (height in feet Above Ground level)
TDZ..... Touchdown Zone
TDZE..... Tauchdown Zone Elevation
TDZ/CL..... Touchdown Zone and Runway Centerline Lighting
TDZL..... Touchdown Zone Lights
Tlv..... Transition Level
VASI..... Visual Approach Slope Indicator
VDP..... Visual Descent Point
VGSI..... Visual Glide Slope Indicator
WP/WPT..... Waypoint (RNAV)
X..... Radar Only Frequency

GENERAL INFO
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LEGEND 13.—Abbreviations.

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LEGEND

INSTRUMENT APPROACH PROCEDURES (CHARTS)

PLANVIEW SYMBOLS

TERMINAL ROUTES

Procedure Track

Missed Approach

Visual Flight Poth

165° / 345° Procedure Turn (Type degree ond point of turn optional)

3100 NoPT 5.6 NM to GS Intcpt

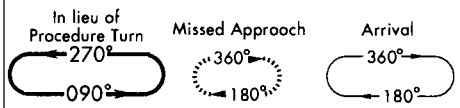
045° (14.2 to LOM)

Minimum Altitude 2000

Feeder Route 155° (15.1) Mileoge

Penetrotes Speciol Use Airspoce

HOLDING PATTERNS



Holding pattern with max. restricted oirspeed:
"175K" opplies to all altitudes.
"210K" opplies to altitudes above 6000' to ond including 14000'.

Limits will only be specified when they deviate from the stondard. DME fixes may be shown.

REPORTING POINT/FIXES

Reporting Point
▲ Name (Compulsory)
△ Name (Non-Compulsory)

Fix or intersection

COMPUTER NAVIGATION FIX (CNF)

x (NAME) ("x" omitted when it conflicts with runway pattern)

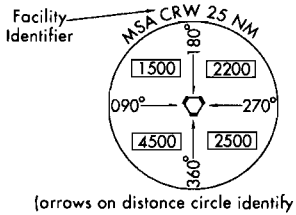
15 DME Distance From Facility — ARC/DME/RNAV Fix

R-198 — Radial line and value

LR-198 — Lead Radial

LB-198 — Lead Beoring

MINIMUM SAFE ALTITUDE (MSA)



(orrows on distonce circle identify sectors)

OBSTACLES

- Spot Elevotion
- Highest Spot Elevation
- Obstacle
- Group of Obstacles
- Highest Obstacle
- ± Doubtful occuracy

SPECIAL USE AIRSPACE

R-352 R-Restricted W-Warning P-Prohibited A-Alert

RADIO AIDS TO NAVIGATION

110.1 Underline indicates No Voice transmitted on this frequency

VOR VOR/DME TACAN VORTAC

NDB NDB/DME WAYPOINT

MAP WP FLYOVER WAYPOINT WAYPOINT COLLOCATED WITH NAVAID

LOM/LMM (Compass locator at Outer Marker/Middle Marker)

Marker Beacon

Localizer (LOC/LDA) Course

Right side shading- Front course; Left side shading- Back Course

SDF Course

180° MLS Approach Azimuth

MLS Identifier — MICROWAVE Chan 514 M-VDZ Glidepath 6.20° DME 111.5 Chon 48(Y) — (Y) TACAN must be in "Y" mode to receive distance information.

LOC/DME

LOC/LDA/SDF/MLS Transmitter (shown when instollotion is offset from its normol postion off the end of the runway.)

Waypoint Data

Coordinotes — PRAYS N38°58.30' W89°51.50' — Waypaint Nome

Frequency — 112.7 CAP 187.1°-56.2

Identifier — 590 Reference Facility Elevation — Radial-Distance (Facility to Waypoint)

Primory Novoid with Coordinate Values

LIMA 114.5 LIM Chan 92 S12°00.80' W77°07.00'

Secondary Navaid

LMM LIMA 248 NT

MISCELLANEOUS

VOR Changeaver Point

RWY 15 S12°00.52' W77°06.91' End of Rwy Coordinates (DOD only)

Distonce not to scale

Internotionol Boundary

LEGEND 14.—Instrument Approach Procedures (Symbols).

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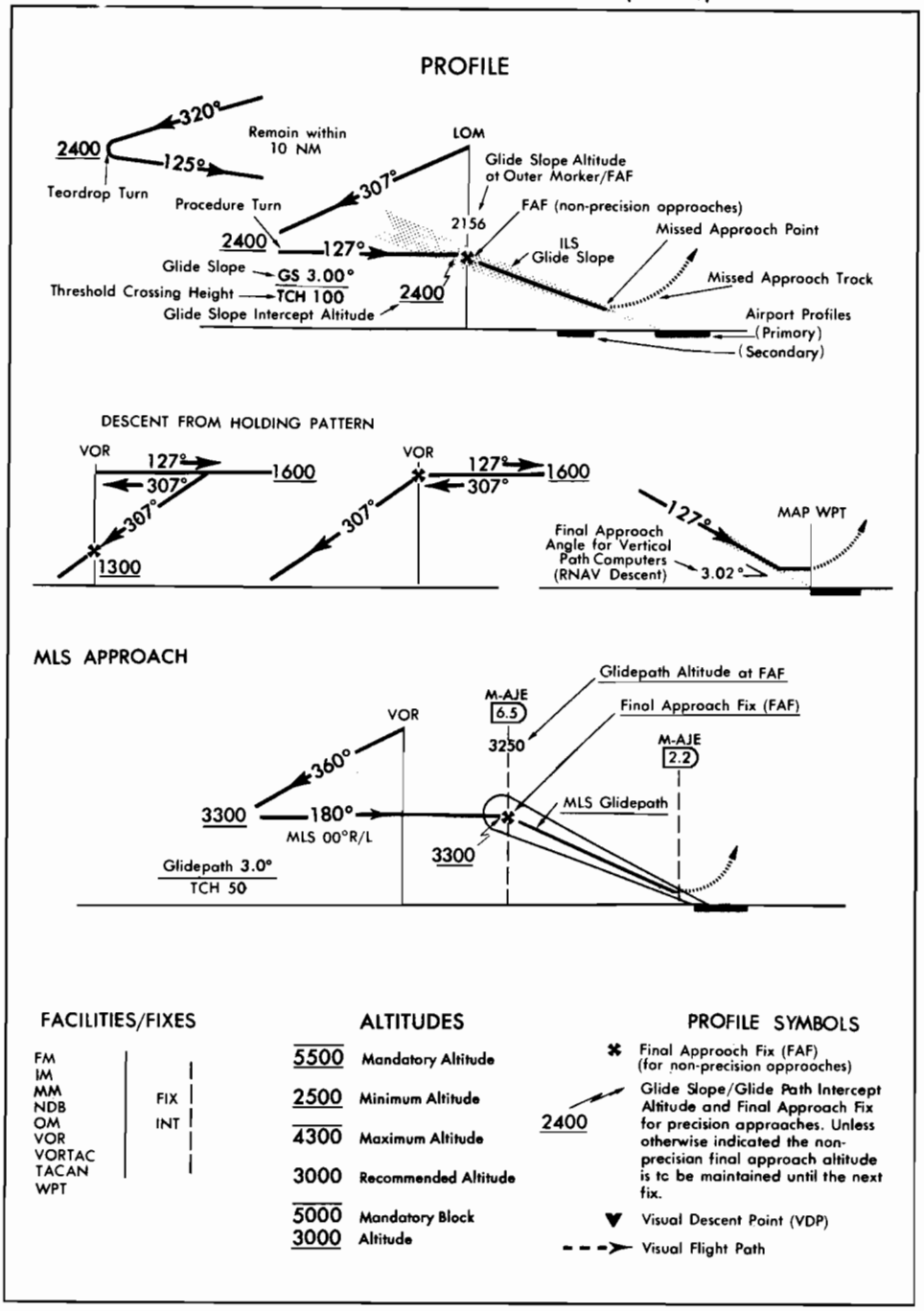
LEGEND

INSTRUMENT APPROACH PROCEDURES (CHARTS)



LEGEND
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LEGEND 15.—Instrument Approach Procedures (Profile).

INSTRUMENT TAKEOFF PROCEDURE CHARTS
RATE-OF-CLIMB TABLE
(ft. per min.)

A rate-of-climb table is provided for use in planning and executing takeoff procedures under known or approximate ground speed conditions.

REQUIRED CLIMB RATE (ft. per NM)	GROUND SPEED (KNOTS) 30	60	80	90	100	120	140
200	100	200	267	300	333	400	467
250	125	250	333	375	417	500	583
300	150	300	400	450	500	600	700
350	175	350	467	525	583	700	816
400	200	400	533	600	667	800	933
450	225	450	600	675	750	900	1050
500	250	500	667	750	833	1000	1167
550	275	550	733	825	917	1100	1283
600	300	600	800	900	1000	1200	1400
650	325	650	867	975	1083	1300	1516
700	350	700	933	1050	1167	1400	1633

REQUIRED CLIMB RATE (ft. per NM)	GROUND SPEED (KNOTS) 150	180	210	240	270	300
200	500	600	700	800	900	1000
250	625	750	875	1000	1125	1250
300	750	900	1050	1200	1350	1500
350	875	1050	1225	1400	1575	1750
400	1000	1200	1400	1600	1700	2000
450	1125	1350	1575	1800	2025	2250
500	1250	1500	1750	2000	2250	2500
550	1375	1650	1925	2200	2475	2750
600	1500	1800	2100	2400	2700	3000
650	1625	1950	2275	2600	2925	3250
700	1750	2100	2450	2800	3150	3500

LEGEND 16.—Instrument Takeoff Procedure Charts, Rate-of-Climb Table.

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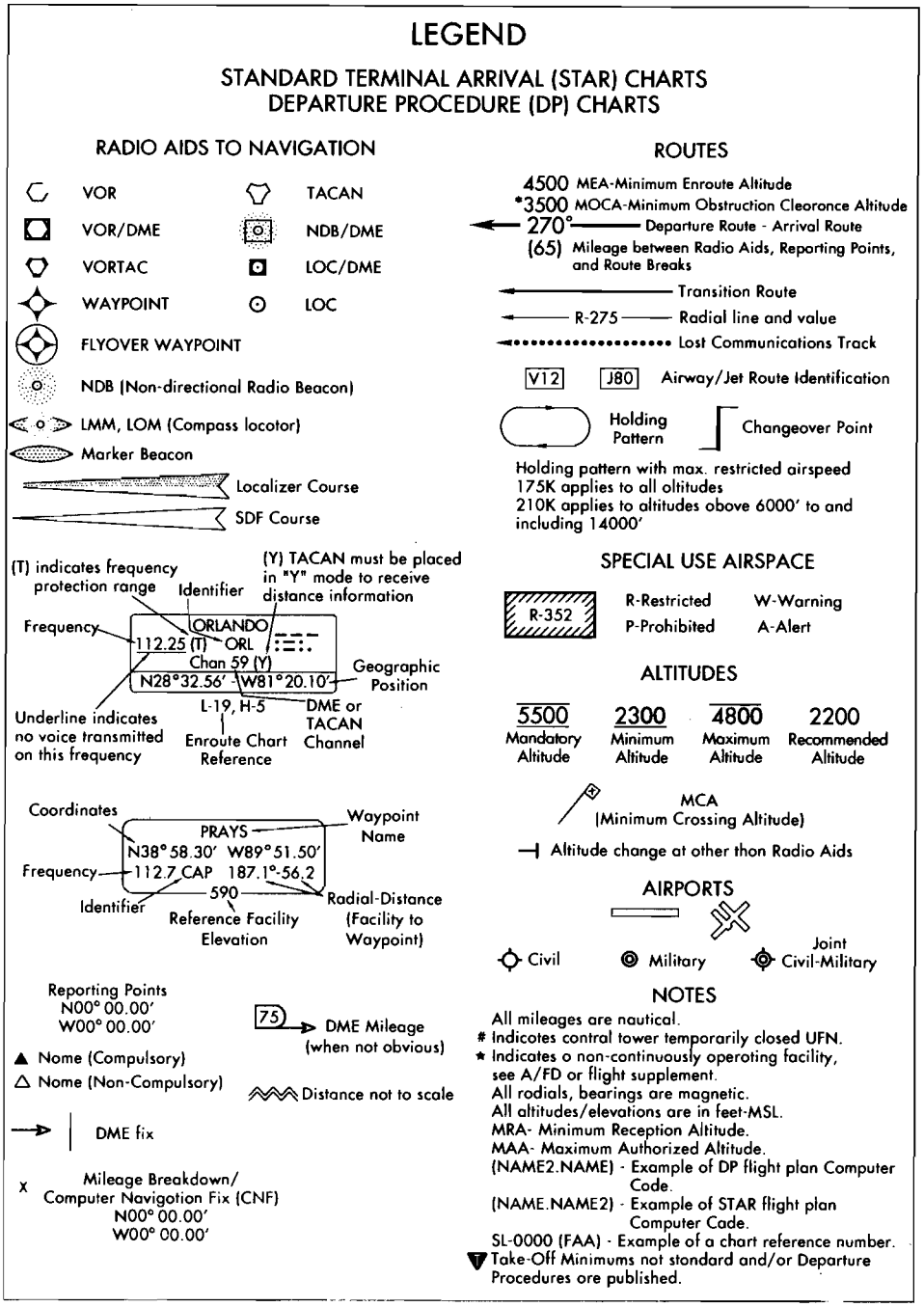
LEGEND



LEGEND
99252

LEGEND 17.—Standard Arrival/Departure Charts.

95201

LEGEND

INSTRUMENT APPROACH PROCEDURES (CHARTS)

AIRPORT DIAGRAM/AIRPORT SKETCH

Runways

Hard Surface | Other Than Hard Surface | Stopways, Taxiways, Parking Areas | Displaced Threshold

Closed Runway | Closed Taxiway | Under Construction | Metal Surface | Runway Centerline Lighting

ARRESTING GEAR: Specific arresting gear systems; e.g., BAK-12, MA-1A etc., shown on airport diagrams, not applicable to Civil Pilots. Military Pilots Refer to Appropriate DOD Publications.

uni-directional | bi-directional | Jet Barrier

REFERENCE FEATURES

Buildings

Tanks

Obstruction

Airport Beacon #

Runway Radar Reflectors

Control Tower #

When Control Tower and Rotating Beacon are co-located, Beacon symbol will be used and further identified as TWR.

Runway length depicted is the physical length of the runway (end-to-end, including displaced thresholds if any) but excluding areas designated as stopways. Where a displaced threshold is shown and/or part of the runway is otherwise not available for landing, an annotation is added to indicate the landing length of the runway; e.g., RWY 13 ldg 5000'.

Helicopter Alighting Areas

Negative Symbols used to identify Copter Procedures

landing point

Runway TDZ elevation.....TDZE 123

←0.3% DOWN

Runway Slope.....0.8% UP→

(shown when runway slope exceeds 0.3%)

NOTE:
Runway Slope measured to midpoint on runways 8000 feet ar longer.

U.S. Navy Optical Landing System (OLS) "OLS" locotion is shown because of its height of approximately 7 feet ond proximity to edge of runway may create an obstruction far some types of aircraft.

Approach light symbols are shown in the Flight Infarmation Handbook.

Airport diagram scales are variable.

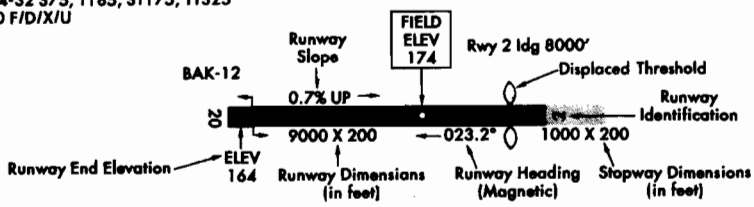
True/magnetic North orientation may vary from diagram to diagram.

Coordinate values are shown in 1 or ½ minute increments. They are further broken down into 6 second ticks, within each 1 minute increment.

Positional accurocy within ±600 feet unless otherwise noted on the chart.

NOTE:
All new and revised airport diagrams are shown referenced to the World Geodetic System (WGS) (noted on appropriate diagram), and may nat be compatible with local coordinates published in FLIP. (Foreign Only)

Runway Weight Bearing Capacity/or PCN Pavement Classification Number is shown as a codified expressian.
Refer to the appropriate Supplement/Directory for applicable codes; e.g.,
RWY 14-32 S75, T185, ST175, TT325
PCN 80 F/D/X/U



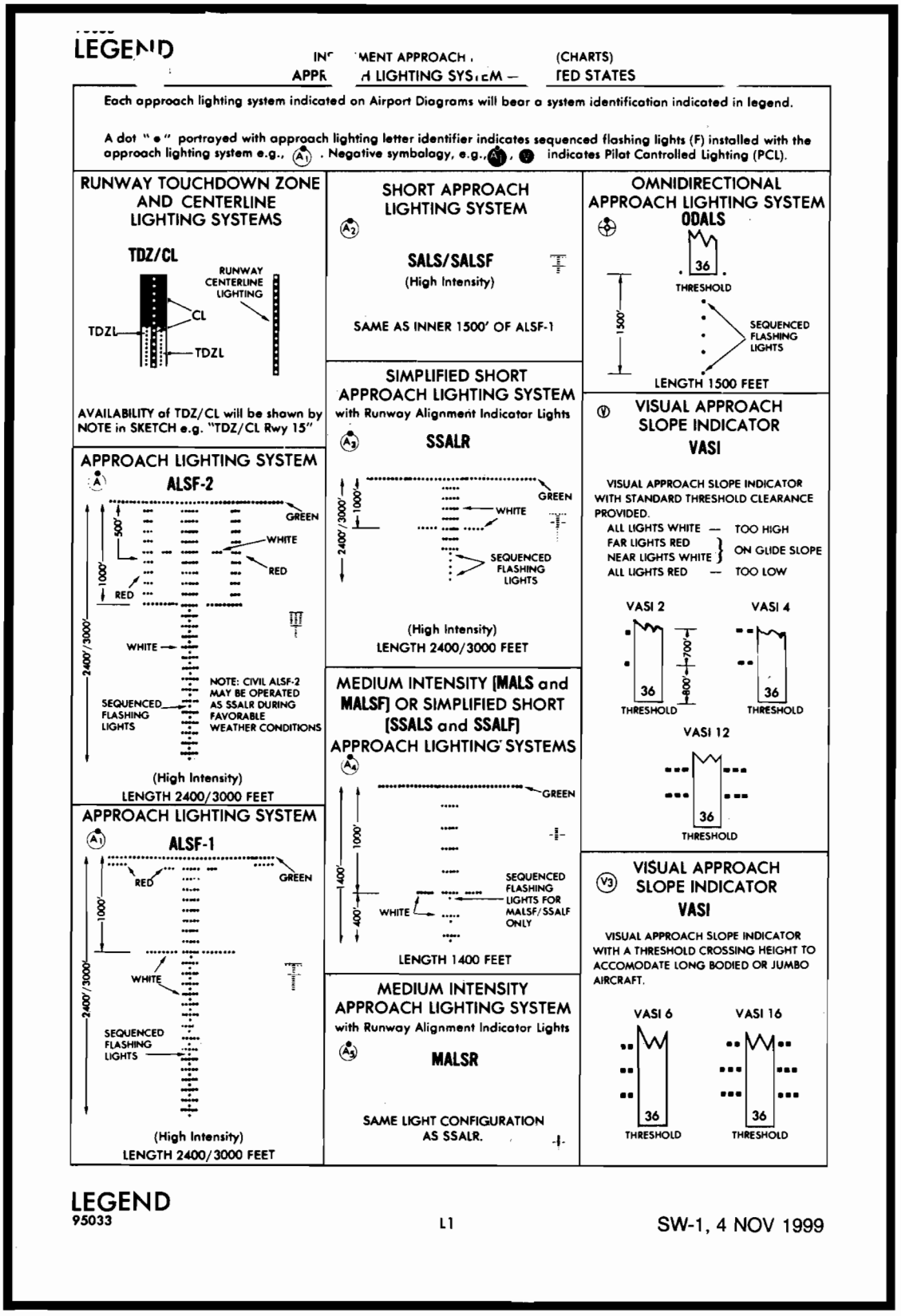
SCOPE

Airport diagroms are specifically designed ta assist in the movement of ground traffic at locations with complex runway/taxiway configurations and provide information for updating Computer Based Navigation Systems (I.E., INS, GPS) aboord aircraft. Airport diagrams are not intended to be used for approach and landing or departure operations. For revisions to Airport Diagrams: Consult FAA Order 7910.4B.

LEGE

95201

LEGEND 18.—Airport Diagram.



LEGEND 19.—Approach Lighting Systems.

SC-1, 24 FEB 2000

L2

95033

LEGEND

INSTRUMENT APPROACH PROCEDURES (CHARTS)

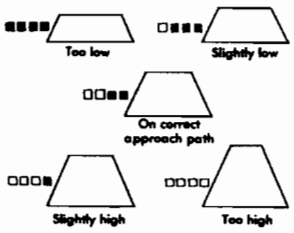
APPROACH LIGHTING SYSTEM — UNITED STATES

Each approach lighting system indicated on Airport Diagrams will bear a system identification indicated in legend.

A dot " • " portrayed with approach lighting letter identifier indicates sequenced flashing lights (F) installed with the approach lighting system e.g., (A1) Negative symbology, e.g., ■, ● indicates Pilot Controlled Lighting (PCL).

(P) PRECISION APPROACH PATH INDICATOR

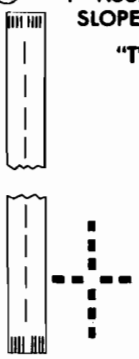
PAPI



Legend: □White ■Red

(V1) "T"-VISUAL APPROACH SLOPE INDICATOR

"T"-VASI



"T" ON BOTH SIDES OF RWY ALL LIGHTS VARIABLE WHITE. CORRECT APPROACH SLOPE-ONLY CROSS BAR VISIBLE. UPRIGHT "T" - FLY UP INVERTED "T" - FLY DOWN RED "T" - GROSS UNDERSHOOT.

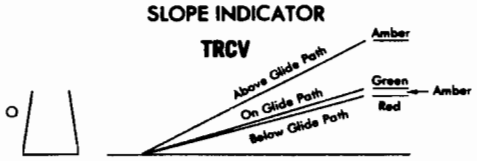
(V2) PULSATING VISUAL APPROACH SLOPE INDICATOR

PVASI

CAUTION: When viewing the pulsating visual approach slope indicators in the pulsating white or pulsating red sectors, it is possible to mistake this lighting aid for another aircraft or a ground vehicle. Pilots should exercise caution when using this type of system.

(V4) TRI-COLOR VISUAL APPROACH SLOPE INDICATOR

TRCV



CAUTION: When the aircraft descends from green to red, the pilot may see a dark amber color during the transition from green to red.

(V5) ALIGNMENT OF ELEMENTS SYSTEMS

APAP

Pointed panels which may be lighted at night. To use the system the pilot positions the aircraft so the elements are in alignment.

LEGEND

95033

LEGEND 20.—Approach Lighting System.

RATE OF DESCENT TABLE

A rate of descent table is provided for use in planning and executing precision descents under known or approximate ground speed conditions. It will be especially useful for approaches when the localizer only is used for course guidance. A best speed, power, altitude combination can be programmed which will result in a stable glide rate and altitude favorable for executing a landing if minimums exist upon breakout. Care should always be exercised so that minimum descent altitude and missed approach point are not exceeded.

ANGLE OF DESCENT (degrees and tenths)		FEET /NM	GROUND SPEED (knots)										
			30	45	60	75	90	105	120	135	150	165	180
2.0		210	105	160	210	265	320	370	425	475	530	585	635
2.5		265	130	200	265	330	395	465	530	595	665	730	795
VERTICAL PATH ANGLE	2.7	287	143	215	287	358	430	501	573	645	716	788	860
	2.8	297	149	223	297	371	446	520	594	669	743	817	891
	2.9	308	154	231	308	385	462	539	616	693	769	846	923
	3.0	318	159	239	318	398	478	557	637	716	796	876	955
	3.1	329	165	247	329	411	494	576	658	740	823	905	987
	3.2	340	170	255	340	425	510	594	679	764	849	934	1019
	3.3	350	175	263	350	438	526	613	701	788	876	963	1051
	3.4	361	180	271	361	451	541	632	722	812	902	993	1083
3.5		370	185	280	370	465	555	650	740	835	925	1020	1110
4.0		425	210	315	425	530	635	740	845	955	1060	1165	1270
4.5		475	240	355	475	595	715	835	955	1075	1190	1310	1430
5.0		530	265	395	530	660	795	925	1060	1190	1325	1455	1590
5.5		580	290	435	580	730	875	1020	1165	1310	1455	1600	1745
6.0		635	315	475	635	795	955	1110	1270	1430	1590	1745	1950
6.5		690	345	515	690	860	1030	1205	1375	1550	1720	1890	2065
7.0		740	370	555	740	925	1110	1295	1480	1665	1850	2035	2220
7.5		795	395	595	795	990	1190	1390	1585	1785	1985	2180	2380
8.0		845	425	635	845	1055	1270	1480	1690	1905	2115	2325	2540
8.5		900	450	675	900	1120	1345	1570	1795	2020	2245	2470	2695
9.0		950	475	715	950	1190	1425	1665	1900	2140	2375	2615	2855
9.5		1005	500	750	1005	1255	1505	1755	2005	2255	2510	2760	3010
10.0		1055	530	790	1055	1320	1585	1845	2110	2375	2640	2900	3165
10.5		1105	555	830	1105	1385	1660	1940	2215	2490	2770	3045	3320
11.0		1160	580	870	1160	1450	1740	2030	2320	2610	2900	3190	3480
11.5		1210	605	910	1210	1515	1820	2120	2425	2725	3030	3335	3635
12.0		1260	630	945	1260	1575	1890	2205	2520	2835	3150	3465	3780

DESCENT TABLE 99028

LEGEND 21.—Instrument Approach Procedure Charts, Rate-of-Descent Table.

INOP COMPONENTS
99084

INOPERATIVE COMPONENTS OR VISUAL AIDS TABLE

Landing minimums published on instrument approach procedure charts are based upon full operation of all components and visual aids associated with the particular instrument approach chart being used. Higher minimums are required with inoperative components or visual aids as indicated below. 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 the instrument approach charts as localizer minimums. This table may be amended by notes on the approach chart. Such notes apply only to the particular approach catergory(ies) as stated. See legend page for description of components indicated below.

(1) ILS, MLS, and PAR

Inoperative Component or Aid	Approach Category	Increase Visibility
ALSF 1 & 2, MALSR, & SSALR	ABCD	1/4 mile

(2) ILS with visibility minimum Of 1,800 RVR

ALSF 1 & 2, MALSR, & SSALR	ABCD	To 4000 RVR
TDZL RCLS	ABCD	To 2400 RVR
RVR	ABCD	To 1/2 mile

(3) VOR,VOR/DME, VORTAC, VOR (TAC), VOR/DME (TAC), LOC, LOC/DME, LDA, LDA/DME, SDF, SDF/DME, GPS, RNAV,and ASR

Inoperative Visual Aid	Approach Category	Increase Visibility
ALSF 1 & 2, MALSR, & SSALR	ABCD	1/2 mile
SSALS,MALS, & ODALS	ABC	1/4 mile

(4) NDB

ALSF 1 & 2, MALSR, & SSALR	C	1/2 mile
	ABD	1/4 mile
MALS, SSALS, ODALS	ABC	1/4 mile

CORRECTIONS, COMMENTS AND/OR PROCUREMENT

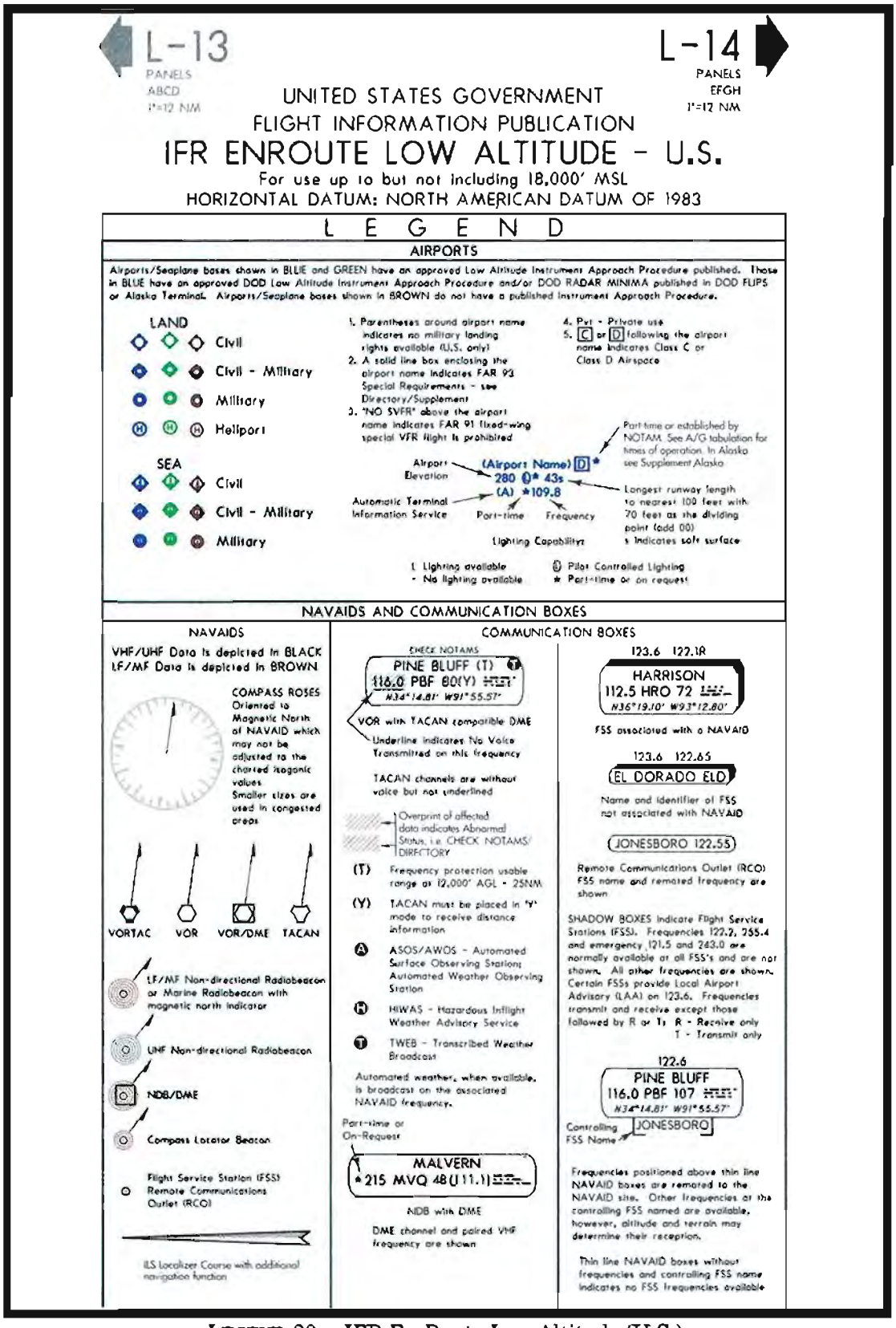
FOR CHARTING ERRORS CONTACT:
National Ocean Service/NOAA
N/ACC1, SSMC-4, Sta. #2335
1305 East-West Highway
Silver Spring, MD 20910-3281
Telephone Toll-Free (800) 626-3677
Internet/E-Mail: Aerochart@NOAA.GOV

FOR CHANGES, ADDITIONS, OR RECOMMENDATIONS ON PROCEDURAL ASPECTS:
Contact Federal Aviation Administration, ATA 110
800 Independence Avenue, SW
Washington, DC 20591
Telephone Toll Free (800) 457-6656

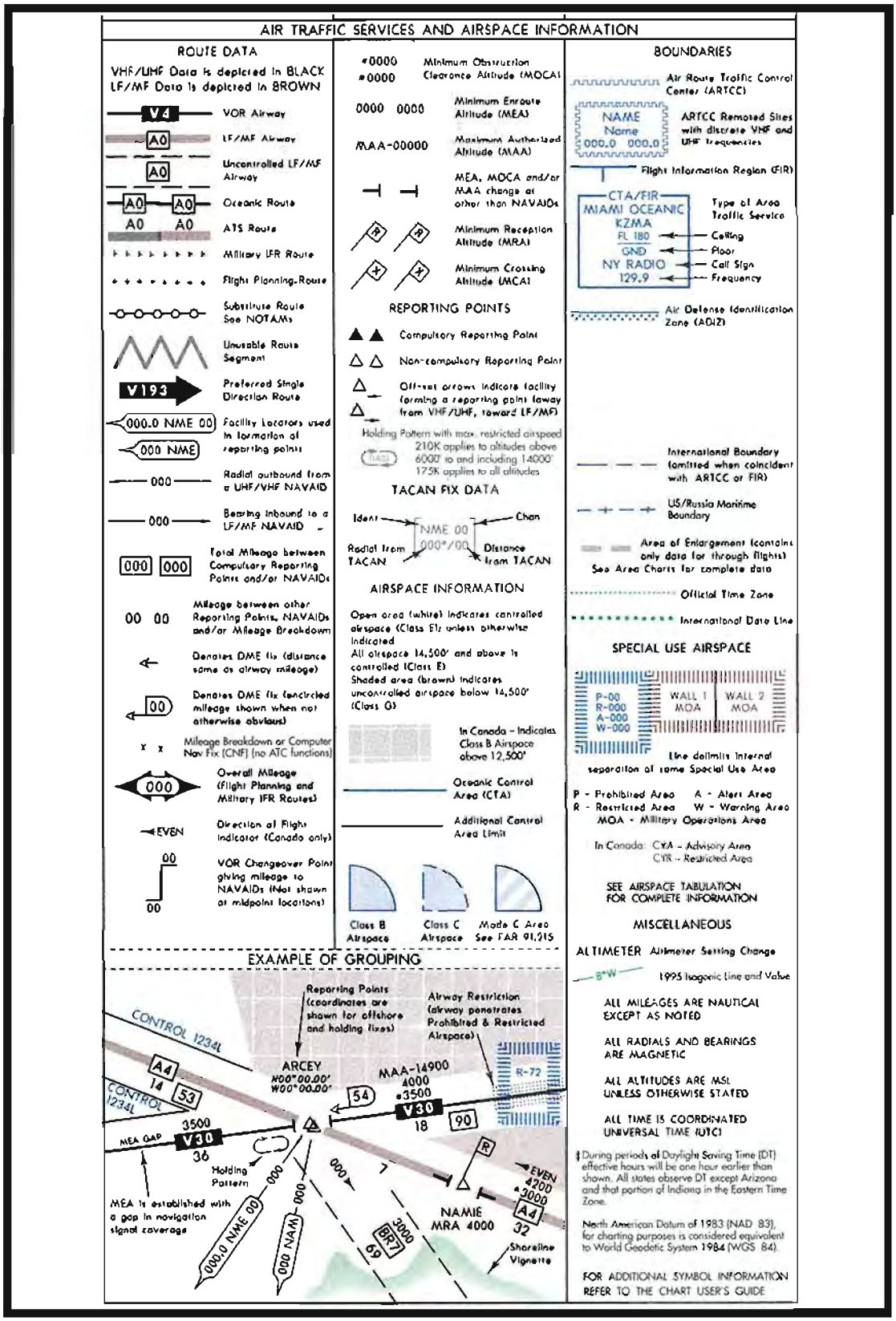
TO PURCHASE CHARTS CONTACT:
National Ocean Service
NOAA, N/ACC3
Distribution Division
Riverdale, MD 20737
Telephone Toll Free (800) 638-8972

Requests for the creation or revisions to Airport Diagrams should be in accordance with FAA Order 7910.4B.

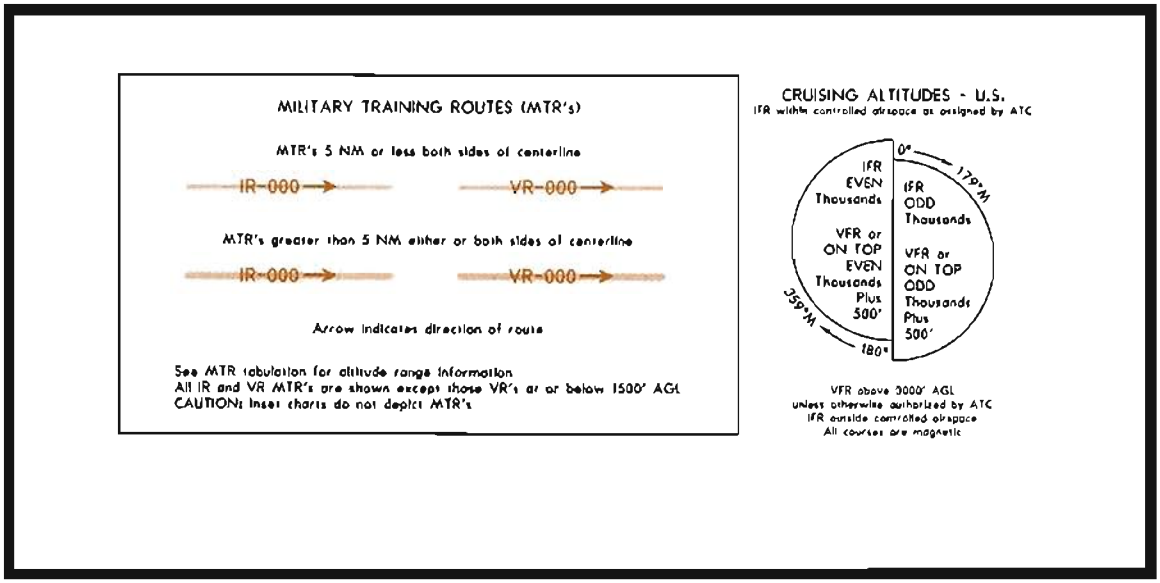
LEGEND 22.—Inoperative Components or Visual Aids Table.



LEGEND 23.—IFR En Route Low Altitude (U.S.).



LEGEND 24.—IFR En Route Low Altitude (U.S.).



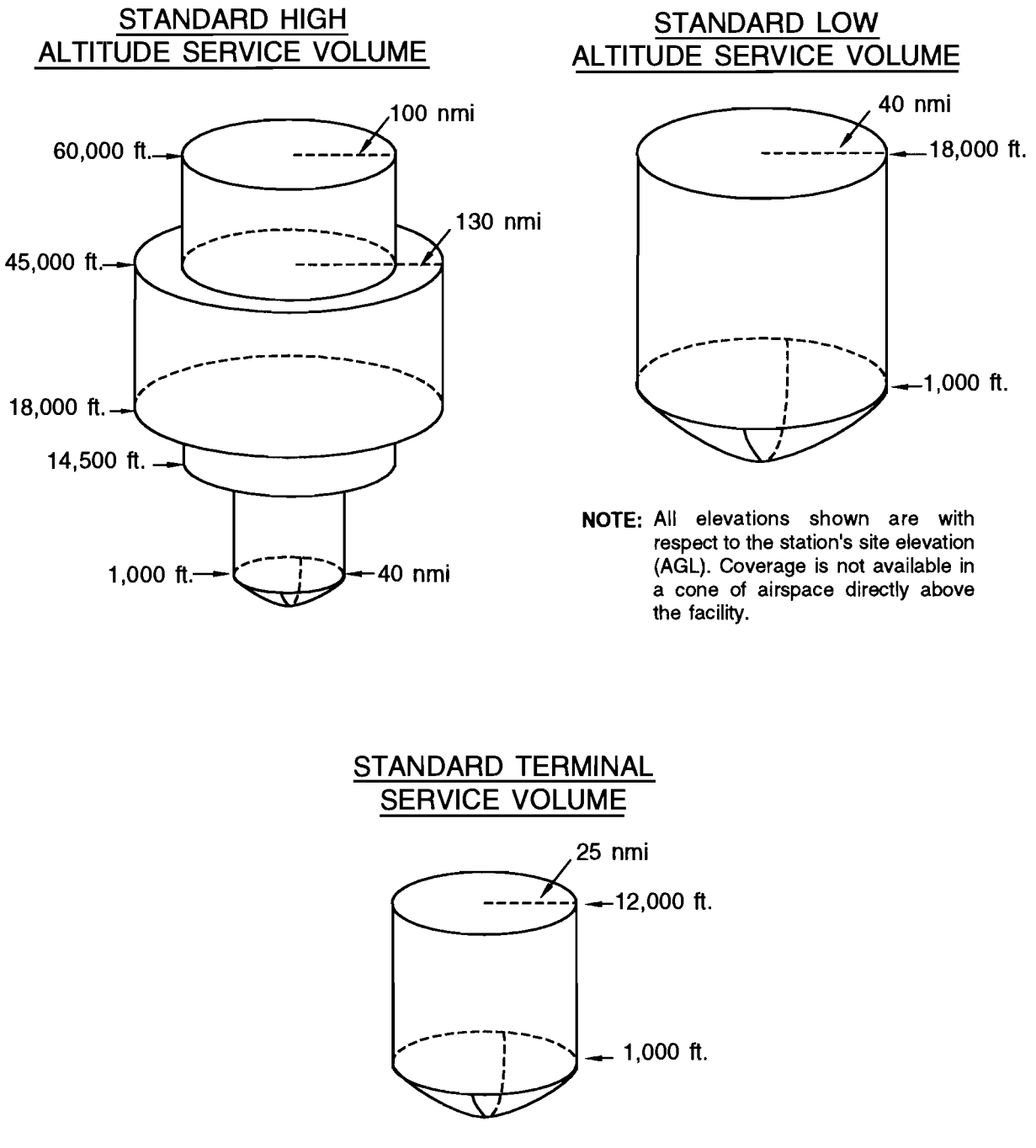
LEGEND 25.—IFR En Route Low Altitude (U.S.).

AIRCRAFT EQUIPMENT SUFFIXES

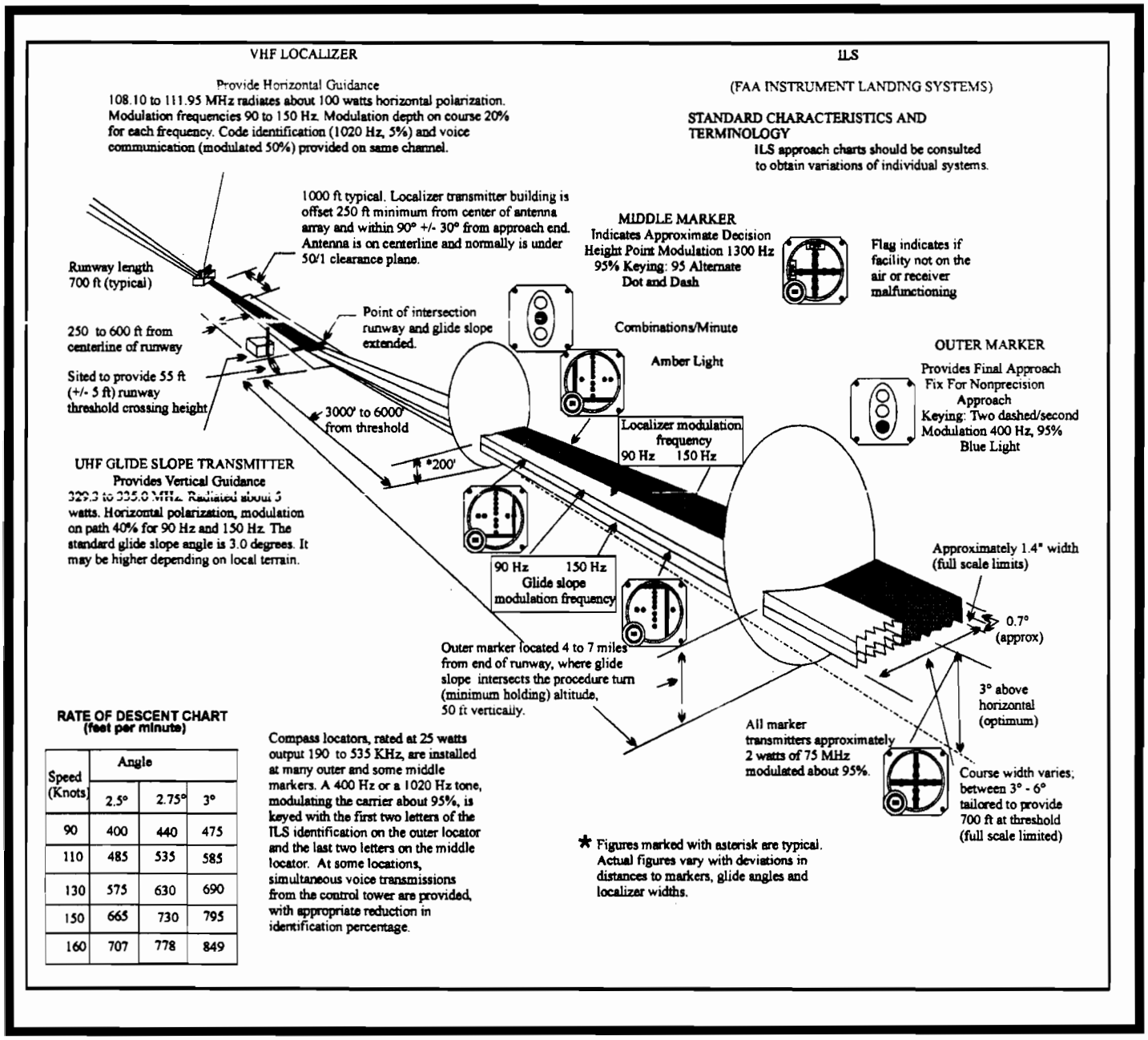
Suffix	Aircraft Equipment Suffixes
	NO DME
/X	No transponder
/T	Transponder with no Mode C
/U	Transponder with Mode C
	DME
/D	No transponder
/B	Transponder with no Mode C
/A	Transponder with Mode C
	TACAN ONLY
/M	No transponder
/N	Transponder with no Mode C
/P	Transponder with Mode C
	AREA NAVIGATION (RNAV)
/Y	LORAN, VOR/DME, or INS with no transponder
/C	LORAN, VOR/DME, or INS, transponder with no Mode C
/I	LORAN, VOR/DME, or INS, transponder with Mode C
	ADVANCED RNAV WITH TRANSPONDER AND MODE C (If an aircraft is unable to operate with a transponder and/or Mode C, it will revert to the appropriate code listed above under Area Navigation.)
/E	Flight Management System (FMS) with en route, terminal, and approach capability. Equipment requirements are: (a) Dual FMS which meets the specifications of AC 25-15, Approval of Flight Management Systems in Transport Category Airplanes; AC 20-129, Airworthiness Approval of Vertical Navigation (VNAV) Systems for use in the U.S. NAS and Alaska; AC 20-130A, Airworthiness Approval of Navigation or Flight Management Systems Integrating Multiple Navigation Sensors; or equivalent criteria as approved by Flight Standards. (b) A flight director and autopilot control system capable of following the lateral and vertical FMS flight path. (c) At least dual inertial reference units (IRU's). (d) A database containing the waypoints and speed/altitude constraints for the route and/or procedure to be flown that is automatically loaded into the FMS flight plan. (e) An electronic map. (U.S. and U.S. territories only unless otherwise authorized.)
/F	A single FMS with en route, terminal, and approach capability that meets the equipment requirements of /E, (a) through (d), above. (U.S. and U.S. territories only unless otherwise authorized.)
/G	Global Positioning System (GPS)/Global Navigation Satellite System (GNSS) equipped aircraft with en route and terminal capability
/R	Required Navigational Performance (Denotes capability to operate in RNP designated airspace and routes)
/W	Reduced Vertical Separation Minima (RVSM)

LEGEND 26.—Aircraft Equipment Suffixes.

AIR NAVIGATION RADIO AIDS

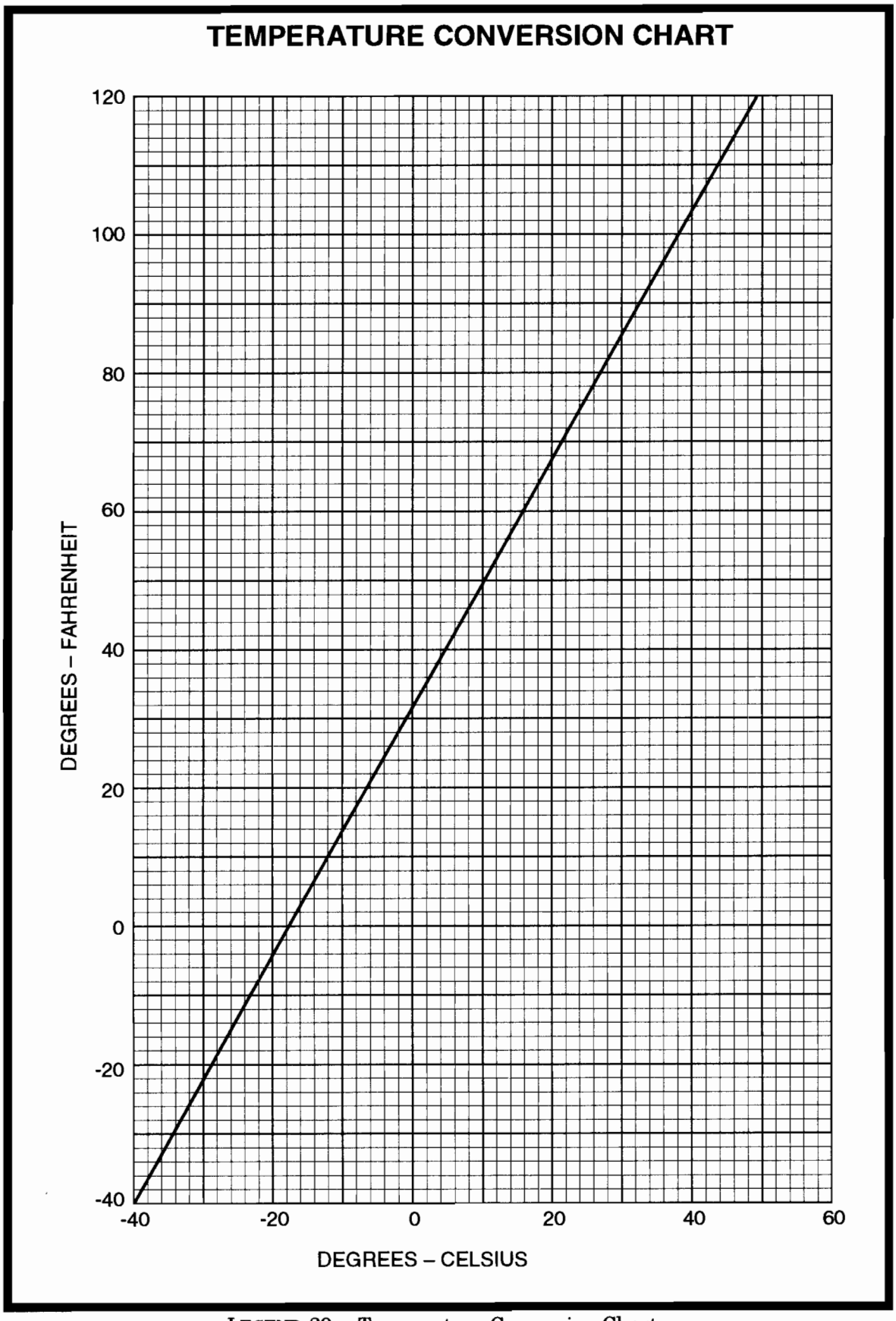


LEGEND 27.—Air Navigation Radio Aids.



Speed (Knots)	Angle		
	2.5°	2.75°	3°
90	400	440	475
110	485	535	585
130	575	630	690
150	665	730	795
160	707	778	849

LEGEND 28.—ILS Standard Characteristics and Terminology.



LEGEND 29.—Temperature Conversion Chart.

APPENDIX 2

Form Approved: OMB No. 2120-0034

U.S. DEPARTMENT OF TRANSPORTATION FEDERAL AVIATION ADMINISTRATION **FLIGHT PLAN**	(FAA USE ONLY) ☐ PILOT BRIEFING ☐ VNR ☐ STOPOVER	TIME STARTED	SPECIALIST INITIALS

1. TYPE	2. AIRCRAFT IDENTIFICATION	3. AIRCRAFT TYPE/ SPECIAL EQUIPMENT	4. TRUE AIRSPEED	5. DEPARTURE POINT	6. DEPARTURE TIME		7. CRUISING ALTITUDE
☐ VFR ☐ IFR ☐ DVFR			KTS		PROPOSED (Z)	ACTUAL (Z)	

8. ROUTE OF FLIGHT

9. DESTINATION (Name of airport and city)	10. EST. TIME ENROUTE HOURS	MINUTES	11. REMARKS

12. FUEL ON BOARD HOURS	MINUTES	13. ALTERNATE AIRPORT(S)	14. PILOT'S NAME, ADDRESS & TELEPHONE NUMBER & AIRCRAFT HOME BASE	15. NUMBER ABOARD
			17. DESTINATION CONTACT/TELEPHONE (OPTIONAL)	

16. COLOR OF AIRCRAFT	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.

FAA Form 7233-1 (8-82)

CLOSE VFR FLIGHT PLAN WITH _____ FSS ON ARRIVAL

FIGURE 1.—Flight Plan.

VALID 141200Z FOR USE 0900-1500Z. TEMPS NEG ABV 24000

FT	3000	6000	9000	12000	18000	24000	30000	34000	39000
EMI	2807	2715-07	2728-10	2842-13	2867-21	2891-30	751041	771150	780855
ALB	0210	9900-07	2714-09	2728-12	2656-19	2777-28	781842	760150	269658
PSB		1509+04	2119+01	2233-04	2262-14	2368-26	781939	760850	780456
STL	2308	2613+02	2422-03	2431-08	2446-19	2461-30	760142	782650	760559

FIGURE 2.—Winds and Temperatures Aloft Forecast.

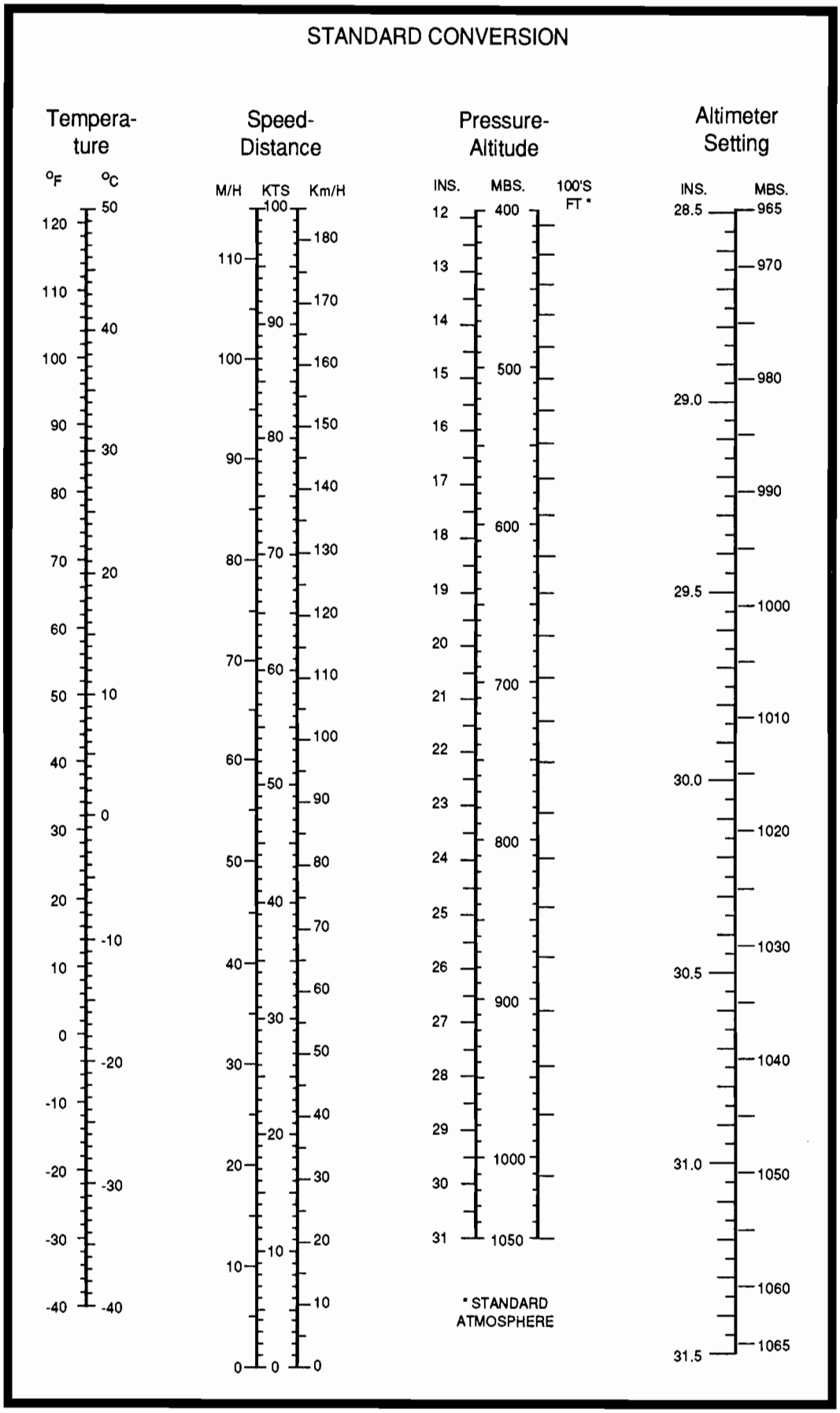


FIGURE 3.—Standard Conversion Chart.

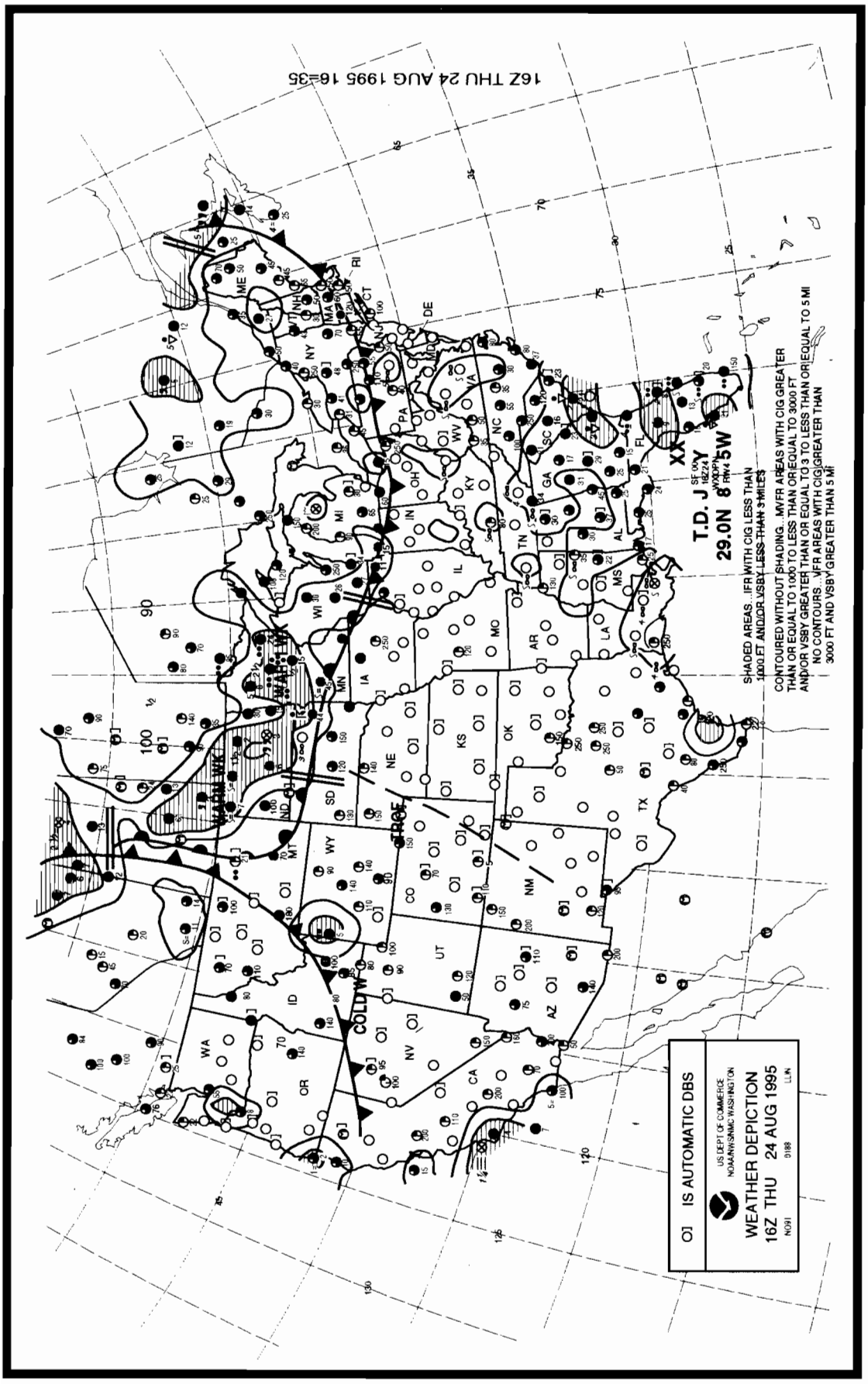


FIGURE 4.—Weather Depiction Chart.

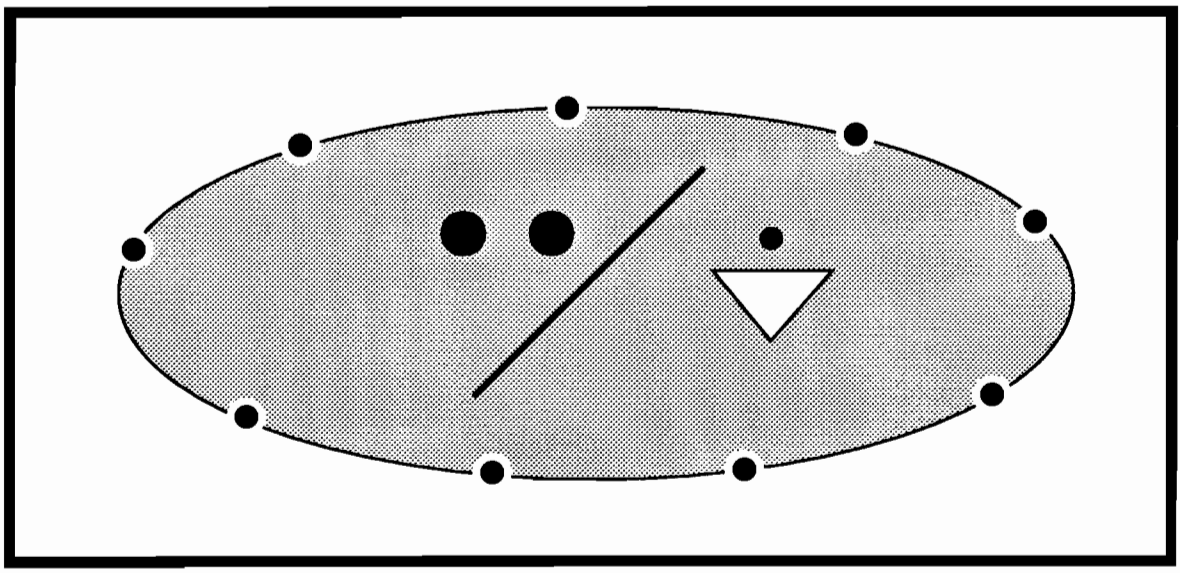


FIGURE 5.—Symbol Used on Low-Level Significant Weather Prognostic Chart.

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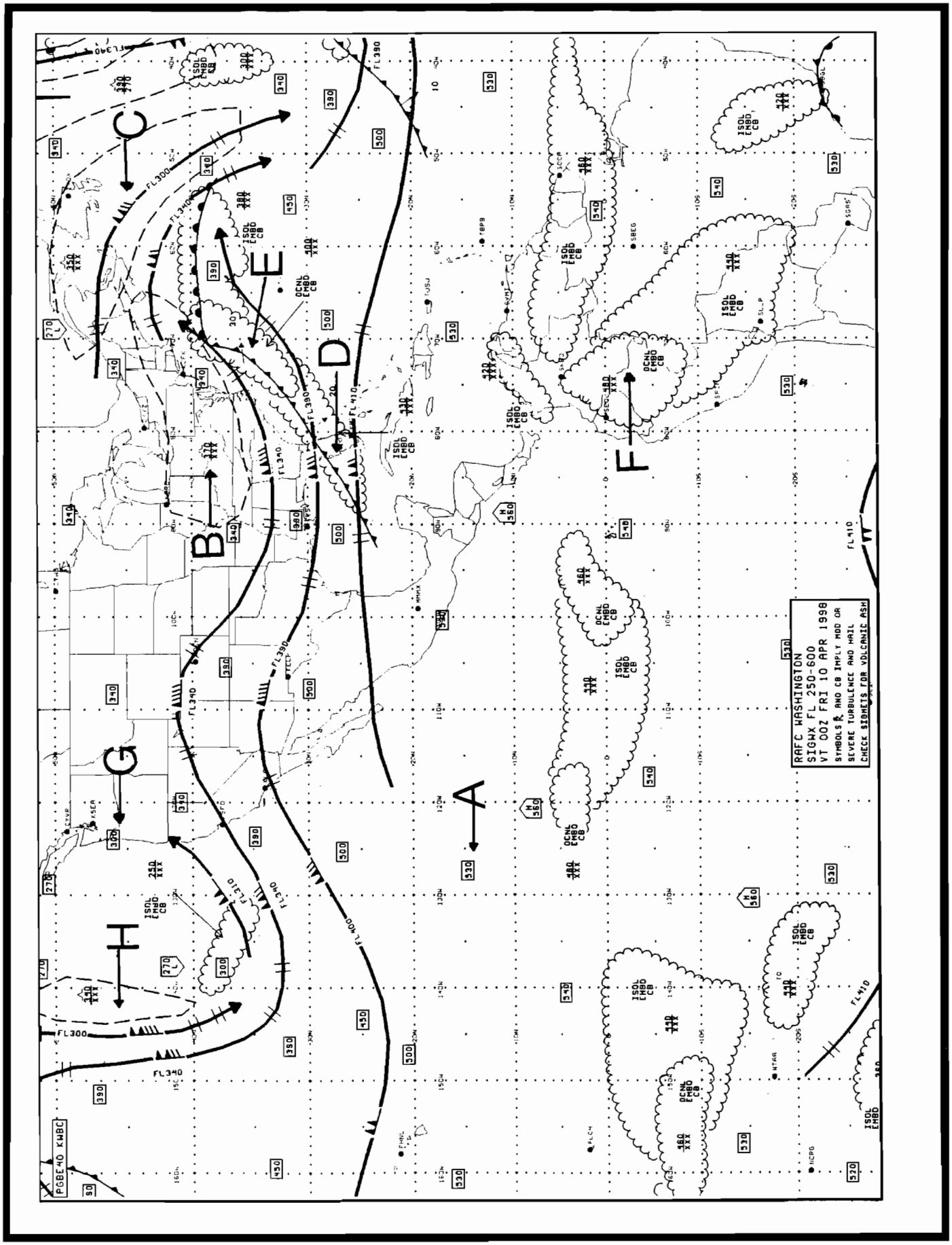

FIGURE 7.—High-Level Significant Weather Prognostic Chart.

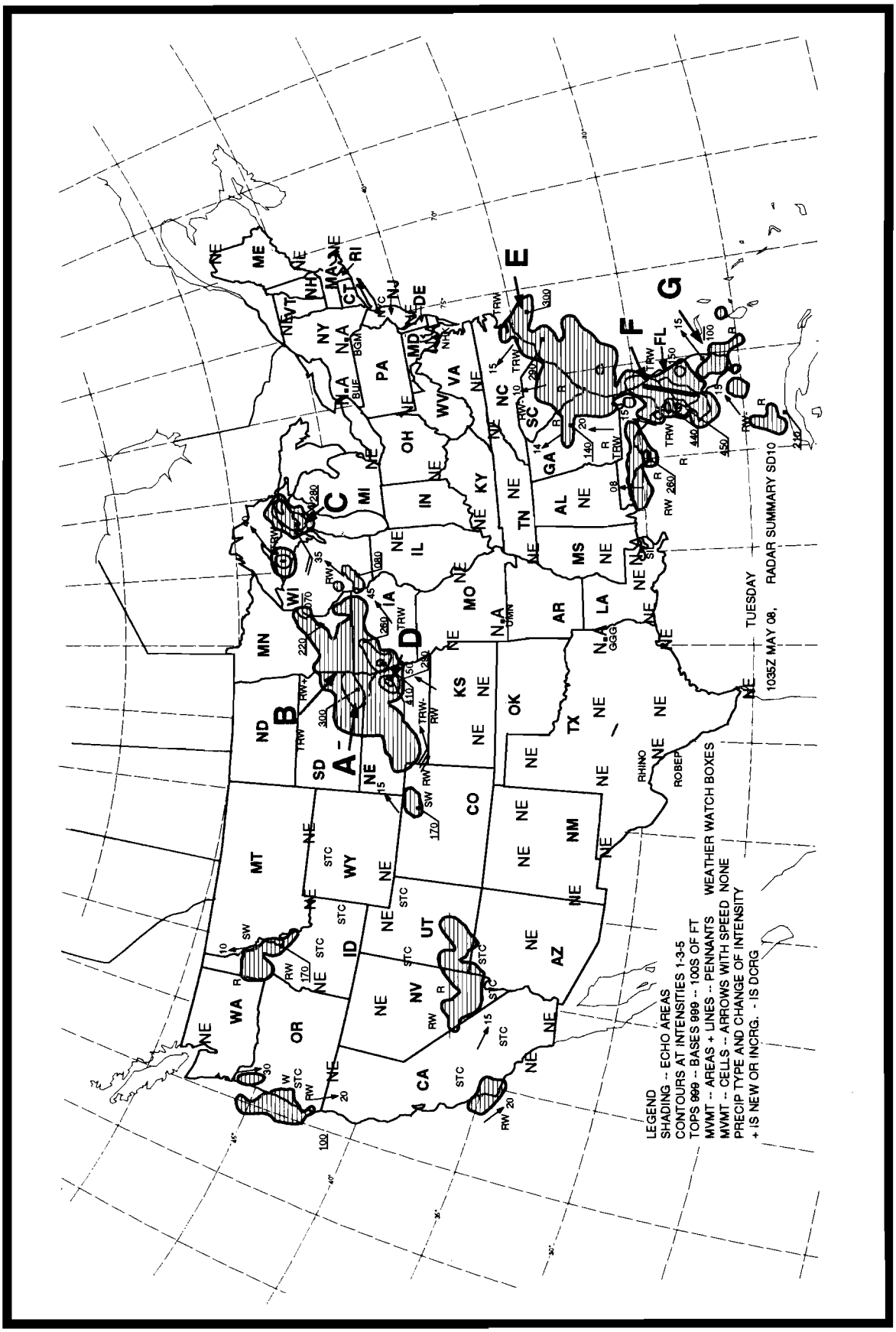

FIGURE 8.—Radar Summary Chart.

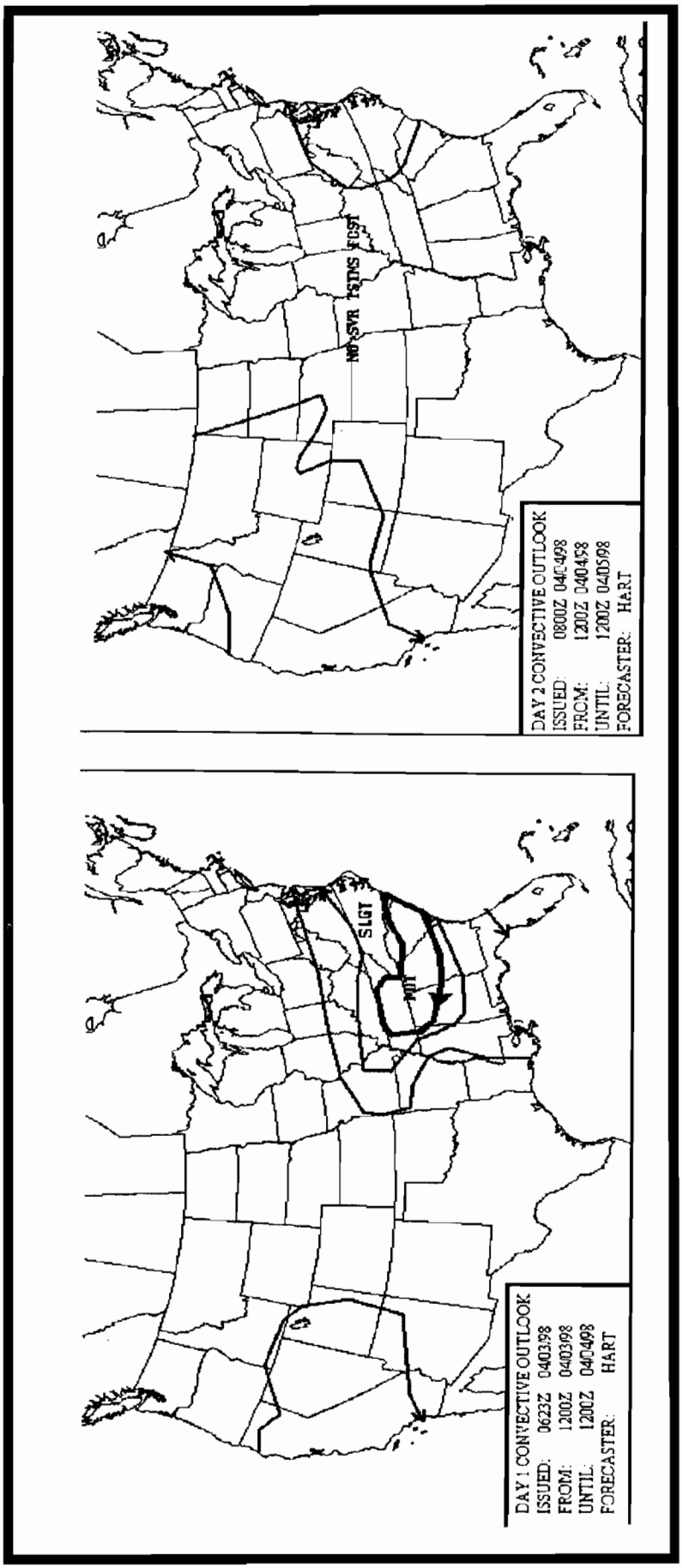

FIGURE 9.—Severe Weather Outlook Charts.

FIGURE 10.—Deleted.

FIGURE 11.—Deleted.

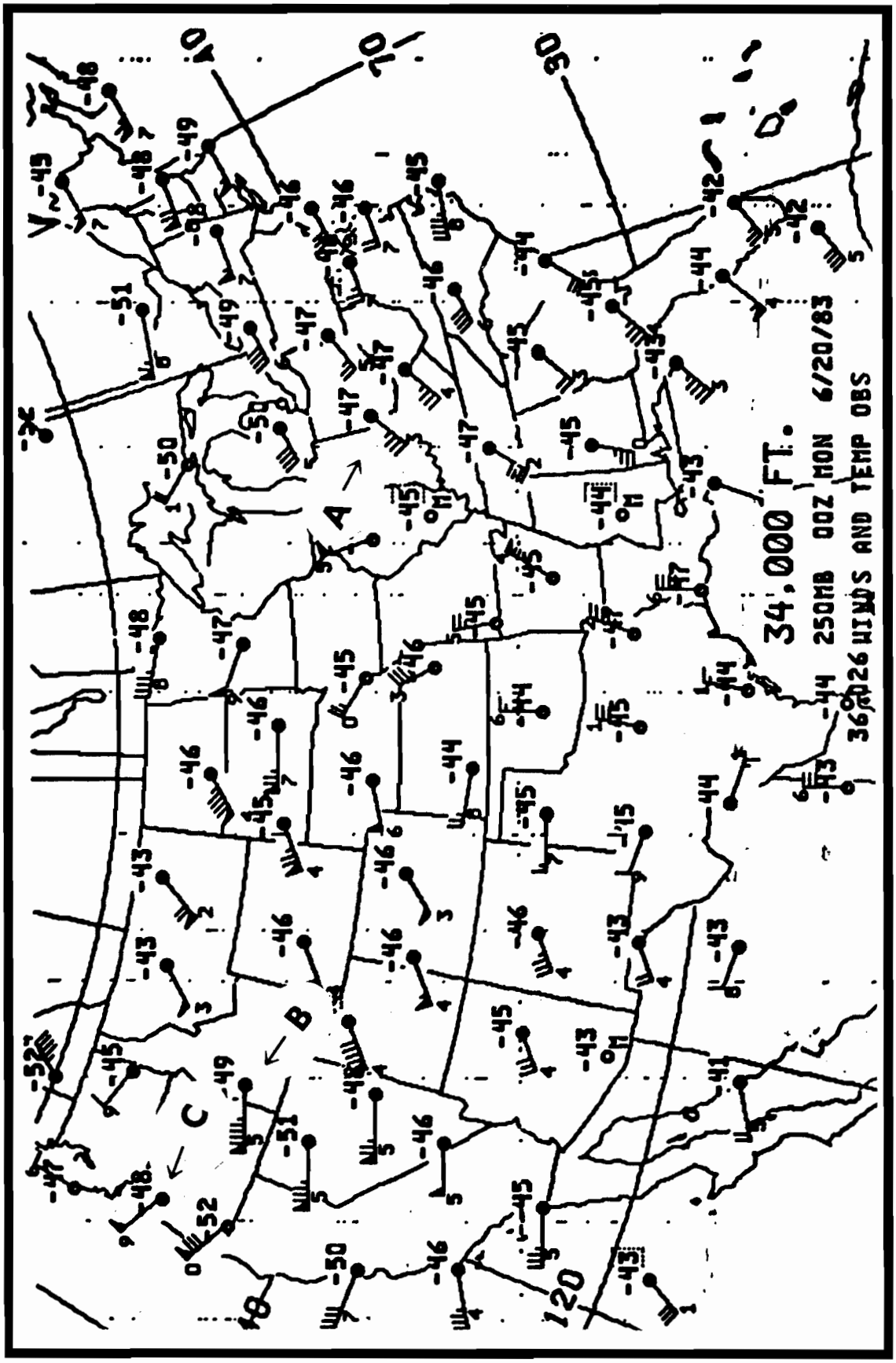

FIGURE 12.—Observed Winds Aloft for 34,000 Feet.

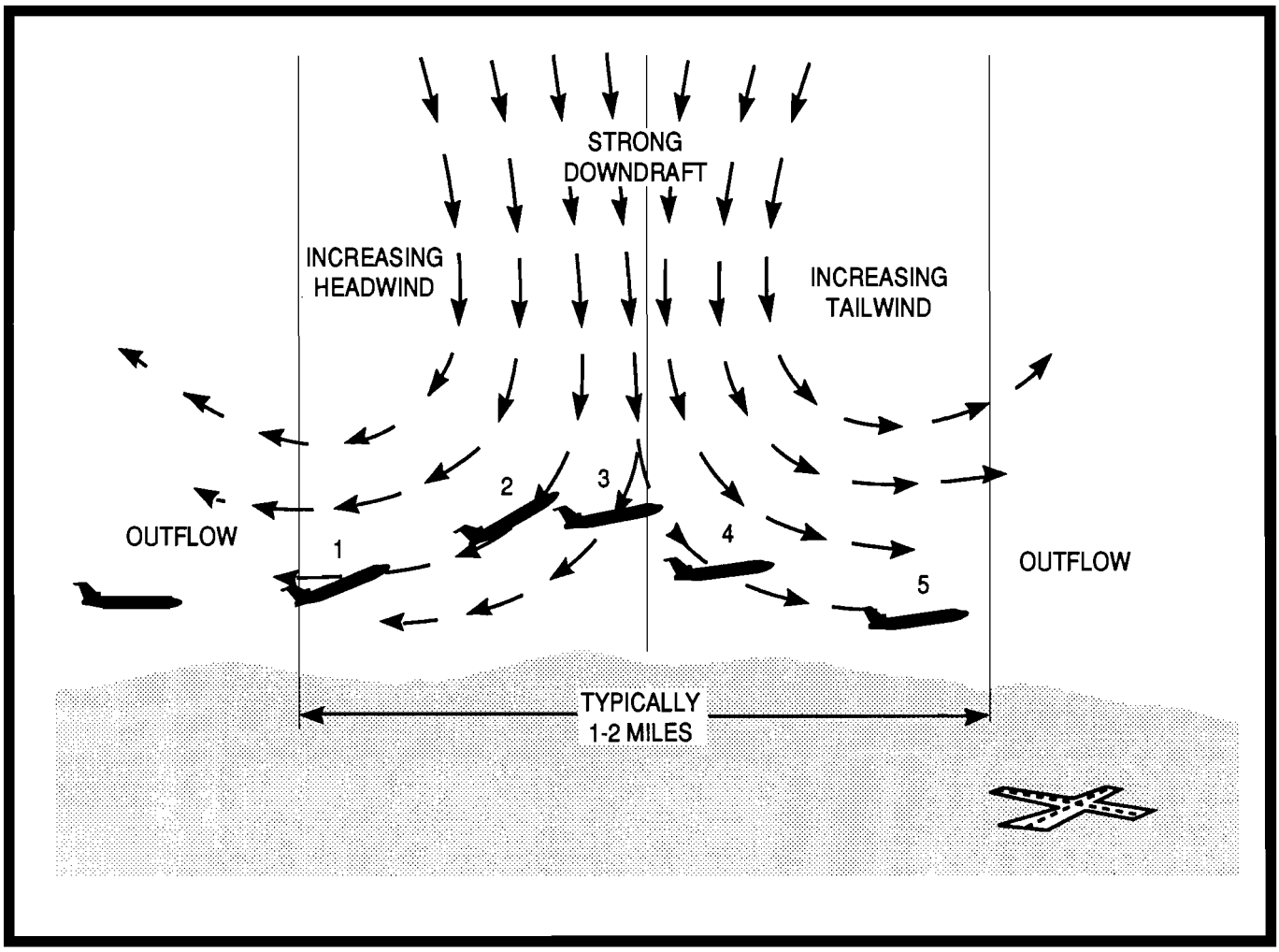

FIGURE 13.—Microburst Section Chart.

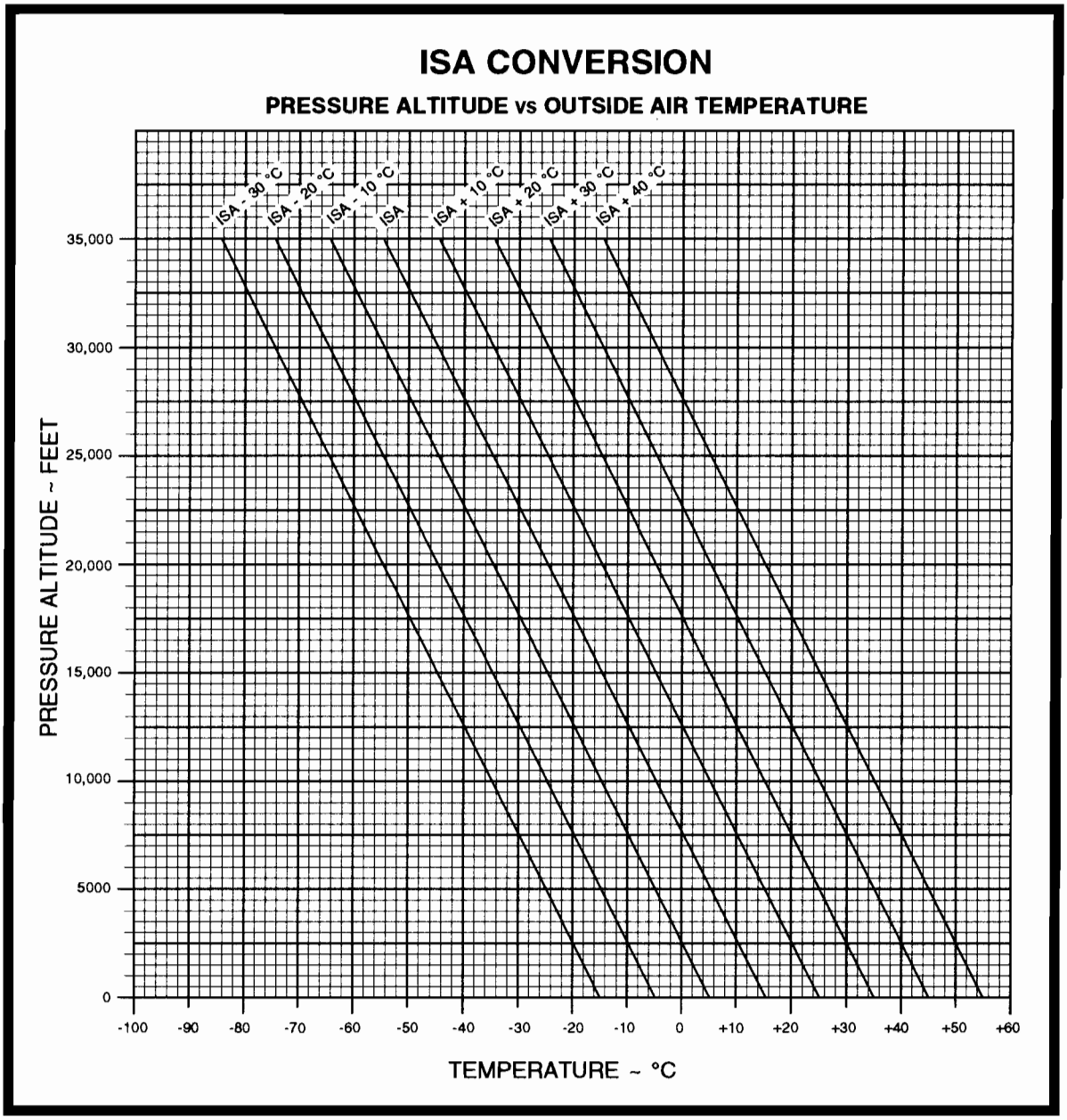

FIGURE 14.—ISA Conversion Chart.

FIGURE 15.—Deleted.

FIGURE 16.—Deleted.

FIGURE 17.—Deleted.

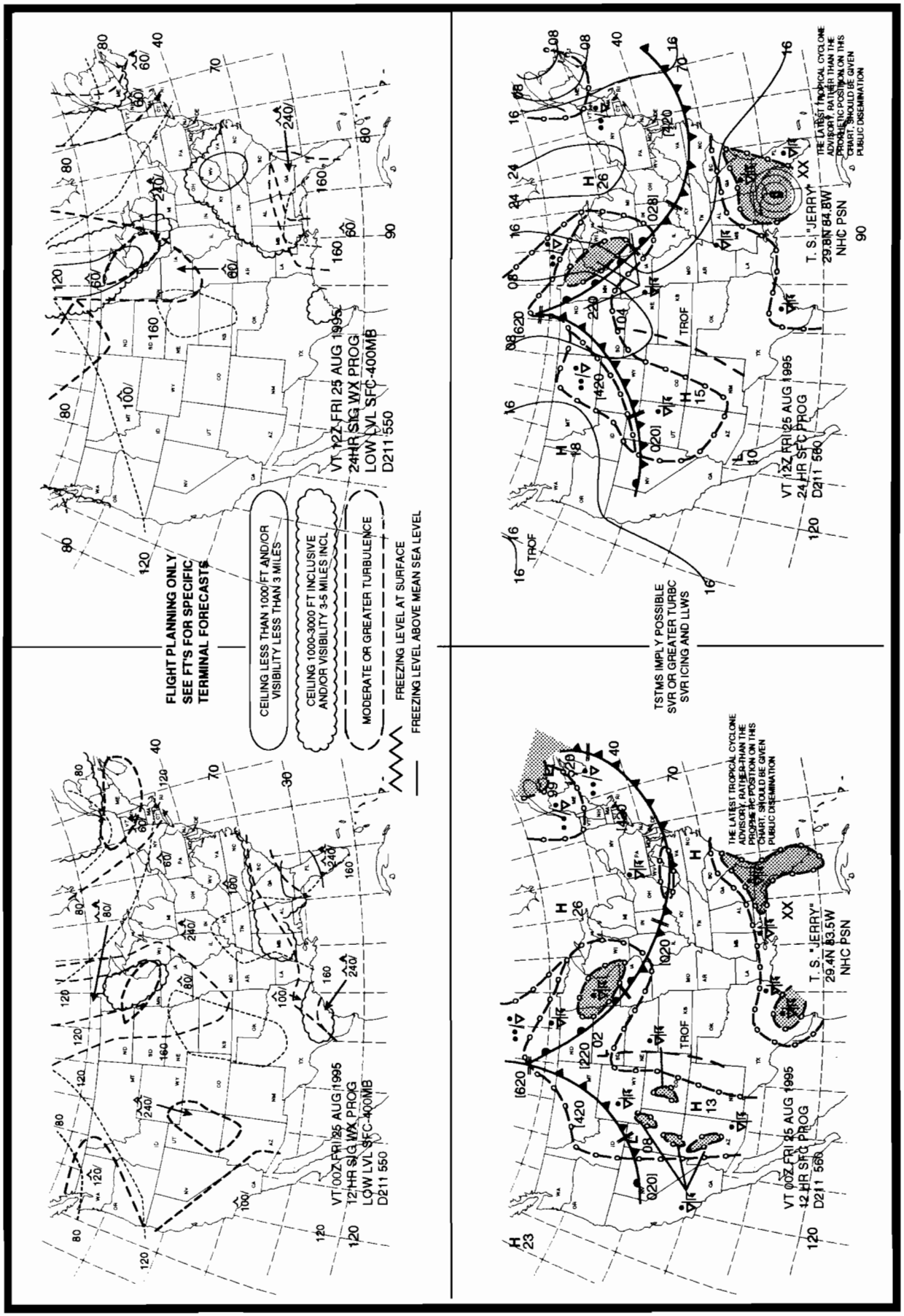

FIGURE 18.—U.S. Low-Level Significant Weather Prognostic Charts.

FIGURE 19.—Deleted.

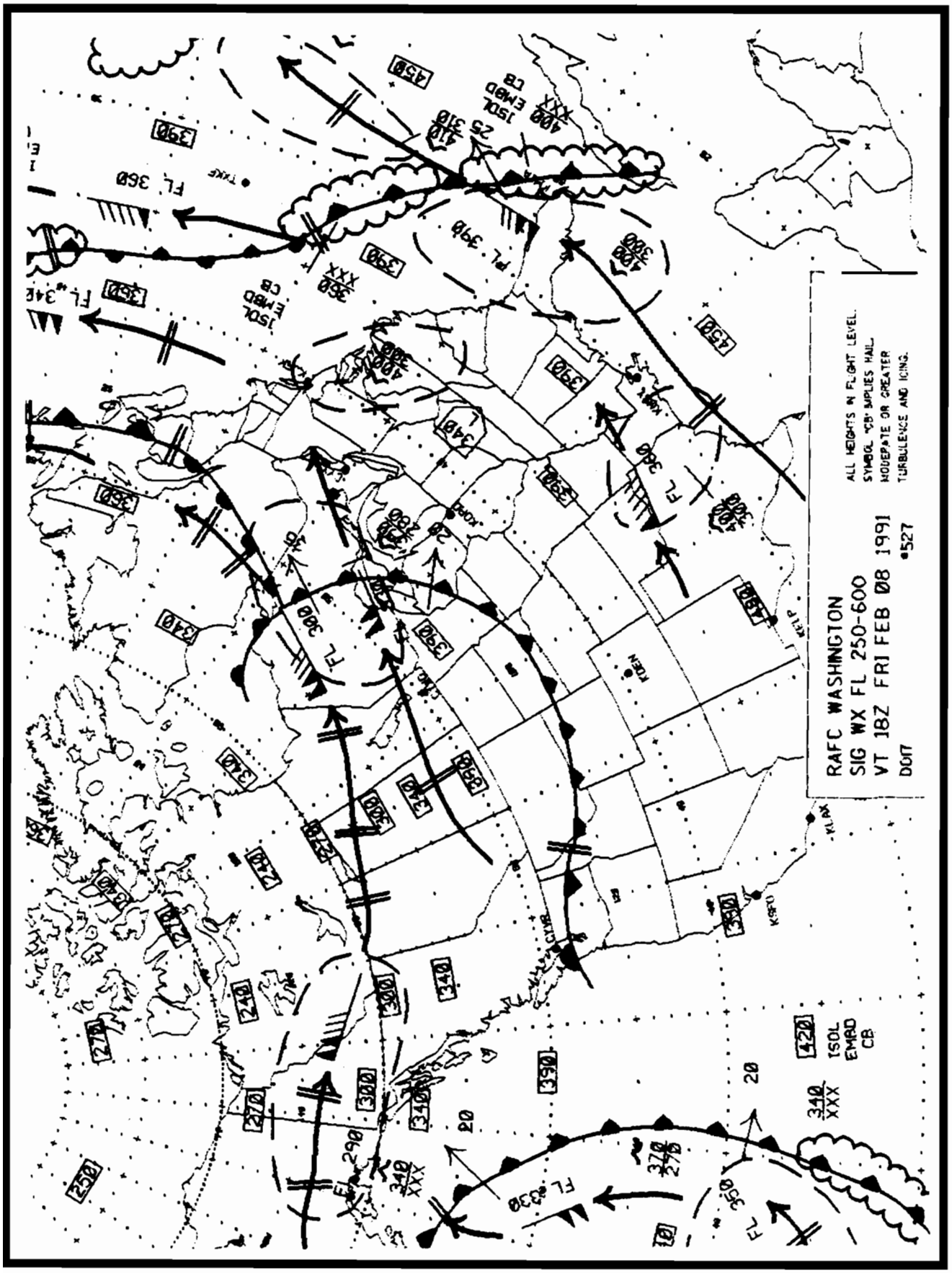

FIGURE 20.—High-Level Significant Weather Prognostic Chart.

Form Approved: OMB No. 2120-0034

U.S. DEPARTMENT OF TRANSPORTATION FEDERAL AVIATION ADMINISTRATION **FLIGHT PLAN**	(FAA USE ONLY) ☐ PILOT BRIEFING ☐ VNR ☐ STOPOVER	TIME STARTED	SPECIALIST INITIALS

1. TYPE	2. AIRCRAFT IDENTIFICATION	3. AIRCRAFT TYPE/ SPECIAL EQUIPMENT	4. TRUE AIRSPEED	5. DEPARTURE POINT	6. DEPARTURE TIME		7. CRUISING ALTITUDE
					PROPOSED (Z)	ACTUAL (Z)	
☐ VFR X IFR ☐ DVFR	N 123RC	T210N/	175 KTS	GJT			15,000

8. ROUTE OF FLIGHT
JNC9, JNC, V187, MANCA, V211

9. DESTINATION (Name of airport and city)	10. EST. TIME ENROUTE HOURS	MINUTES	11. REMARKS
DRO			

12. FUEL ON BOARD HOURS	MINUTES	13. ALTERNATE AIRPORT(S)	14. PILOT'S NAME, ADDRESS & TELEPHONE NUMBER & AIRCRAFT HOME BASE	15. NUMBER ABOARD
4	30	GJT	17. DESTINATION CONTACT/TELEPHONE (OPTIONAL)	2

16. COLOR OF AIRCRAFT	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.
RED/WHITE/BLUE	

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

AIRCRAFT INFORMATION

MAKE Cessna MODEL T210N

N 123RC Vso 58____

AIRCRAFT EQUIPMENT/STATUS**

**NOTE: X= OPERATIVE INOP= INOPERATIVE N/A= NOT APPLICABLE
TRANSPONDER: X (MODE C) X ILS: (LOCALIZER) X (GLIDE SLOPE) X
VOR NO. 1 X (NO. 2) X ADF: X RNAV: X
VERTICAL PATH COMPUTER: N/A DME: X
MARKER BEACON: X (AUDIO) X (VISUAL) X

FIGURE 21.—Flight Plan and Aircraft Information.

Form Approved: OMB No. 2120-0034

U.S. DEPARTMENT OF TRANSPORTATION FEDERAL AVIATION ADMINISTRATION **FLIGHT PLAN**	(FAA USE ONLY) ☐ PILOT BRIEFING ☐ VNR ☐ STOPOVER	TIME STARTED	SPECIALIST INITIALS

1. TYPE	2. AIRCRAFT IDENTIFICATION	3. AIRCRAFT TYPE/ SPECIAL EQUIPMENT	4. TRUE AIRSPEED	5. DEPARTURE POINT	6. DEPARTURE TIME		7. CRUISING ALTITUDE
					PROPOSED (Z)	ACTUAL (Z)	
X IFR	N 123RC	T210N/	175 KTS	DRO			16,000

8. ROUTE OF FLIGHT
V211, MANCA, V187, HERRM, V187, JNC

9. DESTINATION (Name of airport and city)	10. EST. TIME ENROUTE HOURS	MINUTES	11. REMARKS
GJT			

12. FUEL ON BOARD HOURS	MINUTES	13. ALTERNATE AIRPORT(S)	14. PILOT'S NAME, ADDRESS & TELEPHONE NUMBER & AIRCRAFT HOME BASE	15. NUMBER ABOARD
			17. DESTINATION CONTACT/TELEPHONE (OPTIONAL)	2

16. COLOR OF AIRCRAFT	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.
RED/WHITE/BLUE	

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

AIRCRAFT INFORMATION

MAKE Cessna MODEL T210N

N 123RC Vso 58____

AIRCRAFT EQUIPMENT/STATUS**

**NOTE: X= OPERATIVE INOP= INOPERATIVE N/A= NOT APPLICABLE
TRANSPONDER: X (MODE C) X ILS: (LOCALIZER) X (GLIDE SLOPE) X
VOR NO. 1 X (NO. 2) X ADF: X RNAV: X
VERTICAL PATH COMPUTER: N/A DME: X
MARKER BEACON: X (AUDIO) X (VISUAL) X

FIGURE 21A.—Flight Plan and Aircraft Information.

FLIGHT LOG

GRAND JUNCTION (GJT) TO DURANGO (DRO)

CHECK POINTS		ROUTE	COURSE	WIND	SPEED-KTS		DIST	TIME		FUEL	
FROM	TO	ALTITUDE		TEMP	TAS	GS	NM	LEG	TOT	LEG	TOT
		JNC9JNC		230 08							
GJT	JNC	CLIMB									
		V187									
	HERRM	15,000	151°		175			:24:0			
		V187									
	MANCA		151°								
APPROACH & LANDING		V211									
		DESENT	092°					:18:30			
	DRO										

OTHER DATA:
NOTE: TAKEOFF RUNWAY 29.
MAG VAR, 14° E.

FLIGHT SUMMARY

TIME	FUEL (LB)	
		EN ROUTE
		RESERVE
		MISSED APPR.
		TOTAL

FIGURE 22.—Flight Planning Log.

FLIGHT LOG

DURANGO (DRO) TO GRAND JUNCTION, WALKER FIELD (GJT)

CHECK POINTS		ROUTE		WIND	SPEED-KTS		DIST	TIME		FUEL	
FROM	TO	ALTITUDE	COURSE	TEMP	TAS	GS	NM	LEG	TOT	LEG	TOT
		V211		230 08							
DRO	MANCA	CLIMB	272°					:14:30			
		V187									
	HERRM	16,000	333°		174						
		V187									
	JNC		331°								
APPROACH & LANDING		DESCENT						:12:00			
	GJT										

OTHER DATA:
NOTE: MAG. VAR. 14° E.

FLIGHT SUMMARY

TIME	FUEL (LB)	
		EN ROUTE
		RESERVE
		MISSED APPR.
		TOTAL

FIGURE 22A.—Flight Planning Log.

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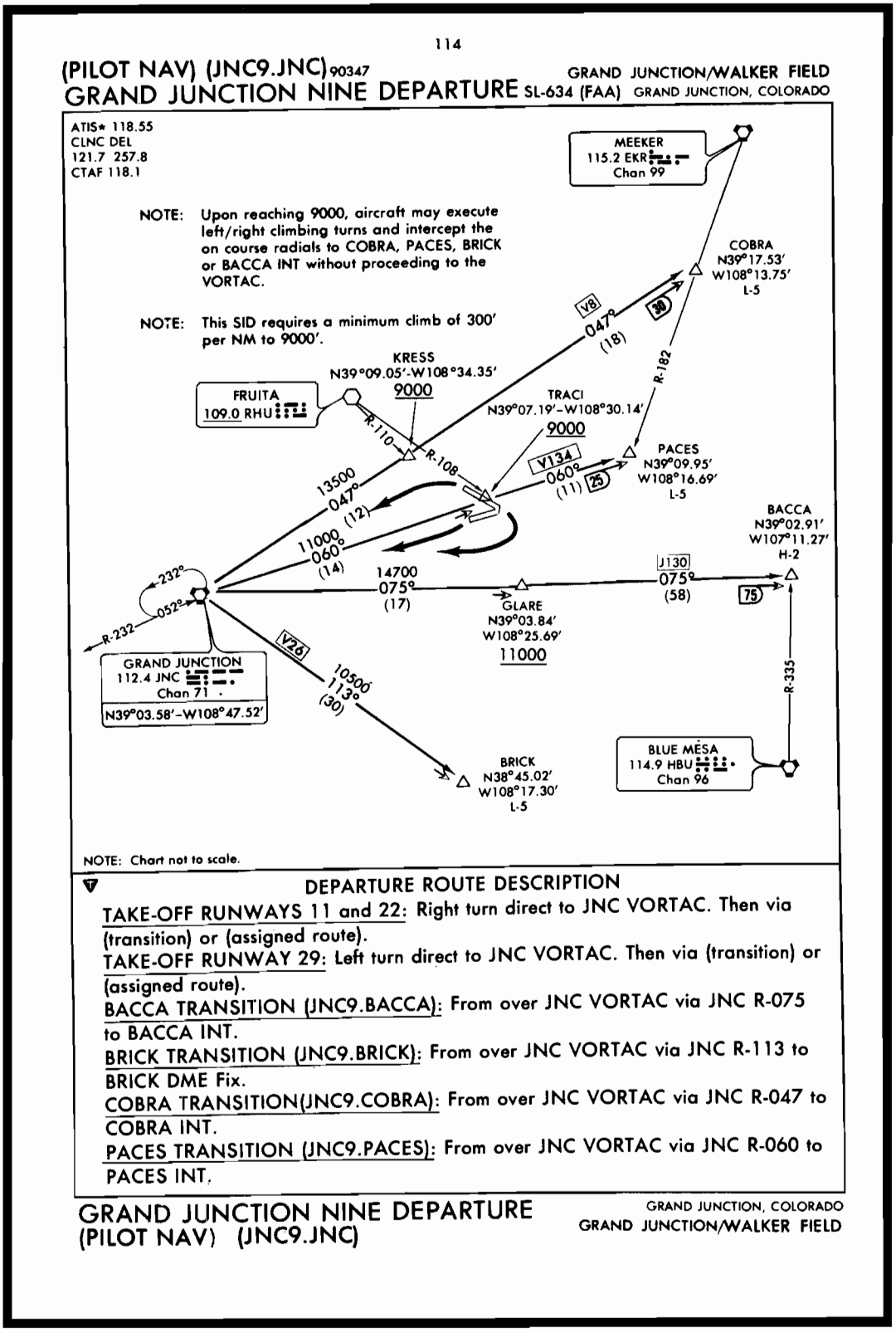

FIGURE 23.—Grand Junction Nine Departure (JNC9.JNC).

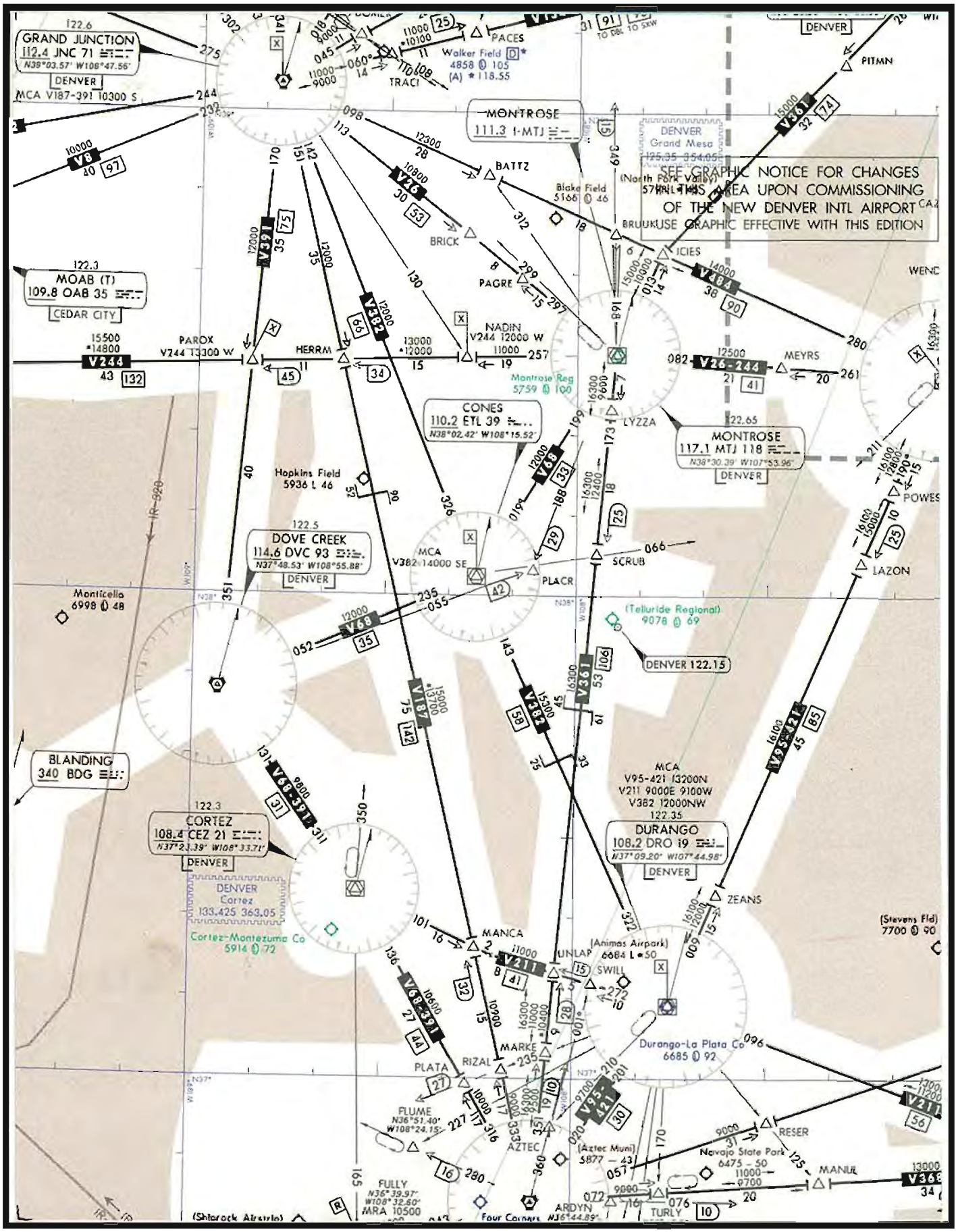

FIGURE 24.—En Route Low-Altitude Chart Segment.

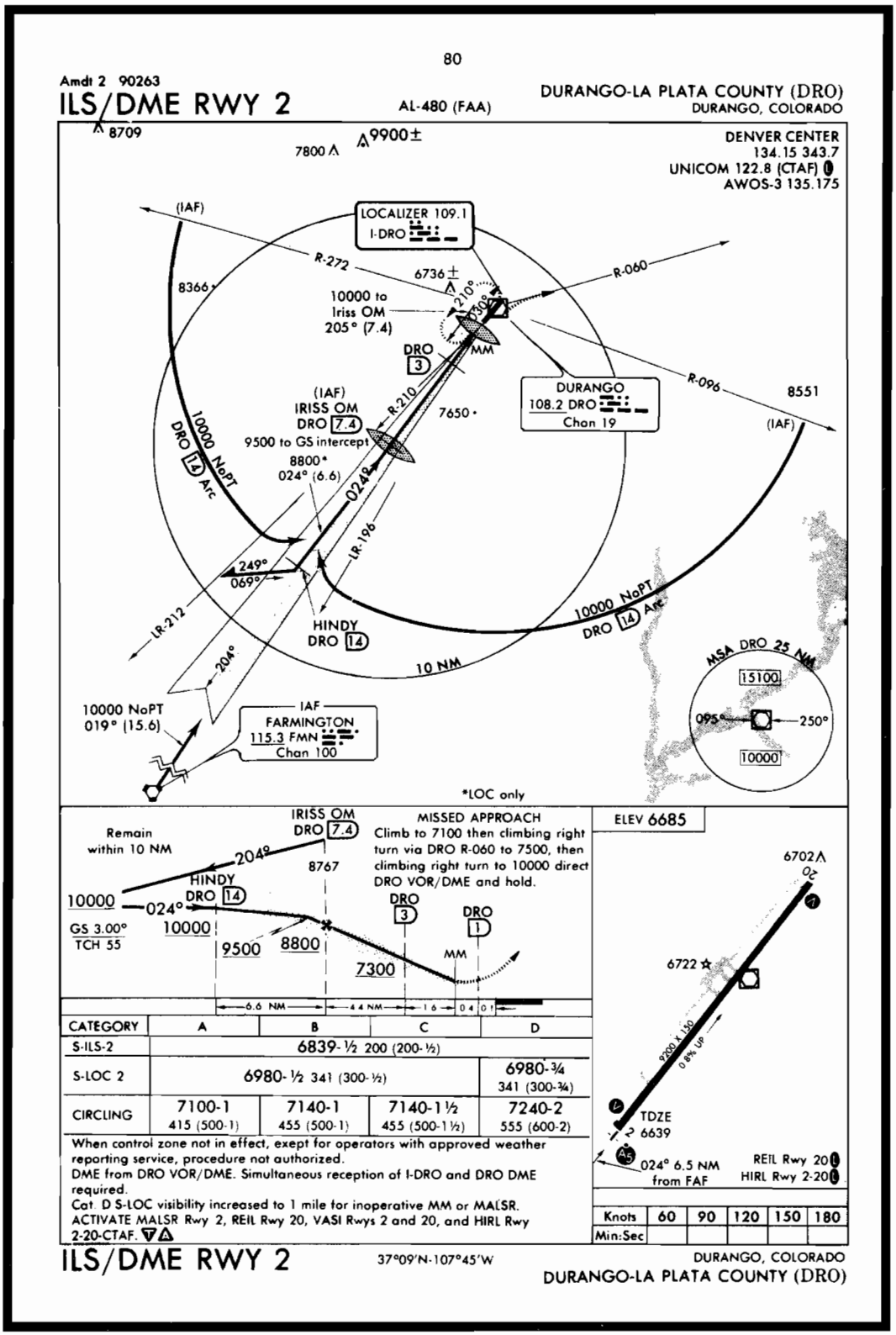

FIGURE 25.—ILS/DME RWY 2.

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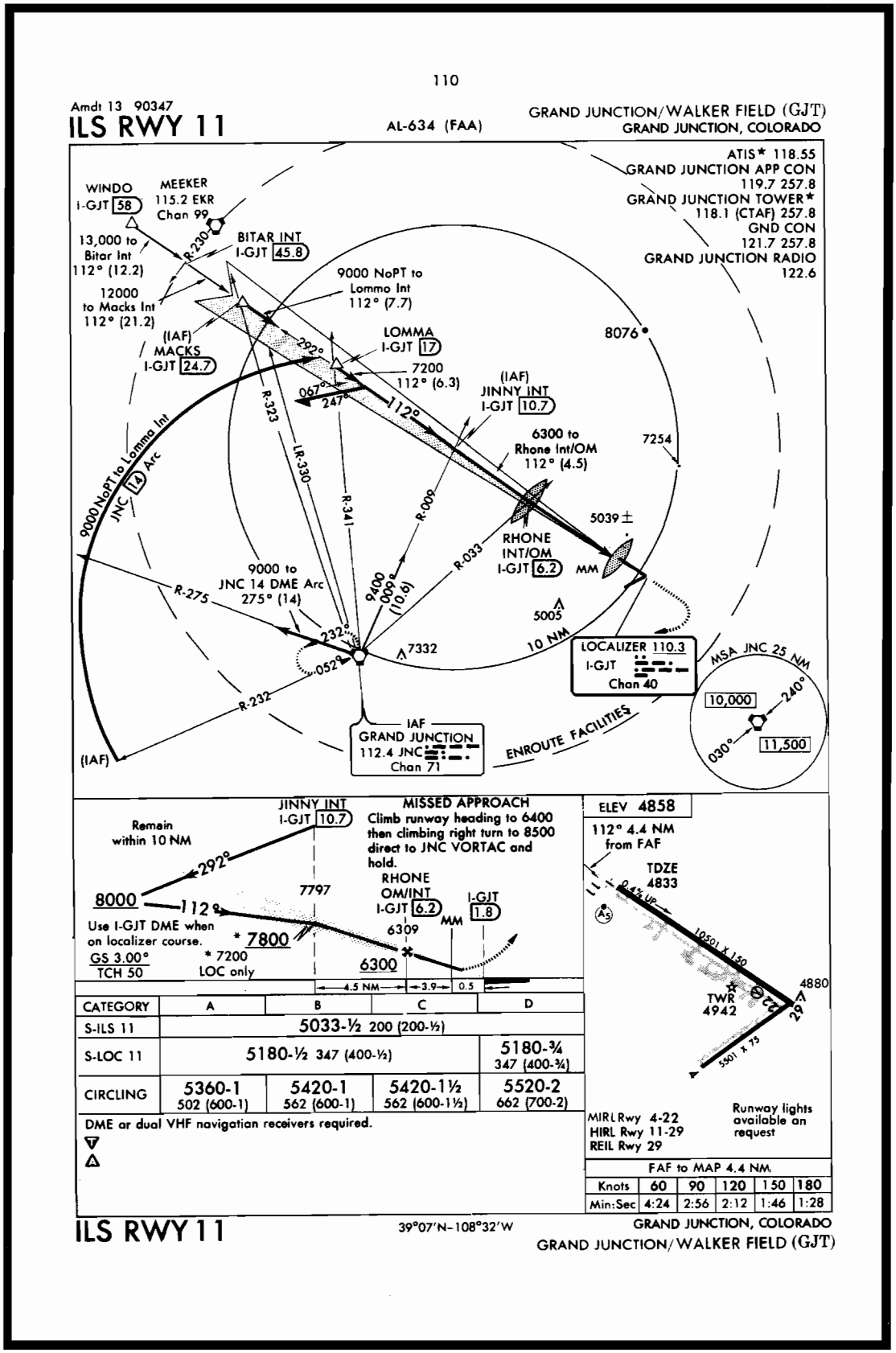

FIGURE 26.—ILS RWY 11.

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Form Approved: OMB No. 2120-0034

U.S. DEPARTMENT OF TRANSPORTATION FEDERAL AVIATION ADMINISTRATION **FLIGHT PLAN**	(FAA USE ONLY) ☐ PILOT BRIEFING ☐ VNR ☐ STOPOVER	TIME STARTED	SPECIALIST INITIALS

1. TYPE	2. AIRCRAFT IDENTIFICATION	3. AIRCRAFT TYPE/ SPECIAL EQUIPMENT	4. TRUE AIRSPEED	5. DEPARTURE POINT	6. DEPARTURE TIME		7. CRUISING ALTITUDE
					PROPOSED (Z)	ACTUAL (Z)	
X IFR	N132SM	C 182/	155 KTS	MFR			8,000

8. ROUTE OF FLIGHT: GNATS 1, MOURN, V121 EUG

9. DESTINATION (Name of airport and city)	10. EST. TIME ENROUTE HOURS	MINUTES	11. REMARKS
MAHLON/SWEET FIELD, EUGENE, OR.			INSTRUMENT TRAINING FLIGHT

12. FUEL ON BOARD HOURS	MINUTES	13. ALTERNATE AIRPORT(S)	14. PILOT'S NAME, ADDRESS & TELEPHONE NUMBER & AIRCRAFT HOME BASE	15. NUMBER ABOARD
		N/R	17. DESTINATION CONTACT/TELEPHONE (OPTIONAL)	

16. COLOR OF AIRCRAFT

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.

FAA Form 7233-1 (8-82)

CLOSE VFR FLIGHT PLAN WITH _____ FSS ON ARRIVAL

AIRCRAFT INFORMATION

MAKE CESSNA MODEL 182

N 132SM Vso 57

AIRCRAFT EQUIPMENT/STATUS**

**NOTE: X= OPERATIVE INOP= INOPERATIVE N/A= NOT APPLICABLE
TRANSPONDER: X (MODE C) X ILS: (LOCALIZER) X (GLIDE SLOPE) N/A
VOR NO. 1 X (NO. 2) X ADF: X RNAV: N/A
VERTICAL PATH COMPUTER: NA DME: X
MARKER BEACON: (AUDIO) INOP (VISUAL) Inop.

FIGURE 27.—Flight Plan and Aircraft Information.

FLIGHT LOG

MEDFORD - JACKSON CO. AIRPORT TO HAHLON/SWEET FIELD, EUGENE, OR.

CHECK POINTS		ROUTE	COURSE	WIND	SPEED-KTS		DIST	TIME		FUEL	
FROM	TO	ALTITUDE		TEMP	TAS	GS	NM	LEG	TOT	LEG	TOT
		GNATS 1									
MFR	MERLI	CLIMB	270°		155			:11:0			
						AVER.					
	MOURN	V121	333°			135					
		8000									
	RBG	V121	287°								
		8000									
	OTH	V121	272°								
		8000									
	EUG	APPROACH	026°								
APPROACH		DESCENT									
& LANDING								:10:0			
	SWEET										
	FIELD										

OTHER DATA:
NOTE:

MAG. VAR. 20° E.
AVERAGE G.S. 135 KTS. FOR GNATS 1
DEPARTURE CLIMB.

FLIGHT SUMMARY

TIME	FUEL (LB)	
		EN ROUTE
		RESERVE
		MISSED APPR.
		TOTAL

FIGURE 28.—Flight Planning Log.

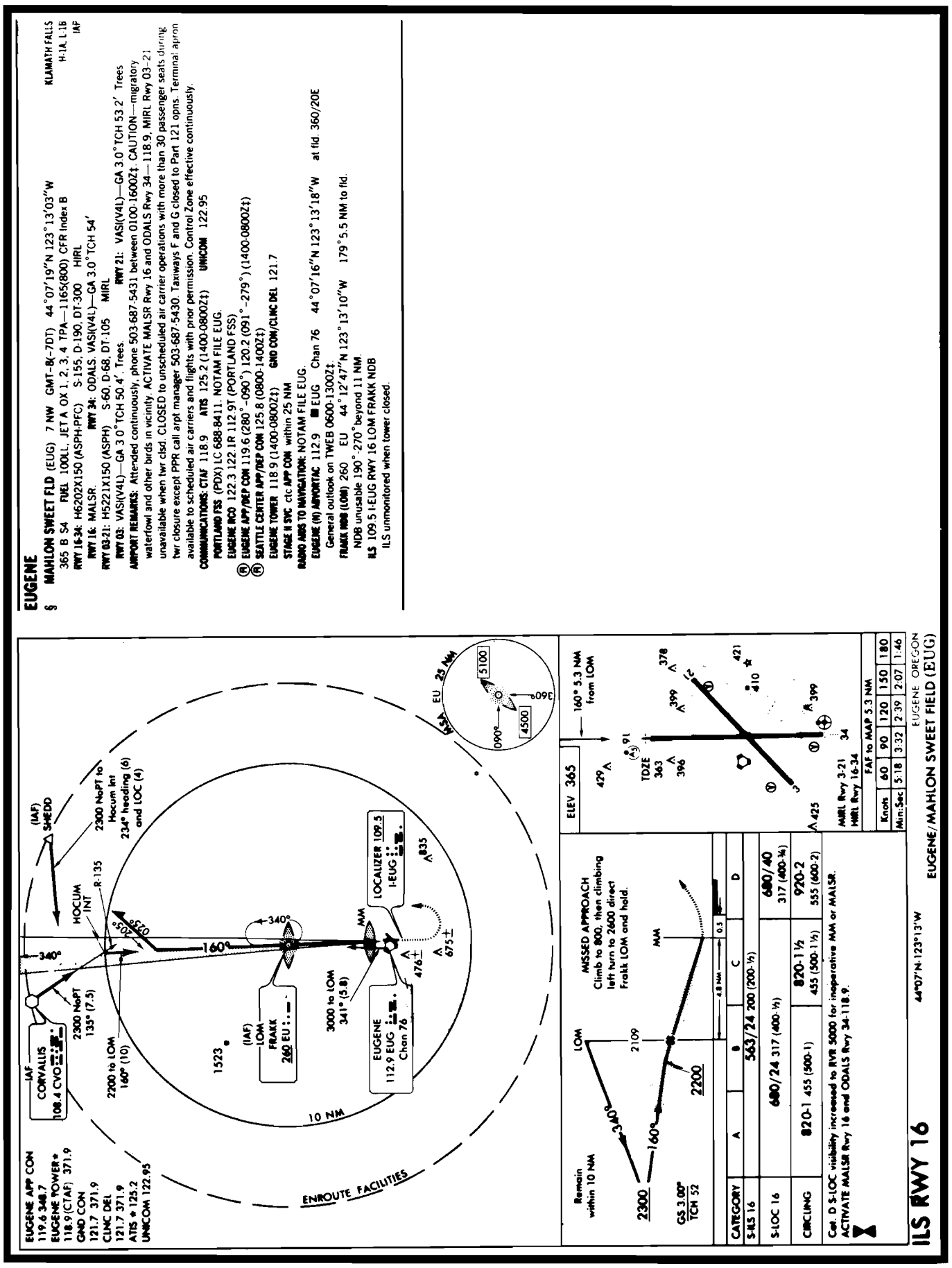

FIGURE 29.—ILS RWY 16 (EUG) and Excerpt from Airport/Facility Directory.

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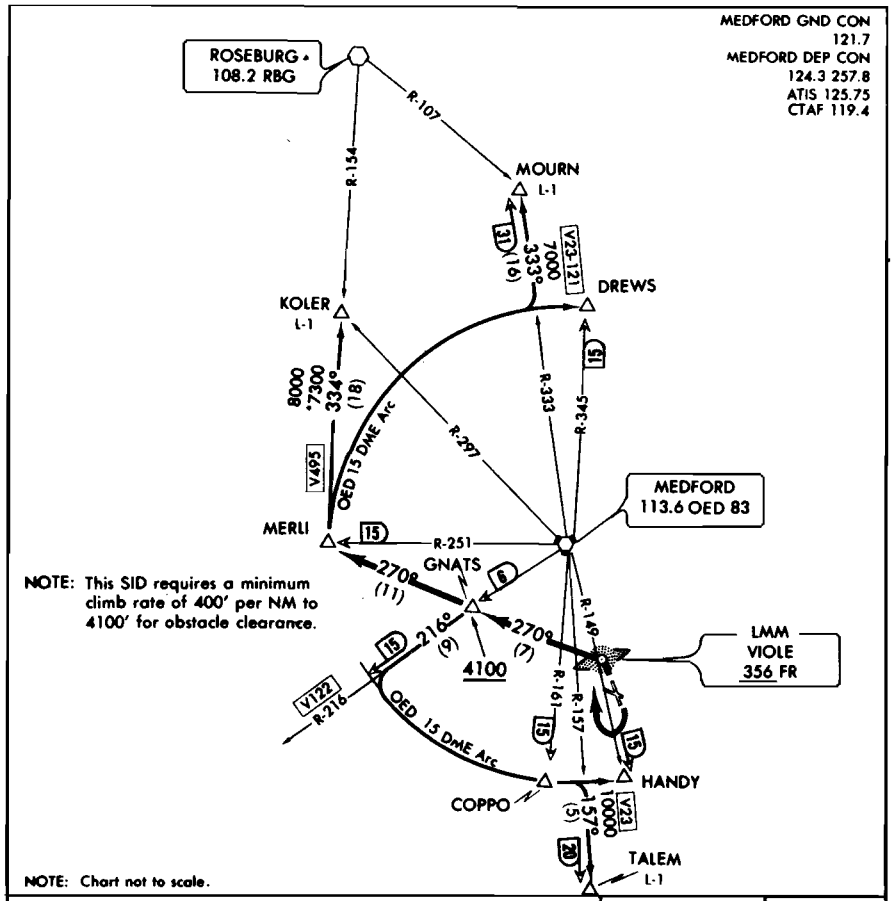


DEPARTURE ROUTE DESCRIPTION

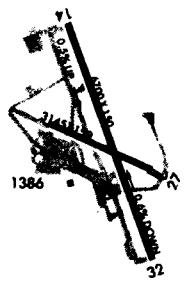
Climb direct to the VIOLE ILS Middle Compass Locator (south take-off turn right), then climb on the 270° magnetic bearing from the LMM to GNATS INT, cross GNATS INT at or above 4100; thence via (transition) or (route).

COPPO TRANSITION (GNATS1.COPPO): Turn left via R-216 to 15 DME Fix, thence turn left via MEDFORD 15 DME Arc to COPPO DME Fix.

KOLER TRANSITION (GNATS1.KOLER): Continue via 270° magnetic bearing from the LMM to MERLI INT, turn right via ROSEBURG R-154 to KOLER INT.

(Continued on next page)

ELEV 1331



GNATS ONE DEPARTURE (GNATS1.GNATS) MEDFORD, OREGON MEDFORD-JACKSON CO

MEDFORD-JACKSON CO
MEDFORD, OREGON

GNATS ONE DEPARTURE (GNATS1.GNATS)

DEPARTURE ROUTE DESCRIPTION
(Continued)

MOURN TRANSITION (GNATS1.MOURN): Continue via 270° magnetic bearing from the LMM to MERLI INT, turn right via MEDFORD 15 DME ARC to intercept V23-121 to MOURN INT.

DREWS TRANSITION (GNATS1.DREWS): Continue via 270° magnetic bearing from the LMM to MERLI INT, turn right via MEDFORD 15 DME ARC to DREWS INT.

TALEM TRANSITION (GNATS1.TALEM): Turn left via MEDFORD R-216 to 15 DME Fix thence turn left via MEDFORD 15 DME ARC to Intercept V23 to TALEM INT.

HANDY TRANSITION (GNATS1.HANDY): Turn left via MEDFORD R-216 to 15 DME Fix, thence turn left via MEDFORD 15 DME Arc to HANDY DME Fix.

GNATS ONE DEPARTURE (GNATS1.GNATS)

MEDFORD, OREGON
MEDFORD-JACKSON CO

§ **MEDFORD-JACKSON CO** (MFR) 3 N GMT-8(-7DT) 42°22'21"N 122°52'17"W KLAMATH FALLS
1331 B S4 **FUEL** 80, 100, 100LL, JET A1 + OX 1, 3 CFR Index B H-1A, L-1A
RWY 14-32: H6700X150 (ASPH-PFC) S-200, D-200, DT-400 HIRL .5% up S IAP
RWY 14: MALSR. Trees. **RWY 32:** REIL. VASI(V4L)—GA 3.0°TCH 49'. Road.
RWY 09-27: H3145X150 (ASPH) S-50, D-70, DT-108 MIRL
RWY 27: Road.
AIRPORT REMARKS: Attended continuously. CLOSED to unscheduled Part 121 air carriers operation, without prior approval, call 503-776-7222. Night refueling delay sunset-1500Z‡, ctc TOWER. Rwy 09-27 clsd to acft over 12,500 lbs GWT. Rwy 09/27 CLOSED when tower clsd. Rwy lgts 14/32 operate med ints when tower closed. ACTIVATE MALSR 14—119.4. Flocks of large waterfowl in vicinity Nov-May
COMMUNICATIONS: CTAF 119.4 **ATIS** 125.75 **UNICOM** 122.95
NORTH BEND FSS (OTH) LC 773-3256. NOTAM FILE MFR.
RCO 122.65 122.1R 113.6T (NORTH BEND FSS)
APP CON 124.3 (1400-0800Z‡) **DEP CON** 124.3 (1400-0800Z‡)
SEATTLE CENTER APP/DEP CON 125.3 (0800-1400Z‡)
TOWER 119.4 (1400-0800Z‡) **GND CON** 121.7
VFR ADVSY SVC ctc TOWER
RADIO AIDS TO NAVIGATION: NOTAM FILE OTH. VHF/DF ctc Medford TOWER
(H) ABVORTAC 113.6 ■ OED Chan 83 42°28'47"N 122°54'43"W 146°6.1 NM to fld. 2080/19E
VORTAC unusable:
160°-165° beyond 35 NM below 8900' 280°-345° beyond 30 NM below 6500'
198°-205° beyond 35 NM below 8500' 345°-360° beyond 35 NM below 6800'
250°-280° beyond 25 NM below 6100'
PUMIE NDB (LOM) 373 MF 42°27'04"N 122°54'44"W 140°4.5 NM to fld. NOTAM FILE MFR
LOM unusable 150°-165° and 260°-265° beyond 5 miles.
VIOLE NDB (LMM) 356 FR 42°23'22"N 122°52'47"W 140°0.5 NM to fld. NOTAM FILE MFR
LMM unusable 305°-335° beyond 10 NM. all altitudes
ILS/DME 110.3 I-MFR Chan 40 Rwy 14 LOM PUMIE NDB. LMM VIOLE NDB. ILS unmonitored when tower closed. Localizer unusable inside threshold.

FIGURE 30.—GNATS One Departure and Excerpt from Airport/Facility Directory.

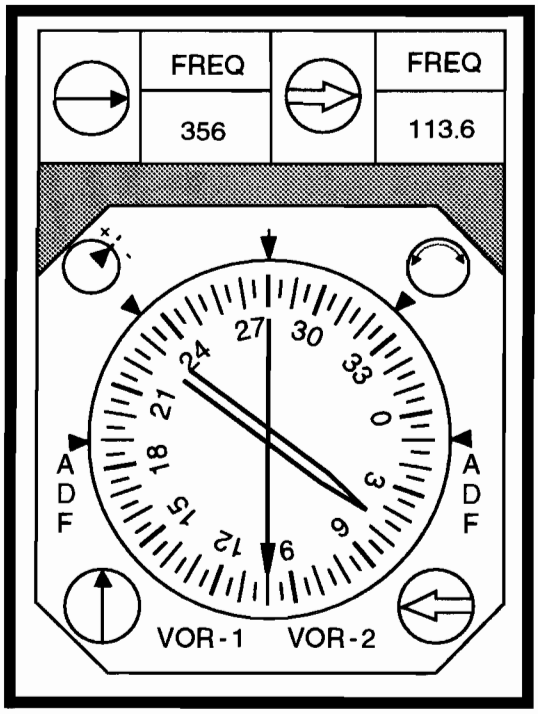


FIGURE 30A.—RMI Indicator.

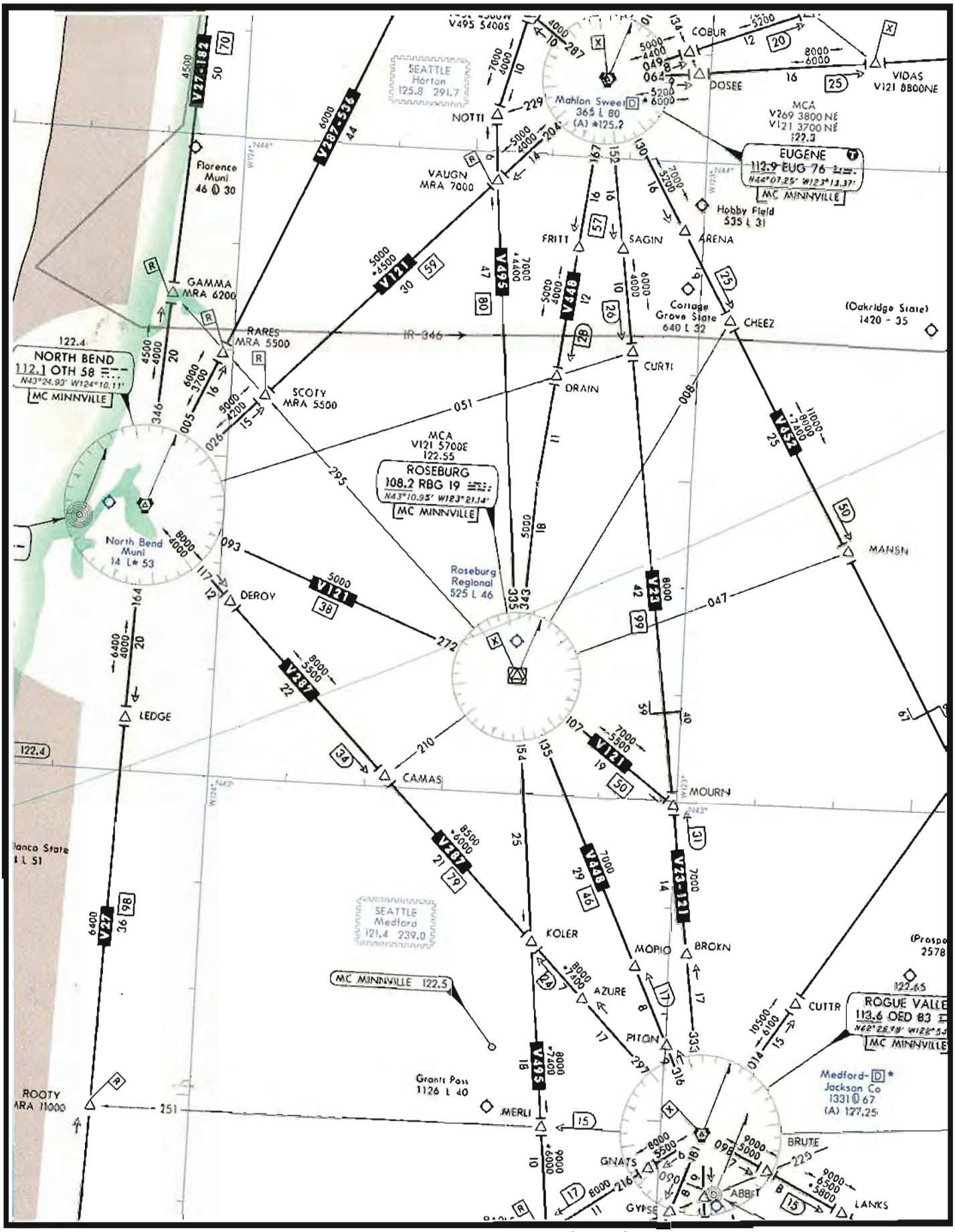


FIGURE 31.—En Route Low-Altitude Chart Segment.

Form Approved: OMB No. 2120-0034

U.S. DEPARTMENT OF TRANSPORTATION FEDERAL AVIATION ADMINISTRATION **FLIGHT PLAN**	(FAA USE ONLY) ☐ PILOT BRIEFING ☐ VNR ☐ STOPOVER	TIME STARTED	SPECIALIST INITIALS

1. TYPE	2. AIRCRAFT IDENTIFICATION	3. AIRCRAFT TYPE/ SPECIAL EQUIPMENT	4. TRUE AIRSPEED	5. DEPARTURE POINT	6. DEPARTURE TIME		7. CRUISING ALTITUDE
					PROPOSED (Z)	ACTUAL (Z)	
X IFR	N4078A	PA 31/	180 KTS	HOT			8,000

8. ROUTE OF FLIGHT: HOT V573, TXK, TXK.BUJ3

9. DESTINATION (Name of airport and city)	10. EST. TIME ENROUTE		11. REMARKS
	HOURS	MINUTES	
DALLAS ADDISON AIRPORT DALLAS, TX			

12. FUEL ON BOARD		13. ALTERNATE AIRPORT(S)	14. PILOT'S NAME, ADDRESS & TELEPHONE NUMBER & AIRCRAFT HOME BASE	15. NUMBER ABOARD
HOURS	MINUTES			
		N/A	17. DESTINATION CONTACT/TELEPHONE (OPTIONAL)	2

16. COLOR OF AIRCRAFT	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.
TAN/WHITE	

FAA Form 7233-1 (8-82)

CLOSE VFR FLIGHT PLAN WITH _____ FSS ON ARRIVAL

AIRCRAFT INFORMATION

MAKE Piper MODEL PA-31

N 4078A Vso 74

AIRCRAFT EQUIPMENT/STATUS**

**NOTE: X= OPERATIVE INOP= INOPERATIVE N/A= NOT APPLICABLE
TRANSPONDER: X (MODE C) X ILS: (LOCALIZER) X (GLIDE SLOPE) X
VOR NO. 1 X (NO. 2) X ADF: X RNAV: X
VERTICAL PATH COMPUTER: N/A DME: X
MARKER BEACON: X (AUDIO) X (VISUAL) X

FIGURE 32.—Flight Plan and Aircraft Information.

FLIGHT LOG

HOT SPRINGS, MEMORIAL FIELD TO DALLAS, ADDISON, TX.

CHECK POINTS		ROUTE		WIND	SPEED-KTS		DIST	TIME		FUEL	
FROM	TO	ALTITUDE	COURSE	TEMP	TAS	GS	NM	LEG	TOT	LEG	TOT
HOT	MARKI	V573 CLIMB	221°					:12:00			
	TXK	V573 8000	210°		180						
	TXK BUJ3	BUJ3 8000	272°								
	BUJ3	BUJ3 DESCENT	239°								
APPROACH & LANDING								:10:00			
	DALLAS ADDISON										

OTHER DATA:
NOTE: MAG. VAR. 4° E.

FLIGHT SUMMARY

TIME	FUEL (LB)	
		EN ROUTE
		RESERVE
		MISSED APPR.
		TOTAL

FIGURE 33.—Flight Planning Log.

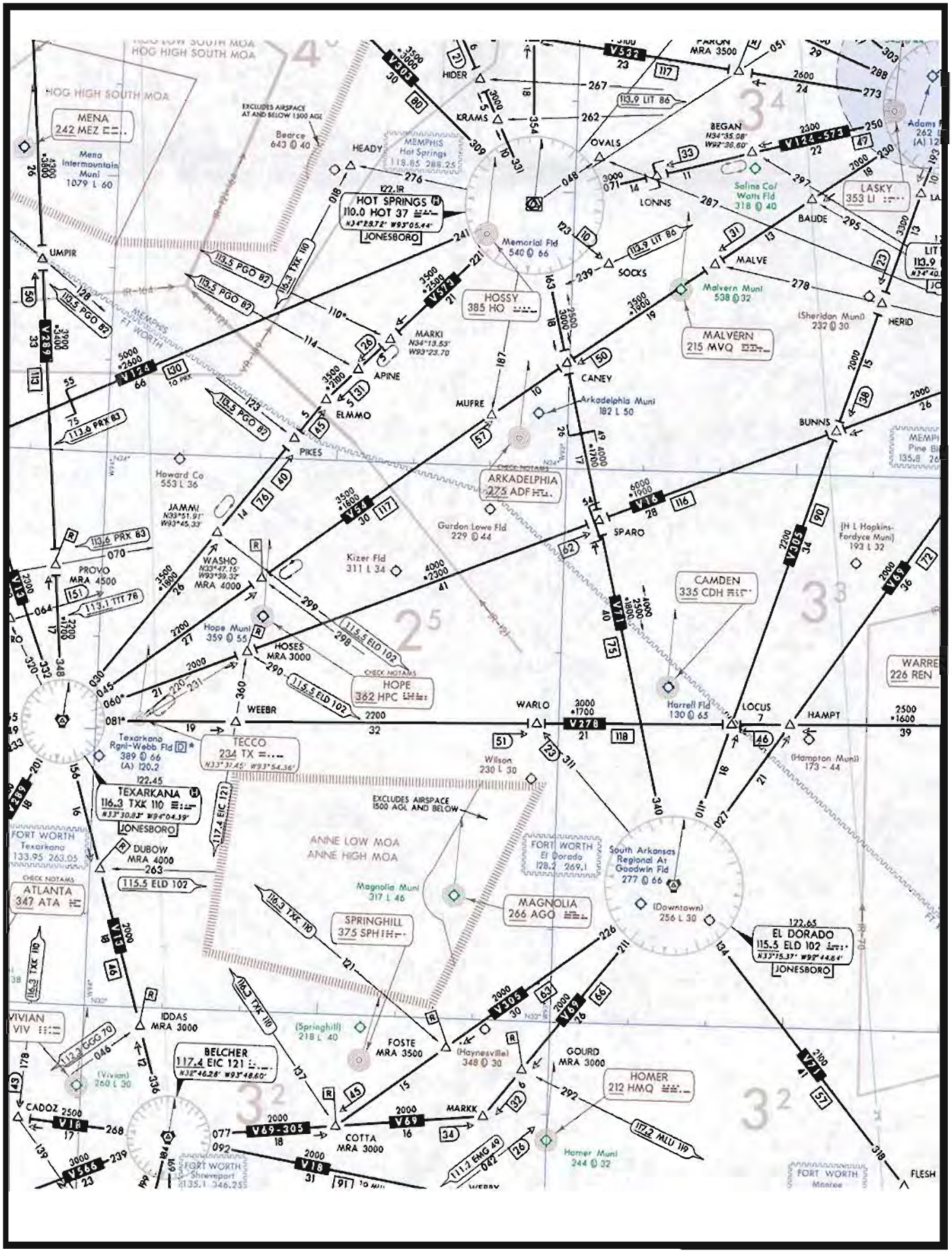


FIGURE 34.—En Route Chart.

ARKANSAS

HOT SPRINGS

MEMORIAL FLD (HOT) 3 SW UTC-6(-5DT) 34°28'41"N 93°05'46"W **MEMPHIS**
540 B S4 **FUEL** 100LL, JET A ARFF Index Ltd. **H-4G, L-14E**
RWY 05-23: H6595X150 (ASPH-GRVD) S-75, D-125, DT-210, DDT-400. HIRL 0.6% up NE **IAP**
RWY 05: MALSR. Tree. **RWY 23:** REIL. Thld dsplcd 490'. Tree.
RWY 13-31: H4099X150 (ASPH) S-28, D-36, DT-63 MIRL
RWY 13: REIL. Road/Trees. **RWY 31:** Pole.
AIRPORT REMARKS: Attended 1130-0400Z‡. CLOSED to unscheduled air carrier ops with more than 30 passenger seats except PPR, call arpt manager 501-624-3306. Last 500' Rwy 05 CLOSED to takeoffs. Rwy 13-31 fair with extensive loose grvl-pavement debris. ACTIVATE HIRL Rwy 05-23 and MALSR Rwy 05—CTAF. Rwy 23 REIL out of svc indefinitely. Control Zone effective 1200-0400Z‡.
COMMUNICATIONS: CTAF/UNICOM 123.0
JONESBORO FSS (JBR) TF 1-800-WX-BRIEF. NOTAM FILE HOT.
HOT SPRINGS RCO 122.1R 110.0T (LITTLE ROCK FSS)
MEMPHIS CENTER APP/DEP CON: 118.85
RADIO AIDS TO NAVIGATION: NOTAM FILE HOT.
HOT SPRINGS (L) VOR/DME 110.0 HOT Chan 37 34°28'43"N 93°05'26"W at fld. 530/4E.
HOSSY NDB (HW/LOM) 385 HO 34°25'21"N 93°11'22"W 050° 5.7 NM to fld.
ILS/DME 111.5 I-HOT Chan 52 Rwy 05 LOM HOSSY NDB. Unmonitored.

FIGURE 34A.—Airport/Facility Directory (HOT).

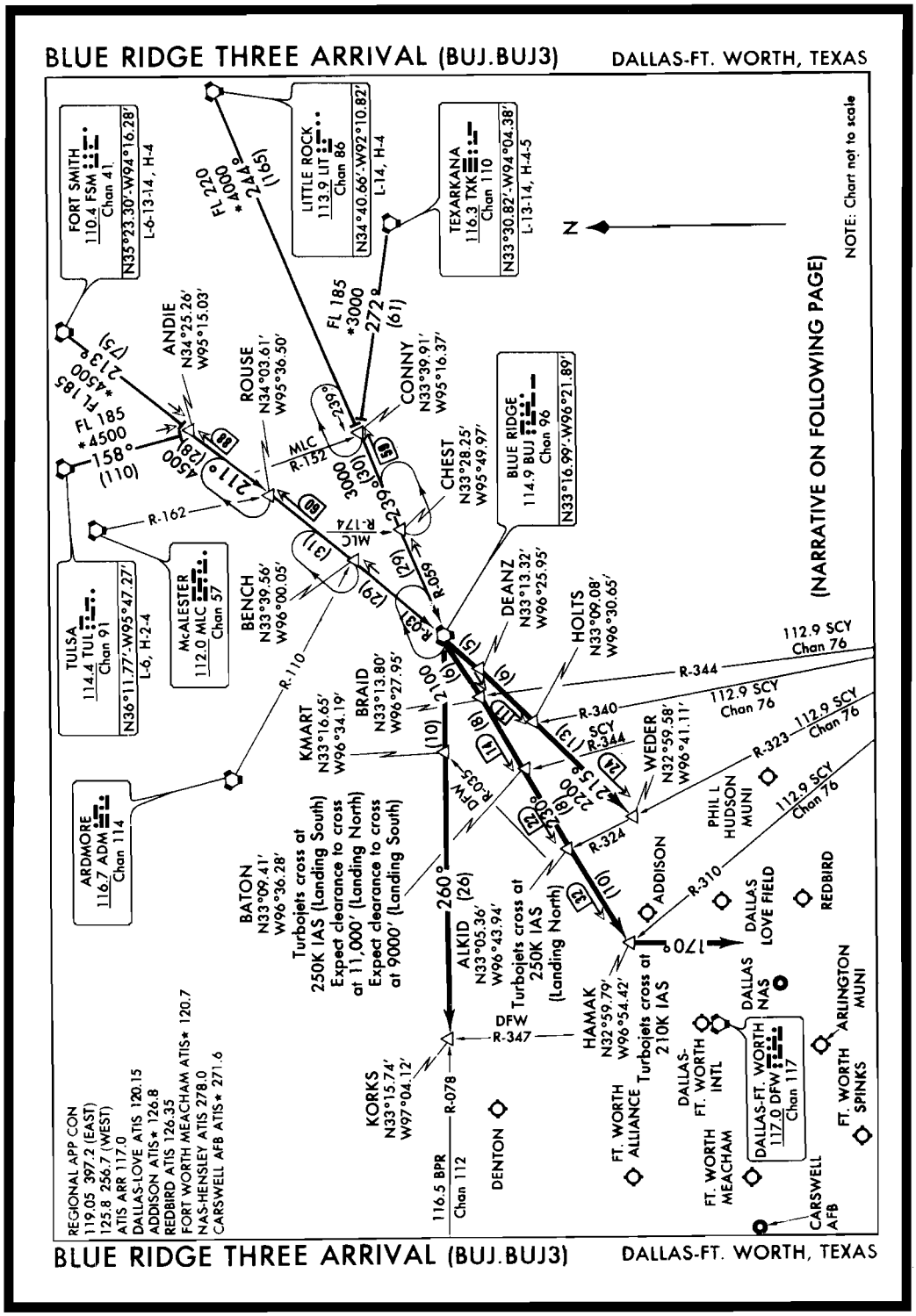


FIGURE 35.—En Route Chart Segment and Blue Ridge Three Arrival.

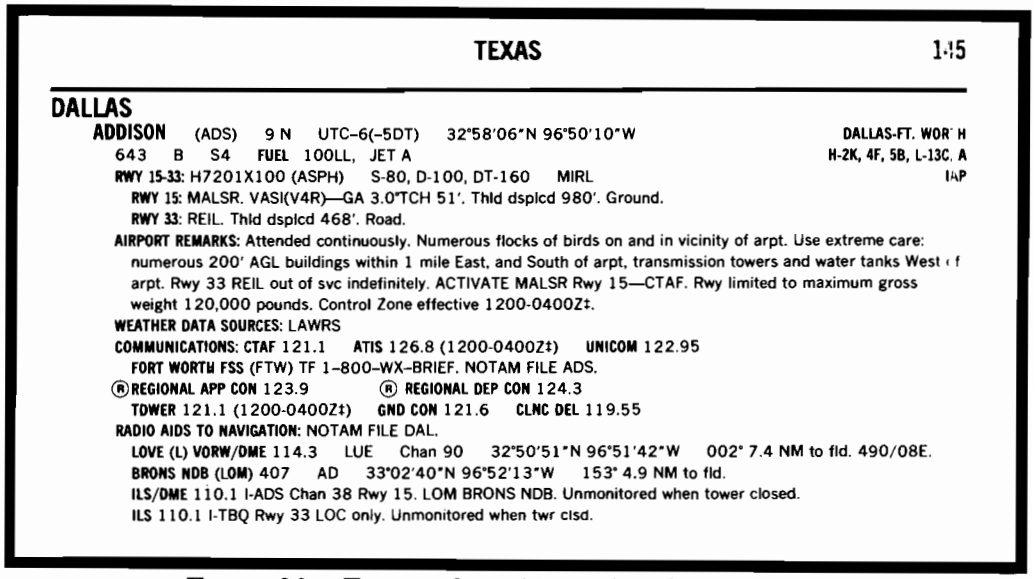
91094 SL-6039 (FAA)

BLUE RIDGE THREE ARRIVAL (BUJ.BUJ3) DALLAS-FT. WORTH, TEXAS

ARRIVAL DESCRIPTION

FORT SMITH TRANSITION (FSM.BUJ3): From over FSM VORTAC via FSM R-213 and BUJ R-031 to BUJ VORTAC. Thence . . . .
LITTLE ROCK TRANSITION (LIT.BUJ3): From over LIT VORTAC via LIT R-244 and BUJ R-059 to BUJ VORTAC. Thence . . . .
TEXARKANA TRANSITION (TXK.BUJ3): From over TXK VORTAC via TXK R-272 and BUJ R-059 to BUJ VORTAC. Thence . . . .
TULSA TRANSITION (TUL.BUJ3): From over TUL VORTAC via TUL R-158 and BUJ R-031 to BUJ VORTAC. Thence . . . .
TURBOJETS LANDING DALLAS-FT WORTH INTL: (Landing South): From over BUJ VORTAC via BUJ R-230 to HAMAK INT. Expect vectors at BATON INT. (Landing North): From over BUJ VORTAC via BUJ R-230 to HAMAK INT, thence heading 170° for vector to final approach course.
NON-TURBOJETS LANDING DALLAS-FT WORTH INTL: (Landing South): From over BUJ VORTAC via BUJ R-230 to HAMAK INT. Expect vectors at BATON INT. (Landing North): From over BUJ VORTAC via BUJ R-215 to WEDER INT. Expect vectors to final approach course.
ALL AIRCRAFT LANDING DALLAS-LOVE FIELD, ADDISON, REDBIRD, NAS DALLAS, and PHIL L. HUDSON: (Landing South/North): From over BUJ VORTAC via BUJ R-215 to WEDER INT. Expect vectors to final approach course.
ALL AIRCRAFT LANDING MEACHAM, CARSWELL AFB, ALLIANCE, ARLINGTON, DENTON and FT. WORTH SPINKS: (Landing South/North): From over BUJ VORTAC via BUJ R-260 to KORKS INT. Expect vectors to final approach course.

FIGURE 35A.—Blue Ridge Three Arrival Description.

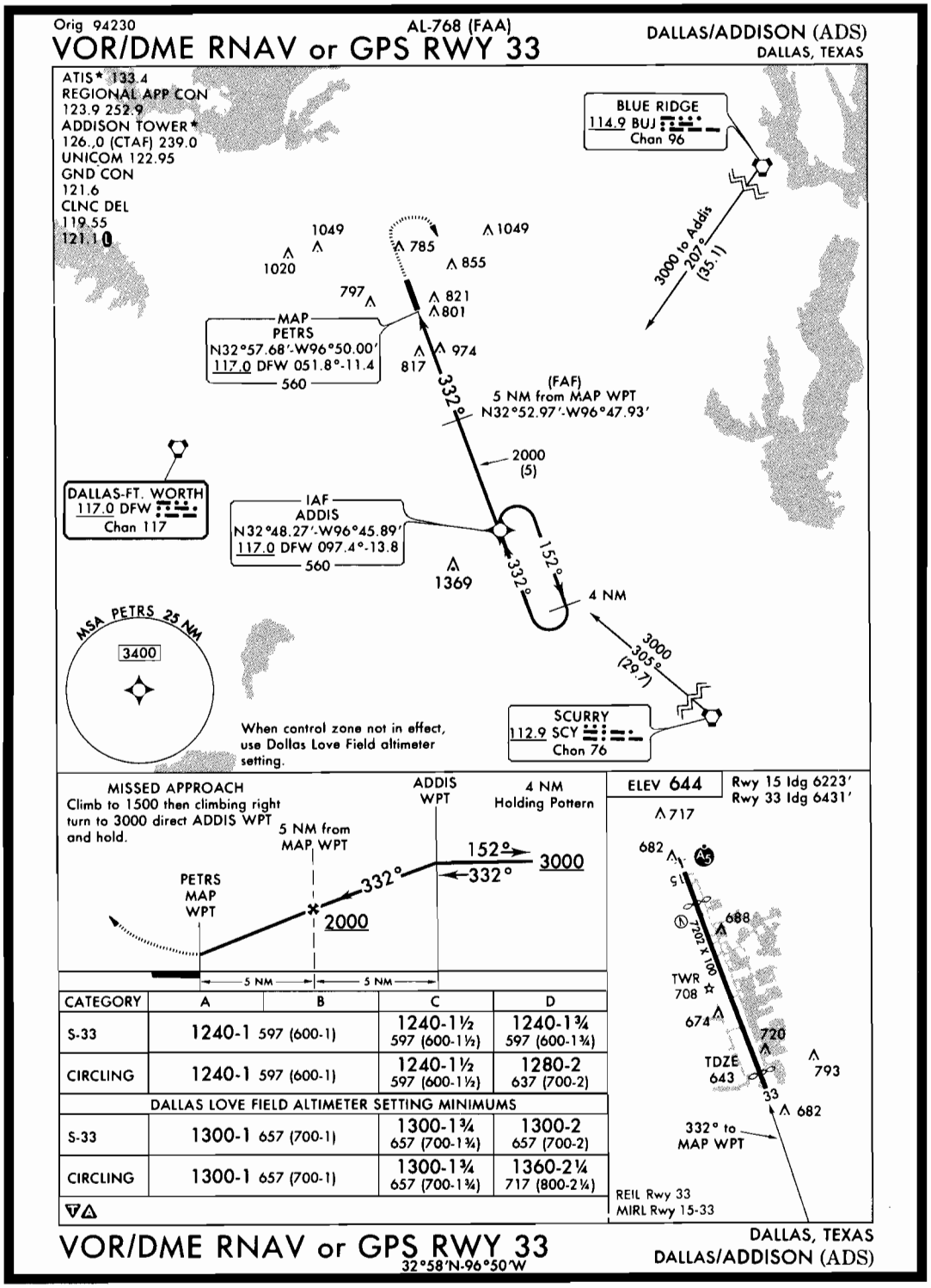


TEXAS 1-5

DALLAS

ADDISON (ADS) 9 N UTC-6(-5DT) 32°58'06"N 96°50'10"W DALLAS-FT. WORTH
643 B S4 **FUEL** 100LL, JET A H-2K, 4F, 5B, L-13C, A
RWY 15-33: H7201X100 (ASPH) S-80, D-100, DT-160 MIRL IAP
RWY 15: MALSR. VASI(V4R)—GA 3.0°TCH 51'. Thld dsplcd 980'. Ground.
RWY 33: REIL. Thld dsplcd 468'. Road.
AIRPORT REMARKS: Attended continuously. Numerous flocks of birds on and in vicinity of arpt. Use extreme care: numerous 200' AGL buildings within 1 mile East, and South of arpt, transmission towers and water tanks West of arpt. Rwy 33 REIL out of svc indefinitely. ACTIVATE MALSR Rwy 15—CTAF. Rwy limited to maximum gross weight 120,000 pounds. Control Zone effective 1200-0400Z‡.
WEATHER DATA SOURCES: LAWRS
COMMUNICATIONS: CTAF 121.1 **ATIS** 126.8 (1200-0400Z‡) **UNICOM** 122.95
FORT WORTH FSS (FTW) TF 1-800-WX-BRIEF. NOTAM FILE ADS.
(R) **REGIONAL APP CON** 123.9 (R) **REGIONAL DEP CON** 124.3
TOWER 121.1 (1200-0400Z‡) **GND CON** 121.6 **CLNC DEL** 119.55
RADIO AIDS TO NAVIGATION: NOTAM FILE DAL.
LOVE (L) VORW/DME 114.3 LUE Chan 90 32°50'51"N 96°51'42"W 002° 7.4 NM to fld. 490/08E.
BRONS NDB (LOM) 407 AD 33°02'40"N 96°52'13"W 153° 4.9 NM to fld.
ILS/DME 110.1 I-ADS Chan 38 Rwy 15. LOM BRONS NDB. Unmonitored when tower closed.
ILS 110.1 I-TBQ Rwy 33 LOC only. Unmonitored when twr clsd.

FIGURE 36.—Excerpt from Airport/Facility Directory.



CATEGORY	A	B	C	D
S-33	1240-1 597 (600-1)		1240-1½ 597 (600-1½)	1240-1¾ 597 (600-1¾)
CIRCLING	1240-1 597 (600-1)		1240-1½ 597 (600-1½)	1280-2 637 (700-2)
DALLAS LOVE FIELD ALTIMETER SETTING MINIMUMS				
S-33	1300-1 657 (700-1)		1300-1¾ 657 (700-1¾)	1300-2 657 (700-2)
CIRCLING	1300-1 657 (700-1)		1300-1¾ 657 (700-1¾)	1360-2¼ 717 (800-2¼)

FIGURE 36A.—RNAV RWY 33 (ADS).

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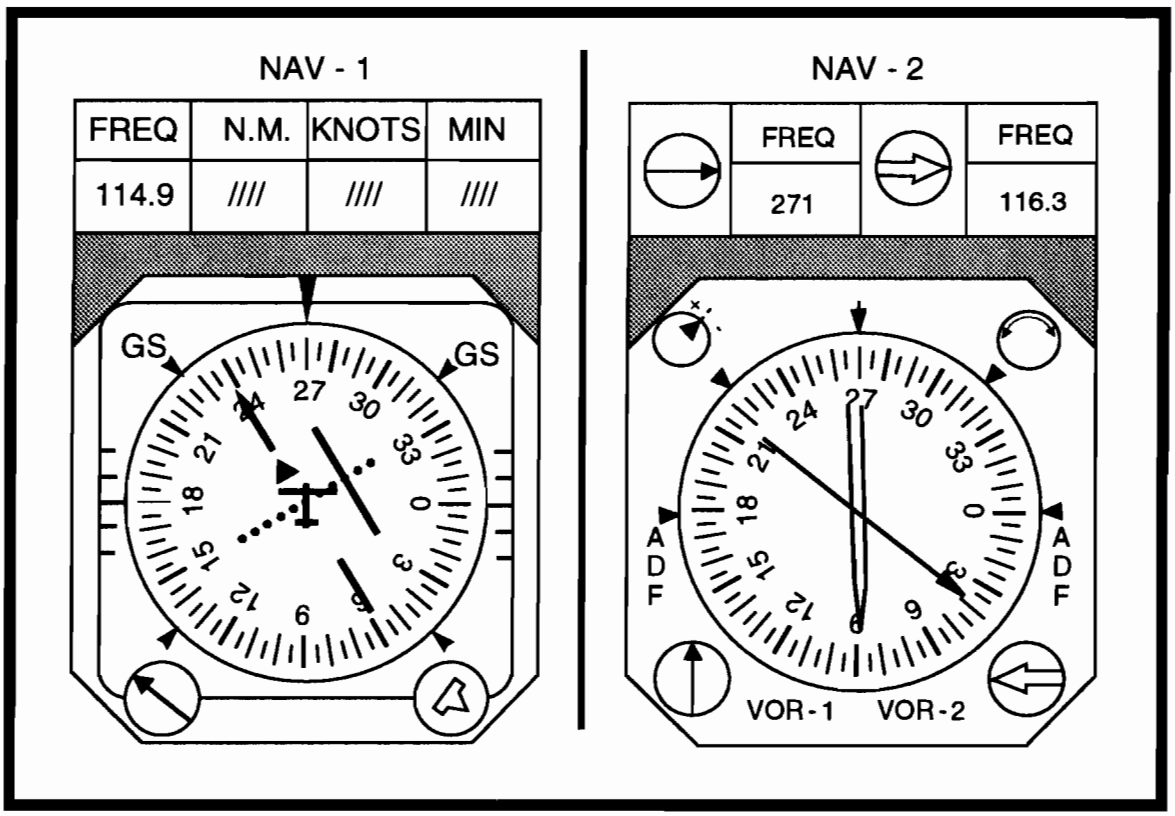


FIGURE 37.—CDI and RMI — NAV 1 and NAV 2.

Form Approved: OMB No. 2120-0034

U.S. DEPARTMENT OF TRANSPORTATION FEDERAL AVIATION ADMINISTRATION **FLIGHT PLAN**	(FAA USE ONLY) ☐ PILOT BRIEFING ☐ VNR ☐ STOPOVER	TIME STARTED	SPECIALIST INITIALS

1. TYPE	2. AIRCRAFT IDENTIFICATION	3. AIRCRAFT TYPE/ SPECIAL EQUIPMENT	4. TRUE AIRSPEED	5. DEPARTURE POINT	6. DEPARTURE TIME		7. CRUISING ALTITUDE
					PROPOSED (Z)	ACTUAL (Z)	
☐ VFR							
X IFR							
☐ DVFR	N4321P	C402/	156 KTS	BGS			11000

8. ROUTE OF FLIGHT
DIRECT BGS, V16 ABI, ABI.AQN2

9. DESTINATION (Name of airport and city)	10. EST. TIME ENROUTE		11. REMARKS
	HOURS	MINUTES	
DALLAS FT. WORTH DFW			

12. FUEL ON BOARD		13. ALTERNATE AIRPORT(S)	14. PILOT'S NAME, ADDRESS & TELEPHONE NUMBER & AIRCRAFT HOME BASE	15. NUMBER ABOARD
HOURS	MINUTES			
		N/A	17. DESTINATION CONTACT/TELEPHONE (OPTIONAL)	2

16. COLOR OF AIRCRAFT	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.
RED/BLUE/WHITE	

FAA Form 7233-1 (8-82)

CLOSE VFR FLIGHT PLAN WITH _____ FSS ON ARRIVAL

AIRCRAFT INFORMATION

MAKE Cessna MODEL 402C

N 4321P Vso 71

AIRCRAFT EQUIPMENT/STATUS**

**NOTE: X= OPERATIVE INOP= INOPERATIVE N/A= NOT APPLICABLE
TRANSPONDER: X (MODE C) X ILS: (LOCALIZER) X (GLIDE SLOPE) X
VOR NO. 1 X (NO. 2) X ADF: X RNAV: X
VERTICAL PATH COMPUTER: N/A DME: X
MARKER BEACON: X (AUDIO) X (VISUAL) X

FIGURE 38.—Flight Plan and Aircraft Information.

FLIGHT LOG

BIG SPRING McMAHON-WRINKLE TO DALLAS FT. WORTH (DFW)

CHECK POINTS		ROUTE		WIND	SPEED-KTS		DIST	TIME		FUEL	
FROM	TO	ALTITUDE	COURSE	TEMP	TAS	GS	NM	LEG	TOT	LEG	TOT
21XS	BGS	DIRECT CLIMB	DIRECT					:06:0			
	LORAN	V16 11,000	075°								
	ABI	V16 11,000	076°		156						
	COTTN	DIRECT 11,000	087°								
	AQN	AQN2	075°								
	CREEK	AQN2	040°								
APPROACH & LANDING		RADAR VEC-						:08:0			
	DFW AIRPORT	DESCENT									

OTHER DATA:
NOTE: MAG. VAR. 11° E.
(STAR) ACTON TWO ARRIVAL (AQN2)

FLIGHT SUMMARY

TIME	FUEL (LB)	
		EN ROUTE
		RESERVE
		MISSED APPR.
		TOTAL

BIG SPRING McMAHON-WRINKLE (21XS) 2SW UTC-6(-5DT). DALLAS-FT. WORTH
H-21, 5A, L-13A, 15B
IAP
32°12'45"N101°31"17"W
2572 B S4FUEL 100LL, JET A
RWY 17-35: H8803X100 (ASPH-CONC) S-44, D-62, DDT-101 MIRL
RWY 17:SSALS.PVASI(ASPH)-GA3.0°TCH 41'.
RWY 06-24:H4600X75(ASPH) MIRL
RWY 24:PVASI(PSIL)-GA3.55°TCH31'. P-line.
AIRPORT REMARKS: Attended 1400-2300Z . For fuel after hours call 915-263-3958. ACTIVATE MIRL Rwy 06-24 and Rwy 17-35, SSALS Rwy 17 and PVASI Rwy 17 and 24-CTAF.
COMMUNICATIONS:CTAF/UNICOM 122.8
SAN ANGELOSFSS (SJT) TF 1-800-WX-BRIEF. NOTAM FILE SJT.
RCO 122.4(SAN ANGELOFSS)
FORT WORTH CENTER APP/DEP CON 133.7
RADIO AIDS TO NAVIGATION: NOTAM FILE SJT.
(L) VORTACW 144.3 BGS Chan 90 32°23'08"N 101°10.5NM to fld. 2670/11E.

EXCERPT FROM AIRPORT/FACILITY DIRECTORY (21 XS)

FIGURE 39.—Flight Log and Excerpt from Airport/Facility Directory (21 XS).

HELENA REGIONAL (HLN) 2 NE UTC-7(-6DT) 46°36'25"N 111°58'55"W **GREAT FALLS**
3873 B S4 **FUEL** 100LL, JET A OX 1,3 AOE ARFF Index B **H-1C**, I-9B
RWY 09-27: H9000X150 (ASPH-PFC) S-100, D-160, DT-250 HIRL **IAP**
RWY 09: VASI(V4L)—GA 3.0°TCH 45'. Ground. **RWY 27:** MALSR. VASI(V4L)—GA 3.0°TCH 55'. Rgt tfc.
RWY 05-23: H4599X75 (ASPH-PFC) S-21, D-30
RWY 05: Road. **RWY 23:** Fence. Rgt tfc.
RWY 16-34: H2979X75 (ASPH) S-21, D-30 MIRL
RWY 34: Ground. Rgt tfc.
AIRPORT REMARKS: Attended 1200-0800Z‡. East 2400' Taxiway C and first 900' Rwy 27 not visible from tower. Prior permission for unscheduled FAR 121 operations, Call 406-442-2821. AOE, 1 hour prior notice required, phone 449-1569 1500-0000Z‡, 0000-1500Z‡ 449-1024. Twys A;B; high speed and C (between A and D) not available for air carrier use by acft with greater than 30 passenger seats. Rwy 16-34 and Rwy 05-23 (except between Rwy 09-27 and Twy D) not available for air carrier use by acft with greater than 30 passenger seats. When tower closed, ACTIVATE HIRL Rwy 09-27 and MALSR Rwy 27—CTAF, when twr closed MIRL Rwy 16-34 are off. Ldg fee for all acft over 12,500 lbs. NOTE: See SPECIAL NOTICE—Simultaneous Operations on Intersecting Runways.
COMMUNICATIONS: CTAF 118.3 **ATIS** 120.4 (Mon-Fri 1300-0700Z‡, Sat-Sun 1300-0500Z‡)
UNICOM 122.95
GREAT FALLS FSS (GTF) TF 1-800-WX-BRIEF. NOTAM FILE HLN.
RCO 122.2 122.1R 117.7T (GREAT FALLS FSS)
APP/DEP CON 119.5 (Mon-Fri 1300-0700Z‡, Sat-Sun 1300-0500Z‡)
SALT LAKE CENTER APP/DEP CON 133.4 (Mon-Fri 0700-1300Z‡, Sat-Sun 0500-1300Z‡)
TOWER 118.3 (Mon-Fri 1300-0700Z‡, Sat-Sun 1300-0500Z‡) **GND CON** 121.9
RADIO AIDS TO NAVIGATION: NOTAM FILE HLN.
(H) VORTAC 117.7 HLN Chan 124 46°36'25"N 111°57'10"W 254° 1.2 NM to fld. 3810/16E.
VORTAC unusable:
006°-090° beyond 25 NM below 11,000' 091°-120° beyond 20 NM below 16,000'
121°-240° beyond 25 NM below 10,000' 355°-006° beyond 15 NM below 17,500'
241°-320° beyond 25 NM below 10,000'
CAPITOL NDB (HW) 317 CVP 46°36'24"N 111°56'11"W 254° 1.9 NM to fld.
NDB unmonitored when tower closed.
HAUSER NDB (MHW) 386 HAU 46°34'08"N 111°45'26"W 268° 9.6 NM to fld.
ILS 110.1 I-HLN Rwy 27 ILS unmonitored when tower closed.

Excerpt from Airport/Facility Directory (21 XS)

BIG SPRING McMAHON-WRINKLE (21XS) 2 SW UTC-6(-5DT). **DALLAS-FT WORTH**
32°12'45"N 101°31'17"W **H-21, 5A, L-13A, 15B**
2572 B S4 **FUEL** 100LL, JET A **IAP**
RWY 17-35: H8803X100 (ASPH-CONC) S-44, D-62, DDT-101 MIRL
RWY 17: SSALS. PVASI (PSIL)—GA 3.0° TCH 41'.
RWY 06-24: H4600X75 (ASPH) MIRL
RWY 24: PVASI (PSIL)—GA 3.55°TCH 31'. P-line.
AIRPORT REMARKS: Attended 1400-2300Z‡. For fuel after hours call 915-263-3958. ACTIVATE MIRL Rwy 06-24 and Rwy 17-35, SSALS Rwy 17 and PVASI Rwy 17 and 24—CTAF.
COMMUNICATIONS: CTAF/UNICOM 122.8
SAN ANGELO FSS (SJT) TF 1-800-WX-BRIEF. NOTAM FILE SJT.
RCO 122.4 (SAN ANGELO FSS)
FORT WORTH CENTER APP/DEP CON 133.7
RADIO AIDS TO NAVIGATION: NOTAM FILE SJT.
(L) VORTACW 114.3 BGS Chan 90 32°23'08"N 101°29'00"W 180° 10.5 NM to fld. 2670/11E.

FIGURE 39A.—Excerpt from Airport/Facility Directory (21 XS).

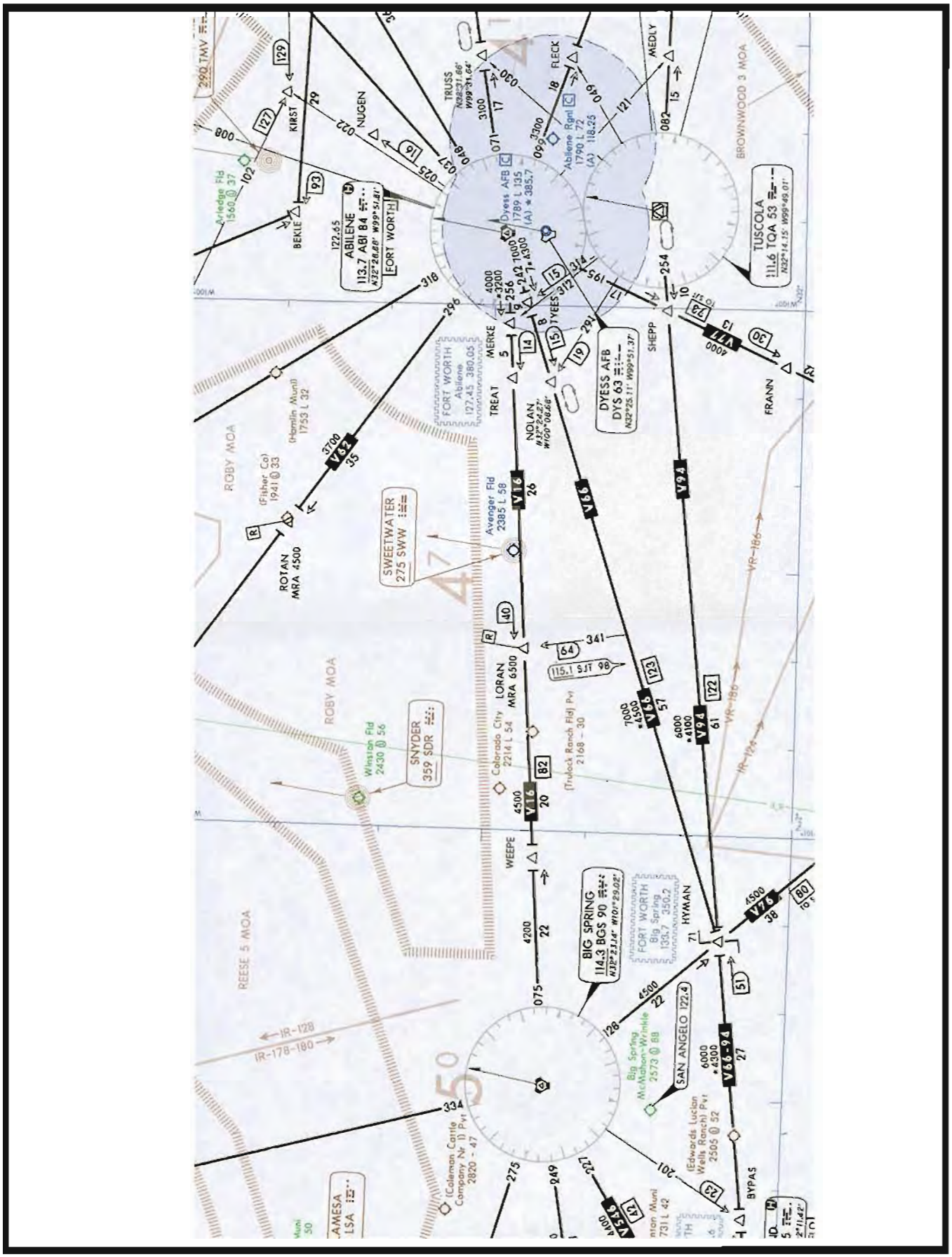


FIGURE 40.—En Route Chart Segment.

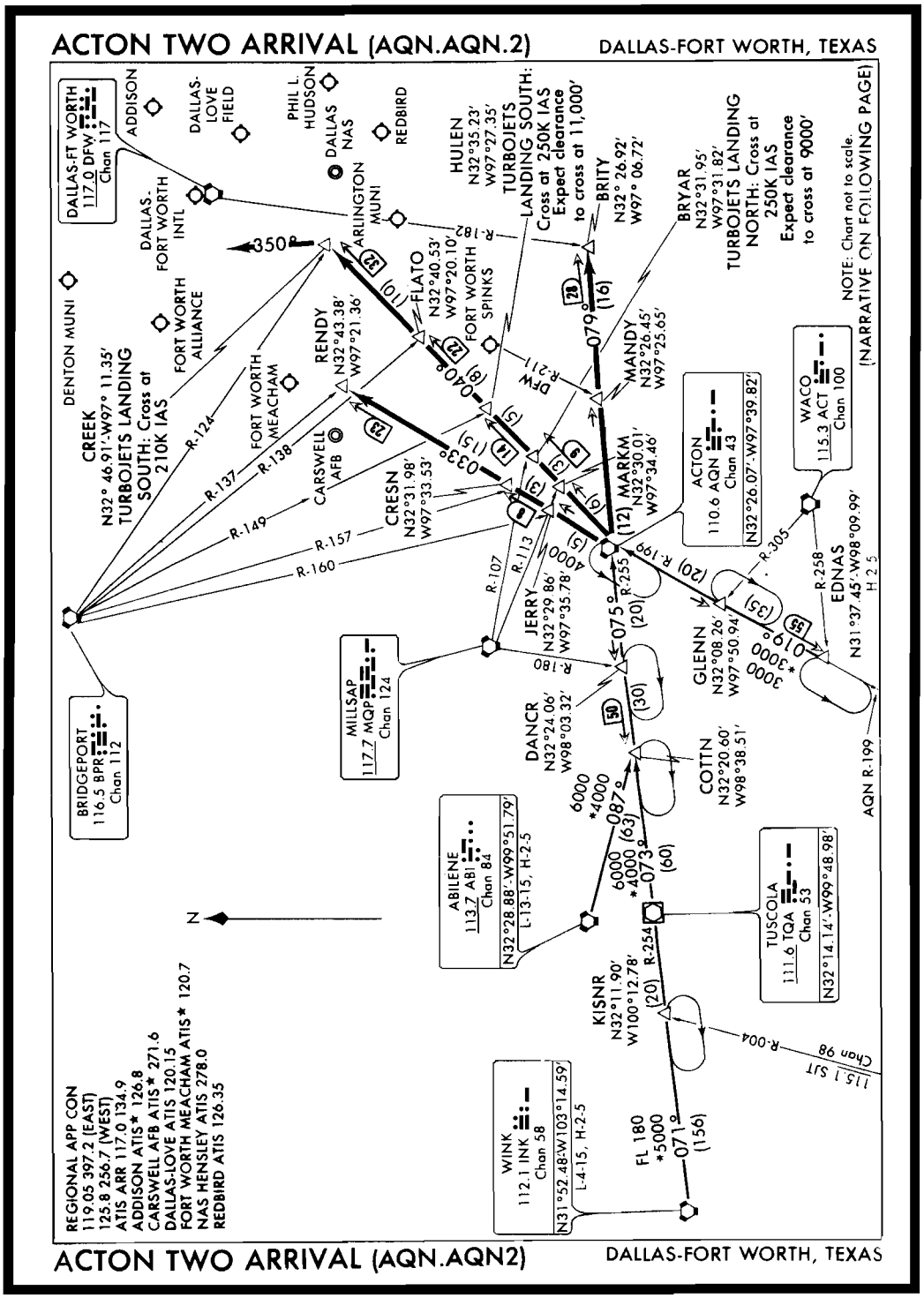


FIGURE 41.—ACTON Two Arrival.

ACTON TWO ARRIVAL (AQN.AQN2) DALLAS-FORT WORTH, TEXAS

ARRIVAL DESCRIPTION

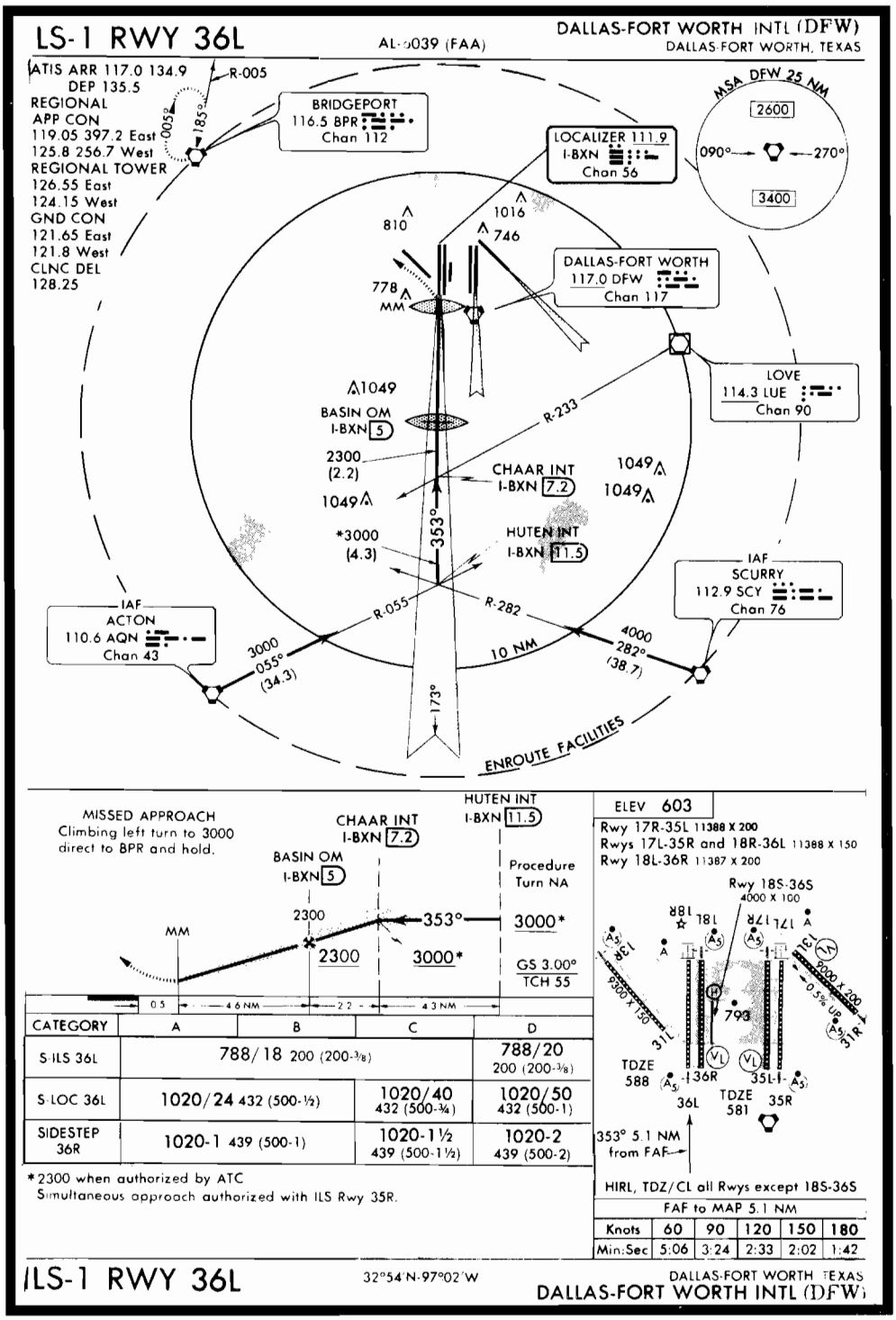
ABILENE TRANSITION (ABI.AQN2): From over ABI VORTAC via ABI R-087 and AQN R-255 to AQN VORTAC. Thence . . . .
EDNAS TRANSITION (EDNAS.AQN2): From over EDNAS INT via AQN R-199 to AQN VORTAC. Thence . . . .
WINK TRANSITION (INK.AQN2): From over INK VORTAC via INK R-071, TQA R-254, TQA R-073 and AQN R-255 to AQN VORTAC. Thence . . . .
TURBOJETS LANDING DALLAS-FT. WORTH INTL, MEACHAM, CARSWELL AFB, DENTON, ALLIANCE: (Landing South): From over AQN VORTAC via AQN R-040 to CREEK INT, thence heading 350° for vector to final approach course. (Landing North): From over AQN VORTAC via AQN R-040 to CREEK INT. Expect vectors at BRYAR INT.
NON-TURBOJETS LANDING DALLAS-FT. WORTH INTL, MEACHAM, CARSWELL AFB, DENTON, ALLIANCE: (Landing South): From over AQN VORTAC via AQN R-033 to RENDY INT. Expect vectors to final approach course. (Landing North): From over AQN VORTAC via AQN R-040 to CREEK INT. Expect vector at BRYAR INT.
TURBOJETS LANDING DALLAS-LOVE FIELD and ADDISON: (Landing South): From over AQN VORTAC via AQN R-040 to CREEK INT, thence heading 350° for vector to final approach course. (Landing North): From over AQN VORTAC via AQN R-079 to BRITY INT. Expect vector to final approach course.
NON-TURBOJETS LANDING DALLAS-LOVE FIELD and ADDISON: (Landing South/North): From over AQN VORTAC via AQN R-079 to BRITY INT. Expect vector to final approach course.
ALL AIRCRAFT LANDING FORT WORTH SPINKS, ARLINGTON, NAS DALLAS, REDBIRD, and PHIL L. HUDSON: (Landing South/North): From over AQN VORTAC via AQN R-079 to BRITY INT. Expect vectors to final approach course.

FIGURE 41A.—ACTON Two Arrival Description.

TEXAS

DALLAS-FORT WORTH INTL (DFW) 12 NW UTC-6(-5DT)32°53'47"N 97°02'28"W 'DALLAS-FT. WORTH
603 B FUEL 100LL, JET A OX 1, 3 LRA ARFF Index E H-2K, 4F, 5B, L-13C, A
RWY 17L-35R: H11,388X150 (CONC-GRVD) S-120, D-200, DT-600, DDT-850 HIRL CL IAP
RWY 17L: ALSF2. TOZ. **RWY 35R:** MALSR. TDZ.
RWY 17R-35L: H11,388X200 (CONC-GRVD) S-120, D-200, DT-600, DDT-850 HIRL CL
RWY 17R: MALSR. TDZ. **RWY 35L:** TDZ. VASI(V6L).
RWY 18R-36L: H11,388X150(CONC-GRVD) S-120, D-200, DT-600, DDT-850 HIRL CL
RWY 18R: ALSF2. TDZ **RWY 36L:** MALSR. TDZ
RWY 18L-36R: H11,387X200 (CONC-GRVD) S-120, D-200, DT-600, DDT-850 HIRL CL
RWY 18L: MALSR. TDZ. **RWY 36R:** TDZ. VASI(V6L).
RWY 13R-31L: H9300X150(CONC-GRVD) S-120, D-220, DT-600, DDT-850 HIRL CL
RWY 13R: MALSR. TDZ. **RWY 31L:** TDZ.
RWY 13L-31R: H9000X200 (CONC-GRVD) S-120, D-200, DT-600, DDT-850 HIRL CL 0.5% up NW
RWY 13L: TDZ. VASI(V6L)—Upper GA 3.25° TCH 93'. Lower GA 3.0° TCH 47'. **RWY 31R:** MALSR. TDZ.
RWY 18S-36S: H4000X100 (CONC)
AIRPORT REMARKS: Attended continuously. Rwy 18S–36S CLOSED indefinitely. Arpt under construction, men and equipment in movement areas. Partial outages of arpt lgt circuits will occur daily. Prior Permission Required from arpt ops for General Aviation acft to proceed to airline terminal gate except to General Aviation Facility. Rwy 18S-36S located on taxiway G, 4000' long 100' wide restricted to prop acft 12,500 lbs. & below and stol acft daylight VFR plus IFR departures. Prior permission required from the primary tenant airlines to operate within central terminal area, CAUTION: proper minimum clearance may not be maintained within the central terminal area. Landing fee. Helipad H1 on apt 104X104 (CONC) Heliport located at Twy G and Twy 24 intersection, daylight VFR. Clearways 500X1000 each end Rwy 17L–35R, Rwy 17R–35L, Rwy 18L–36R and Rwy 18R–36L. Flight Notification Service (ADCUS) available.
WEATHER DATA SOURCES: LLWAS.
COMMUNICATIONS: **ATIS** 117.0 134.9 (ARR) 135.5 (DEP) **UNICOM** 122.95
FORT WORTH FSS (FTW) LC 429-6434, TF 1-800-WX-BRIEF. NOTAM FILE DFW
Ⓡ **REGIONAL APP CON** 119.05(E) 119.4(E) 125.8(W) 132.1(W)
REGIONAL TOWER 126.55 (E) 124.15 (W) **GND CON** 121.65 133.15(E) 121.8 (W) **CLNC DEL** 128.25 127.5
Ⓡ **REGIONAL DEP CON** 118.55 (E) 124.25 (WEST) 127.75 (NORTH-SOUTH)
TCA: See VFR Terminal Area chart.
RADIO AIDS TO NAVIGATION: NOTAM FILE DFW.
(H) **VORTACW** 117.0 DFW Chan 117 32°51'57"N 97°01'40"W at fld. 560/08E.
VOR Portion unusable 045°-050° all altitudes and distances, 350–100° beyond 30 NM below 2100'.
ISSUE NDB (LOM) 233 PK 32°47'35"N 97°01'49"W 348° 6.2 NM to fld.
JIFFY NDB (LOM) 219 FL 32°59'44"N 97°01'46"W 179° 6.0 NM to fld.
ILS/DME 109.5 I-LWN Chan 32 Rwy 13R.
ILS/DME 109.1 I-FLQ Chan 28 Rwy 17L. LOM JIFFY NDB.
ILS 111.5 I-JHZ Rwy 17R. LOM JIFFY NDB.
ILS 111.3 I-CIX Rwy 18L.
ILS/DME 111.9 I-VYN Chan 56 Rwy 18R.
ILS 110.9 I-RRA Rwy 31R.
ILS/DME 109.1 I-PKQ Chan 28 Rwy 35R. LOM ISSUE NDB.
ILS/DME 111.9 I-BXN Chan 56 Rwy 36L.

FIGURE 42.—ILS-1 RWY 36L, Dallas-Fort Worth Intl.



CATEGORY	A	B	C	D
S-ILS 36L	788/18 200 (200-3/8)			788/20 200 (200-3/8)
S-LOC 36L	1020/24 432 (500-½)		1020/40 432 (500-¾)	1020/50 432 (500-1)
SIDESTEP 36R	1020-1 439 (500-1)		1020-1½ 439 (500-1½)	1020-2 439 (500-2)

Knots	60	90	120	150	180
Min:Sec	5:06	3:24	2:33	2:02	1:42

*2300 when authorized by ATC
Simultaneous approach authorized with ILS Rwy 35R.

FIGURE 42A.—ILS RWY 36L.

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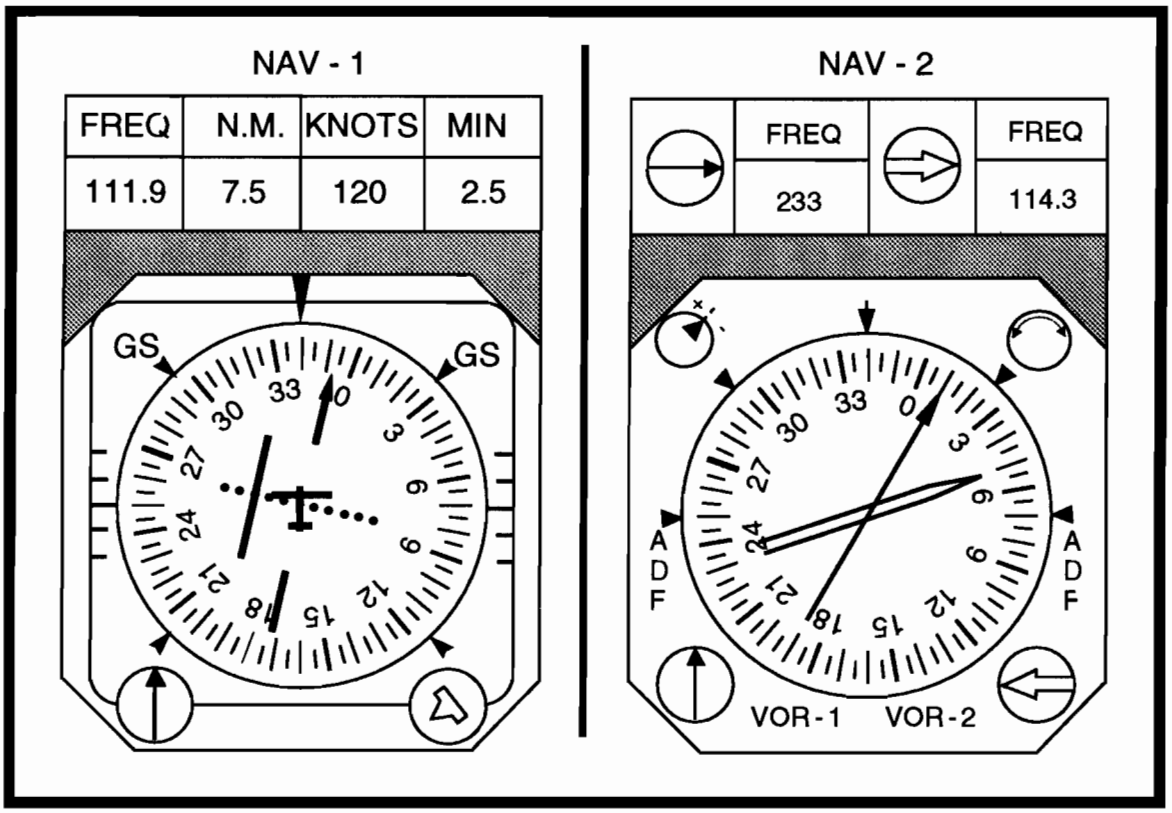


FIGURE 43.—CDI and RMI – NAV 1 and NAV 2.

Form Approved: OMB No. 2120-0034

U.S. DEPARTMENT OF TRANSPORTATION FEDERAL AVIATION ADMINISTRATION **FLIGHT PLAN**	(FAA USE ONLY) ☐ PILOT BRIEFING ☐ VNR ☐ STOPOVER	TIME STARTED	SPECIALIST INITIALS

1. TYPE	2. AIRCRAFT IDENTIFICATION	3. AIRCRAFT TYPE/ SPECIAL EQUIPMENT	4. TRUE AIRSPEED	5. DEPARTURE POINT	6. DEPARTURE TIME		7. CRUISING ALTITUDE
					PROPOSED (Z)	ACTUAL (Z)	
☐ VFR							
X IFR							
☐ DVFR	N3678A	PA31/	180 KTS	YKM			12000

8. ROUTE OF FLIGHT
GROMO 2, HITCH, V468 BTG, DIRECT

9. DESTINATION (Name of airport and city)	10. EST. TIME ENROUTE		11. REMARKS
	HOURS	MINUTES	
PORTLAND INTL. AIRPORT PDX			INSTRUMENT TRAINING FLIGHT

12. FUEL ON BOARD		13. ALTERNATE AIRPORT(S)	14. PILOT'S NAME, ADDRESS & TELEPHONE NUMBER & AIRCRAFT HOME BASE	15. NUMBER ABOARD
HOURS	MINUTES			
		N/A	17. DESTINATION CONTACT/TELEPHONE (OPTIONAL)	2

16. COLOR OF AIRCRAFT	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.
GOLD/WHITE	

FAA Form 7233-1 (8-82)

CLOSE VFR FLIGHT PLAN WITH _____ FSS ON ARRIVAL

AIRCRAFT INFORMATION

MAKE Piper MODEL PA-31

N 3678A Vso 77

AIRCRAFT EQUIPMENT/STATUS**

**NOTE: X= OPERATIVE INOP= INOPERATIVE N/A= NOT APPLICABLE
TRANSPONDER: X (MODE C) X ILS: (LOCALIZER) X (GLIDE SLOPE) X
VOR NO. 1 X (NO. 2) X ADF: X RNAV: X
VERTICAL PATH COMPUTER: N/A DME: X
MARKER BEACON: X (AUDIO) INOP (VISUAL) X

FIGURE 44.—Flight Plan and Aircraft Information.

FLIGHT LOG

YAKIMA AIR TERMINAL TO PORTLAND, INTL.

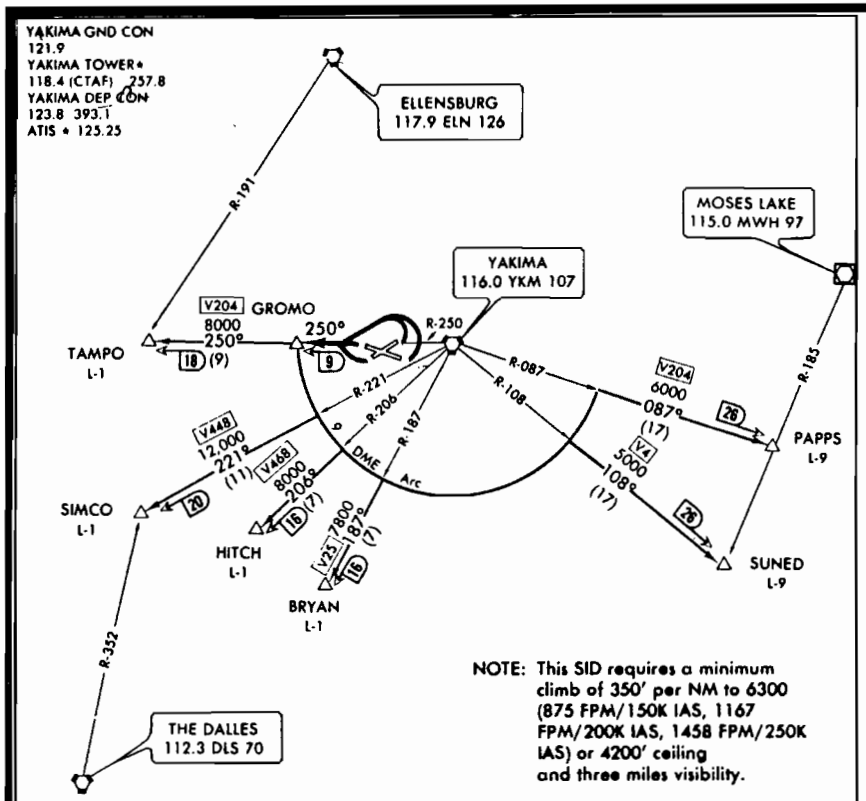
CHECK POINTS		ROUTE		WIND	SPEED-KTS		DIST	TIME		FUEL	
FROM	TO	ALTITUDE	COURSE	TEMP	TAS	GS	NM	LEG	TOT	LEG	TOT
YKM	HITCH	GROMO 2									
		CLIMB	206°					:10.			
	VOR	V468									
	C.O.P.	12,000	206°		180						
		V468									
	BTG	12,000	234°								
		DIRECT									
	PDX		160°								
APPROACH & LANDING								:13.			
	PDX AIRPORT										

OTHER DATA:
NOTE: MAG. VAR. 20° E.

FLIGHT SUMMARY

TIME	FUEL (LB)	
		EN ROUTE
		RESERVE
		MISSED APPR.
		TOTAL

FIGURE 45.—Flight Planning Log.



▽ DEPARTURE ROUTE DESCRIPTION

TAKE-OFF RUNWAY 22: Turn right thence . . . .

TAKE-OFF RUNWAY 4, 9: Turn left thence . . . .

TAKE-OFF RUNWAY 27: Climb runway heading thence . . . .

. . . .intercept and proceed via YKM R-250 to the GROMO DME FIX (YKM R-250/9), thence via (assigned transition).

TAMPO TRANSITION (GROMO2.TAMPO): From GROMO DME Fix via V204 to TAMPO INT.

NOTE: Climb in holding pattern east of TAMPO INT, right turns, 250° inbound to 8000' before proceeding on course.

(Continued on next page)

ELEV 1095

GROMO TWO DEPARTURE (PILOT NAV)
(GROMO2.GROMO)

YAKIMA, WASHINGTON
YAKIMA AIR TERMINAL

(GROMO2.GROMO)

GROMO TWO DEPARTURE (PILOT NAV)

YAKIMA AIR TERMINAL
YAKIMA, WASHINGTON

DEPARTURE ROUTE DESCRIPTION
(Continued)

SIMCO TRANSITION (GROMO2.SIMCO): From over GROMO DME Fix via 9 DME Arc and V448 to SIMCO INT. NOTE: Climb in holding pattern NE of SIMCO INT, right turns, 221° inbound to 12000 feet before proceeding on course.

HITCH TRANSITION (GROMO2.HITCH): From over GROMO DME Fix via 9 DME Arc and V468 to HITCH DME Fix. NOTE: Climb in holding pattern NE of HITCH DME Fix, right turns, 206° inbound to 8000 feet before proceeding on course.

BRYAN TRANSITION (GROMO2.BRYAN): From over GROMO DME Fix via 9 DME Arc and V25 to BRYAN DME Fix.

SUNED TRANSITION (GROMO2.SUNED): From over GROMO DME Fix via 9 DME Arc and V4 to SUNED INT.

PAPPS TRANSITION (GROMO2.PAPPS): From over GROMO DME Fix via 9 DME Arc and V204 to PAPPS INT.

GROMO TWO DEPARTURE (PILOT NAV)
(GROMO2.GROMO)

YAKIMA, WASHINGTON
YAKIMA AIR TERMINAL

§ **YAKIMA AIR TERMINAL** (YKM) 3 S GMT−8(−7DT) 46°34'06"N 120°32'33"W SEATTLE
1095 8 S4 FUEL 80, (100, 100LL, JET A OX 1, 3 CFR Index A H-1A, L-1C, 9A
RWY 09-27: H7603X150 (ASPH-PFC) S-95, D-110, DT-175 HIRL .6% up NW IAP
RWY 09: VASI(V4L)— GA 3.0° TCH 50'. Antenna. RWY 27: MALSR. Trees.
RWY 04-22: H4293X150 (ASPH) S-70, D-80, DT-120 MIRL
RWY 04: Trees. RWY 22: VASI(V2L)— GA 3.03° TCH 61'. Thld dsplcd 469'. Tree.
AIRPORT REMARKS: Attended continuously. CLOSED 0600-1400Z‡ to Part 121 non-scheduled operations and Part 121 scheduled charters operations without prior approval, call (509) 575-6150/6014. Bird hazard. ACTIVATE MALSR Rwy 27 — 118.4.
COMMUNICATIONS: CTAF 118.4 ATIS 125.25 (1400-0600Z‡) UNICOM 122.95
SEATTLE FSS (SEA) LC 965-1840 NOTAM FILE YKM
RCO 122.5 122.1R 116.0T (SEATTLE FSS)
APP/DEP CON 123.8 (1400-0600Z‡) SEATTLE CENTER APP/DEP CON 132.6 (0600-1400Z‡)
TOWER 118.4 (1400-0600Z‡) GND CON 121.9
VFR ADVSY SVC 123.8
RADIO AIDS TO NAVIGATION:
(H) VORTAC 116.0 YKM Chan 107 46°34'14"N 120°26'36"W 244° 3.6 NM to fld. 980/21E
DME portion unusable:
350°-065° beyond 20 NM below 9000' 025°-065° beyond 15 NM below 8000'
115°-135° beyond 25 NM below 7000' 135°-150° beyond 30 NM below 7500'
195°-230° beyond 22 NM below 8000' 300°-325° beyond 29 NM below 9000'
325°-335° beyond 20 NM below 9000' 335°-350° beyond 25 NM below 10,000'
VOR portion unusable:
350°-080° beyond 25 NM below 9000' 025°-035° beyond 5 NM below 10,000'
080°-105° beyond 35 NM below 6000' 105°-107° beyond 25 NM below 6000'
109°-135° beyond 25 NM below 6000' 135°-180° beyond 30 NM below 7500'
195°-225° beyond 30 NM below 8500' 305°-335° beyond 30 NM below 9000'
DONNY NDB (LOM) 371 YK 46°31'33"N 120°22'16"W 269° 7 NM to fld
ILS 110.1 I-YKM Rwy 27 LOM DONNY NDB. ILS unmonitored when tower closed. Localizer unusable inside threshold.

FIGURE 46.—GROMO Two Departure and Excerpt from Airport/Facility Directory.

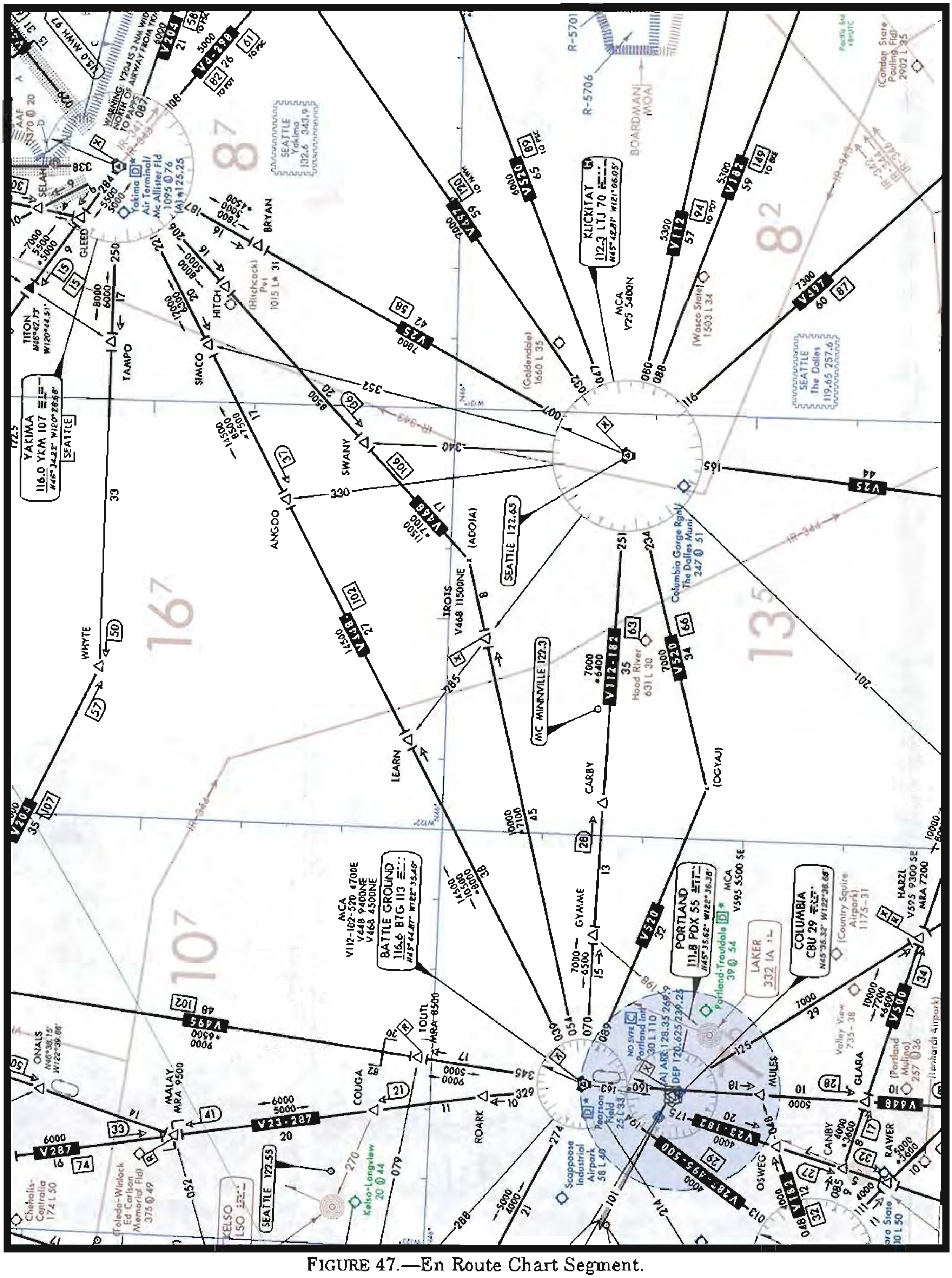


FIGURE 47.—En Route Chart Segment.

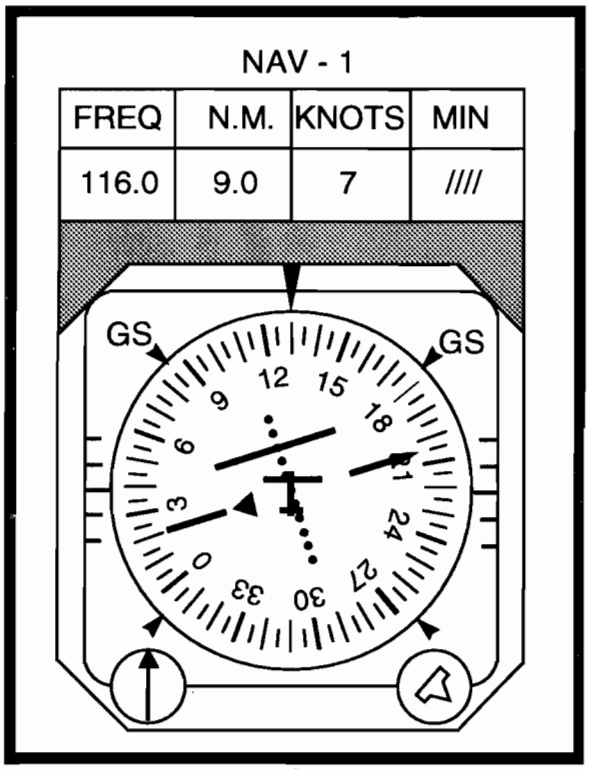


FIGURE 48.—CDI — NAV 1.

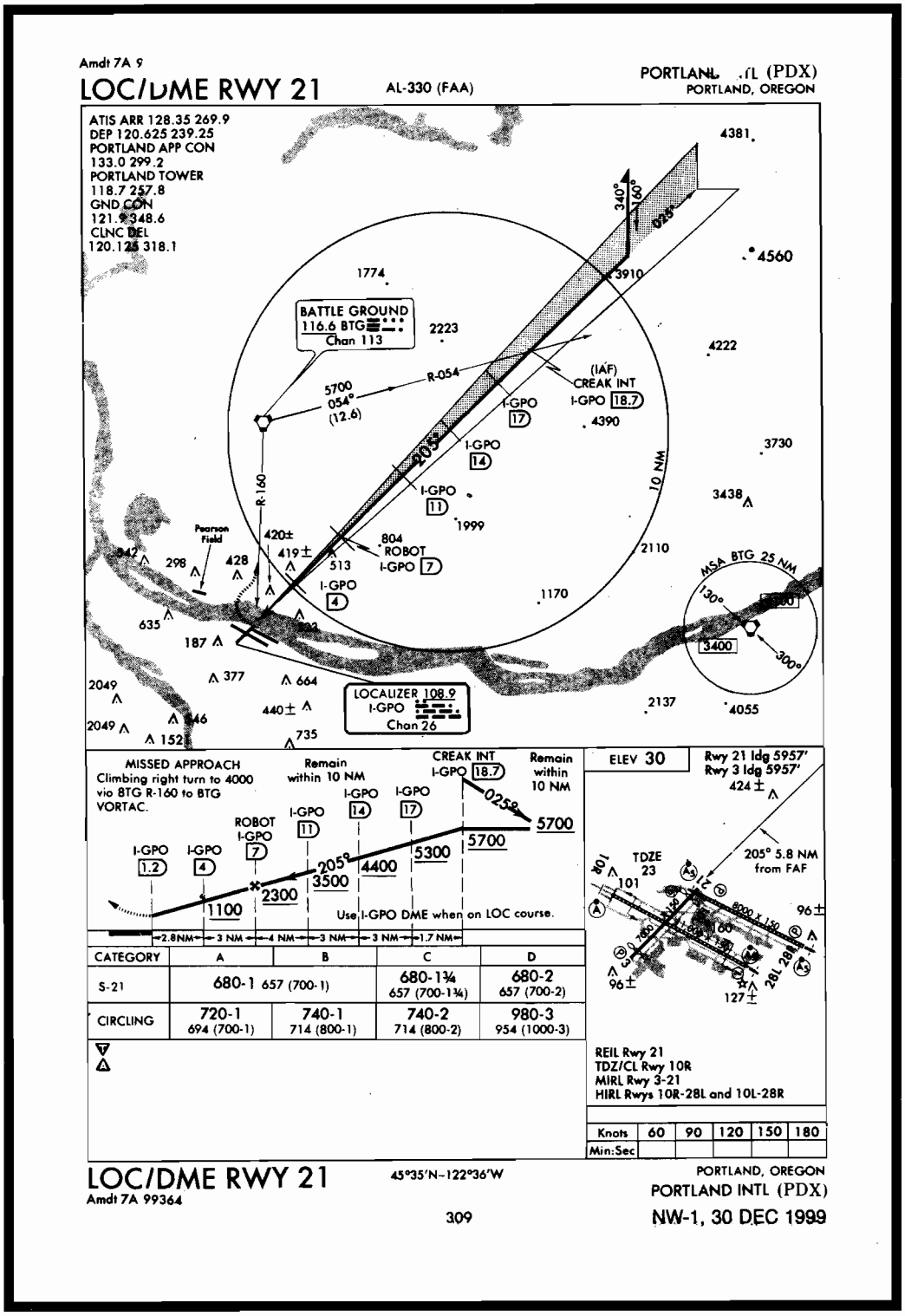


FIGURE 49.—LOC/DME RWY 21 (PDX).

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Form Approved: OMB No. 2120-0034

U.S. DEPARTMENT OF TRANSPORTATION FEDERAL AVIATION ADMINISTRATION **FLIGHT PLAN**	(FAA USE ONLY) ☐ PILOT BRIEFING ☐ VNR ☐ STOPOVER	TIME STARTED	SPECIALIST INITIALS

1. TYPE	2. AIRCRAFT IDENTIFICATION	3. AIRCRAFT TYPE/ SPECIAL EQUIPMENT	4. TRUE AIRSPEED	5. DEPARTURE POINT	6. DEPARTURE TIME		7. CRUISING ALTITUDE
					PROPOSED (Z)	ACTUAL (Z)	
VFR							
X IFR							
DVFR	N2468	A36/	158 KTS	SBA			8000

8. ROUTE OF FLIGHT
HABUTI GVO, V27 MQO, V113 PRB

9. DESTINATION (Name of airport and city)	10. EST. TIME ENROUTE		11. REMARKS
	HOURS	MINUTES	
PASO ROBLES MUNI PRB			IFR TRAINING FLIGHT

12. FUEL ON BOARD		13. ALTERNATE AIRPORT(S)	14. PILOT'S NAME, ADDRESS & TELEPHONE NUMBER & AIRCRAFT HOME BASE	15. NUMBER ABOARD
HOURS	MINUTES			
		N/A	17. DESTINATION CONTACT/TELEPHONE (OPTIONAL)	2

16. COLOR OF AIRCRAFT	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.
GOLD/WHITE	

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

AIRCRAFT INFORMATION

MAKE Beechcraft MODEL A-36

N 2468 Vso 52

AIRCRAFT EQUIPMENT/STATUS**

**NOTE: X= OPERATIVE INOP= INOPERATIVE N/A= NOT APPLICABLE
TRANSPONDER: X (MODE C) X ILS: (LOCALIZER) X (GLIDE SLOPE) X
VOR NO. 1 X (NO. 2) X ADF: X RNAV: X
VERTICAL PATH COMPUTER: N/A DME: X
MARKER BEACON: X (AUDIO) X (VISUAL) INOP

FIGURE 50.—Flight Plan and Aircraft Information.

FLIGHT LOG

SANTA BARBARA MUNI TO PASO ROBLES MUNI

CHECK POINTS		ROUTE	COURSE	WIND	SPEED-KTS		DIST	TIME		FUEL	
FROM	TO	ALTITUDE		TEMP	TAS	GS	NM	LEG	TOT	LEG	TOT
		HABUT 1									
SBA	HABUT	CLIMB	253°					:08:00			
		163°R									
	GVO	8000	343°		158						
		V27									
	MQO	8000	306°								
		V113									
	PRB		358°								
APPROACH & LANDING											
		DESCENT						:10:00			
	PRB AIRPORT										

OTHER DATA:
NOTE: MAG. VAR. 16° E.

FLIGHT SUMMARY

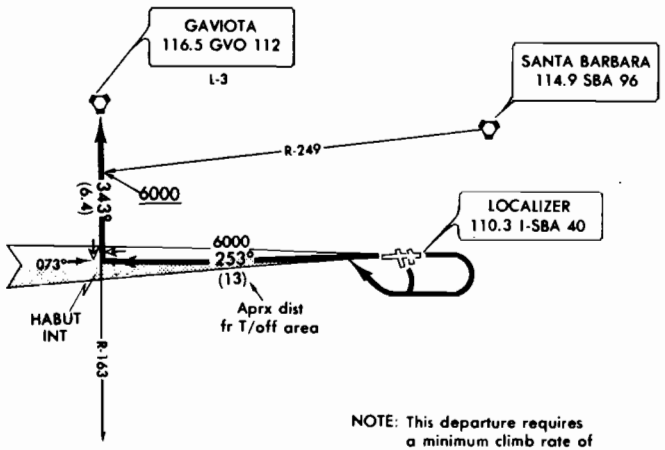
TIME	FUEL (LB)	
		EN ROUTE
		RESERVE
		MISSED APPR.
		TOTAL

FIGURE 51.—Flight Planning Log.

HABUT ONE DEPARTURE (HABUT1.GVO)

SANTA BARBARA MUNI
SANTA BARBARA, CALIFORNIA

SANTA BARBARA GND CON
121.7
SANTA BARBARA TOWER ✱
119.7 242.4
SANTA BARBARA DEP CON
120.55 321.4
ATIS ✱ 125.1



NOTE: This departure requires a minimum climb rate of 385′ per NM to 6000

NOTE: IFR departure Rwys 33L/R not authorized.

NOTE: Chart not to scale

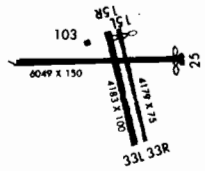
DEPARTURE ROUTE DESCRIPTION

TAKE-OFF RUNWAY 7: Maintain runway heading to at least 650′, then turn right, thence intercept and climb westbound via I-SBA localizer west course to HABUT INT, thence via GVO R-163 to GVO VORTAC. Cross SBA R-249 at or above 6000′.

TAKE-OFF RUNWAY 15: Maintain runway heading to at least 310′, then turn right, thence intercept and climb westbound via I-SBA localizer west course to HABUT INT, thence via GVO R-163 to GVO VORTAC. Cross SBA R-249 at or above 6000′.

(Continued on next page)

ELEV 10



SANTA BARBARA, CALIFORNIA
SANTA BARBARA MUNI

HABUT ONE DEPARTURE (HABUT1.GVO)

HABUT ONE DEPARTURE (HABUT1.GVO)

SANTA BARBARA MUNI
SANTA BARBARA, CALIFORNIA

DEPARTURE ROUTE DESCRIPTION
(Continued)

TAKE-OFF RUNWAY 25: Climb westbound via I-SBA localizer west course to HABUT INT, thence via GVO R-163 to GVO VORTAC. Cross SBA R-249 at or above 6000′.

HABUT ONE DEPARTURE (HABUT1.GVO)

SANTA BARBARA, CALIFORNIA
SANTA BARBARA MUNI

§ **SANTA BARBARA MUNI** (SBA) 7 W GMT-8(-7DT) 34°25′34″N 119°50′22″W LOS ANGELES H-2F, L-3B IAP
10 B S4 FUEL 80, 100, 100LL, JET A OX 1, 2, 3, 4 TPA—See Remarks
CFR Index C
RWY 07-25: H6049X150 (ASPH-GRVD) S-110, D-160, DT-245 HIRL
RWY 07: MALSR. Tree. Rgt tfc. RWY 25: VASI(V4L)—GA 3.0°TCH 46′. Thld dsplcd 324′. Road.
RWY 15R-33L: H4183X100 (ASPH) S-48, D-63, DT-100 MIRL
RWY 15R: REIL. Pole. RWY 33L: Road. Rgt tfc.
RWY 15L-33R: H4179X75 (ASPH) S-35, D-41, DT-63
RWY 15L: Thld dsplcd 225′. Tree. RWY 33R: Pole. Rgt tfc.
AIRPORT REMARKS: Attended 1330-0600Z‡. Fee after hours. Numerous flocks of birds on and in vicinity of arpt. TPA—1000(990) small acft, 1500(1490) large acft. Pure jet touch/go or low approaches prohibited.
COMMUNICATIONS: CTAF 119.7 ATIS 125.1 (1430-0600Z‡) UNICOM 122.95
SANTA BARBARA FSS (SBA) on arpt 123.65, 122.3, 122.2, 122.1R, 116.5T LD (805) 967-2305, DL. NOTAM FILE SBA.
Ⓡ APP CON 125.4 (1430-0600Z‡) Ⓡ DEP CON 120.55 (1430-0600Z‡)
Ⓡ LOS ANGELES CENTER APP/DEP CON 128.05 (0600-1430Z‡)
TOWER 119.7 (1430-0600Z‡) GND CON 121.7
VFR ADVSY SVC ctc TOWER
RADIO AIDS TO NAVIGATION: NOTAM FILE SBA. VHF/DF ctc SANTA BARBARA FSS
(H) ABVORTAC 114.9 ■ SBA Chan 96 34°30′34″N 119°46′12″W 198°5.6 NM to fld. 3620/16E.
GAVIOTA (L) VORTAC 116.5 GVO Chan 112 34°31′53″N 120°05′24″W 099°14.0 NM to fld. 2620/16E
ILS/DME 110.3 I-SBA Chan 40 Rwy 07

CALIFORNIA

VOR RECEIVER CHECK POINTS

Facility Name (Arpt Name)	Freq/Ident	Type Check Pt. Gnd. AB/ALT	Azimuth from Fac. Mag	Dist. from Fac. N.M.	Check Point Description
Sacramento (Sacramento Executive)	115.2/SAC	A/1000	015		Over apch end rwy 02.
Salinas (Salinas Muni)	117.3/SNS	G	247		0.4 NM on Compass rose.
Santa Ana (John Wayne Airport/Orange County)	109.4/SNA	G	186		On runup pad rwy 01R.
Santa Barbara	114.9/SBA	A/2000	277	11	Over Lake Cachuma Dam spillway.
Santa Barbara (Santa Barbara Muni)	114.9/SBA	G	200	5.9	On runup area end rwy 15.

FIGURE 52.—HABUT One Departure and Excerpt from Airport/Facility Directory.

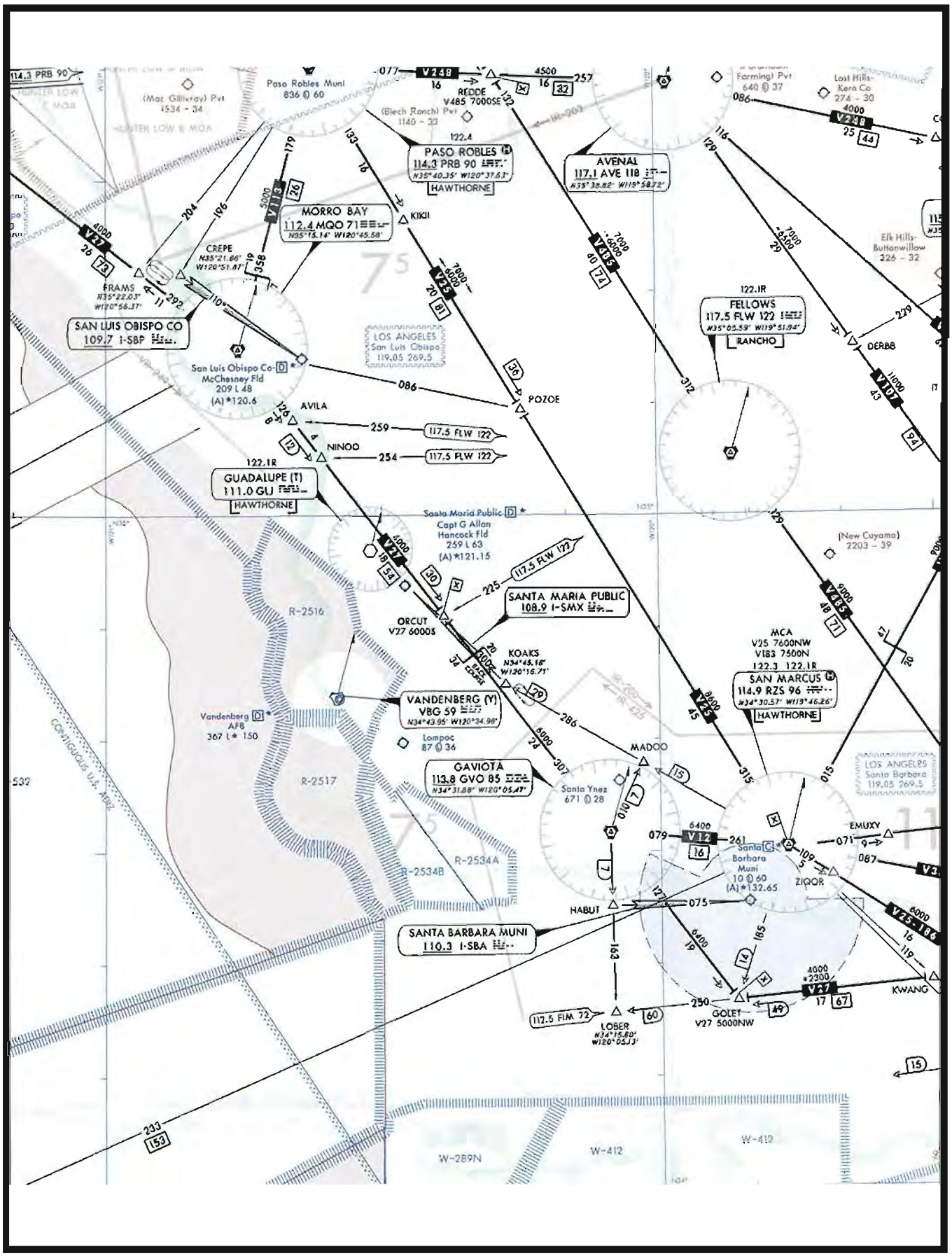


FIGURE 53.—En Route Chart Segment.

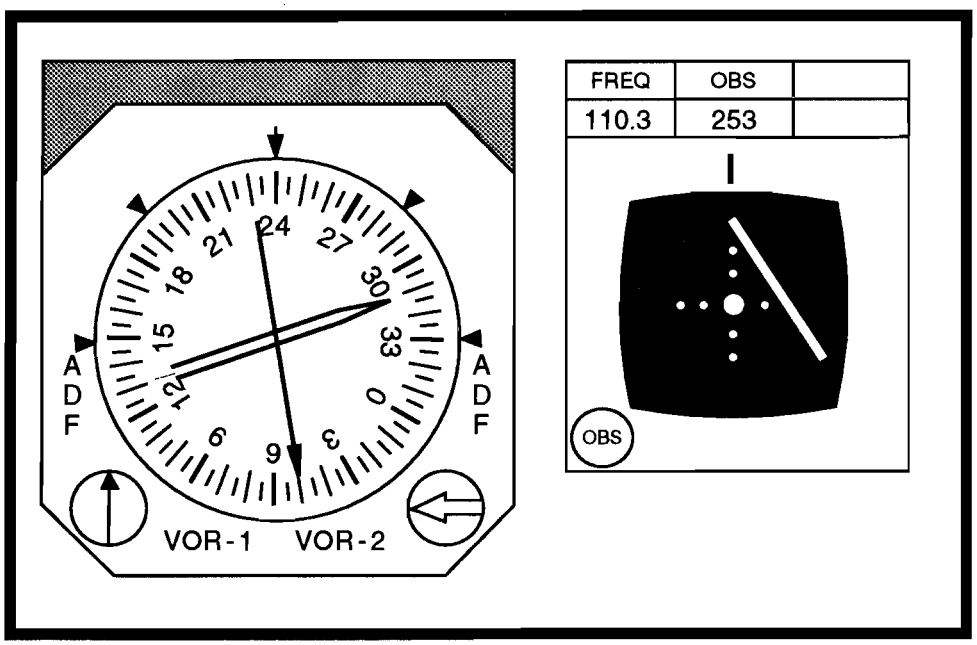


FIGURE 54.—RMI and CDI Indicators.

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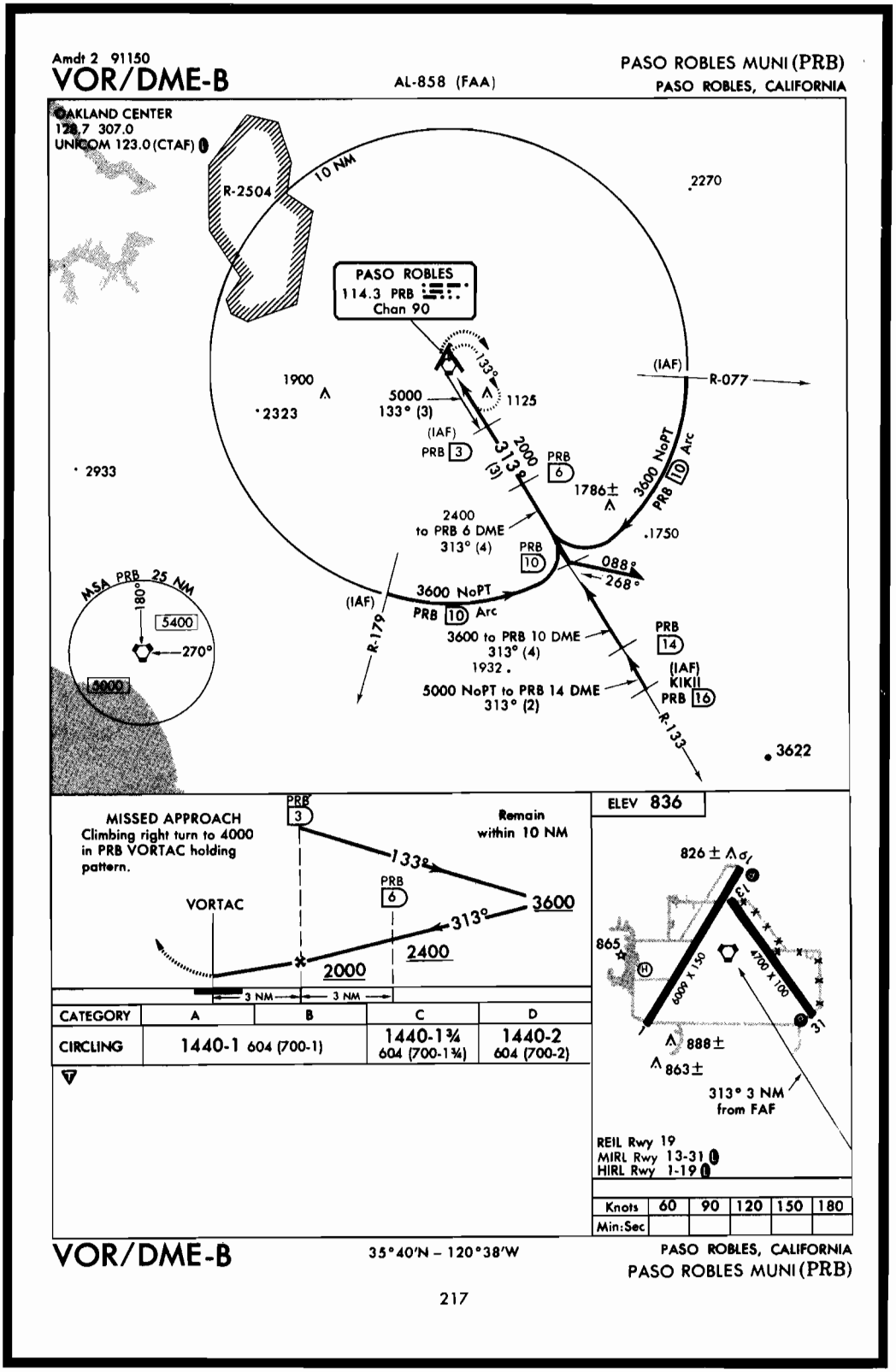

FIGURE 55.—VOR/DME-B (PRB).

Form Approved: OMB No. 2120-0034

U.S. DEPARTMENT OF TRANSPORTATION FEDERAL AVIATION ADMINISTRATION **FLIGHT PLAN**	(FAA USE ONLY) ☐ PILOT BRIEFING ☐ VNR ☐ STOPOVER	TIME STARTED	SPECIALIST INITIALS

1. TYPE	2. AIRCRAFT IDENTIFICATION	3. AIRCRAFT TYPE/ SPECIAL EQUIPMENT	4. TRUE AIRSPEED	5. DEPARTURE POINT	6. DEPARTURE TIME		7. CRUISING ALTITUDE
					PROPOSED (Z)	ACTUAL (Z)	
☐ VFR X IFR ☐ DVFR	N12193	BH 206/	110 KTS	EASTERWOOD FIELD			7000

8. ROUTE OF FLIGHT
DIRECT CLL, V15 TNV, V571 IAH, DIRECT

9. DESTINATION (Name of airport and city)	10. EST. TIME ENROUTE		11. REMARKS
	HOURS	MINUTES	
WILLIAM P HOBBY AIRPORT HOUSTON, TX			

12. FUEL ON BOARD		13. ALTERNATE AIRPORT(S)	14. PILOT'S NAME, ADDRESS & TELEPHONE NUMBER & AIRCRAFT HOME BASE	15. NUMBER ABOARD
HOURS	MINUTES			
		N/A	17. DESTINATION CONTACT/TELEPHONE (OPTIONAL)	2

16. COLOR OF AIRCRAFT	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.
TAN/GOLD/WHITE	

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

AIRCRAFT INFORMATION

MAKE Bell MODEL 206L

N 12193 Vso N/A

AIRCRAFT EQUIPMENT/STATUS**

**NOTE: X= OPERATIVE INOP= INOPERATIVE N/A= NOT APPLICABLE
TRANSPONDER: X (MODE C) X ILS: (LOCALIZER) X (GLIDE SLOPE) X
VOR NO. 1 X (NO. 2) X ADF: X RNAV: X
VERTICAL PATH COMPUTER: N/A DME: X
MARKER BEACON: X (AUDIO) X (VISUAL) X

FIGURE 56.—IFR Flight Plan and Aircraft Information.

FLIGHT LOG

EASTERWOOD FIELD TO WILLIAM P HOBBY AIRPORT

CHECK POINTS		ROUTE	COURSE	WIND	SPEED-KTS		DIST	TIME		FUEL	
FROM	TO	ALTITUDE		TEMP	TAS	GS	NM	LEG	TOT	LEG	TOT
EASTER WOOD	CLL	DIRECT CLIMB	DIRECT					:05:			
	TNV	V15 7000	127°		110		27				
	IAH	V571 7000	110°				42				
	HUB	DIRECT 7000	161°				18				
APPROACH & LANDING								:15:			
	HOBBY AIRPORT										

OTHER DATA:
NOTE: MAG. VAR. 6° E.

FLIGHT SUMMARY

TIME	FUEL (LB)	
		EN ROUTE
		RESERVE
		MISSED APPR.
		TOTAL

FIGURE 57.—Flight Planning Log.

COLLEGE STATION

EASTERWOOD FLD (CLL) 3 SW UTC-6(-5DT) 30°35'18"N 96°21'49"W **HOUSTON**
320 B S4 **FUEL** 100LL, JET A OX 2 ARFF Index A **H-2K, 5B, L-17A**
RWY 16-34: H7000X150 (ASPH-GRVD) S-70, D-90, DT-150 MIRL **IAP**
RWY 16: VASI(V4R)—GA 3.0°TCH 51'. Tree. **RWY 34:** MALSR.
RWY 10-28: H5160X150 (CONC) S-27, D-50, DT-87 MIRL
RWY 10: VASI(V4L)—GA 3.0°TCH 50'. Tree. **RWY 28:** REIL VASI(V4L)—GA 3.0° TCH 54'. Tree.
RWY 04-22: H5149X150 (CONC) S-27, D-50, DT-87
RWY 04: Tree. **RWY 22:** Tree.
AIRPORT REMARKS: Attended 1200-0500Z‡. CAUTION: deer on rwys. CAUTION: Rwy 10-28 taxiway B and taxiway E have uneven surfaces. Birds on and in vicinity of arpt. MIRL Rwy 10–28 preset medium ints when twr clsd, to increase ints and ACTIVATE MIRL Rwy 16–34 and MALSR Rwy 34—CTAF. CLOSED to unscheduled air carrier ops with more than 30 passenger seats except 24 hours PPR call, arpt manager 409–845–4811. Rwy 04–22 day VFR ops only. Itinerant acft park North of twr, overnight parking fee. Ldg fee scheduled FAR 135 and all FAR 121 ops. For fuel after hours PPR call 409–845–4811/823 –0690 or ctc Texas A and M University police 409–845–2345; late ngt fee. Rwy 16–34 grvd except south 200'. Rwy 04–22 deteriorating and vegetation growing through cracks. NOTE: See SPECIAL NOTICE—Simultaneous Operations on Intersecting Runways.
COMMUNICATIONS: CTAF 118.5 **ATIS** 126.85 (1200–0400Z‡) **UNICOM** 122.95
MONTGOMERY COUNTY FSS (CXO) TF 1–800–WX–BRIEF. NOTAM FILE CLL.
COLLEGE STATION RCO 122.65 122.2 (MONTGOMERY COUNTY FSS).
Ⓡ**HOUSTON CENTER APP/DEP CON:** 120.4
TOWER: 118.5 (1200-0400Z‡) (VFR only) **GND CON:** 121.7
RADIO AIDS TO NAVIGATION: NOTAM FILE CLL. VHF/DF ctc FSS
COLLEGE STATION (L) VORTACW 113.3 CLL Chan 80 30°36'17"N 96°25'13"W 100° 3.1 NM to fld. 370/08E. **HIWAS.**
ROWDY NDB (LOM) 260 CL 30°29'36"N 96°20'16"W 341° 5.9 NM to fld.
ILS 111.7 I-CLL Rwy 34 LOM ROWDY NDB. ILS unmonitored when twr closed.

COLLEGE STATION 30°36'17"N 96°25'13"W NOTAM FILE CLL. **HOUSTON**
(L) **VORTACW** 113.3 CLL Chan 80 100° 3.1 NM to Easterwood Fld. 370/08E. **HIWAS.** **H-2K, 5B, L-17A**
RCO 122.65 122.2 (MONTGOMERY COUNTY FSS)

VOR RECEIVER CHECK 259

TEXAS

VOR RECEIVER CHECK POINTS

Facility Name (Arpt Name)	Freq/Ident	Type Check Pt. Gnd. AB/ALT	Azimuth from Fac. Mag	Dist. from Fac. N.M.	Check Point Description
Abilene (Abilene Regional)	113.7/ABI	A/2800	047	10.1	Over silos in center of Ft Phantom Lake.
Alice (Alice International)	114.5/ALI	G	270	0.5	On twy N of hangar.
Amarillo (Amarillo International)	117.2/AMA	G	210	4.5	On east runup pad Rwy 22
Austin (Robert Mueller Muni)	114.6/AUS	G	118	0.6	On runup area on twy to Rwy 31L.
Beaumont (Jefferson County)	114.5/BPT	G	310	1.0	On runup area for Rwy 12
Big Spring (Big Spring McMahon-Wrinkle)	114.3/BGS	A/3500	107	10.5	Over red and white water tank.
Borger (Hutchinson Co)	108.6/BGD	G	175	6.7	On intersecting twy in front of terminal.
Brownsville (Brownsville/South Padre Island Intl)	116.3/BRO	G	248	3.2	On NE corner of parking ramp.
Brownwood (Brownwood Muni)	108.6/BWD	A/2600	169	6.2	Over rotating bcn.
Childress (Childress Muni)	117.6/CDS	G	353	3.7	At intersection of edge of ramp at center twy.
College Station (Easterwood Field)	113.3/CLL	G	097	3.2	On W edge of parking ramp
Corpus Christi (Corpus Christi Intl)	115.5/CRP	A/1100	187	7.5	Over grain elevator.
Corpus Christi (San Patricio County)	115.5/CRP	A/1000	318	9.5	Over rotating beacon on arpt.
Daisetta (Liberty Muni)	116.9/DAS	A/1200	195	7.5	Over hangar S of arpt.
Dalhart (Dalhart Muni)	112.0/DHT	G	170	3.9	On SE corner of main ramp
Eagle Lake (Eagle Lake)	116.4/ELA	A/1200	180	4.5	Over water tank 0.4 NM S

FIGURE 58.—Excerpts from Airport/Facility Directory.

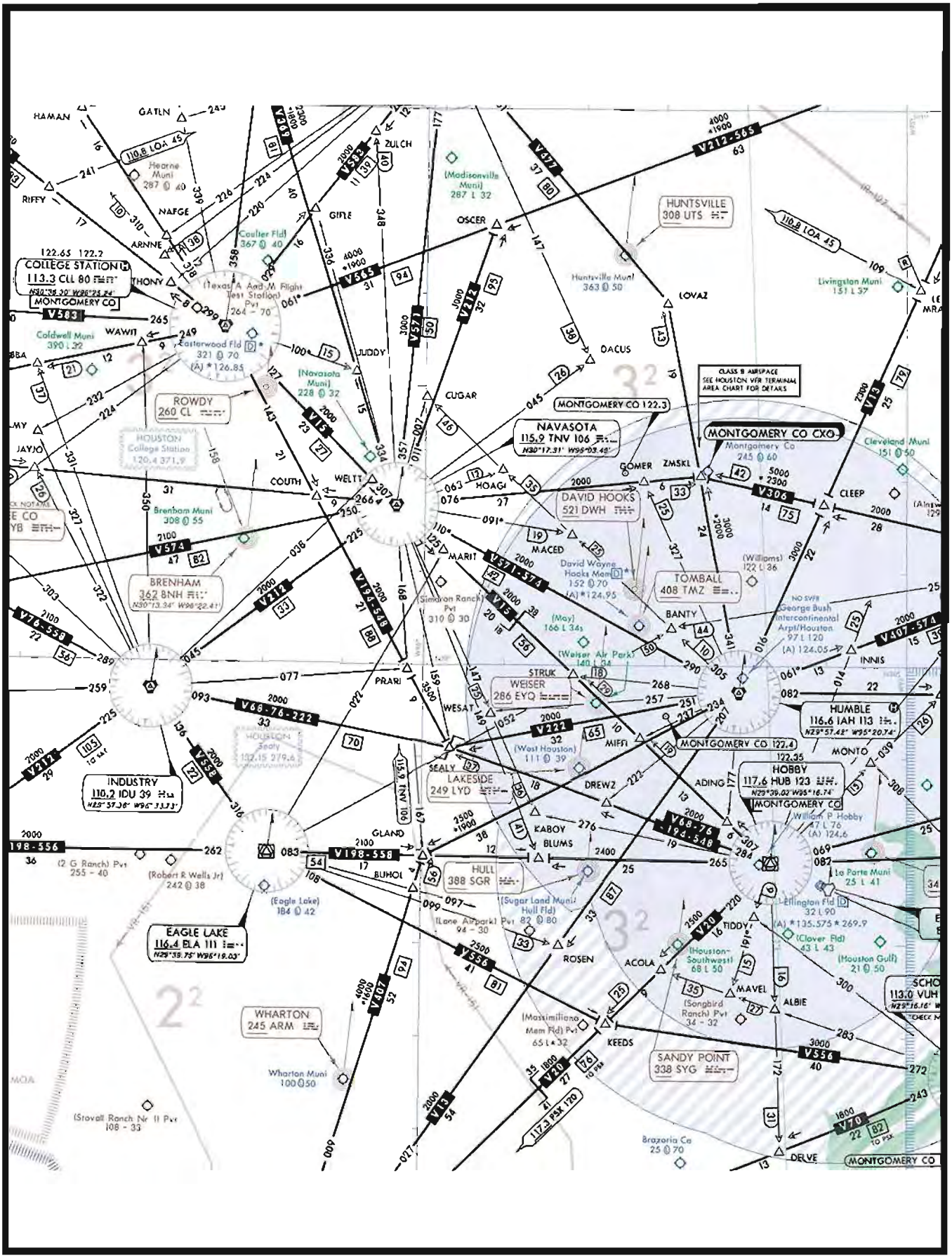

FIGURE 59.—En Route Chart Segment.

172 **TEXAS**

WILLIAM P. HOBBY (HOU) 8 SE UTC-6(-5DT) 29°38'43"N 95°16'43"W **HOUSTON**
47 B S4 **FUEL** 100, JET A OX 1, 2, 3, 4 LRA ARFF Index C **H-5B, L-17B**
RWY 04-22: H7602X150 (CONC-GRVD) S-75, D-200, DT-400 HIRL CL **IAP**
RWY 04: MALSR. TDZ. **RWY 22:** MALS. VASI(V4L)—GA 3.0° TCH 52'. Pole.
RWY 12R-30L: H7601X150 (ASPH-GRVD) S-75, D-195, DT-220 HIRL CL
RWY 12R: MALSR. VASI(V4R)—GA 3.0°TCH 49'. Thld dsplcd 1032'. Pole.
RWY 30L: REIL. Thld dsplcd 200'. Road.
RWY 17-35: H6000X150 (CONC-ASPH-GRVD) S-75, D-121, DT-195 MIRL
RWY 17: VASI(V4L)—GA 3.0°TCH 38'. Antenna. **RWY 35:** VASI(V4R)—GA 3.0°TCH 41'. Building.
RWY 12L-30R: H5149X100 (CONC-GRVD) S-30, D-45, DT-80 MIRL
RWY 12L: VASI(V4L)—GA 3.0°TCH 52'. **RWY 30R:** Antenna.
AIRPORT REMARKS: Attended continuously. Arpt CLOSED to acft with wing span over 117' except 24 hours PPR, call arpt manager 713-643-4597. CAUTION: numerous birds on and in vicinity of arpt. CAUTION to larger acft: W ramp twy centerline to parked acft on W side only 68'. W ramp twy centerline to edge of adjacent svc vehicle road on W side only 48'. PPR to taxi to main terminal bldg, call 713-643-4597. Flight Notification Service (ADCUS) available. NOTE: See SPECIAL NOTICE—Simultaneous Operations on Intersecting Runways.
WEATHER DATA SOURCES: LLWAS.
COMMUNICATIONS: ATIS 124.6 **UNICOM** 122.95
MONTGOMERY COUNTY FSS (CXO) TF 1-800-WX-BRIEF. NOTAM FILE HOU.
HOBBY RCO 122.35 (MONTGOMERY COUNTY FSS)
(R) **HOUSTON APP CON** 120.8 (South) 124.35 (West) 120.05(North and East)
HOBBY TOWER 118.7 **HOUSTON GND CON** 121.9 **CLNC DEL** 125.45 **PRE-TAXI CLNC** 125.45
(R) **HOUSTON DEP CON** 120.8 (South) 123.8 (West) 119.7 (North and East)
ARSA ctc **APP CON**
RADIO AIDS TO NAVIGATION: NOTAM FILE HOU.
HOBBY (H) VORW/DME 117.6 HUB Chan 123 29°39'00"N 95°16'44"W at fld. 50/06E.
TUTTE NDB (LOM) 395 HU 29°35'20"N 95°20'25"W 038° 4.7 NM to fld.
ILS/DME 111.3 I-PRQ Chan 50 Rwy 12R.
ILS/DME 109.9 I-HUB Chan 36 Rwy 04 LOM TUTTE NDB. BC unusable beyond 25° SE of centerline.
ILS/DME 111.3 I-UPU Chan 50 Rwy 30L

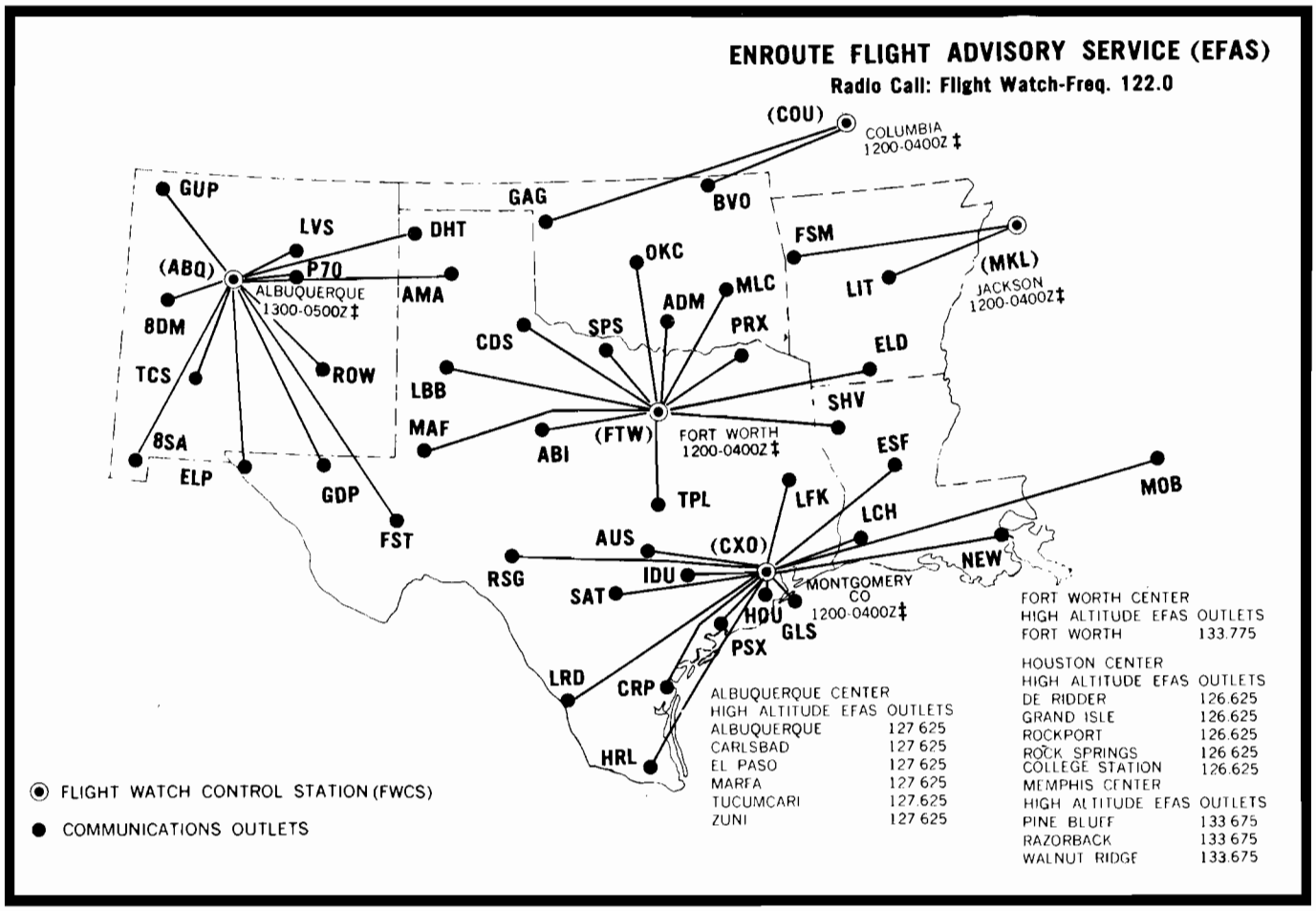

FIGURE 60.—Airport/Facility Directory and Enroute Flight Advisory Service (EFAS).

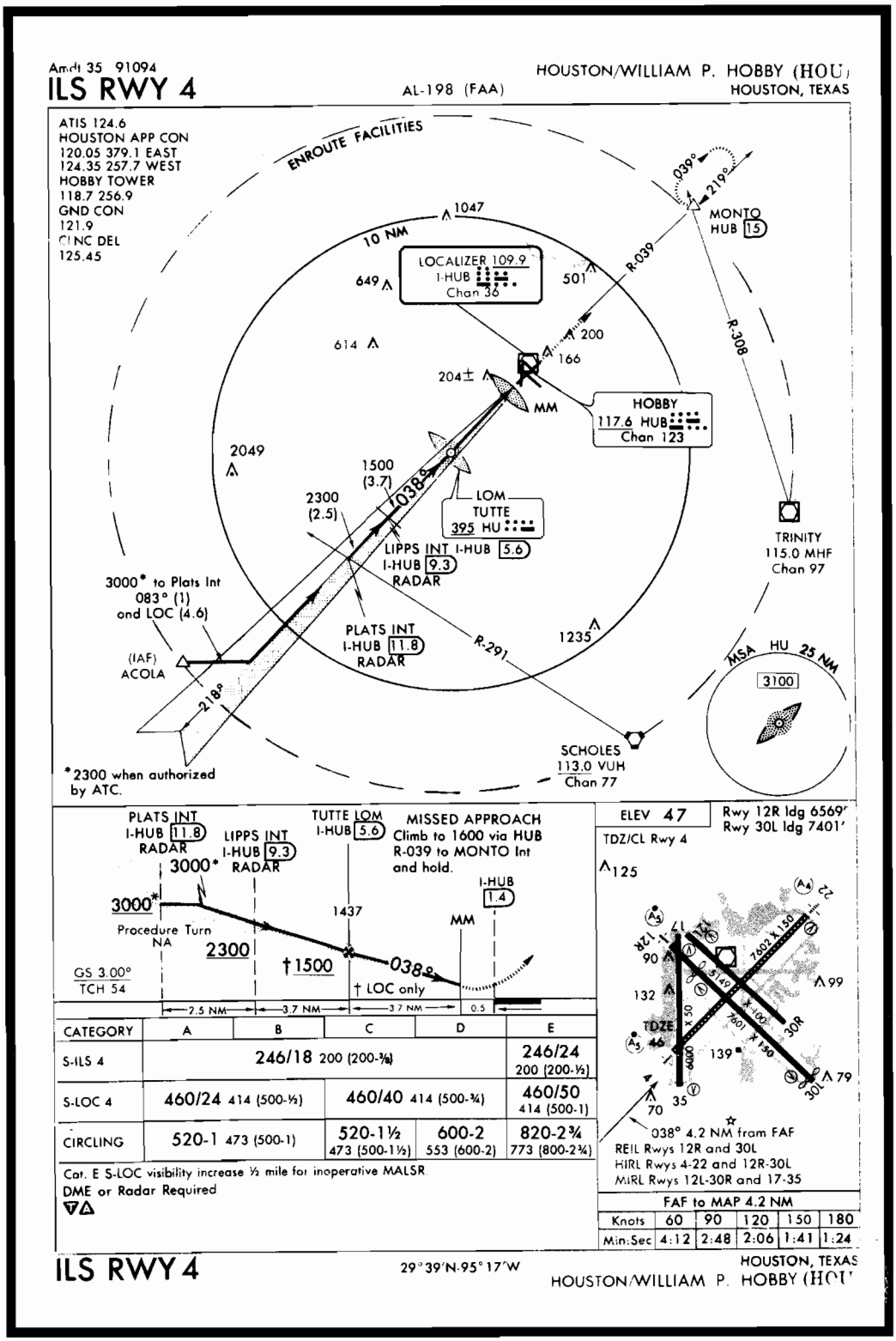

FIGURE 60A.—ILS RWY 4 (HOU).

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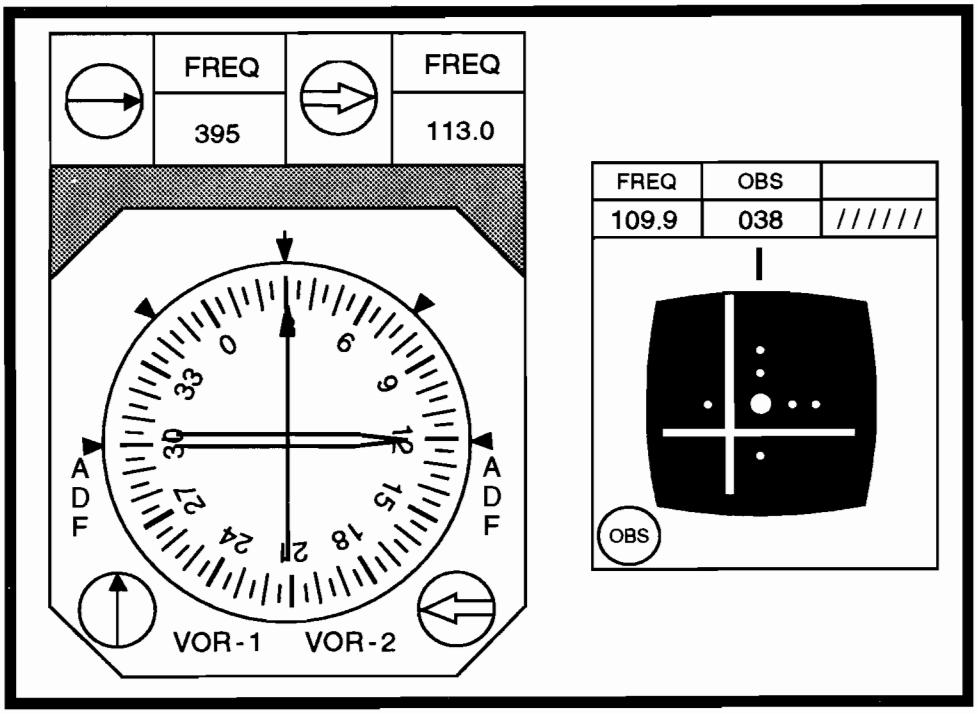


FIGURE 61.—RMI and CDI Indicators.

Form Approved: OMB No. 2120-0034

U.S. DEPARTMENT OF TRANSPORTATION FEDERAL AVIATION ADMINISTRATION **FLIGHT PLAN**	(FAA USE ONLY) ☐ PILOT BRIEFING ☐ VNR ☐ STOPOVER	TIME STARTED	SPECIALIST INITIALS

1. TYPE	2. AIRCRAFT IDENTIFICATION	3. AIRCRAFT TYPE/ SPECIAL EQUIPMENT	4. TRUE AIRSPEED	5. DEPARTURE POINT	6. DEPARTURE TIME		7. CRUISING ALTITUDE
					PROPOSED (Z)	ACTUAL (Z)	
☐ VFR							
X IFR							
☐ DVFR	N321JL	HU369/	105 KTS	LFT			5000

8. ROUTE OF FLIGHT
DIRECT LFT, V552 TBD

9. DESTINATION (Name of airport and city)	10. EST. TIME ENROUTE HOURS	MINUTES	11. REMARKS
HOUMA TERREBONNE LA (HUM)			

12. FUEL ON BOARD HOURS	MINUTES	13. ALTERNATE AIRPORT(S)	14. PILOT'S NAME, ADDRESS & TELEPHONE NUMBER & AIRCRAFT HOME BASE	15. NUMBER ABOARD
		N/A	17. DESTINATION CONTACT/TELEPHONE (OPTIONAL)	2

16. COLOR OF AIRCRAFT	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.
ORANGE/BLACK/WHITE	

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

AIRCRAFT INFORMATION

MAKE Hughes MODEL 369

N 321JL Vso N/A

AIRCRAFT EQUIPMENT/STATUS**

**NOTE: X= OPERATIVE INOP= INOPERATIVE N/A= NOT APPLICABLE
TRANSPONDER: X (MODE C) X ILS: (LOCALIZER) X (GLIDE SLOPE) X
VOR NO. 1 X (NO. 2) X ADF: X RNAV: X
VERTICAL PATH COMPUTER: N/A DME: X
MARKER BEACON: X (AUDIO) X (VISUAL) X

FIGURE 62.—Flight Plan and Aircraft Information.

FLIGHT LOG

LAFAYETTE REGIONAL TO HOUMA TERREBONNE (HUM)

CHECK POINTS		ROUTE	COURSE	WIND	SPEED-KTS		DIST	TIME		FUEL	
FROM	TO	ALTITUDE		TEMP	TAS	GS	NM	LEG	TOT	LEG	TOT
LFT AIRPORT	LFT VOR	DIRECT CLIMB						:05:0			
	HATCH	V552 5000	114°		105						
	GRICE	V552 5000	116°								
	TBD	V552 5000	116°								
APPROACH & LANDING		DESCENT	117°					:10:0			
	HUM AIRPORT										

OTHER DATA:
NOTE: MAG. VAR. 6° E.

FLIGHT SUMMARY

TIME	FUEL (LB)	
		EN ROUTE
		RESERVE
		MISSED APPR.
		TOTAL

FIGURE 63.—Flight Planning Log.

LOUISIANA

VOR RECEIVER CHECK POINTS

Facility Name (Arpt Name)	Freq/Ident	Type Check Pt. Gnd AB/ALT	Azimuth from Fac. Mag	Dist. from Fac. N.M.	Check Point Description
Baton Rouge (Baton Rouge Metro, Ryan)	116.5/BTR	A/1500	063	7.7	Over water tank W side of arpt.
Downtown	108.6/DTN	A/1500	290	10	Over white water tower.
Esler (Esler Regional)	108.8/ESF	G	151	3.5	On ramp in front of admin bldg.
Hammond (Hammond Muni)	109.6/HMU	G	342	.6	On twy W side app end Rwy 18.
Lafayette (Lafayette Regional)	110.8/LFT	A/1000	340	25	Over rotating beacon
Lake Charles (Lake Charles Muni)	113.4/LCH	A/1000	253	6.2	Over rotg bcn on atct.
Monroe (Monroe Muni)	117.2/MLU	G	209	0.9	On ramp SE of atct.
Natchez (Concordia Parish)	110.0/HEZ	A/1000	247	10.5	Over hangar NW end of field.
New Orleans (Lakefront)	113.2/MSY	A/1000	081	7.7	Over lakefront atct.
Ruston	112.8/RSN	A/2000	343	14	Over hwy & RR crossing at Dubash.
Shreveport (Shreveport Downtown)	108.6/DTN	G	307	.5	On runup area N side of rwy 14.
Shreveport (Shreveport Regional)	117.4/SHV	A/1200	175	19.3	Over old terminal building.
Tibby (Thibodaux Muni)	112.0/TBD	A/1000	006	5.0	Over railroad bridge off apch end rwy 26.
	112.0/TBD	A/1000	117	10.0	Over intersection of rwys 17-35 and 12-30

LAFAYETTE REGIONAL (LFT) 2 SE GMT-6(-5DT) 30°12′14″N 91°59′16″W **HOUSTON**
42 B S4 **FUEL** 100LL, JET A OX 1 CFR Index B **H-4F, L-17C**
RWY 03-21: H7651X150 (ASPH-GRVD) S-75, D-170, DT-290 HIRL **IAP**
RWY 03: REIL. VASI(V4L)—GA 3.0°TCH 35′. Tree.
RWY 21: MALSR. VASI(V4L)—GA 3.0°TCH 44′. Tree.
RWY 10-28: H5401X150 (ASPH) S-85, D-110, DT-175 MIRL
RWY 10: REIL (out of svc indefinitely). VASI(V4L)—GA 3.0° TCH 35.33′. Tree.
RWY 28: REIL. VASI(V4L)—GA 3.0° TCH 55′. Thld dsplcd 202′. Tree.
RWY 01-19: H5069X150 (ASPH) S-25, D-45
RWY 01: VASI(V4R)—GA 3.0°TCH 50′. Tree.
AIRPORT REMARKS: Attended continuously. Rwy 01-19 closed to air carriers. ACTIVATE MALSR Rwy 21—118.5.
COMMUNICATIONS: CTAF 118.5 **ATIS** 120.5 Opr 1200-0500Z‡ **UNICOM** 122.95
LAFAYETTE FSS (LFT) on arpt. 122.35, 122.2, 122.1R, 110.8T LD 318-233-4952 NOTAM FILE LFT.
Ⓡ **APP/DEP CON** 121.1 (011°-190°) 124.0 (191°-010°) (1200-0400Z‡)
HOUSTON CENTER APP/DEP CON 133.65 (0400-1200Z‡)
TOWER 118.5, 121.35 (Helicopter ops) (1200-0400Z‡) **GND CON** 121.8 **CLNC DEL** 125.55
STAGE III ctc **APP CON** within 25 NM below 7000′
RADIO AIDS TO NAVIGATION: NOTAM FILE LFT. VHF/DF ctc LAFAYETTE FSS
(L) VORTAC 110.8 LFT Chan 45 30°08′45″N 91°59′00″W 344°3.0 NM to fld. 40/06E
LAFFS NDB (LOM) 375 LF 30°17′21″N 91°54′29″W 215° 5.8 NM to fld
LAKE MARTIN NDB (MHW) 362 LKM 30°11′33″N 91°52′58″W 270°5.2 NM to fld
ILS/DME 109.5 I-LFT Chan 32 Rwy 21 LOM LAFFS NDB. Unmonitored when twr clsd.
ASR

FIGURE 64.—Excerpt from Airport/Facility Directory (LFT).

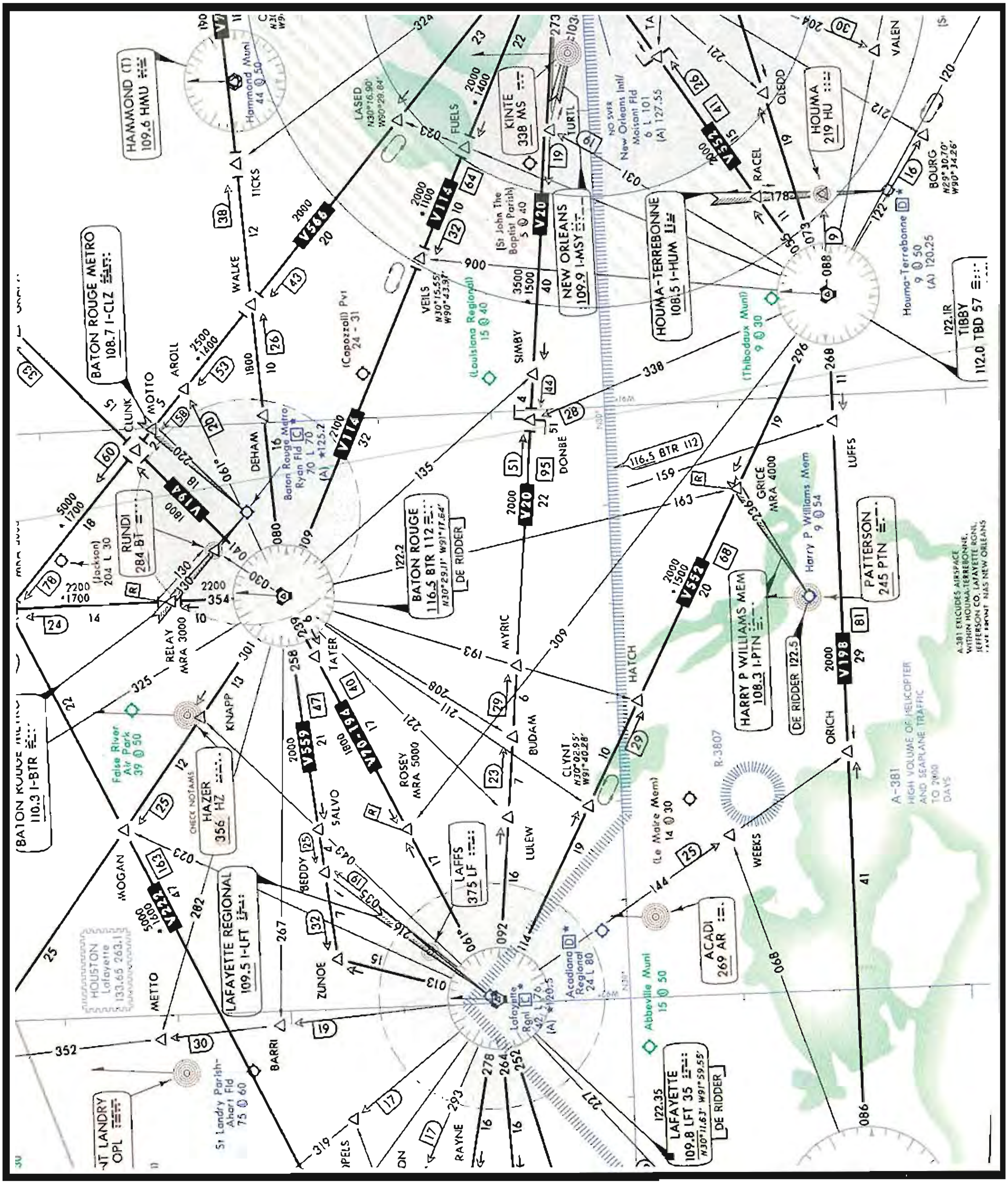


FIGURE 65.—En Route Chart Segment.

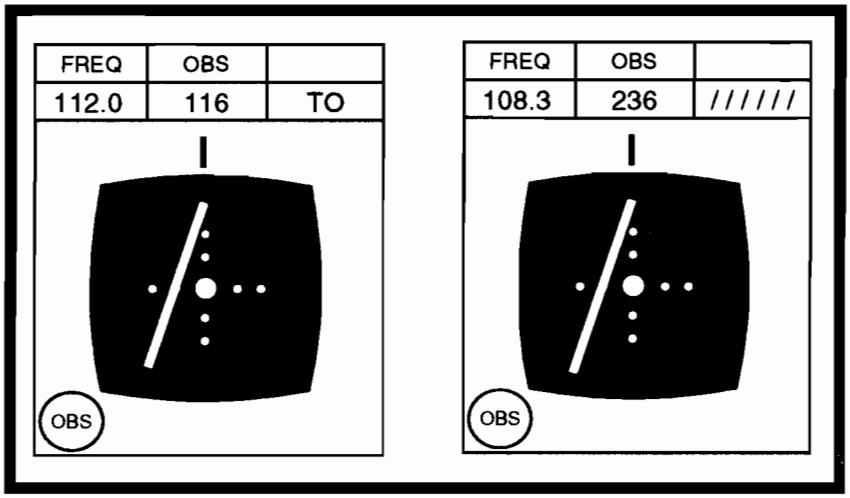


FIGURE 66.—CDI and OBS Indicators.

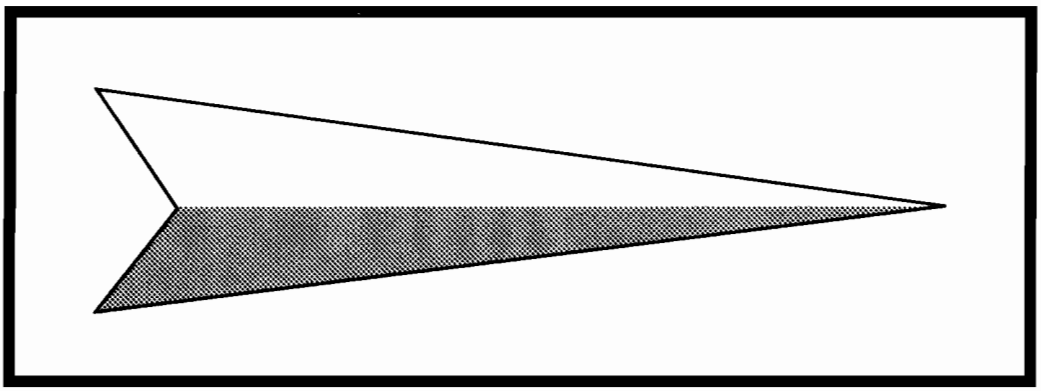
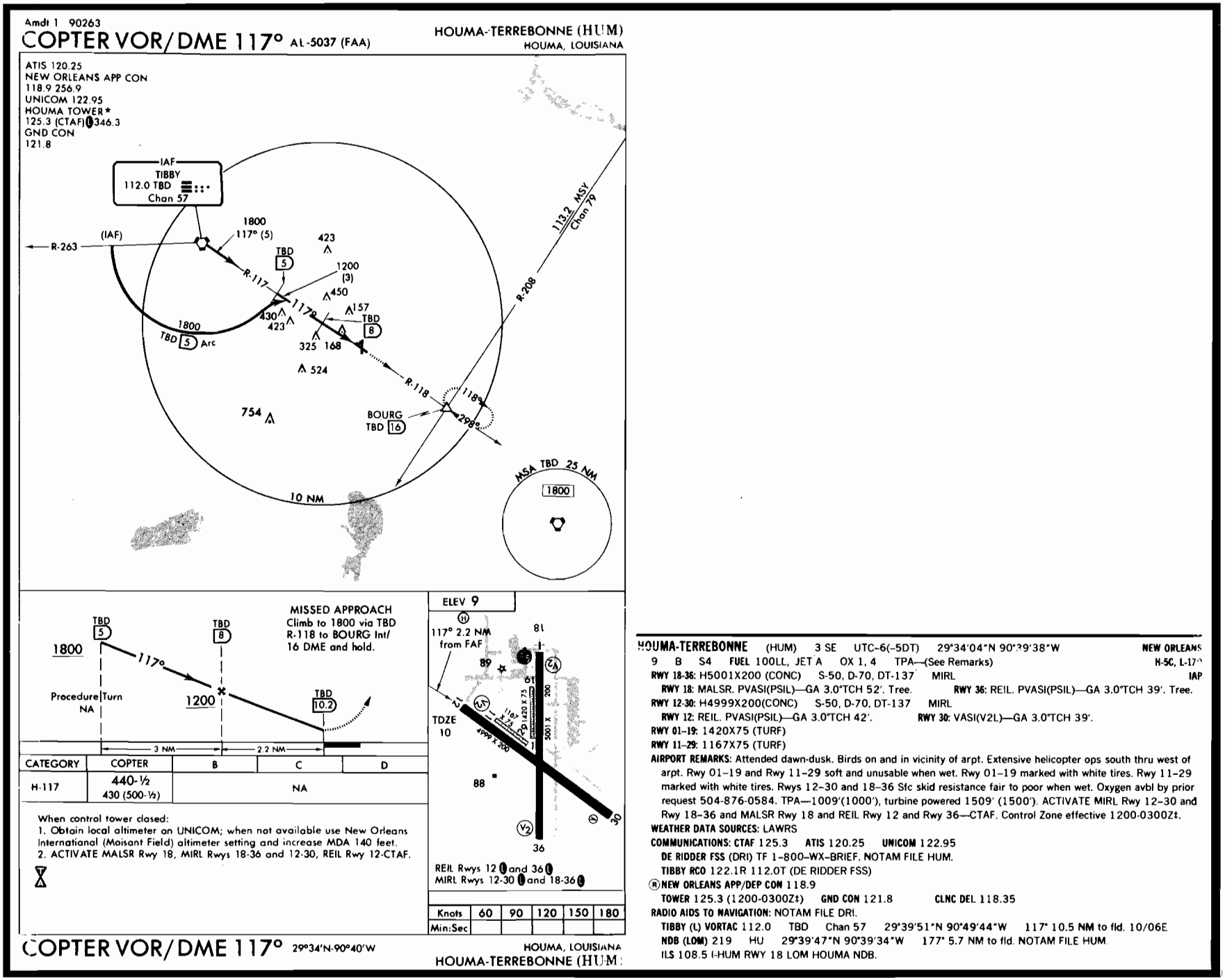


FIGURE 67.—Localizer Symbol.



HOUMA-TERREBONNE (HUM) 3 SE UTC-6(-5DT) 29°34'04"N 90°39'38"W **NEW ORLEANS**
9 B S4 **FUEL** 100LL, JET A OX 1, 4 TPA—(See Remarks) **H-5C, L-17C**
RWY 18-36: H5001X200 (CONC) S-50, D-70, DT-137 MIRL **IAP**
RWY 18: MALSR. PVASI(PSIL)—GA 3.0°TCH 52'. Tree. **RWY 36:** REIL. PVASI(PSIL)—GA 3.0°TCH 39'. Tree.
RWY 12-30: H4999X200(CONC) S-50, D-70, DT-137 MIRL
RWY 12: REIL. PVASI(PSIL)—GA 3.0°TCH 42'. **RWY 30:** VASI(V2L)—GA 3.0°TCH 39'.
RWY 01-19: 1420X75 (TURF)
RWY 11-29: 1167X75 (TURF)
AIRPORT REMARKS: Attended dawn-dusk. Birds on and in vicinity of arpt. Extensive helicopter ops south thru west of arpt. Rwy 01-19 and Rwy 11-29 soft and unusable when wet. Rwy 01-19 marked with white tires. Rwy 11-29 marked with white tires. Rwys 12-30 and 18-36 Sfc skid resistance fair to poor when wet. Oxygen avbl by prior request 504-876-0584. TPA—1009'(1000'), turbine powered 1509' (1500'). ACTIVATE MIRL Rwy 12-30 and Rwy 18-36 and MALSR Rwy 18 and REIL Rwy 12 and Rwy 36—CTAF. Control Zone effective 1200-0300Z‡.
WEATHER DATA SOURCES: LAWRS
COMMUNICATIONS: CTAF 125.3 **ATIS** 120.25 **UNICOM** 122.95
DE RIDDER FSS (DRI) TF 1-800-WX-BRIEF. NOTAM FILE HUM.
TIBBY RCO 122.1R 112.0T (DE RIDDER FSS)
(R) **NEW ORLEANS APP/DEP CON** 118.9
TOWER 125.3 (1200-0300Z‡) **GND CON** 121.8 **CLNC DEL** 118.35
RADIO AIDS TO NAVIGATION: NOTAM FILE DRI.
TIBBY (L) VORTAC 112.0 TBD Chan 57 29°39'51"N 90°49'44"W 117° 10.5 NM to fld. 10/06E
NDB (LOM) 219 HU 29°39'47"N 90°39'34"W 177° 5.7 NM to fld. NOTAM FILE HUM.
ILS 108.5 I-HUM RWY 18 LOM HOUMA NDB.

FIGURE 68.—COPTER VOR DME-117 Degrees (HUM).

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Form Approved: OMB No. 2120-0034

U.S. DEPARTMENT OF TRANSPORTATION FEDERAL AVIATION ADMINISTRATION **FLIGHT PLAN**	(FAA USE ONLY) ☐ PILOT BRIEFING ☐ VNR ☐ STOPOVER	TIME STARTED	SPECIALIST INITIALS

1. TYPE	2. AIRCRAFT IDENTIFICATION	3. AIRCRAFT TYPE/ SPECIAL EQUIPMENT	4. TRUE AIRSPEED	5. DEPARTURE POINT	6. DEPARTURE TIME		7. CRUISING ALTITUDE
					PROPOSED (Z)	ACTUAL (Z)	
☐ VFR X IFR ☐ DVFR	N2142S	C172/	128 KTS	GREENWOOD LAKE 4N1			5000

8. ROUTE OF FLIGHT
DIRECT SHAFF INT., V213 HELON INT., V58 JUDDS INT., JUDDS2

9. DESTINATION (Name of airport and city)	10. EST. TIME ENROUTE		11. REMARKS
	HOURS	MINUTES	
BRADLEY INTL. BDL			INSTRUMENT TRAINING FLIGHT

12. FUEL ON BOARD		13. ALTERNATE AIRPORT(S)	14. PILOT'S NAME, ADDRESS & TELEPHONE NUMBER & AIRCRAFT HOME BASE	15. NUMBER ABOARD
HOURS	MINUTES			
		N/A	17. DESTINATION CONTACT/TELEPHONE (OPTIONAL)	2

16. COLOR OF AIRCRAFT	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.
BROWN/TAN/WHITE	

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

AIRCRAFT INFORMATION

MAKE Cessna MODEL 172

N 2142S Vso 33

AIRCRAFT EQUIPMENT/STATUS**

**NOTE: X= OPERATIVE INOP= INOPERATIVE N/A= NOT APPLICABLE
TRANSPONDER: X (MODE C) X ILS: (LOCALIZER) X (GLIDE SLOPE) X
VOR NO. 1 X (NO. 2) X ADF: X RNAV: N/A
VERTICAL PATH COMPUTER: N/A DME: X
MARKER BEACON: X (AUDIO) INOP (VISUAL) X

FIGURE 69.—Flight Plan and Aircraft Information.

FLIGHT LOG

GREENWOOD LAKE (4N1) TO BRADLEY INTL. (BDL)

CHECK POINTS		ROUTE	COURSE	WIND	SPEED-KTS		DIST	TIME		FUEL	
FROM	TO	ALTITUDE		TEMP	TAS	GS	NM	LEG	TOT	LEG	TOT
		DIRECT									
4N1	SHAFF	CLIMB	350°					:08:0			
		V213									
	HELON	5000	029°		128						
		V58									
	IGN	5000	102°								
		JUDDS2									
			112°								
		JUDDS2									
	JUDDS		100°								
		JUDDS2									
	BRISS		057°								
APPROACH & LANDING								:12:0			
	BDL INTL										

OTHER DATA:
NOTE: MAG. VAR. 14° W.

FLIGHT SUMMARY

TIME	FUEL (LB)	
		EN ROUTE
		RESERVE
		MISSED APPR.
		TOTAL

FIGURE 70.—Flight Planning Log.

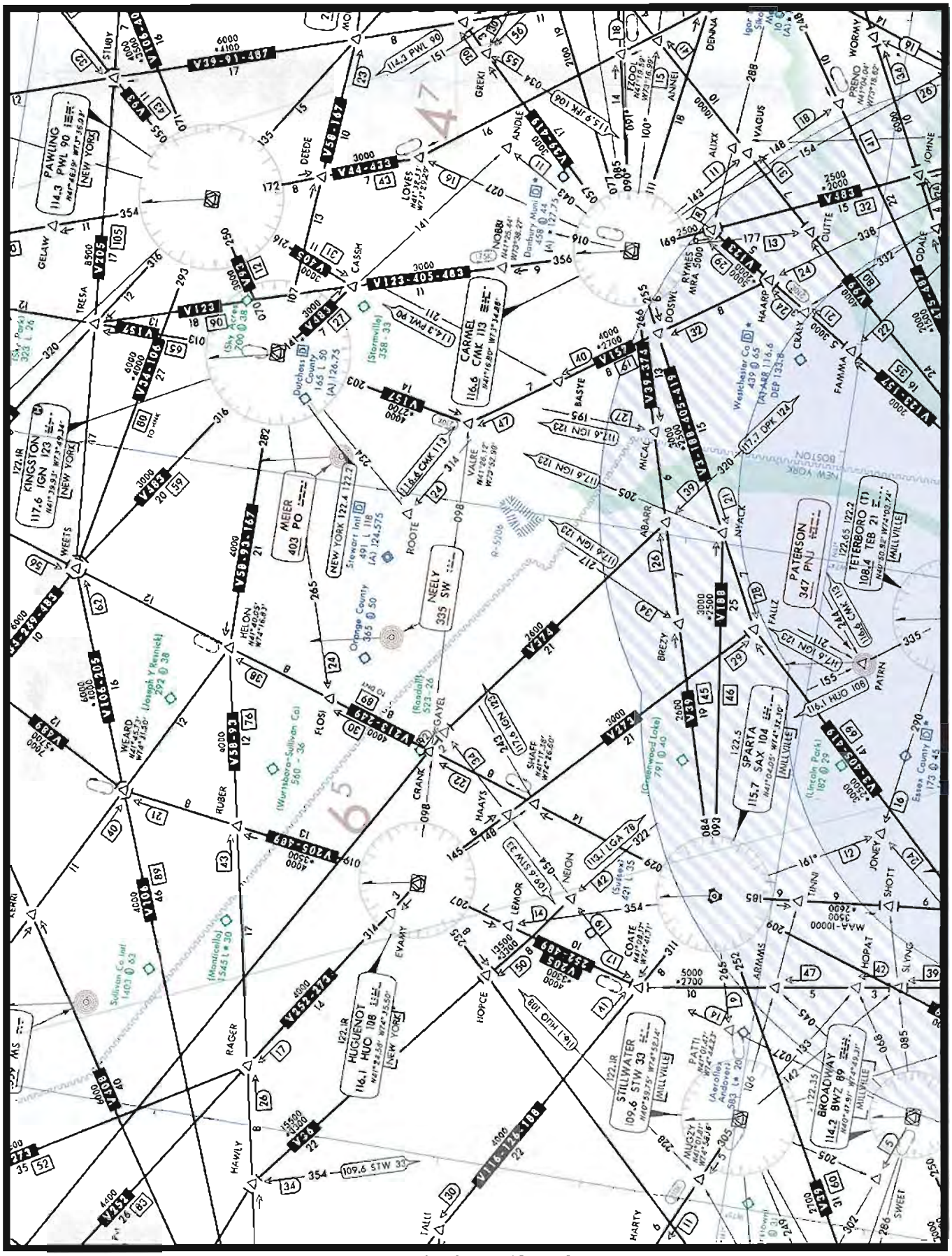


FIGURE 71.—En Route Chart Segment.

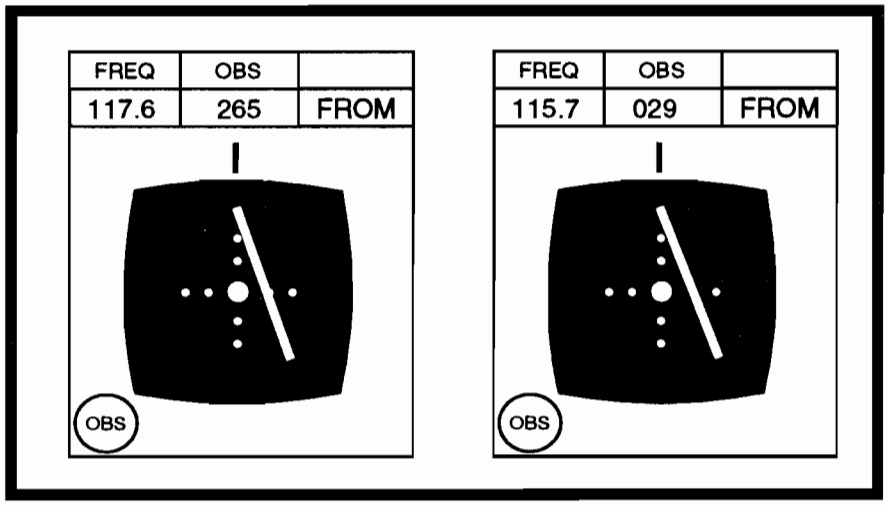
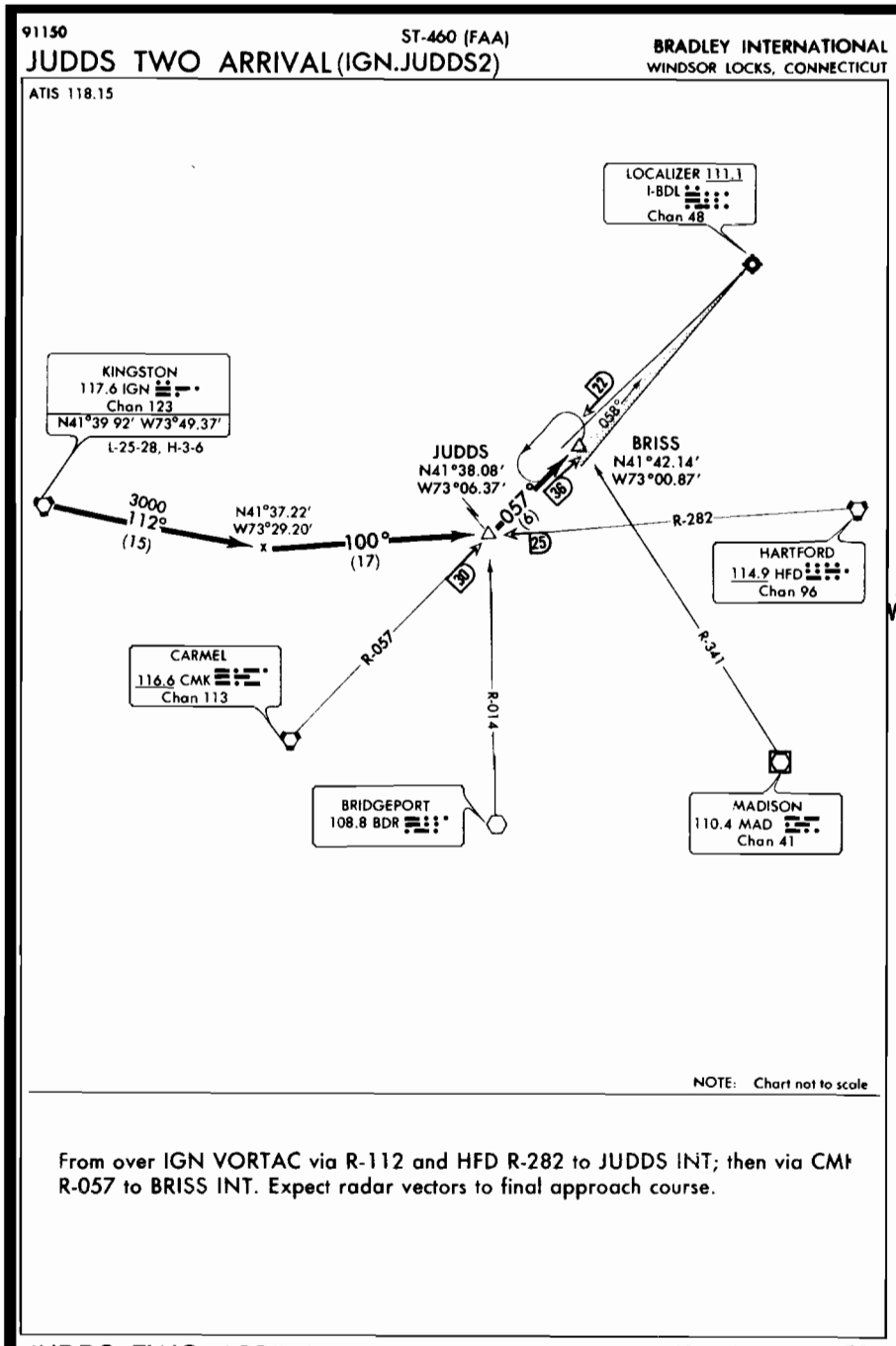


FIGURE 71A.—CDI and OBS Indicators.



CONNECTICUT

WINDSOR LOCKS

BRADLEY INTL (BDL) 3 W UTC-5(-4DT) 41°56'20"N 72°41'01"W — NEW YORK
174 B S4 **FUEL** 100LL, JET A OX 1, 2, 3, 4 TPA—See Remarks — H-3D, 6J, L-25C, 28I
LRA ARFF Index D — IAP
RWY 06-24: H9502X200 (ASPH-GRVD) S-200, D-200, DT-350,DDT-710 HIRL CL
RWY 06: ALSF2 TDZ. Trees. **RWY 24:** MALSR. VASI(V4L)—GA 3.0°TCH 56'.
RWY 15-33: H6846X200 (ASPH) S-200, D-200, DT-350 HIRL
RWY 15: REIL. VASI(V4L)—GA 3.5°TCH 59'. Trees. **RWY 33:** MALSF. VASI(V4R)—GA 3.0°TCH 59'. Trees
RWY 01-19: H5141X100 (ASPH) S-60, D-190, DT-328 MIRL
RWY 01: Building. **RWY 19:** Trees.
AIRPORT REMARKS: Attended continuously. Rwy 01-19 restricted to ldg and tkf with maximum tkf gross weight of 73,000 pounds. This restriction does not apply to acft emergency. Numerous birds frequently on or in vicinity or arpt. Portions of taxiway Alpha not visible from tower. TPA—1174(1000) light acft, 1874(1700) heavy acft. Landing fee for business, corporate and revenue producing aircraft. 24 hours ARFF level D svc avbl. 24 hours PPR for unscheduled air carrier ops with more than 30 passenger seats call arpt manager 203-627-3001/3008. This does not include delayed regularly schedule air carrier ops or diversions. Rwy 15 REIL out of svc indefinitely. Flight Notification Service (ADCUS) available. NOTE: See SPECIAL NOTICE—Simultaneous Operations on Intersecting Runways.
WEATHER DATA SOURCES: LLWAS.
COMMUNICATIONS: ATIS 118.15 **UNICOM** 122.95
BRIDGEPORT FSS (BDR) TF 1-800-WX-BRIEF. NOTAM FILE BDL.
WINDSOR LOCKS RCO 122.3 (BRIDGEPORT FSS)
Ⓡ **BRADLEY APP CON** 125.8 (within 20 miles)
Ⓡ **BRADLEY DEP CON** 121.05 (South) 125.35 (North and West) 123.95 (Northeast)
TOWER 120.3 **GND CON** 121.9 **CLNC DEL** 121.75
ARSA ctc **APP CON**
RADIO AIDS TO NAVIGATION: NOTAM FILE BDL.
(T) **VORTACW** 109.0 BDL Chan 27 41°56'27"N 72°41'21"W at fld. 165/14W.
VOR portion unusable 090°-103° beyond 24 NM below 5000' 104°-170° beyond 10 NM below 6000'
260°-290° beyond 15 NM below 6000'.
DME portion unusable:
040°-085° beyond 13 NM below 2000'
130°-150° beyond 10 NM below 3000'
170°-195° beyond 14 NM below 3000'
250°-290° beyond 18 NM below 6000'
CHUPP NDB (LOM) 388 BD 41°52'38"N 72°46'00"W 058° 5.2 NM to fld.
ILS/DME 111.1 I-BDL Chan 48 Rwy 06. LOM CHUPP NDB.
ILS/DME 108.55 I-IKX Chan 22Y Rwy 33
ILS/DME 111.1 I-MYQ Chan 48 Rwy 24

FIGURE 72.— JUDDS TWO ARRIVAL.

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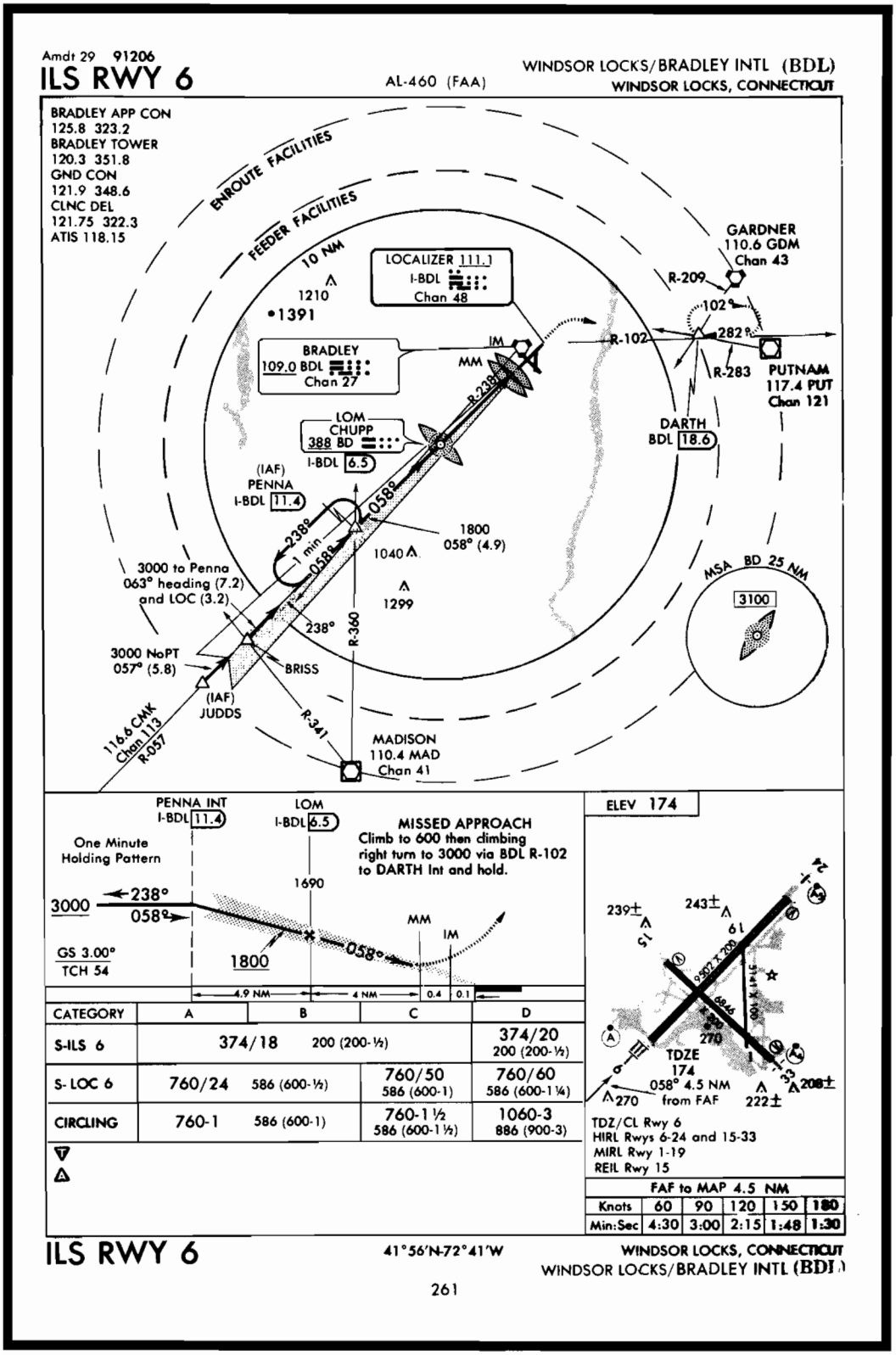

FIGURE 73.—ILS RWY 6 (BDL).

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Form Approved: OMB No. 2120-0034

U.S. DEPARTMENT OF TRANSPORTATION FEDERAL AVIATION ADMINISTRATION **FLIGHT PLAN**	(FAA USE ONLY) ☐ PILOT BRIEFING ☐ VNR ☐ STOPOVER	TIME STARTED	SPECIALIST INITIALS

1. TYPE	2. AIRCRAFT IDENTIFICATION	3. AIRCRAFT TYPE/ SPECIAL EQUIPMENT	4. TRUE AIRSPEED	5. DEPARTURE POINT	6. DEPARTURE TIME		7. CRUISING ALTITUDE
					PROPOSED (Z)	ACTUAL (Z)	
☐ VFR							
X IFR							
☐ DVFR	N242T	C310/	160 KTS	HLN			11000

8. ROUTE OF FLIGHT
STAKK2, V365 BZN, V86

9. DESTINATION (Name of airport and city)	10. EST. TIME ENROUTE		11. REMARKS
	HOURS	MINUTES	
LOGAN INTL. AIRPORT (BIL)			

12. FUEL ON BOARD		13. ALTERNATE AIRPORT(S)	14. PILOT'S NAME, ADDRESS & TELEPHONE NUMBER & AIRCRAFT HOME BASE	15. NUMBER ABOARD
HOURS	MINUTES			
		N/A	17. DESTINATION CONTACT/TELEPHONE (OPTIONAL)	2

16. COLOR OF AIRCRAFT	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.
RED/BLACK/WHITE	

FAA Form 7233-1 (8-82)

CLOSE VFR FLIGHT PLAN WITH _____ FSS ON ARRIVAL

AIRCRAFT INFORMATION

MAKE Cessna MODEL 310R

N 242T Vso 72

AIRCRAFT EQUIPMENT/STATUS**

**NOTE: X= OPERATIVE INOP= INOPERATIVE N/A= NOT APPLICABLE
TRANSPONDER: X (MODE C) X ILS: (LOCALIZER) X (GLIDE SLOPE) INOP
VOR NO. 1 X (NO. 2) X ADF: X RNAV: N/A
VERTICAL PATH COMPUTER: N/A DME: X
MARKER BEACON: X (AUDIO) X (VISUAL) X

FIGURE 74.—Flight Plan and Aircraft Information.

FLIGHT LOG

HELENA REGIONAL AIRPORT TO BILLINGS LOGAN INTL.

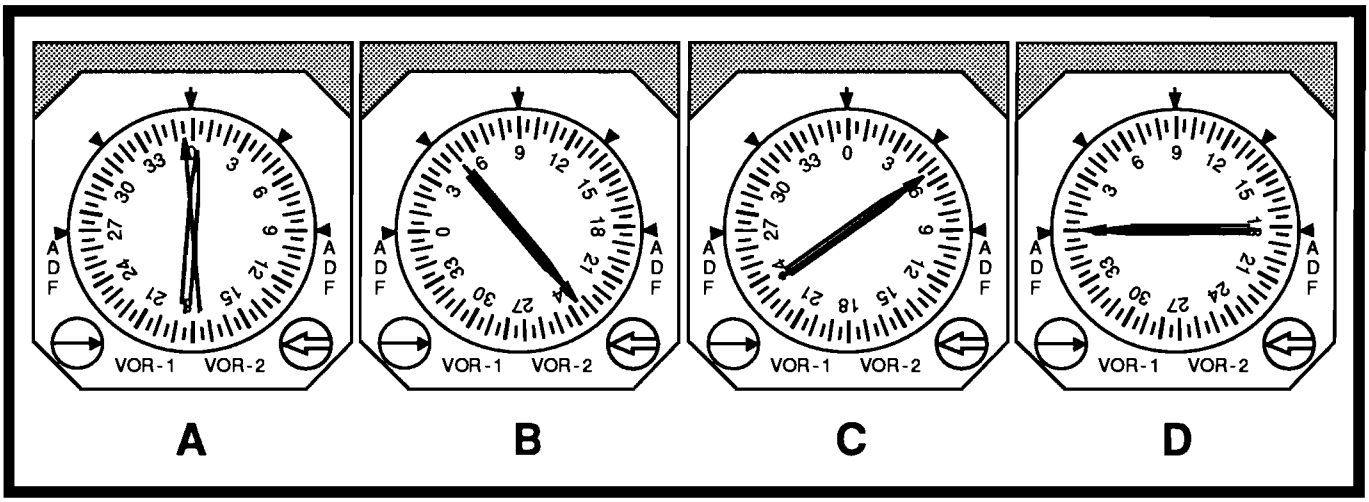
CHECK POINTS FROM	CHECK POINTS TO	ROUTE / ALTITUDE	COURSE	WIND / TEMP	SPEED-KTS TAS	SPEED-KTS GS	DIST NM	TIME LEG	TIME TOT	FUEL LEG	FUEL TOT
		STAKK2									
HLN	VESTS	CLIMB	103°					:15:0			
		V365									
	BZN	11000	140°		160						
		V86	110°								
	LVM	11000	/ 063°								
		V86									
	REEPO	11000	067°								
		V86									
	BIL		069°								
APPROACH & LANDING								:15:0			
	LOGAN INTL										

OTHER DATA:
NOTE: MAG. VAR. 18° E.

FLIGHT SUMMARY

TIME	FUEL (LB)	
		EN ROUTE
		RESERVE
		MISSED APPR.
		TOTAL

FIGURE 75.—Flight Planning Log.



HELENA REGIONAL (HLN) 2 NE UTC-7(-6DT) 46°36'25"N 111°58'55"W GREAT FALLS
3873 B S4 FUEL 100LL, JET A OX 1,3 AOE ARFF Index B H-1C, L-9B
RWY 09-27: H9000X150 (ASPH-PFC) S-100, D-160, DT-250 HIRL IAP
RWY 09: VASI(V4L)—GA 3.0°TCH 45'. Ground. RWY 27: MALSR. VASI(V4L)—GA 3.0°TCH 55'. Rgt tfc.
RWY 05-23: H4599X75 (ASPH-PFC) S-21, D-30
RWY 05: Road. RWY 23: Fence. Rgt tfc.
RWY 16-34: H2979X75 (ASPH) S-21, D-30 MIRL
RWY 34: Ground. Rgt tfc.
AIRPORT REMARKS: Attended 1200-0800Z‡. East 2400' Taxiway C and first 900' Rwy 27 not visible from tower. Prior permission for unscheduled FAR 121 operations, Call 406-442-2821. AOE, 1 hour prior notice required, phone 449-1569 1500-0000Z‡, 0000-1500Z‡ 449-1024. Twys A;B; high speed and C (between A and D) not available for air carrier use by acft with greater than 30 passenger seats. Rwy 16-34 and Rwy 05-23 (except between Rwy 09-27 and Twy D) not available for air carrier use by acft with greater than 30 passenger seats. When tower closed, ACTIVATE HIRL Rwy 09-27 and MALSR Rwy 27—CTAF, when twr closed MIRL Rwy 16-34 are off. Ldg fee for all acft over 12,500 lbs. NOTE: See SPECIAL NOTICE—Simultaneous Operations on Intersecting Runways.
COMMUNICATIONS: CTAF 118.3 ATIS 120.4 (Mon-Fri 1300-0700Z‡, Sat-Sun 1300-0500Z‡)
UNICOM 122.95
GREAT FALLS FSS (GTF) TF 1-800-WX-BRIEF. NOTAM FILE HLN.
RCO 122.2 122.1R 117.7T (GREAT FALLS FSS)
APP/DEP CON 119.5 (Mon-Fri 1300-0700Z‡, Sat-Sun 1300-0500Z‡)
SALT LAKE CENTER APP/DEP CON 133.4 (Mon-Fri 0700-1300Z‡, Sat-Sun 0500-1300Z‡)
TOWER 118.3 (Mon-Fri 1300-0700Z‡, Sat-Sun 1300-0500Z‡) GND CON 121.9
RADIO AIDS TO NAVIGATION: NOTAM FILE HLN.
(H) VORTAC 117.7 HLN Chan 124 46°36'25"N 111°57'10"W 254° 1.2 NM to fld. 3810/16E.
VORTAC unusable:
006°-090° beyond 25 NM below 11,000' 091°-120° beyond 20 NM below 16,000'
121°-240° beyond 25 NM below 10,000' 355°-006° beyond 15 NM below 17,500'
241°-320° beyond 25 NM below 10,000'
CAPITOL NDB (HW) 317 CVP 46°36'24"N 111°56'11"W 254° 1.9 NM to fld.
NDB unmonitored when tower closed.
HAUSER NDB (MHW) 386 HAU 46°34'08"N 111°45'26"W 268° 9.6 NM to fld.
ILS 110.1 I-HLN Rwy 27 ILS unmonitored when tower closed.

VOR RECEIVER CHECK

Facility Name (Arpt Name)	Freq/Ident	Type Check Pt. Gnd. AB/ALT	Azimuth from Fac. Mag	Dist. from Fac. N.M.	Check Point Description
Helena (Helena Regional)	117.7/HLN	G	237	0.7	On Twy E midway between Twy C and Rwy 27.
Kalispell (Glacier Park Intl)	108.4/FCA	A/4000	316	6.4	Over apch end Rwy 29.
Lewistown (Lewistown Muni)	112.0/LWT	A/5200	072	5.4	Over apch end Rwy 07.
Livingston	116.1/LVM	A/6500	234	5.5	Over northern most radio twr NE of city.
Miles City (Frank Wiley Field)	112.1/MLS	G	036	4.2	On twy leading to Rwy 30.
Missoula (Missoula Intl)	112.8/MSO	G	340	0.6	On edge of ramp in front of Admin Building.

FIGURE 76.— VOR Indications and Excerpts from Airport/Facility Directory (HLN).

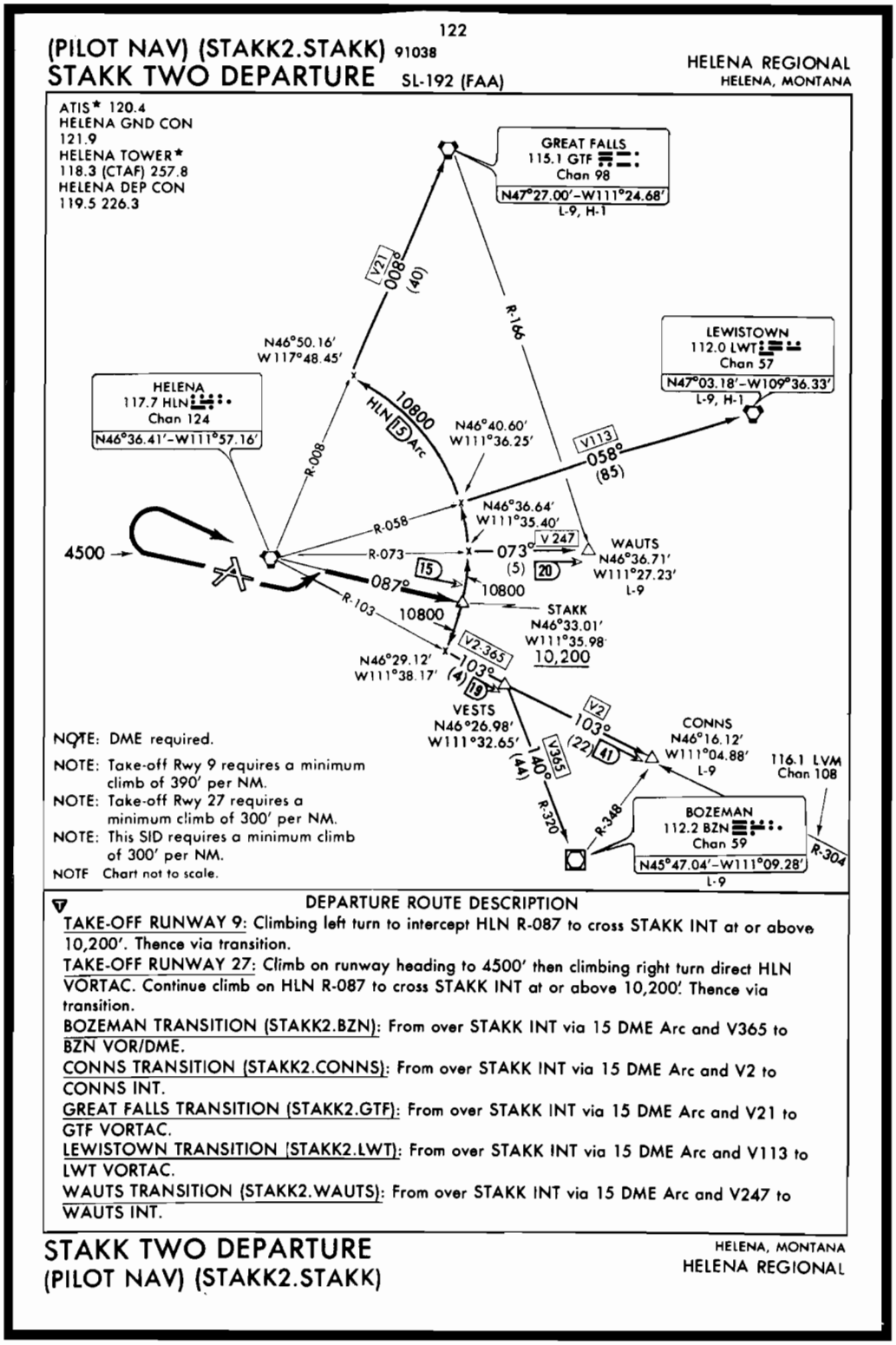


FIGURE 77.— STAKK TWO DEPARTURE.

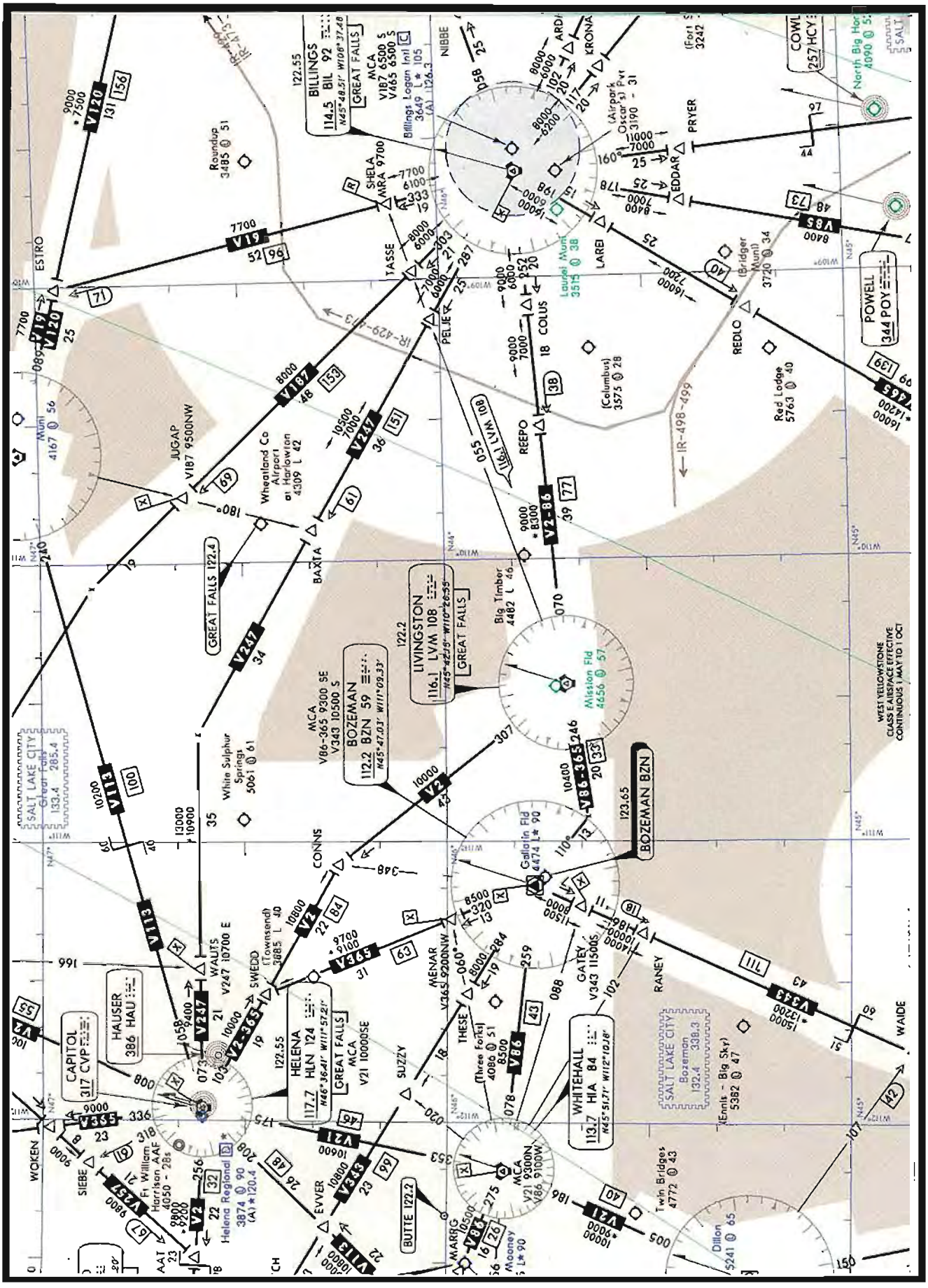


FIGURE 78.—En Route Chart Segment.

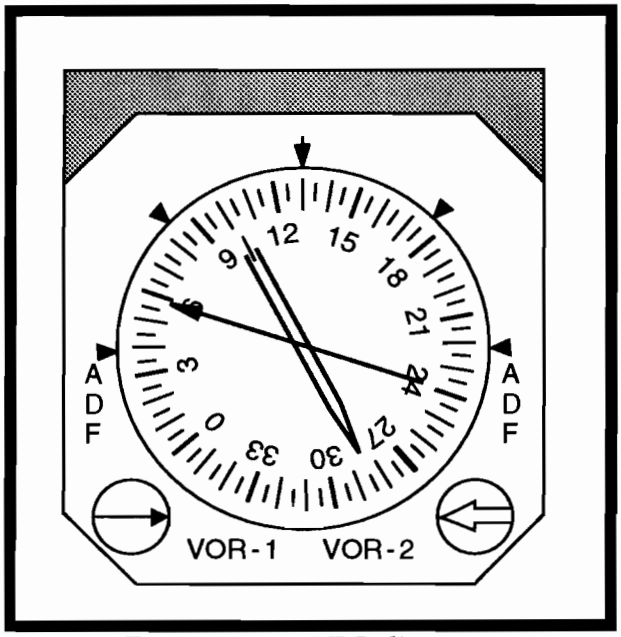
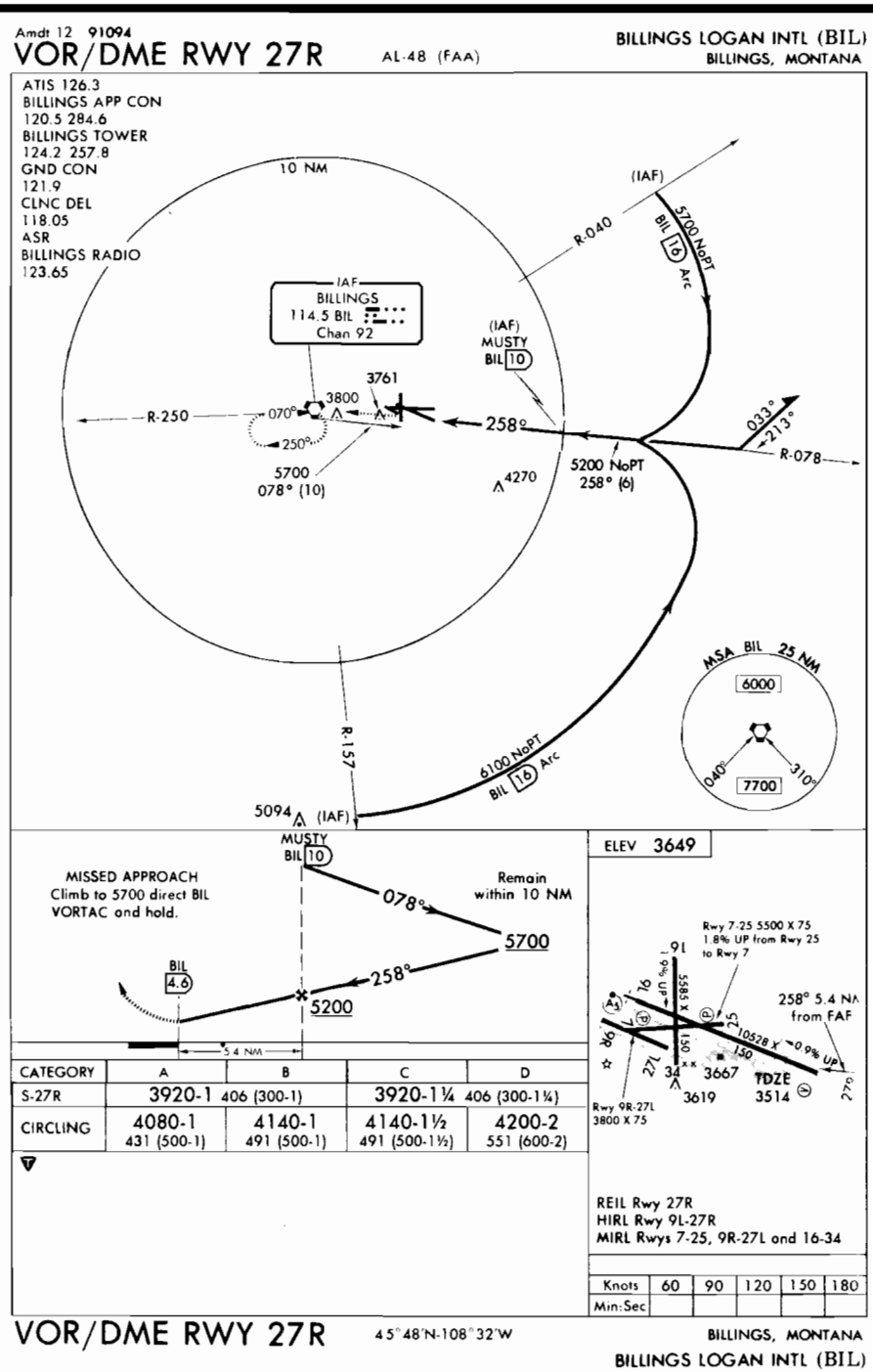


FIGURE 79.—RMI Indicator.



CATEGORY	A	B	C	D
S-27R	3920-1 406 (300-1)		3920-1¼ 406 (300-1¼)	
CIRCLING	4080-1 431 (500-1)	4140-1 491 (500-1)	4140-1½ 491 (500-1½)	4200-2 551 (600-2)

Knots	60	90	120	150	180
Min:Sec					

BILLINGS LOGAN INTL (BIL) 2 NW UTC-7(-6DT) 45°48'30"N 108°32'36"W BILLINGS
3649 B S4 FUEL 80, 100LL, JET A, MOGAS OX 1, 2, 3, 4 LRA ARFF Index C H-1C, L-9C
RWY 09L-27R: H10528X150 (ASPH-PFC) S-130, D-170, DT-285, DDT-555 for DC-10-40, IAP
DDT-710 for B747-100 HIRL 0.9% up NW
RWY 09L: MALSR. **RWY 27R:** REIL. VASI(V4L)—GA 2.75° TCH 50'. Ground.
RWY 16-34: H5585X150 (ASPH) S-55, D-70 MIRL 1.9% up S
RWY 34: Fence.
RWY 07-25: H5500X75 (ASPH-PFC) S-12 MIRL
RWY 07: PAPI(P4L)—GA 3.0° TCH 27'. Ground. **RWY 25:** PAPI(P4R)—GA 3.0° TCH 35'.
RWY 09R-27L: H3800X75 (ASPH-AFSC) S-12 MIRL
AIRPORT REMARKS: Attended continuously. 180° turns Rwy 09L-27R by acft over 25000 lbs prohibited. Taxiway E CLOSED to the airline apron. Rwy 09R-27L restricted to aircraft weighing 13,000 pounds maximum gross certificated landing weight or less. For MIRL Rwys 09R-27L, and 16-34, and 07-25 HIRL Rwy 09L-27R and MALSR Rwy 09L ctc twr or FSS. Flight Notification Service (ADCUS) available. NOTE: See SPECIAL NOTICE—Simultaneous Operations on Intersecting Runways.
WEATHER DATA SOURCES: LLWAS.
COMMUNICATIONS: **ATIS** 126.3 **UNICOM** 122.95
BILLINGS FSS (BIL) on arpt. 123.65 122.2 122.1R LD 406-259-4545. NOTAM FILE BIL.
Ⓡ**APP/DEP CON** 120.5 (South) 119.2 (North) 114.5T
TOWER 124.2 **GND CON** 121.9 **CLNC DEL** 118.05 **PRE TAXI CLNC** 121.9
STAGE III SVC ctc APP CON 20 NM out
RADIO AIDS TO NAVIGATION: NOTAM FILE BIL.
(H) VORTAC 114.5 **BIL** Chan 92 45°48'31"N 108°37'26"W 073° 3.4 NM to fld. 3800/17E.
LOCKWOOD NDB (HW) 400 **LKO** 45°46'03"N 108°23'30"W 274° 6.8 NM to fld.
SAIGE NDB (LOM) 251 **BI** 45°51'08"N 108°41'37"W 096° 6.8 NM to fld.
ILS 110.3 I-BIL Rwy 09L LOM SAIGE NDB.

FIGURE 80.—VOR/DME RWY 27R and Airport/Facility Directory (BIL).

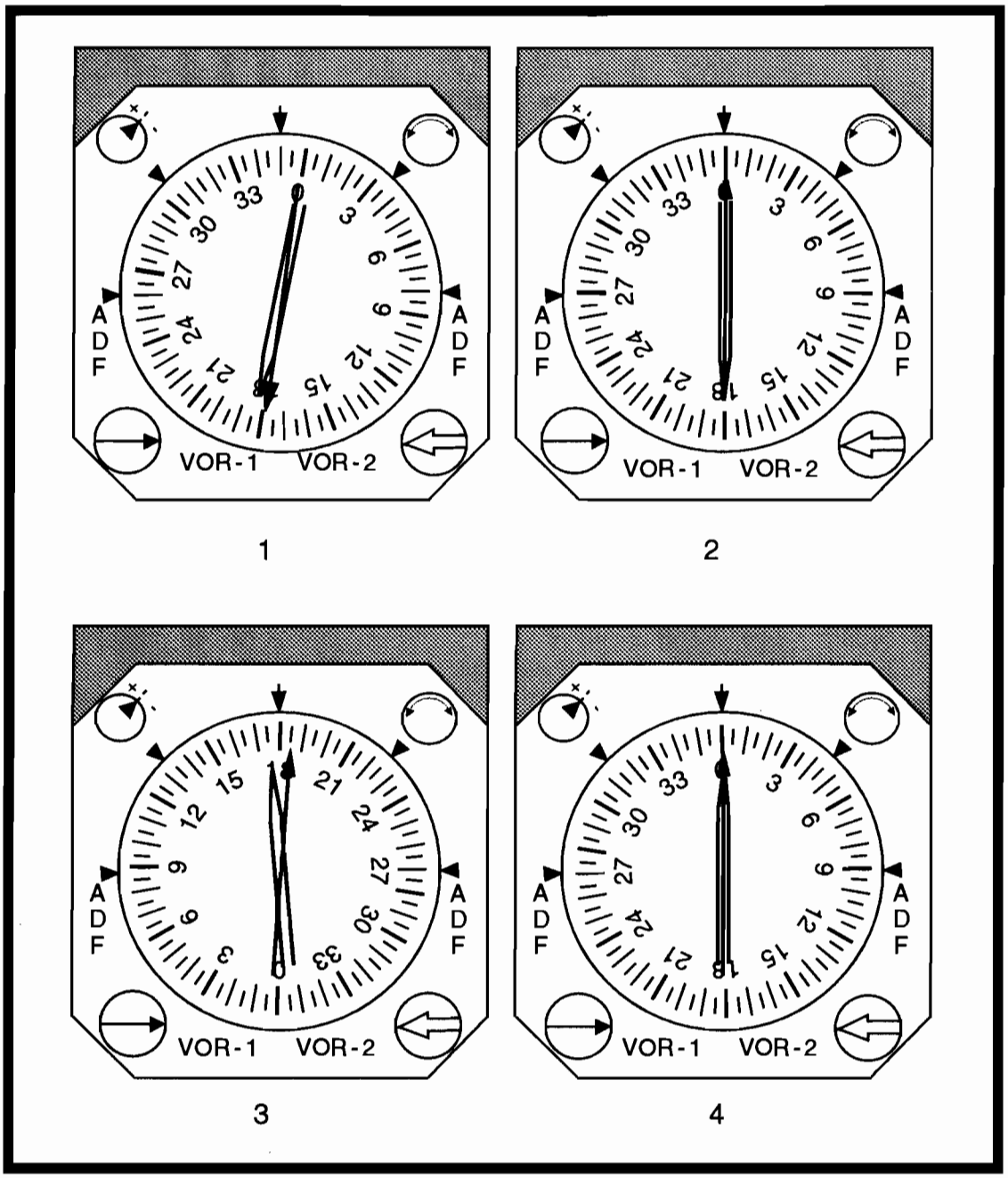


FIGURE 81.—Dual VOR System, VOT Check.

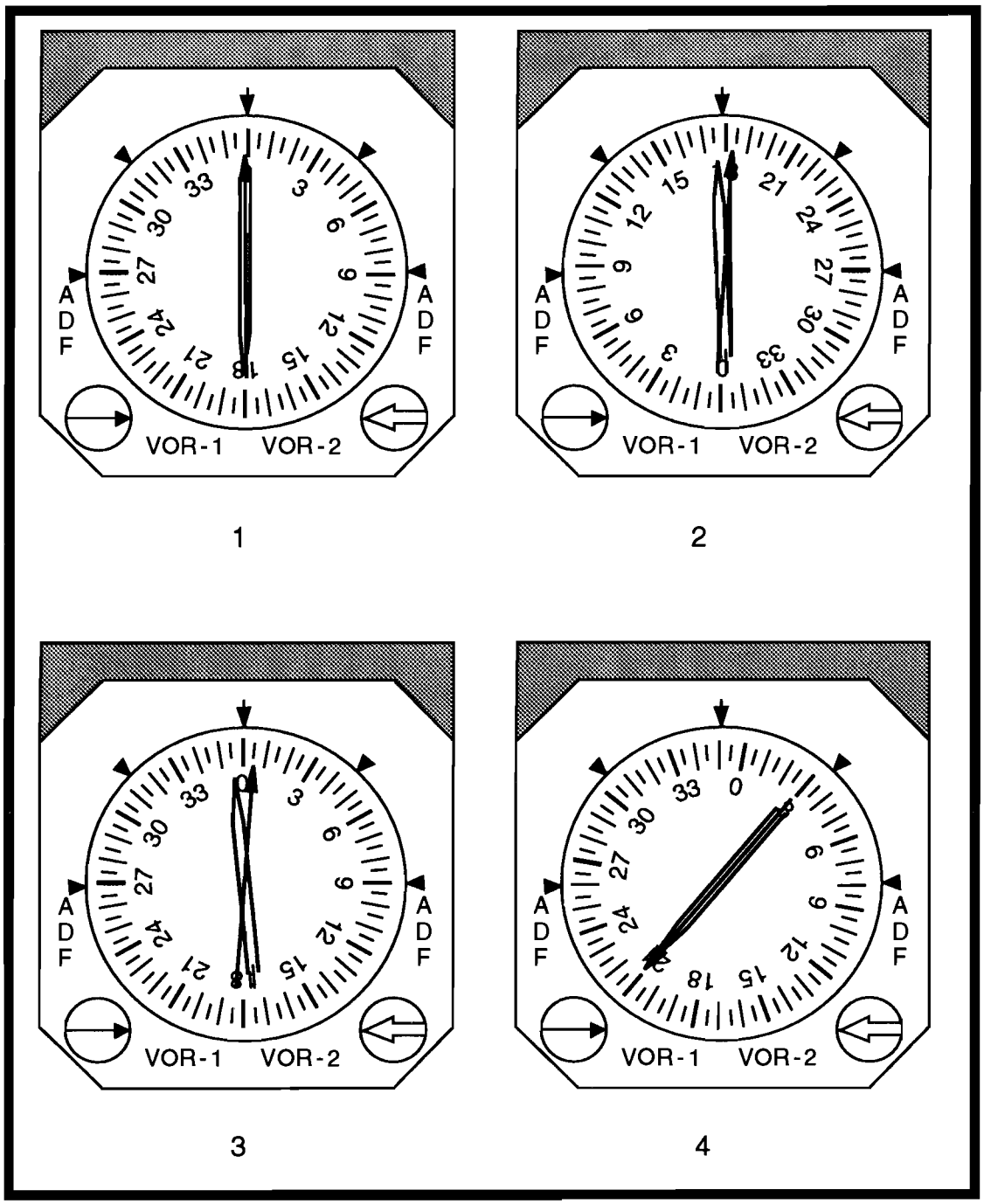


FIGURE 82.—Dual VOR System, Accuracy Check.

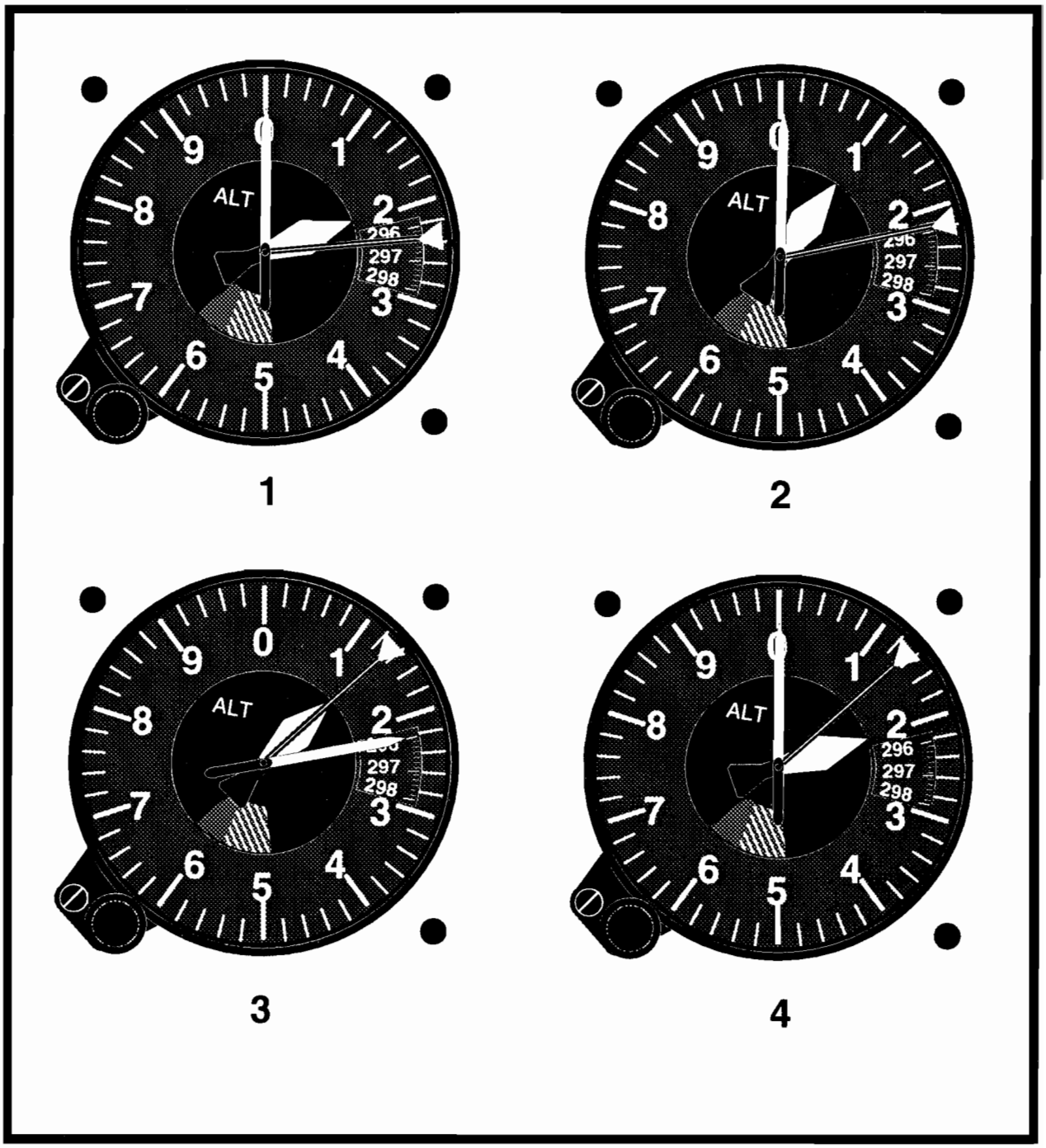


FIGURE 83.—Altimeter/12,000 Feet.

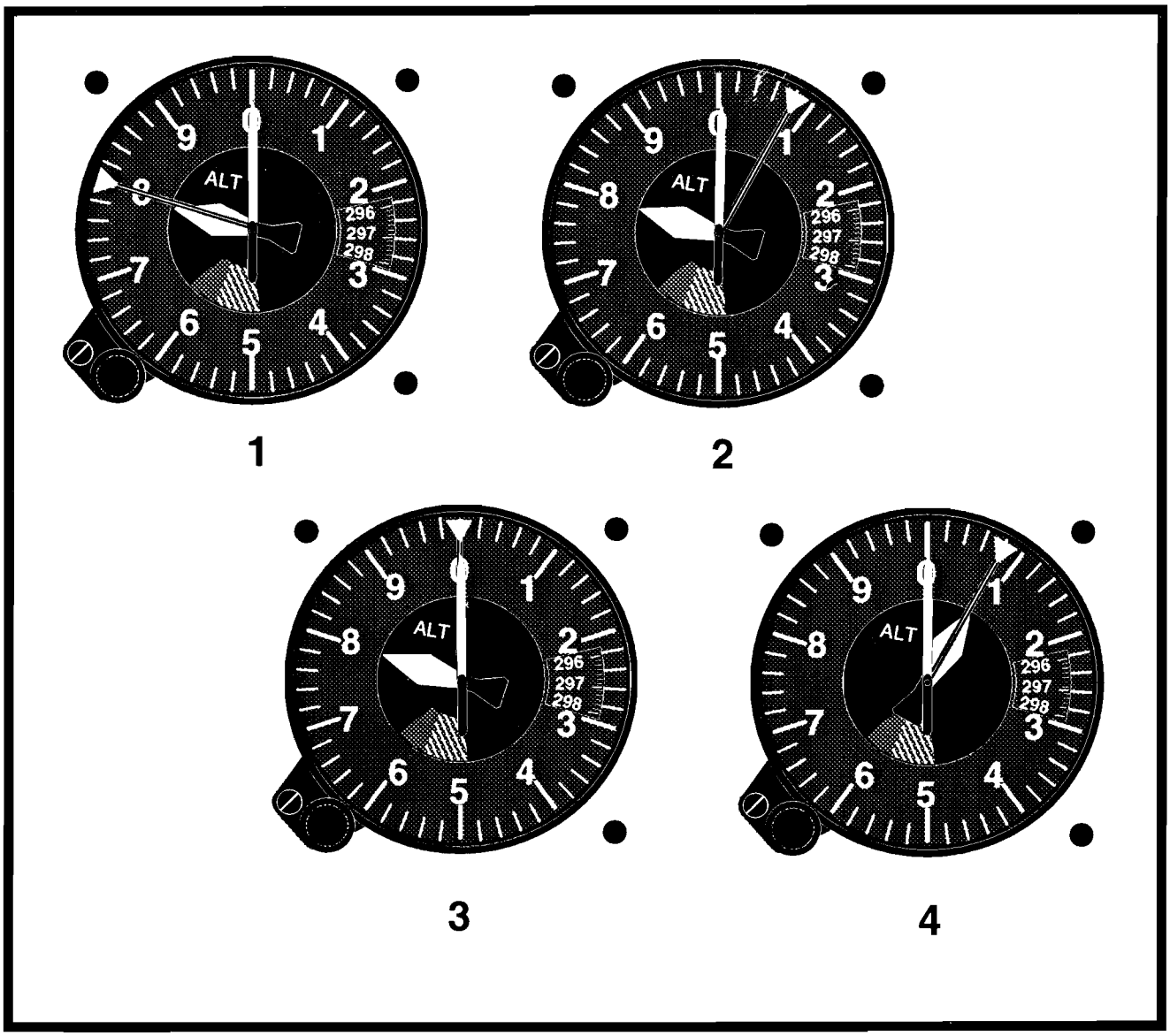


FIGURE 84.—Altimeter/8,000 Feet.

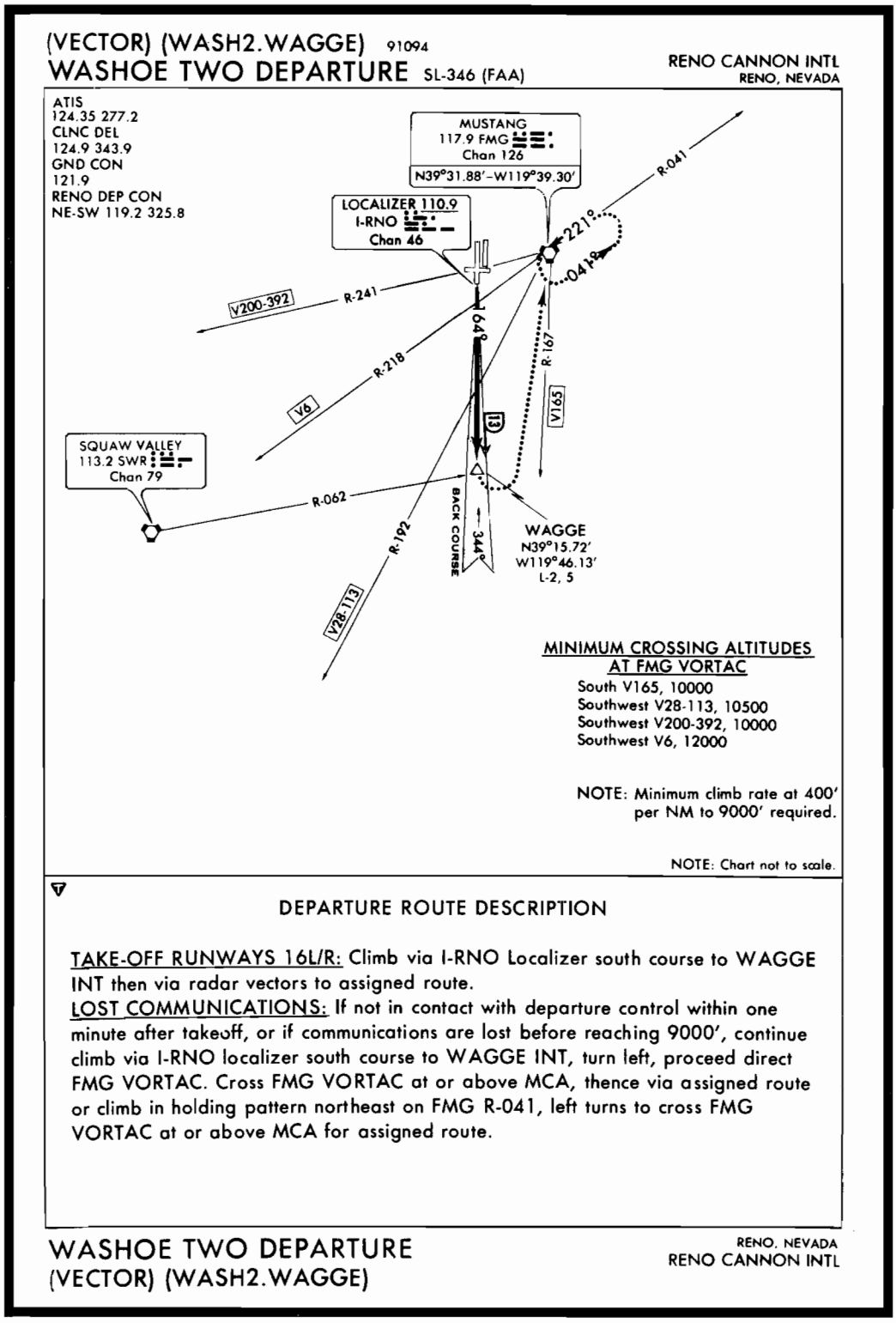


FIGURE 85.—WASHOE TWO DEPARTURE.

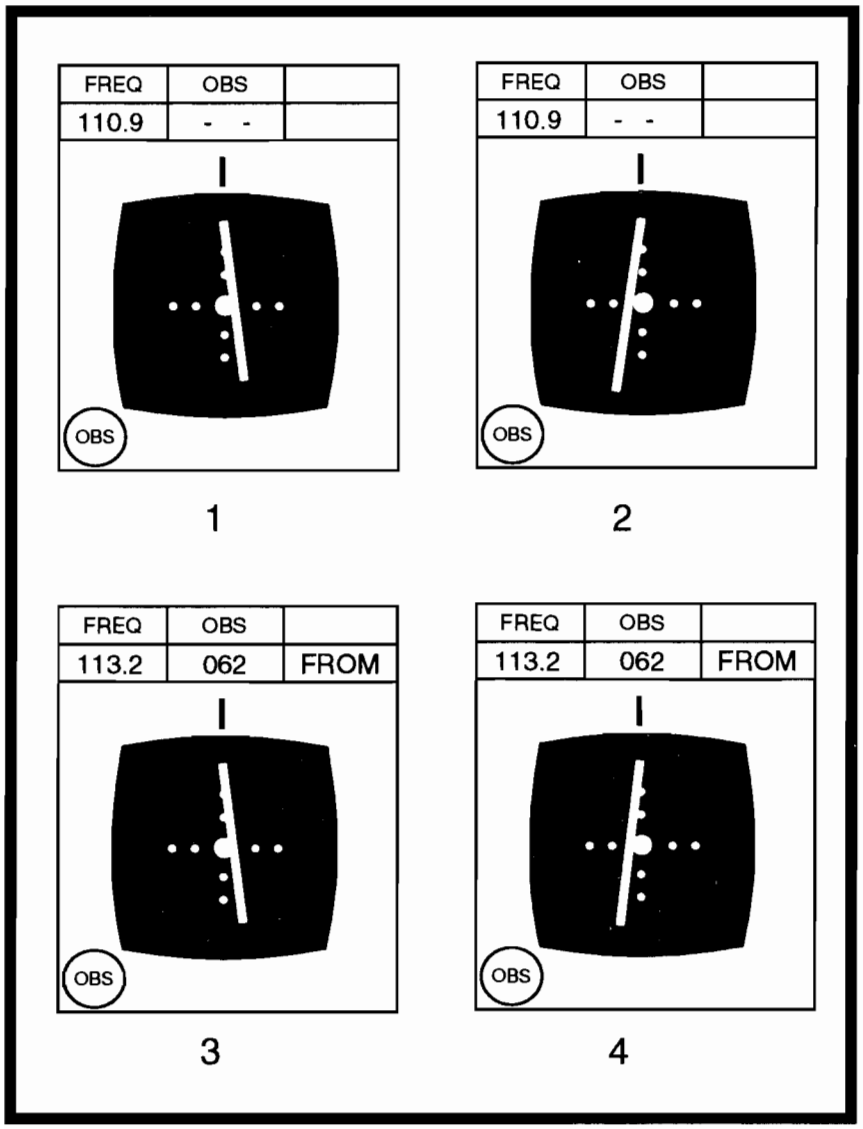


FIGURE 86.—CDI and OBS Indicators.

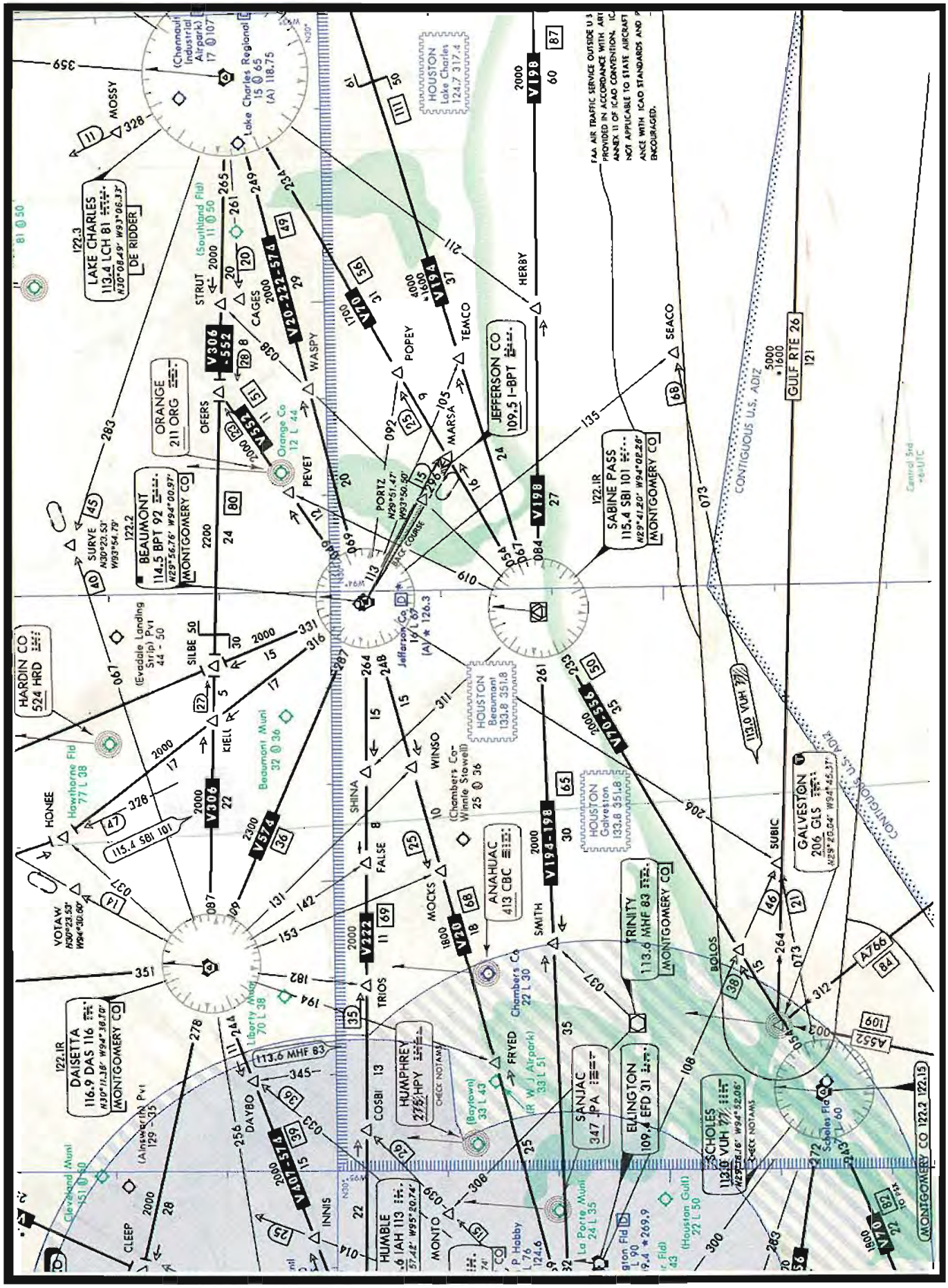


FIGURE 87.—En Route Chart Segment.

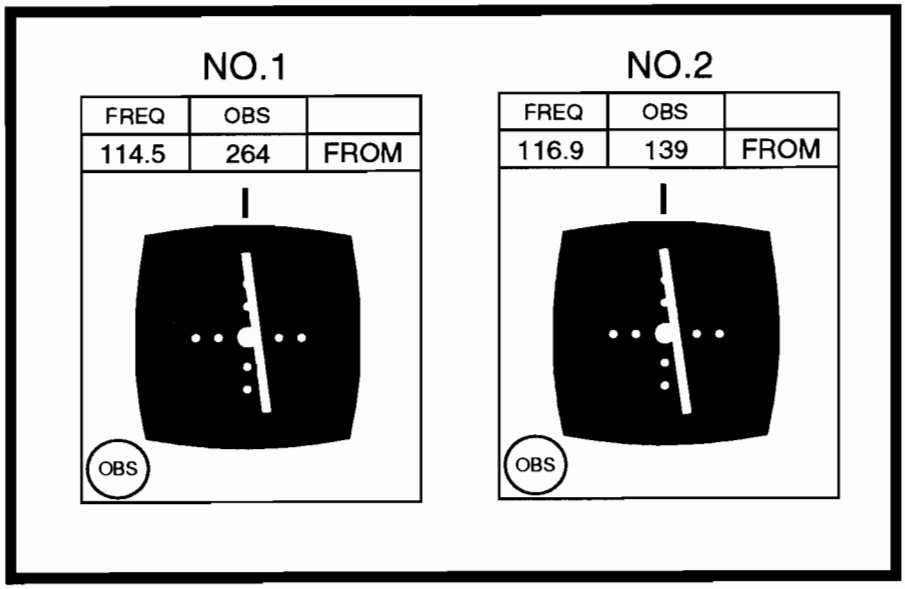


FIGURE 88.—CDI and OBS Indicators.

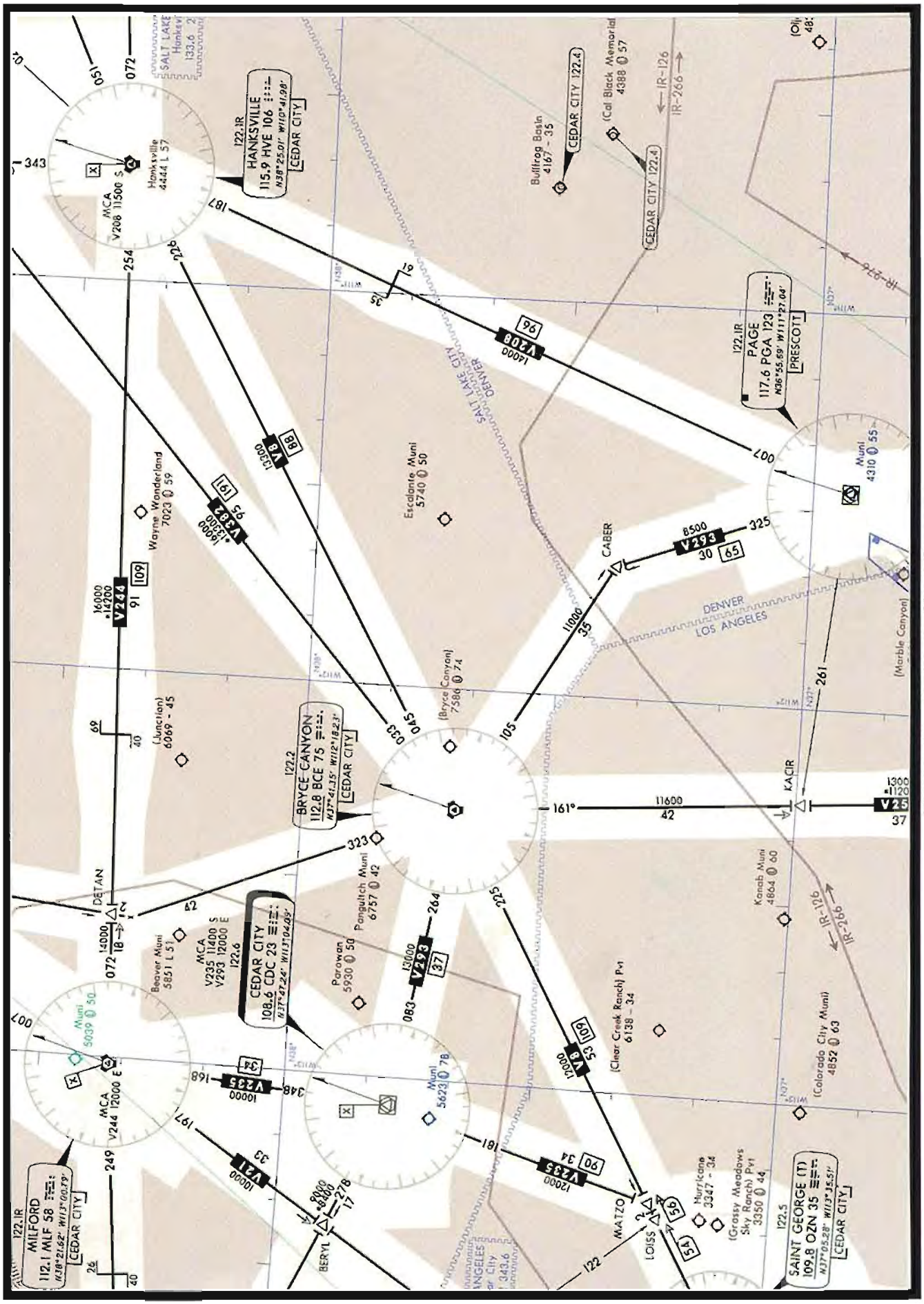


FIGURE 89.—En Route Chart Segment.

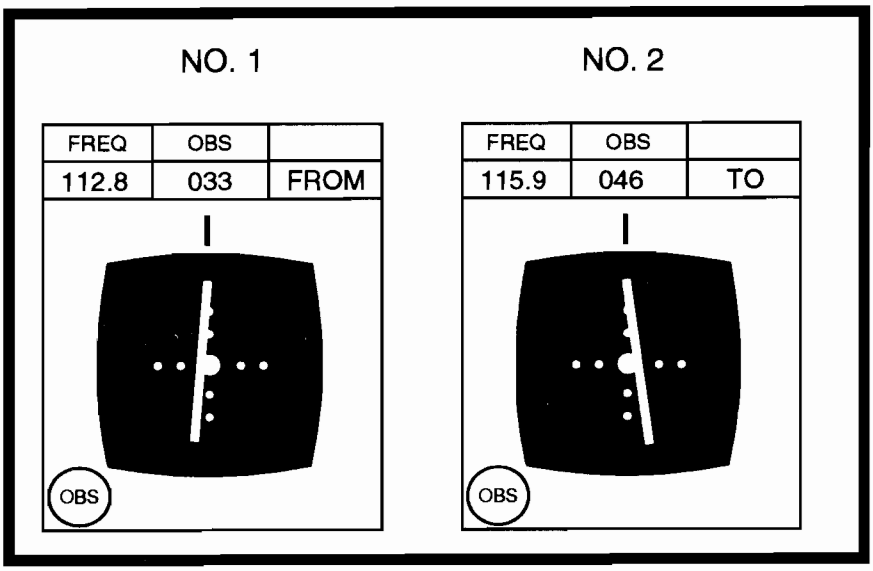


FIGURE 90.—CDI/OBS Indicators.

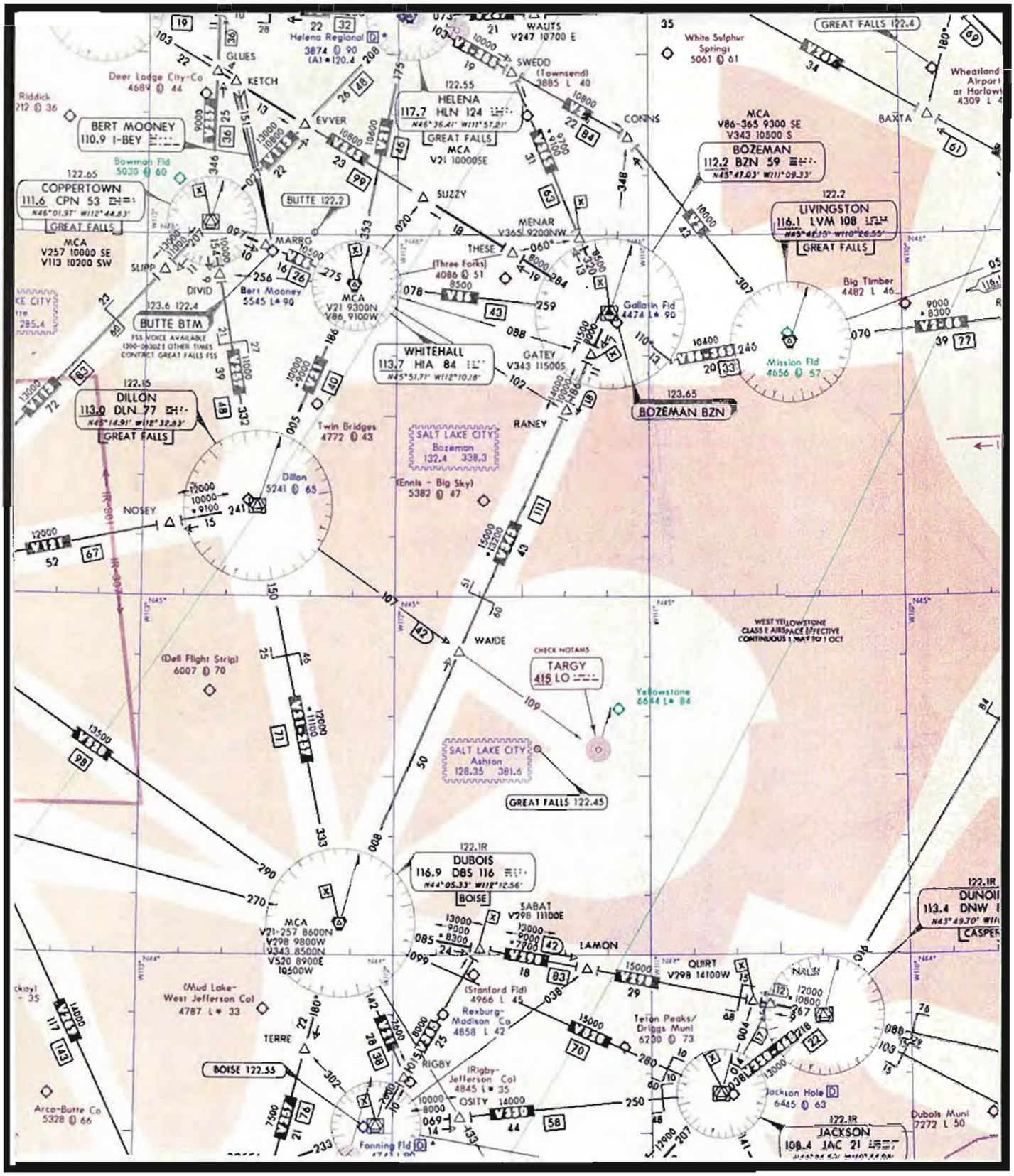


FIGURE 91.—En Route Chart Segment.

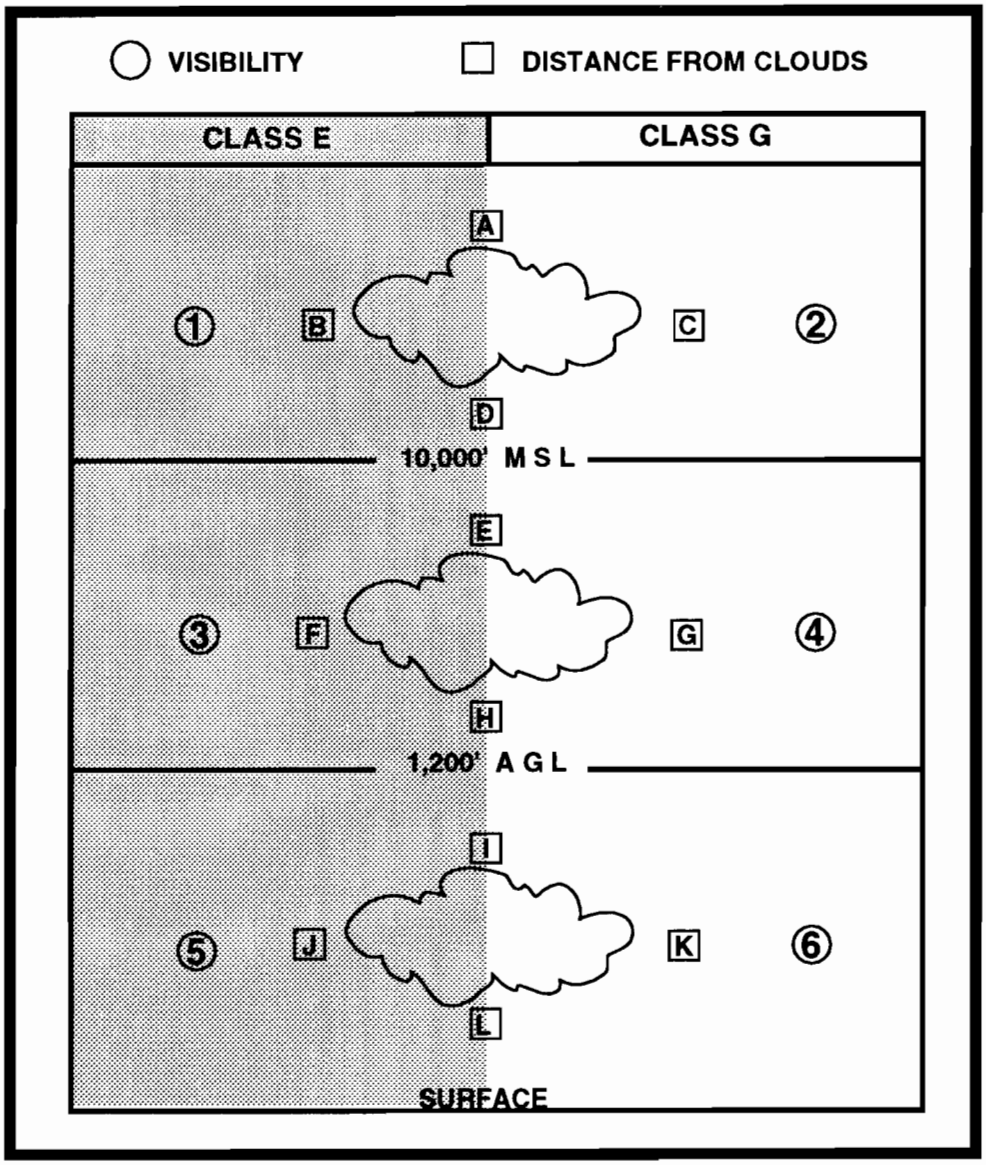


FIGURE 92.—Minimum In-Flight Visibility and Distance from Clouds.

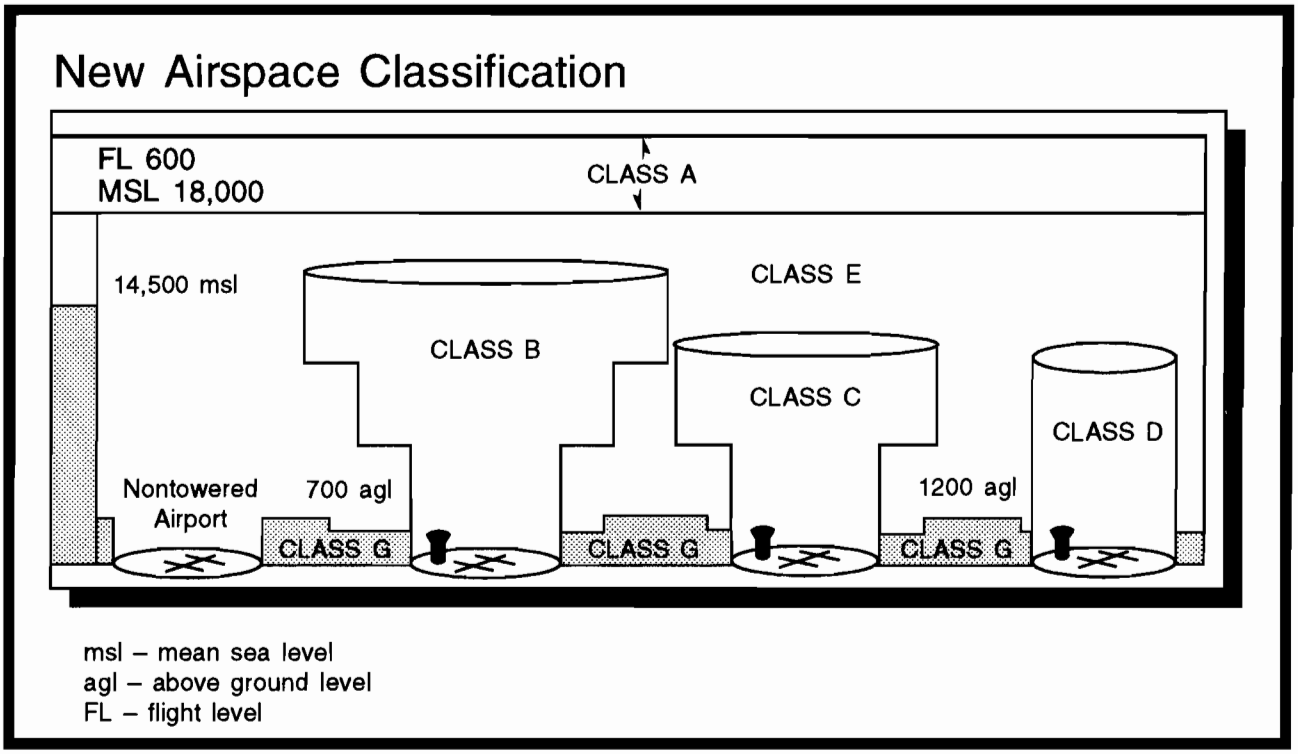


FIGURE 93.—New Airspace Classification.

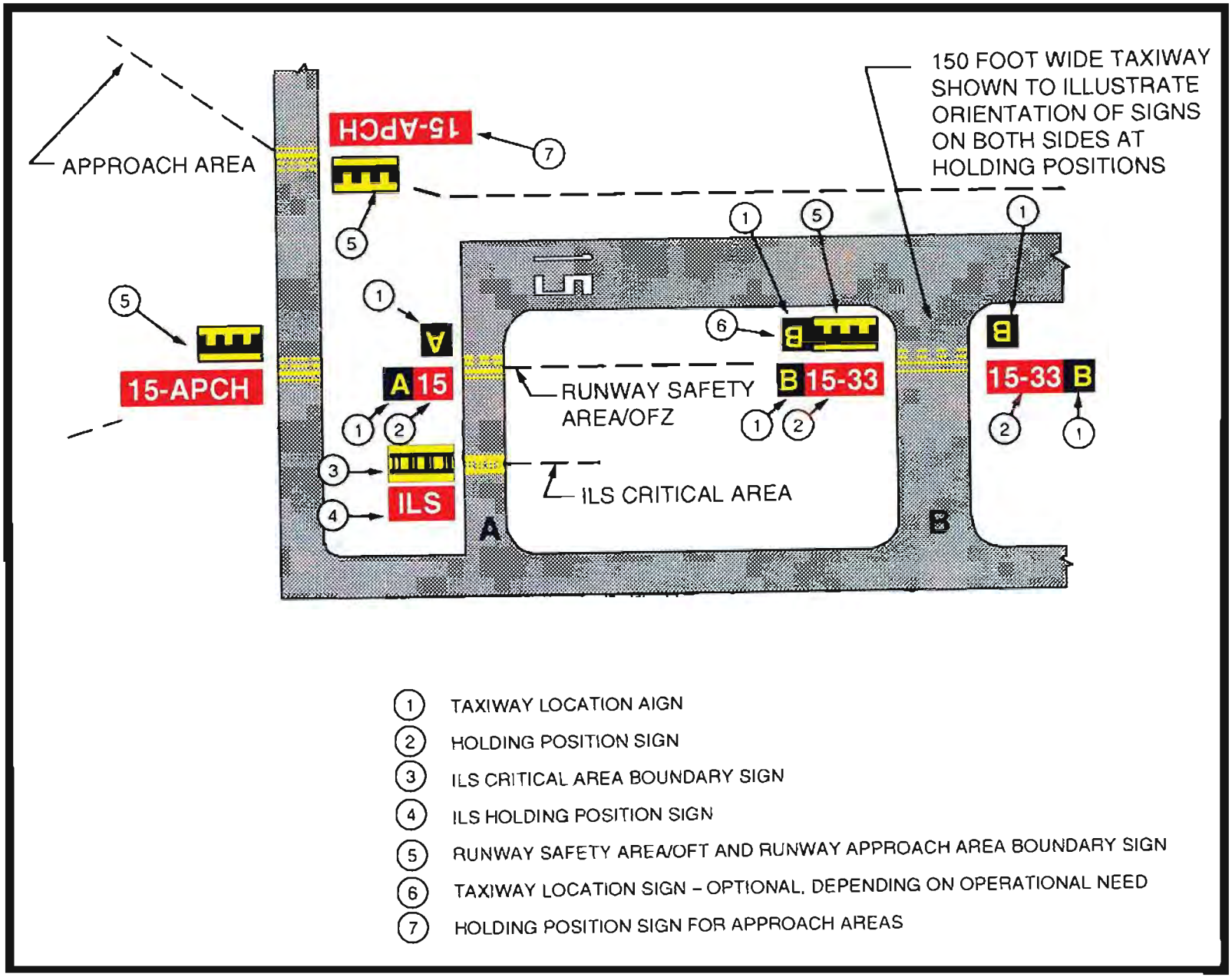


FIGURE 94.—Application Examples for Holding Positions.

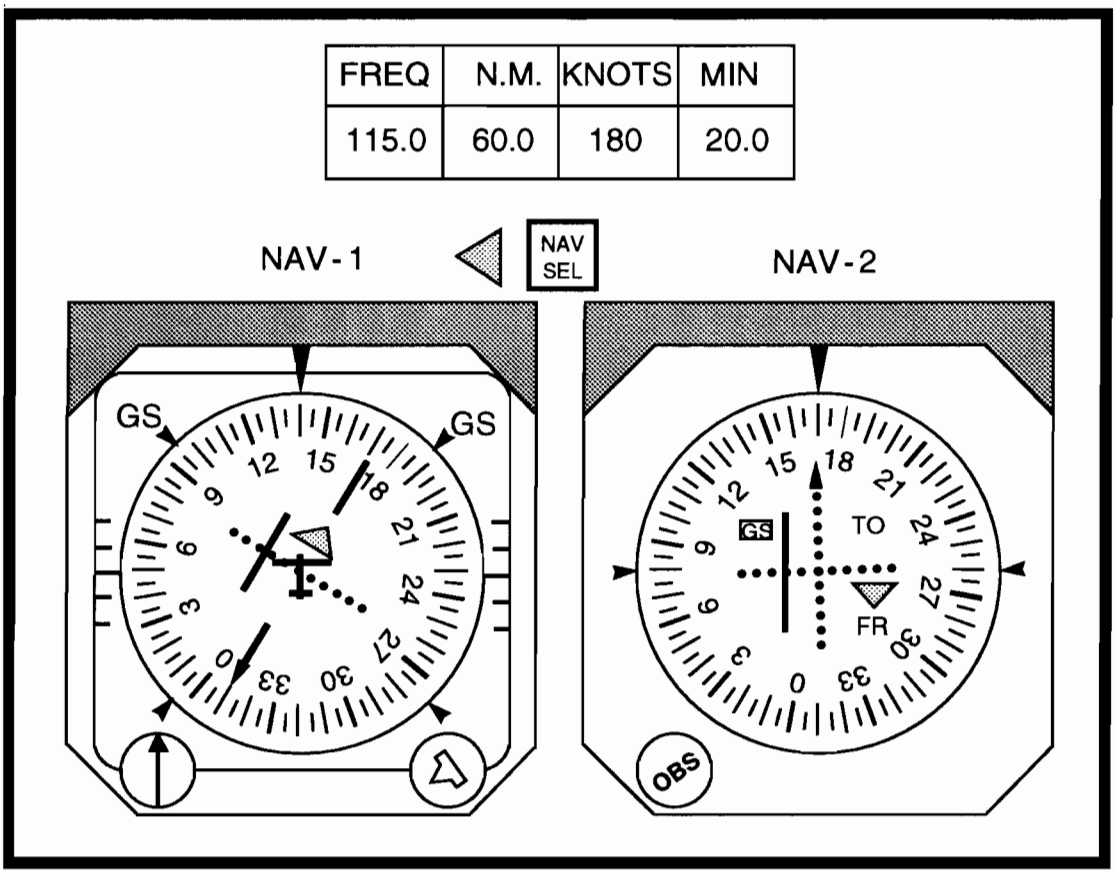


FIGURE 95.—No. 1 and No. 2 NAV Presentation.

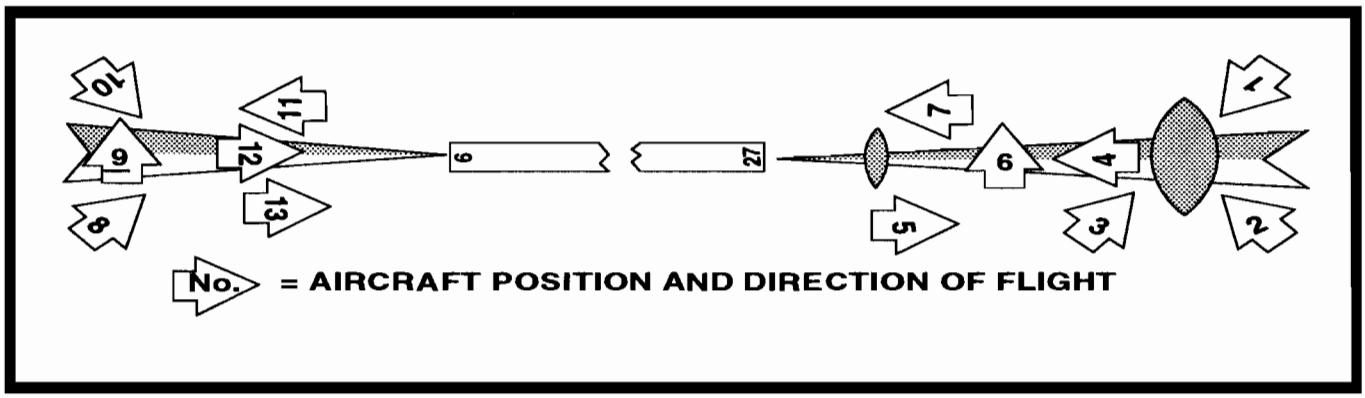


FIGURE 96.—Aircraft Position and Direction of Flight.

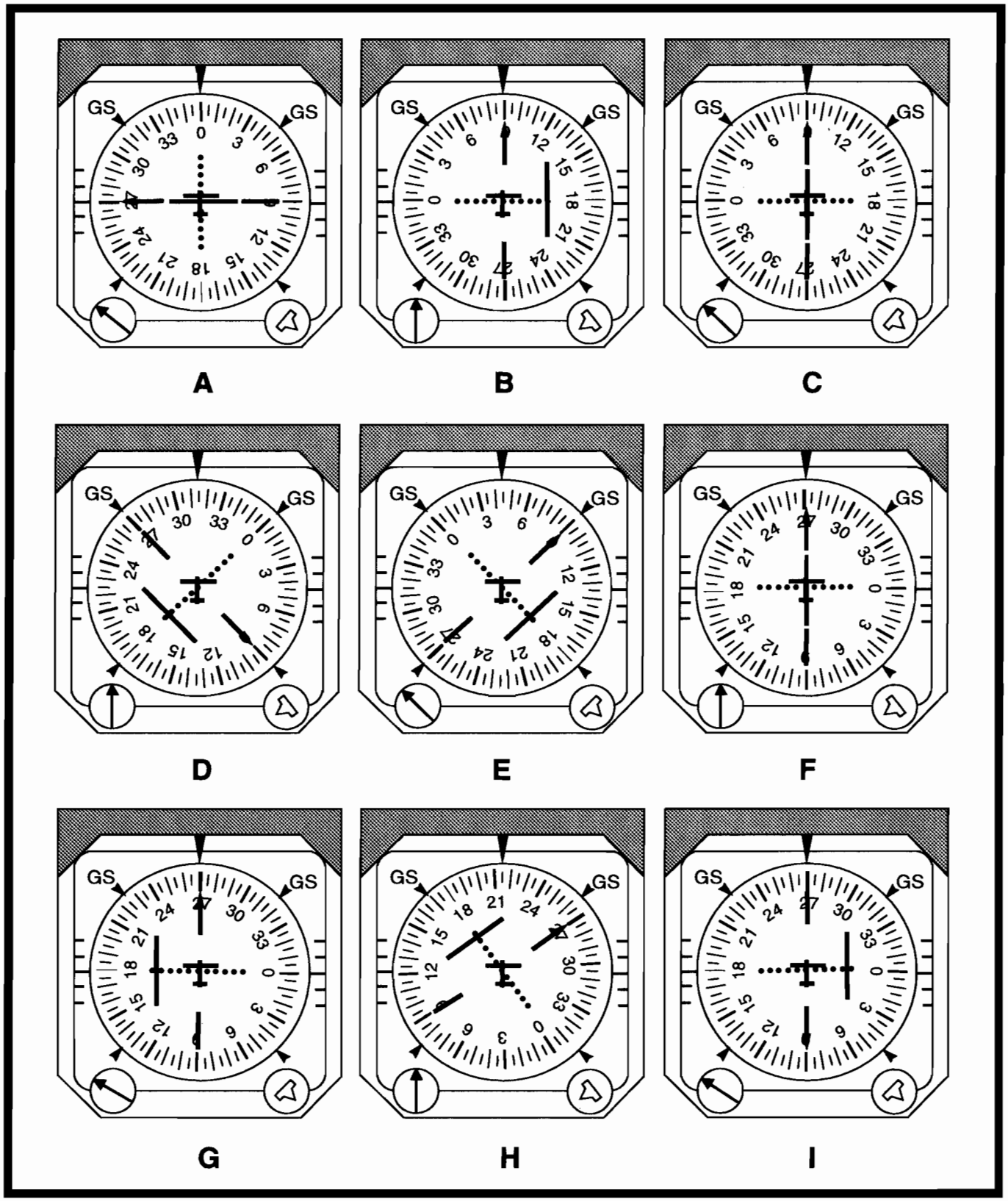


FIGURE 97.—HSI Presentation.

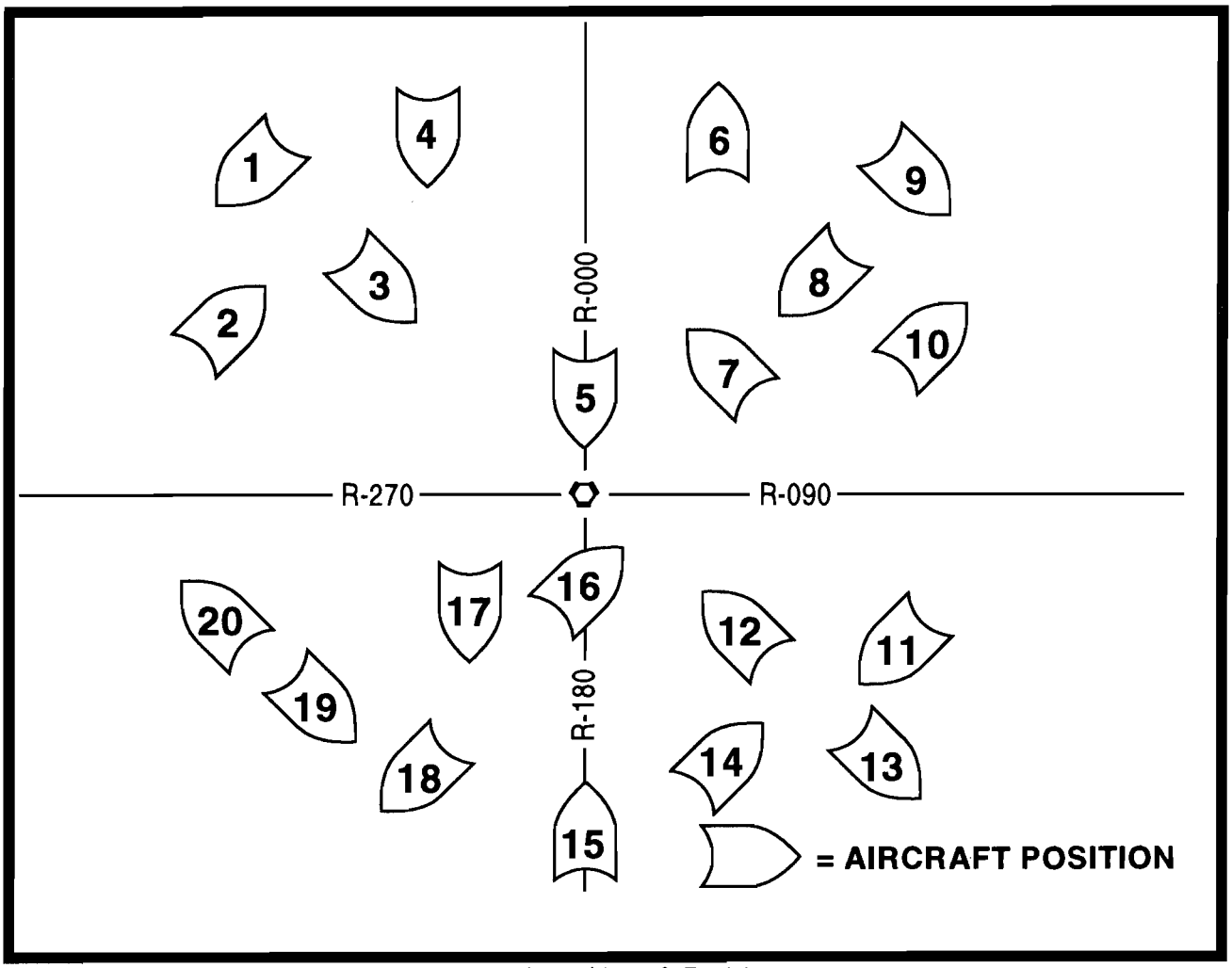


FIGURE 98.—Aircraft Position.

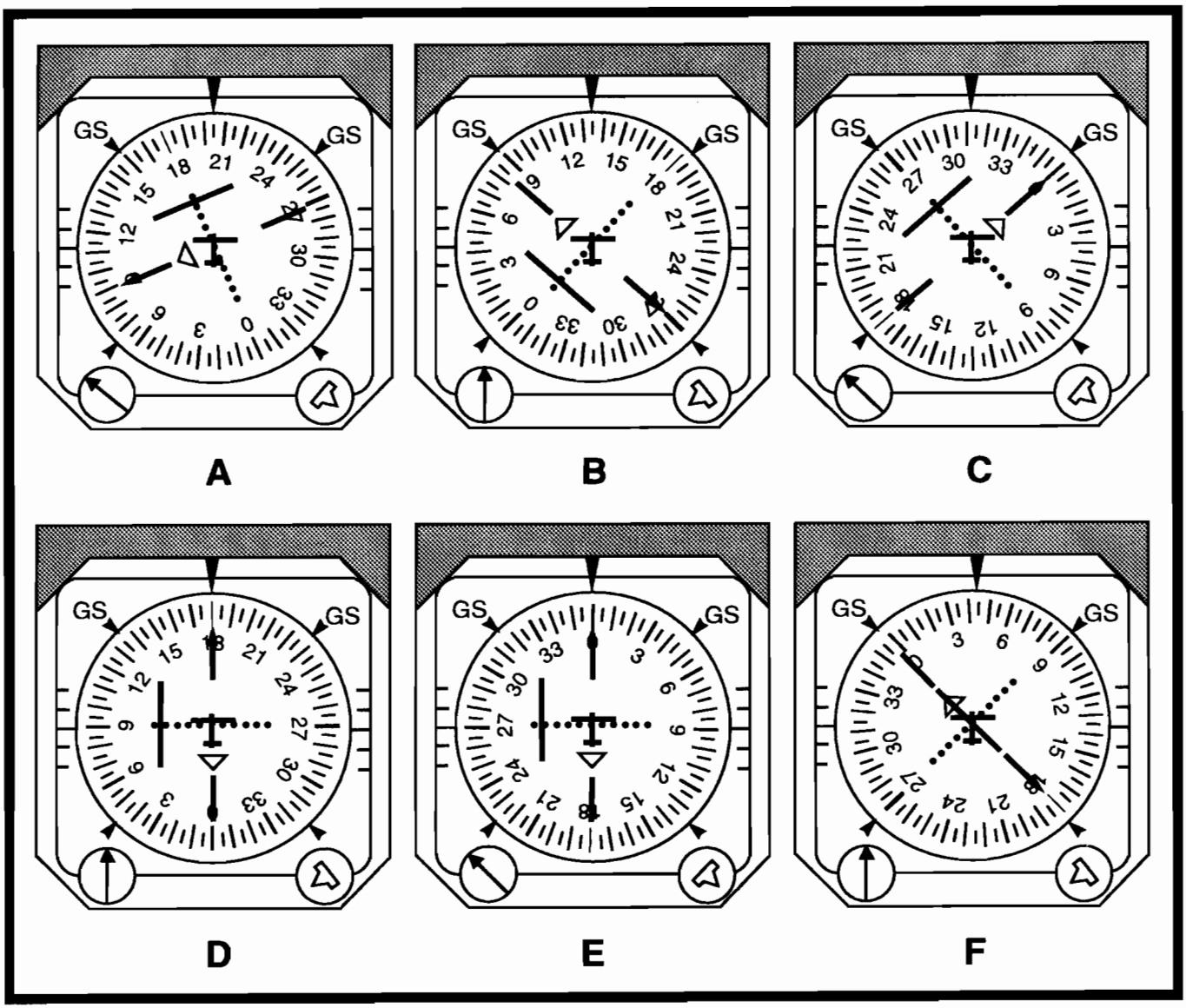


FIGURE 99.—HSI Presentation.

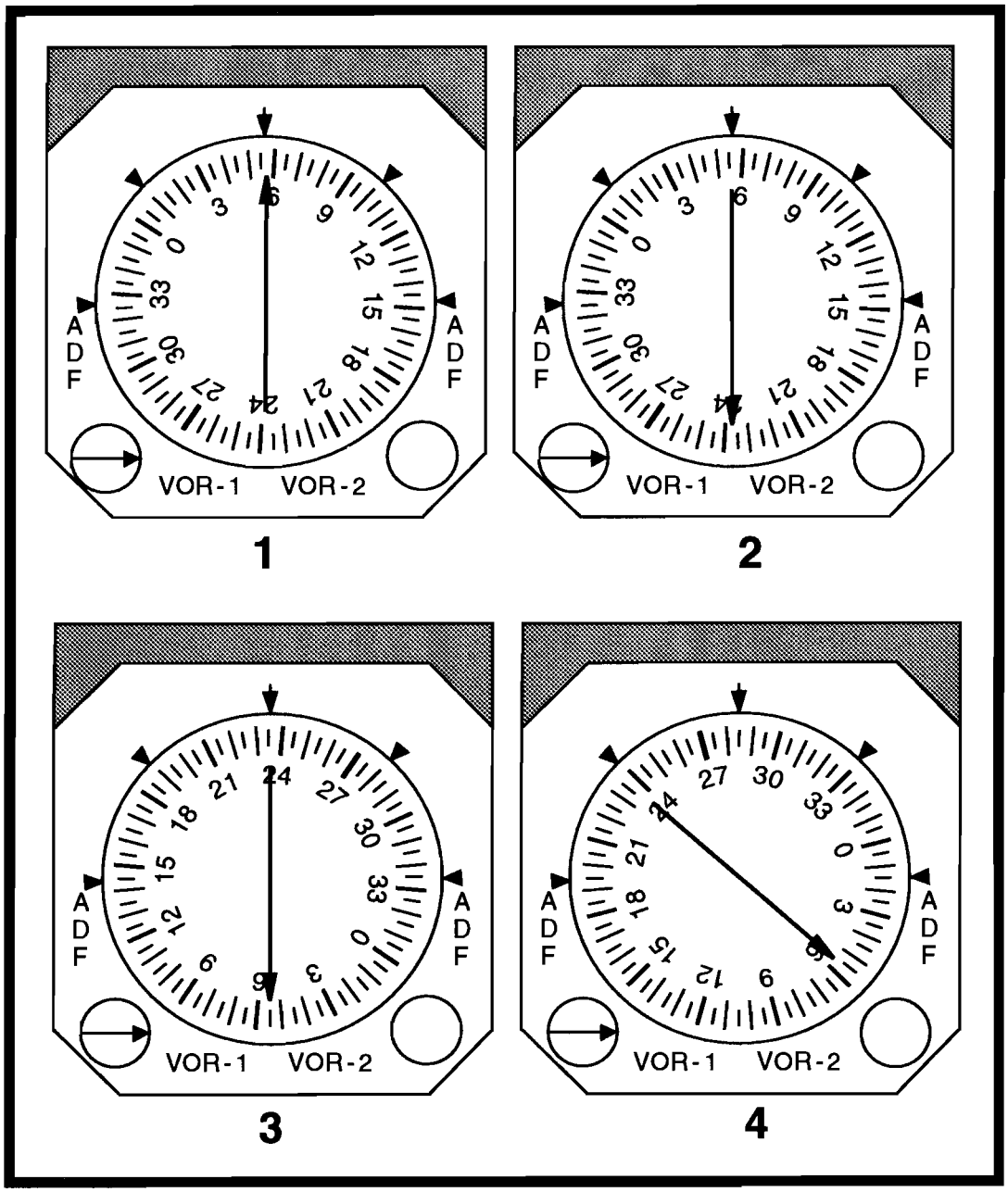


FIGURE 100.—RMI Illustrations.

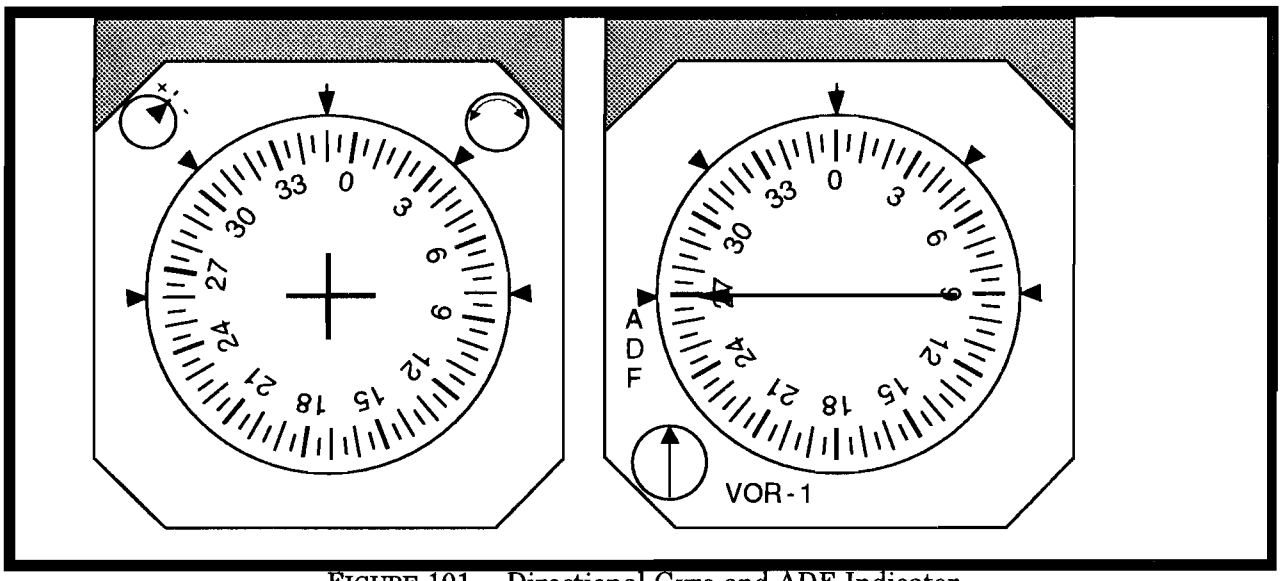


FIGURE 101.—Directional Gyro and ADF Indicator.

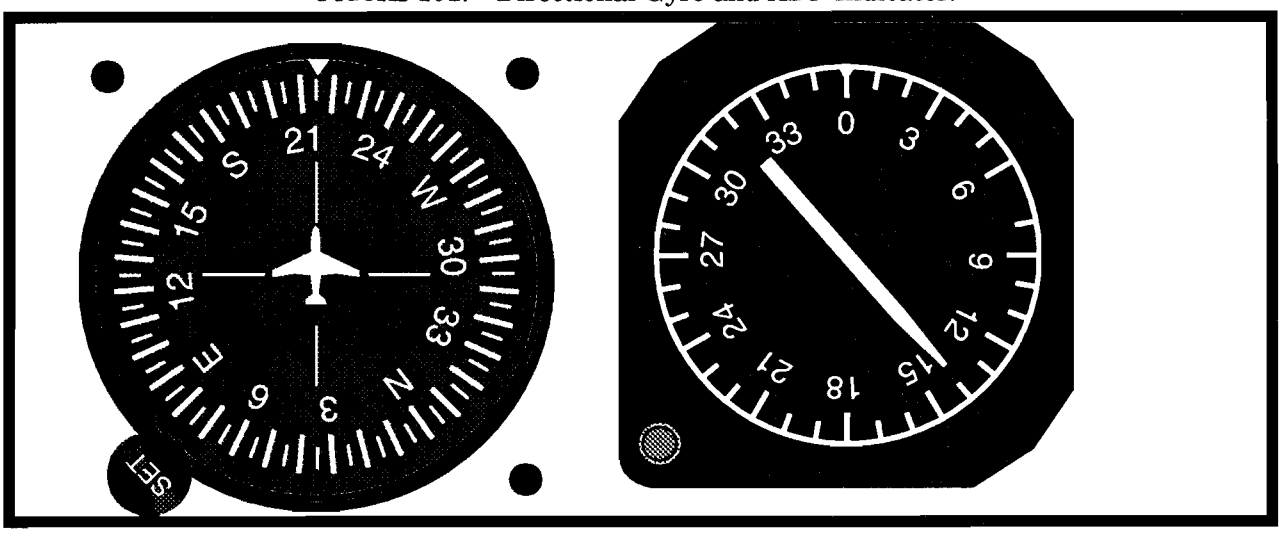


FIGURE 102.—Directional Gyro and ADF Indicator.

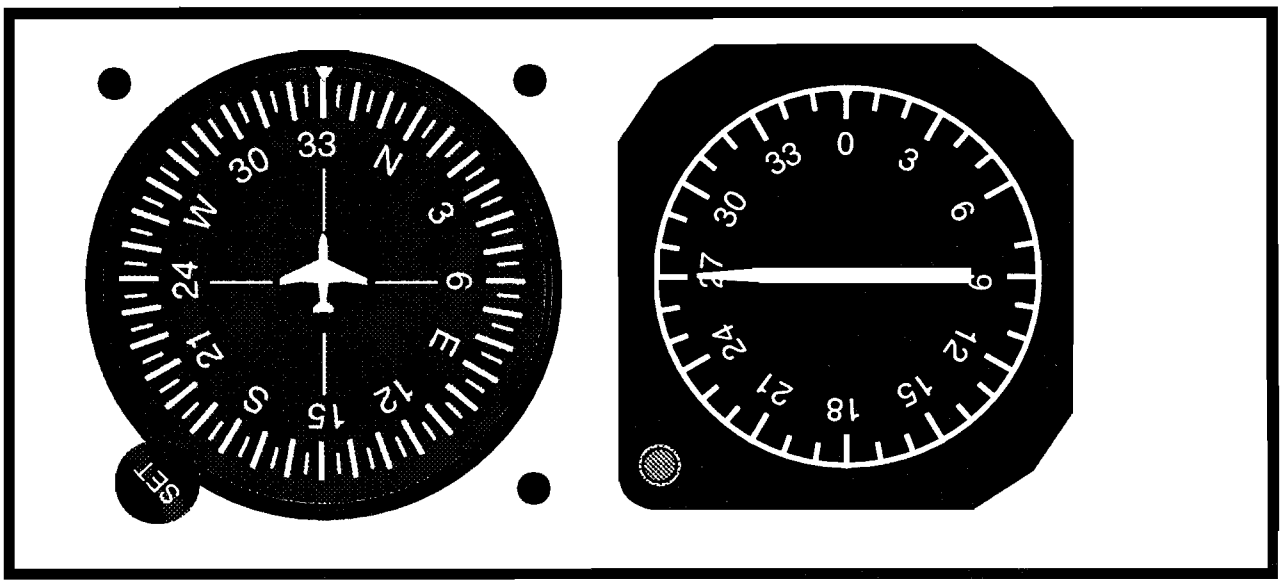


FIGURE 103.—Directional Gyro and ADF Indicator.

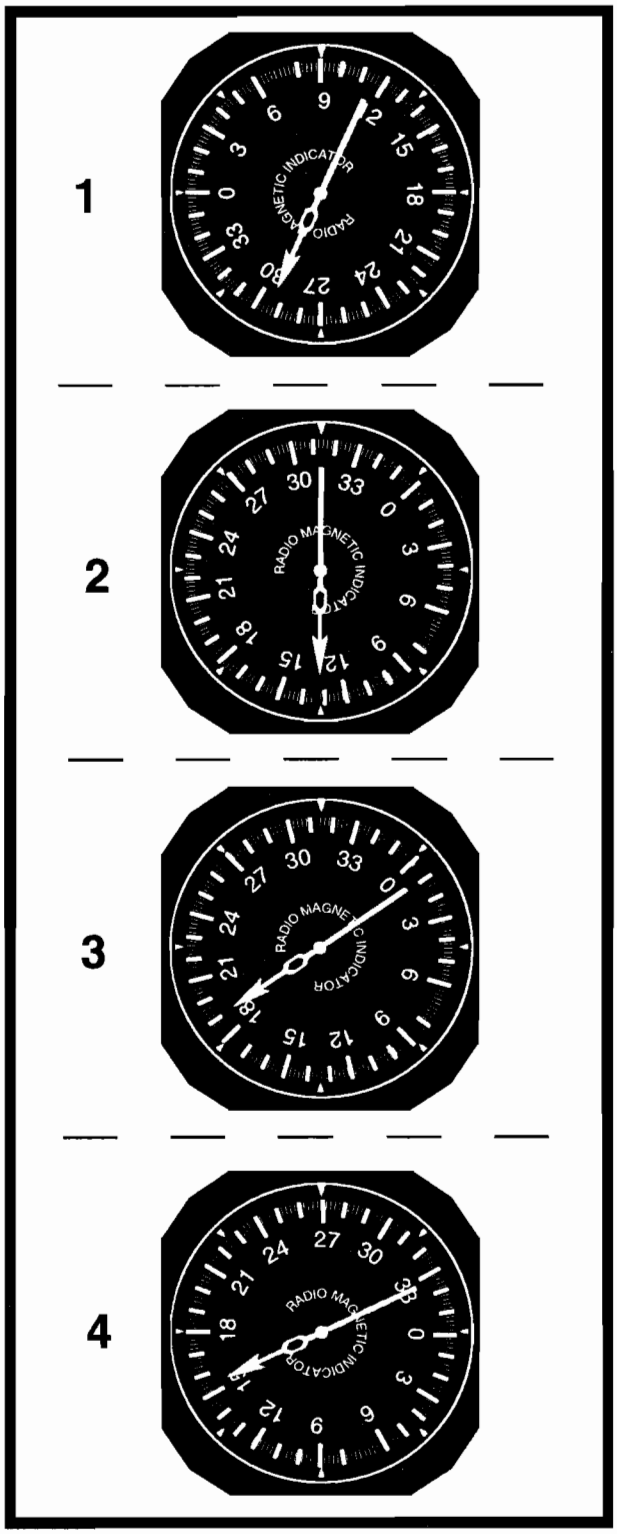


FIGURE 104.—Radio Magnetic Indicator.

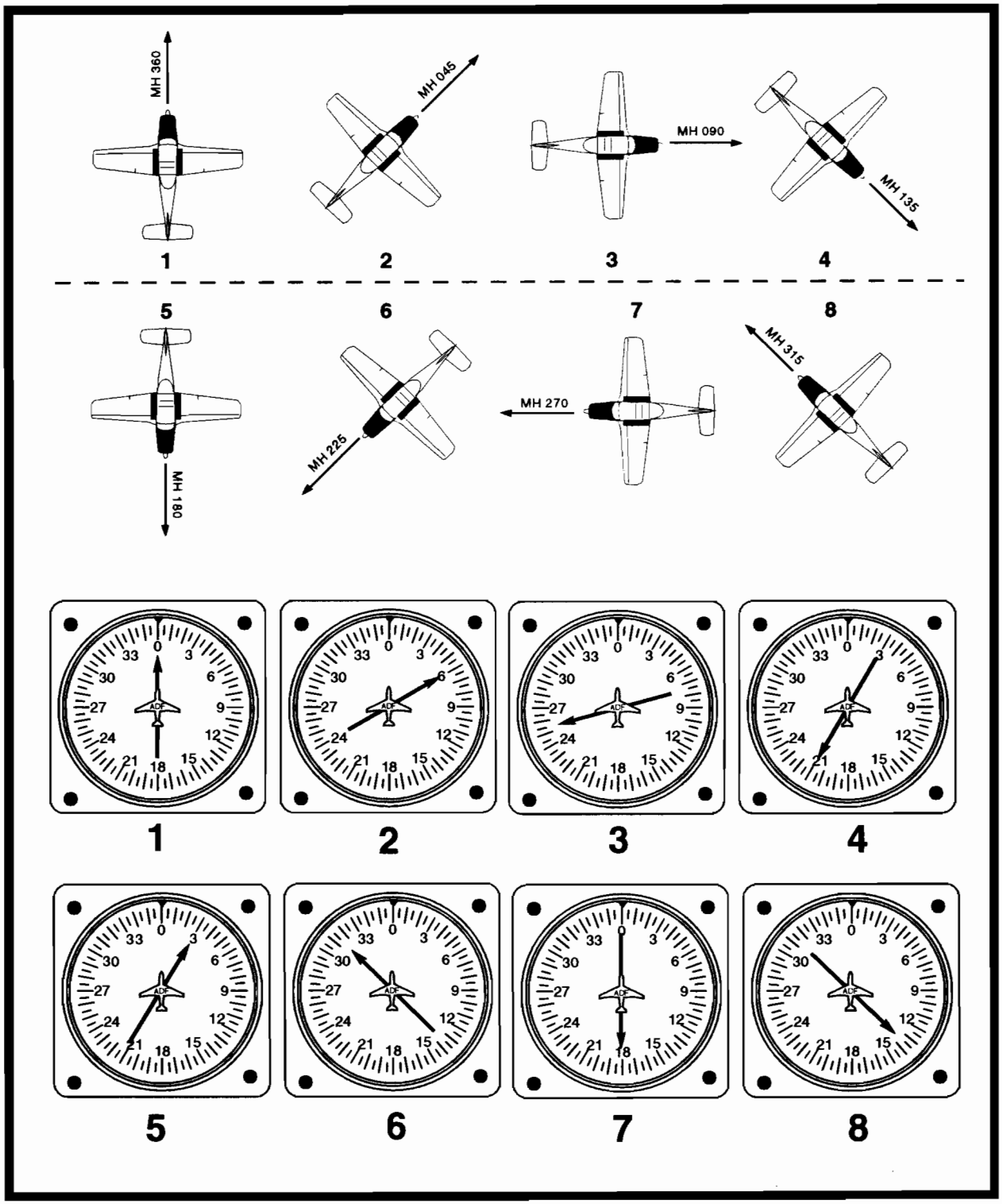


FIGURE 105.—Aircraft Magnetic Heading and ADF Illustration.

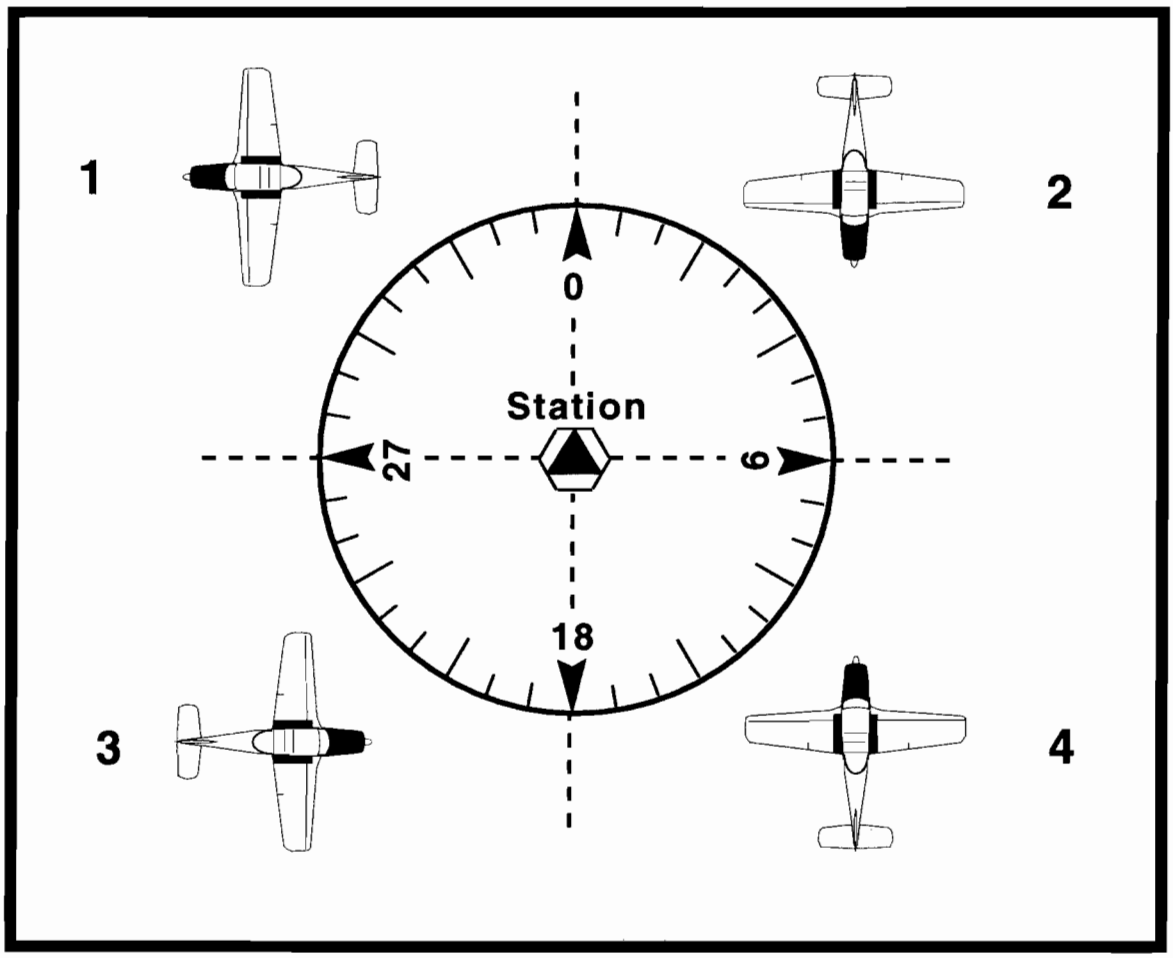


FIGURE 106.—Aircraft Location Relative to VOR.

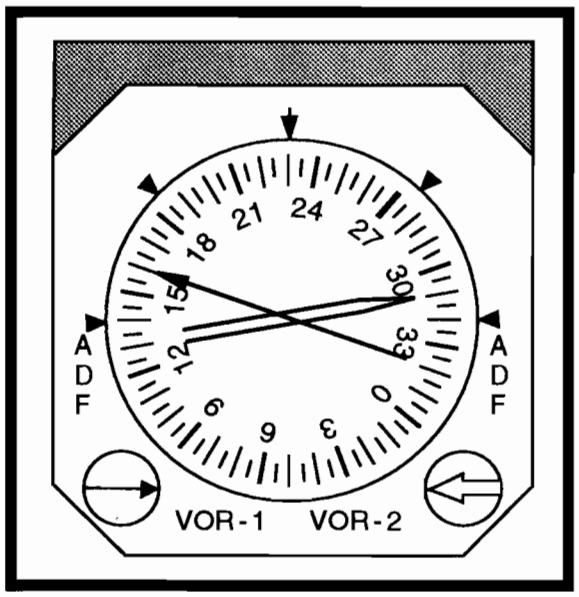


FIGURE 107.—RMI — DME — ARC Illustration Wind Component.

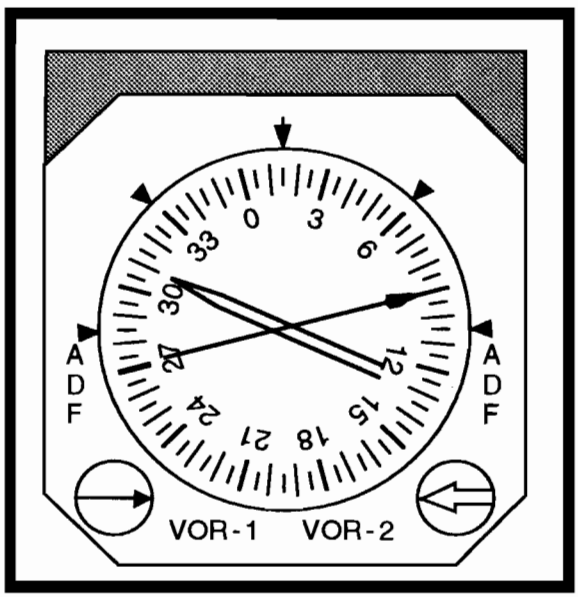


FIGURE 108.—RMI — DME — ARC Illustration Wind Component.

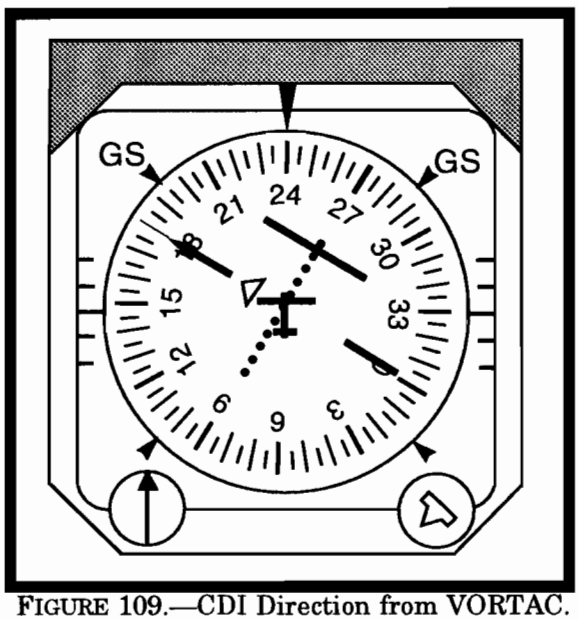


FIGURE 109.—CDI Direction from VORTAC.

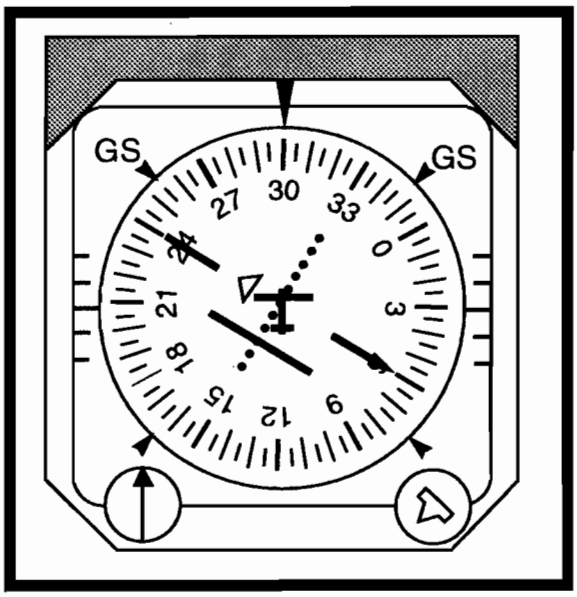


FIGURE 110.—CDI Direction from VORTAC.

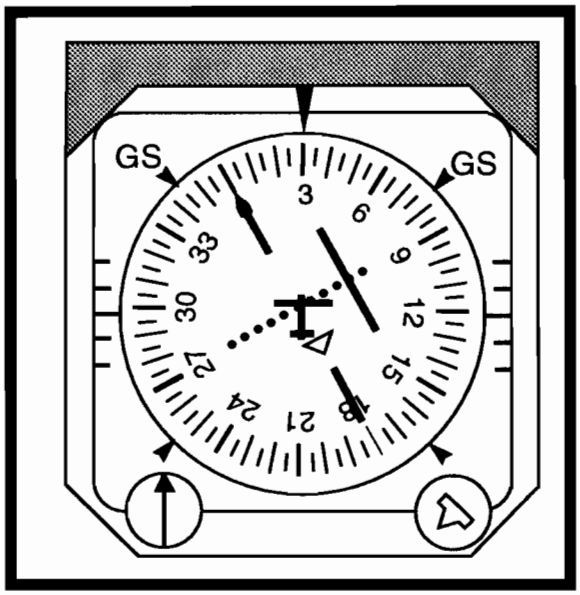


FIGURE 111.—CDI Direction from VORTAC.

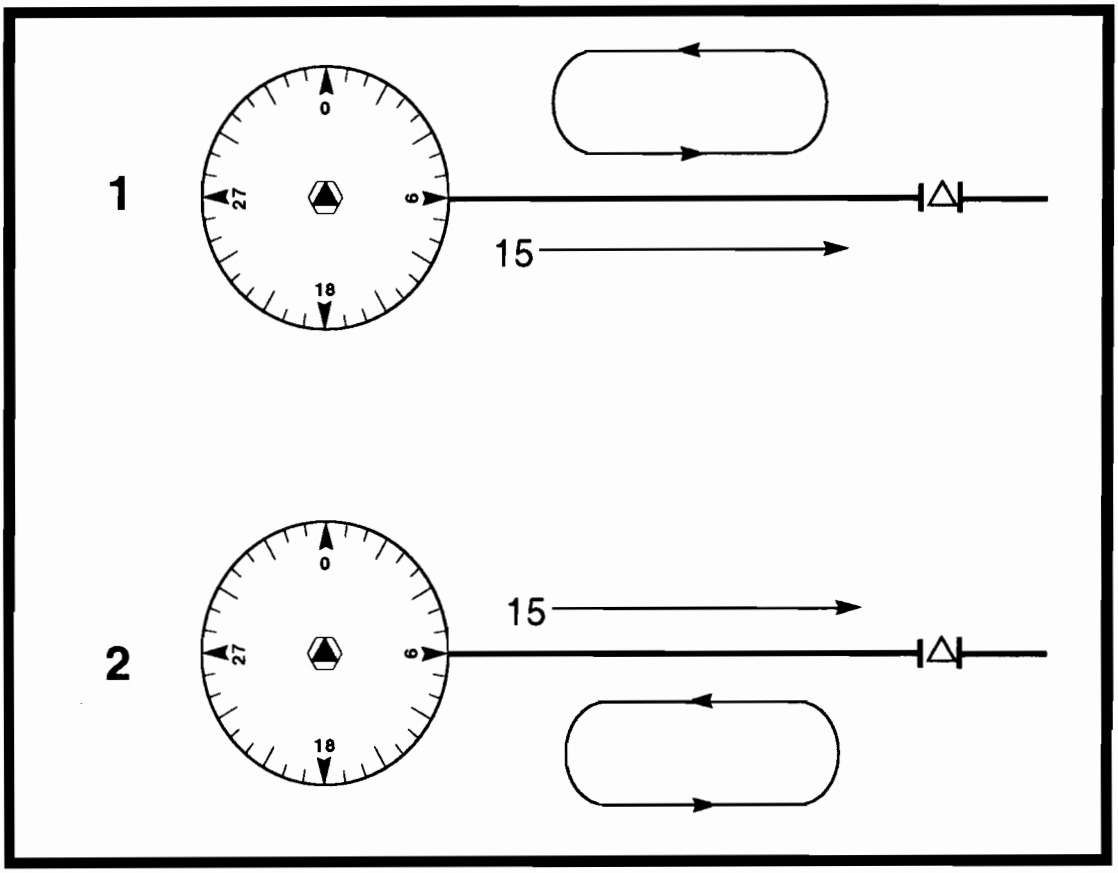


FIGURE 112.—Holding Entry Pocedure.

FIGURE 113.—Aircraft Course and DME Indicator.

FIGURE 114.—Aircraft Course and DME Indicator.

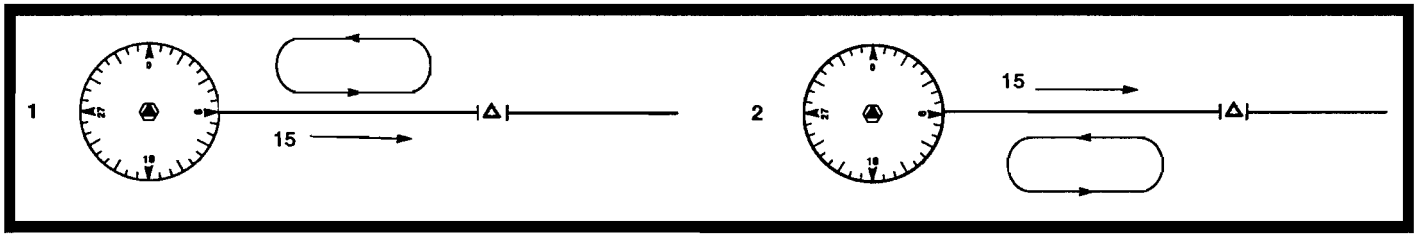


FIGURE 115.—DME Fix with Holding Pattern.

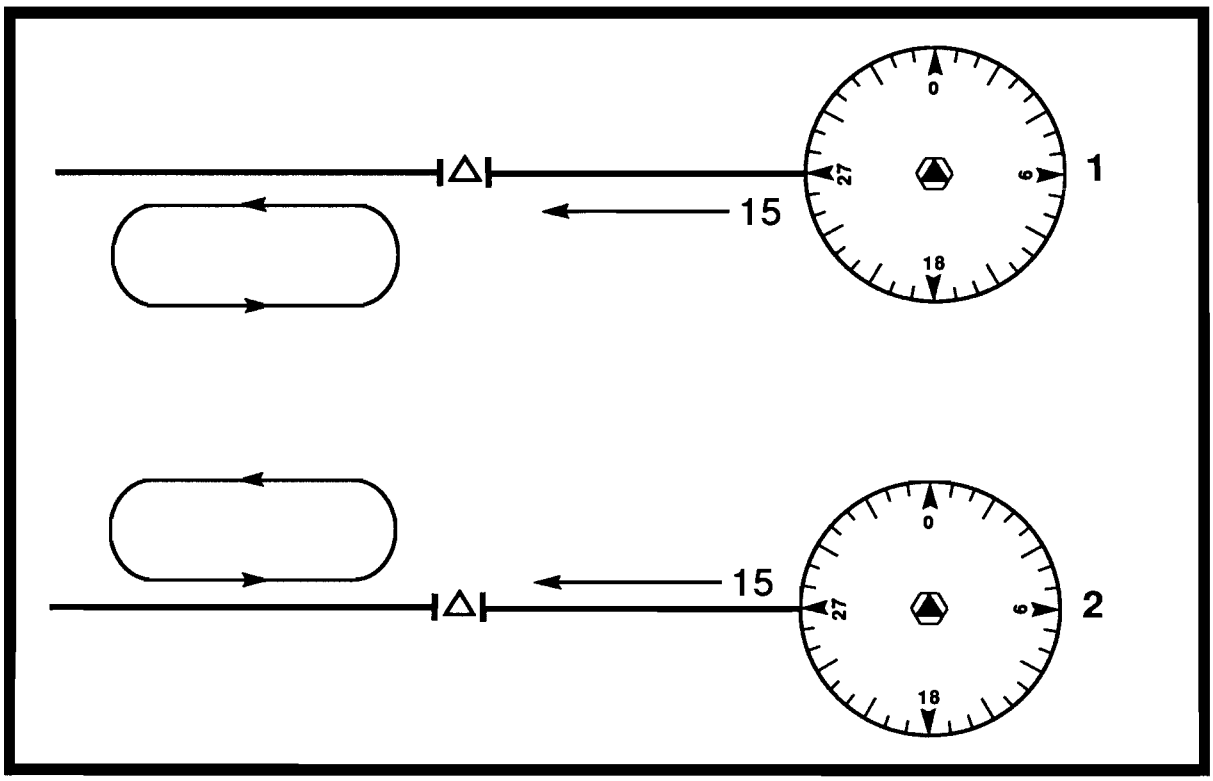


FIGURE 116.—Holding Entry Procedure.

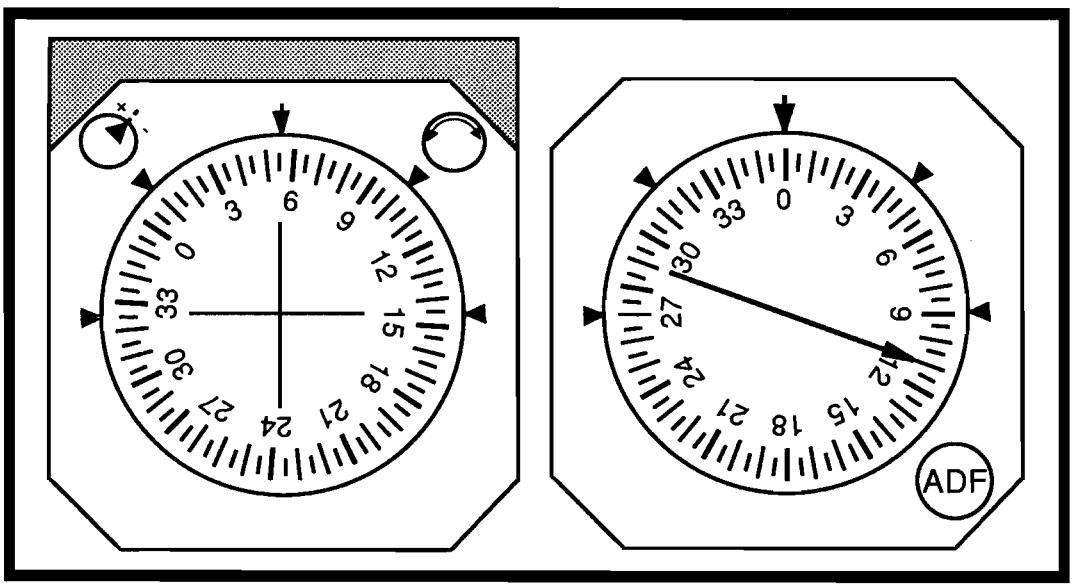


FIGURE 117.—Heading and ADF Indicators.

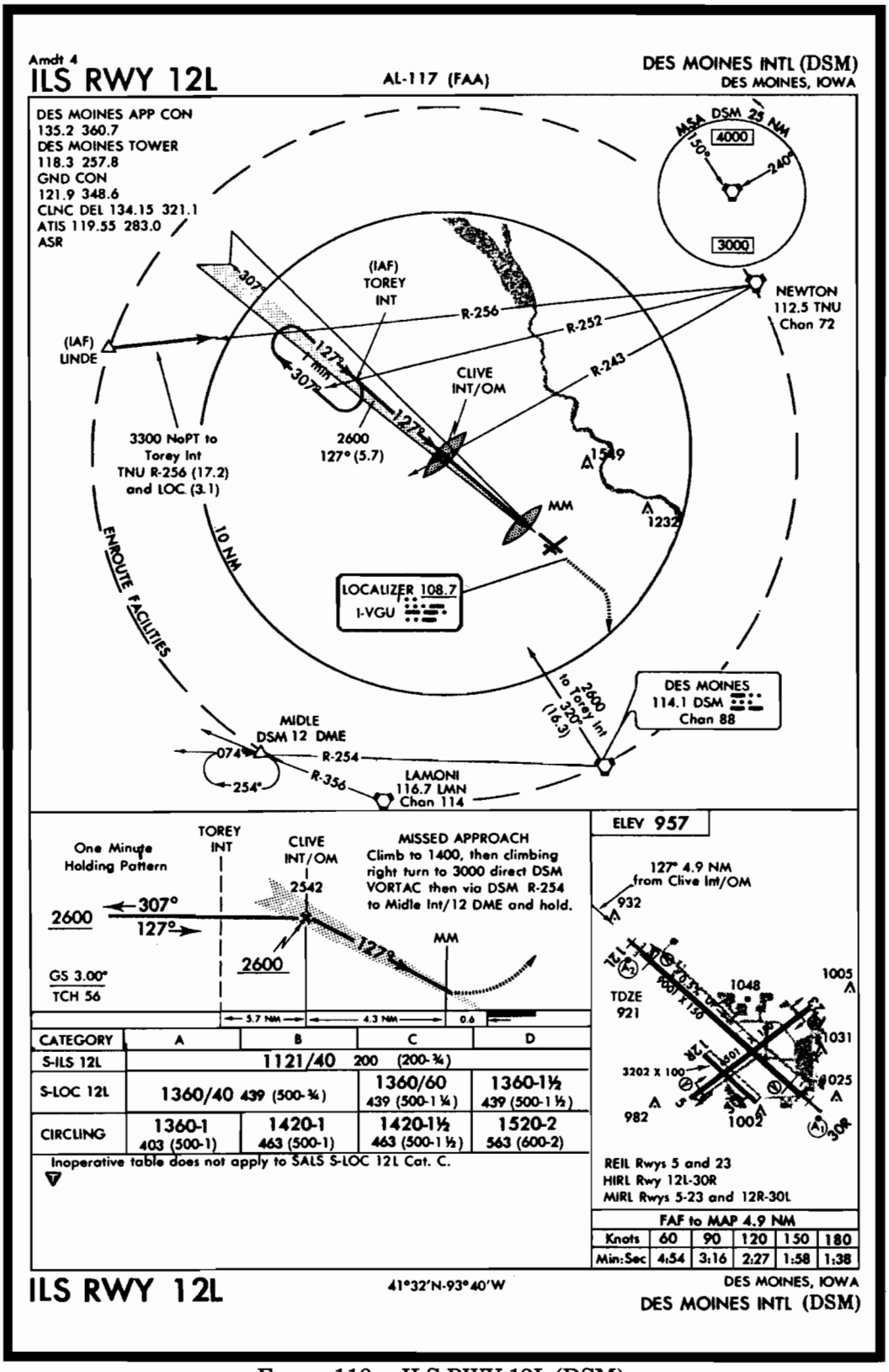


FIGURE 118.—ILS RWY 12L (DSM).

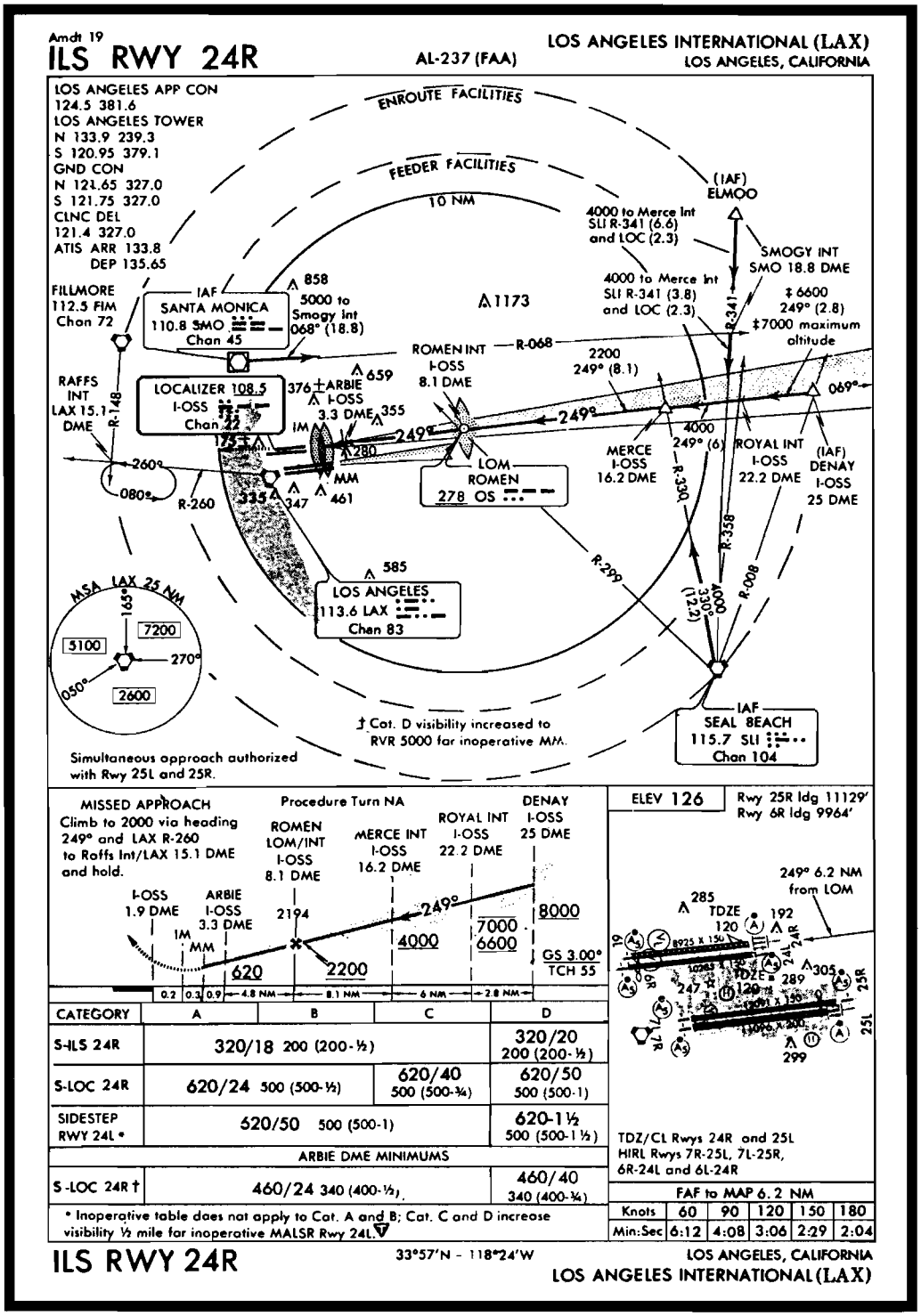


FIGURE 119.—ILS RWY 24R (LAX).

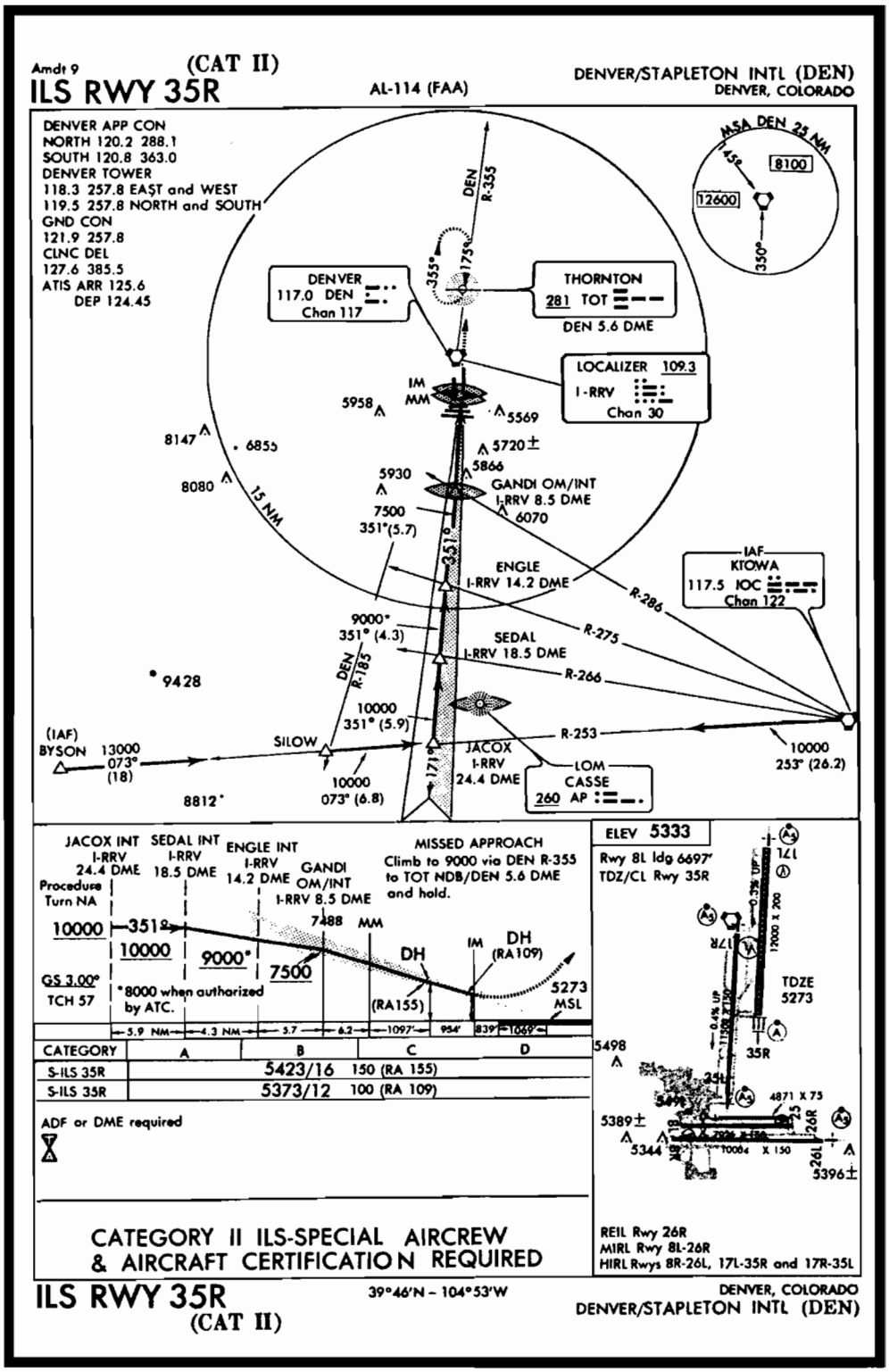


FIGURE 120.—ILS RWY 35R (DEN).

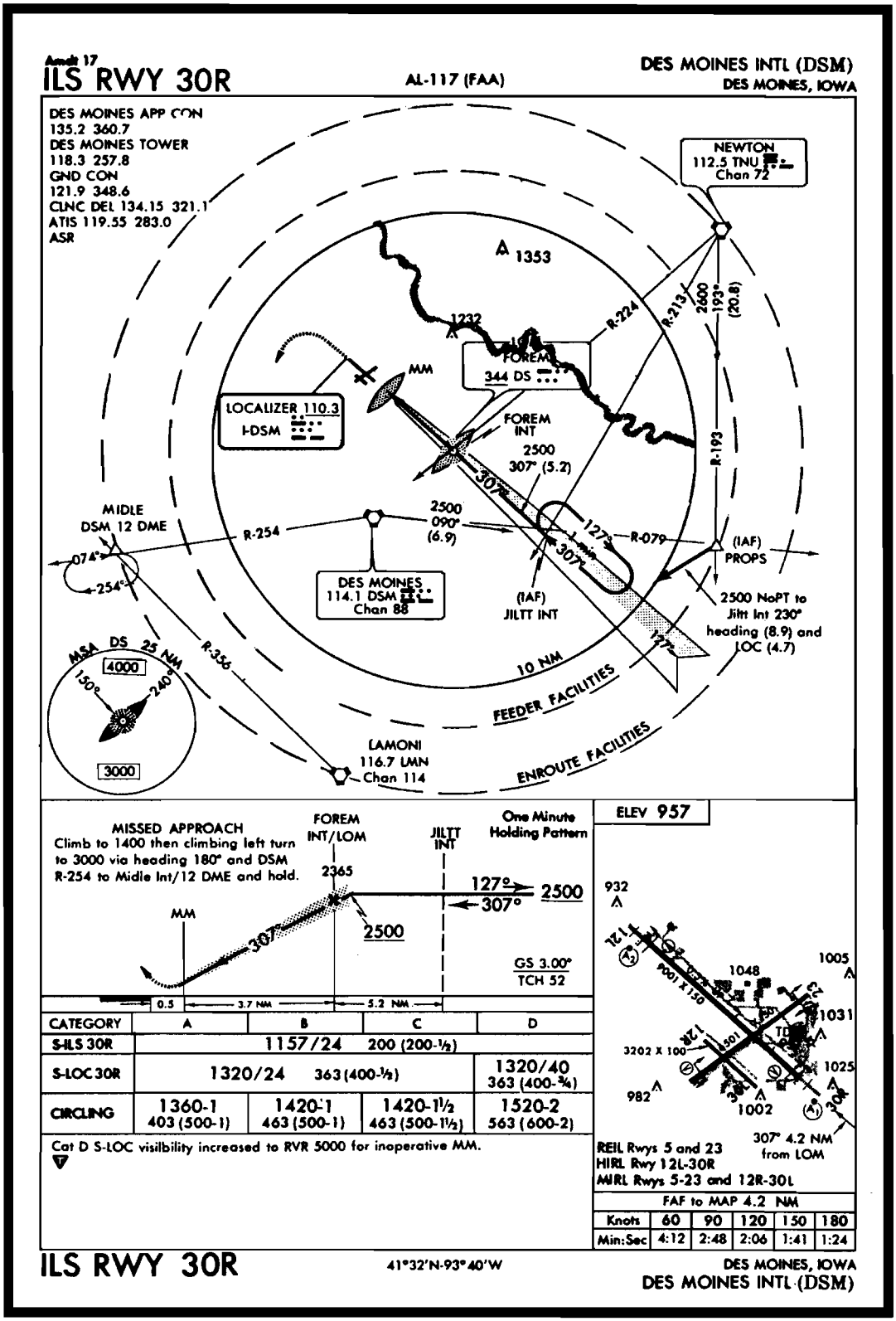


FIGURE 121.—ILS RWY 30R (DSM).

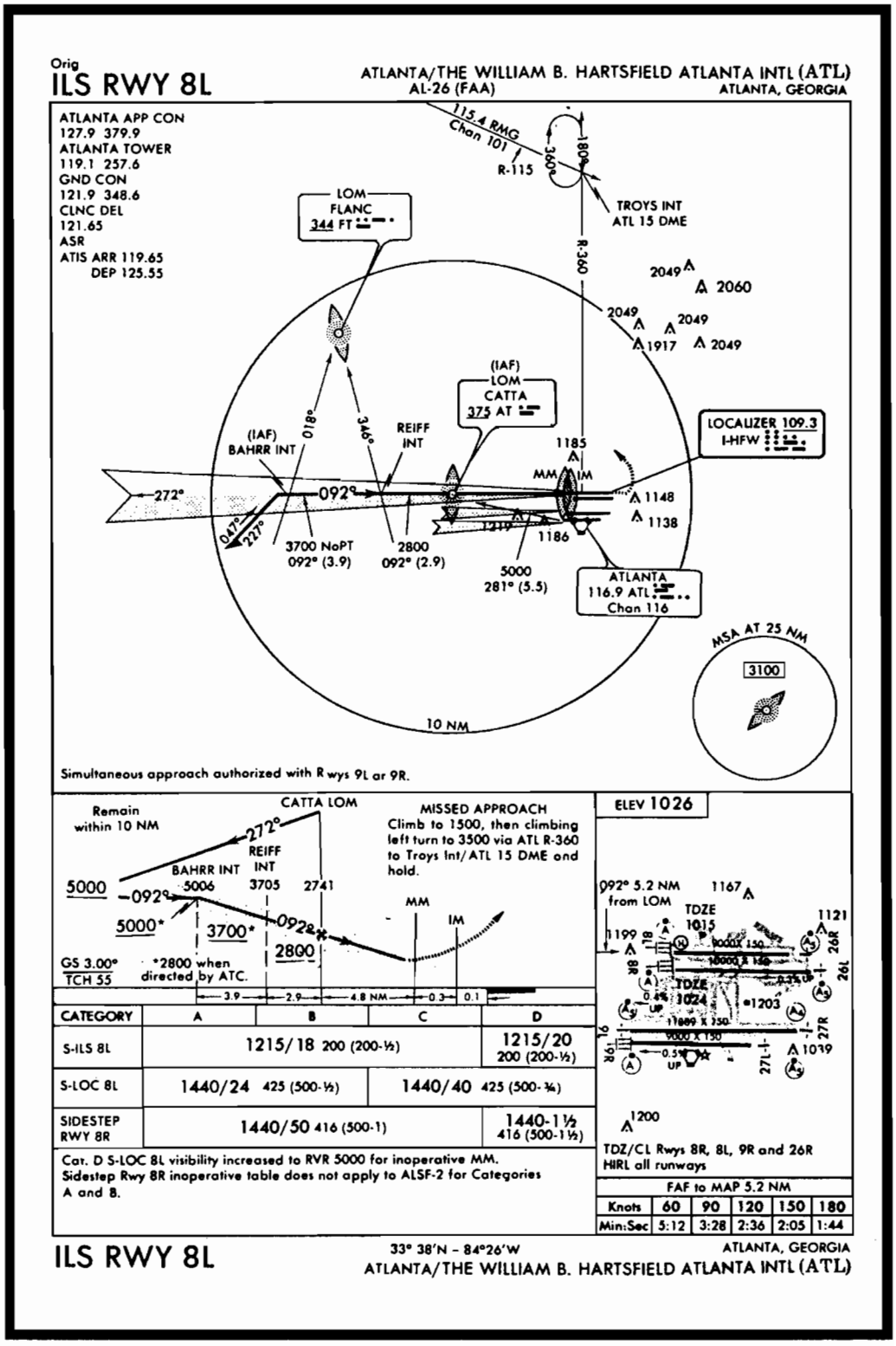


FIGURE 122.—ILS RWY 8L (ATL).

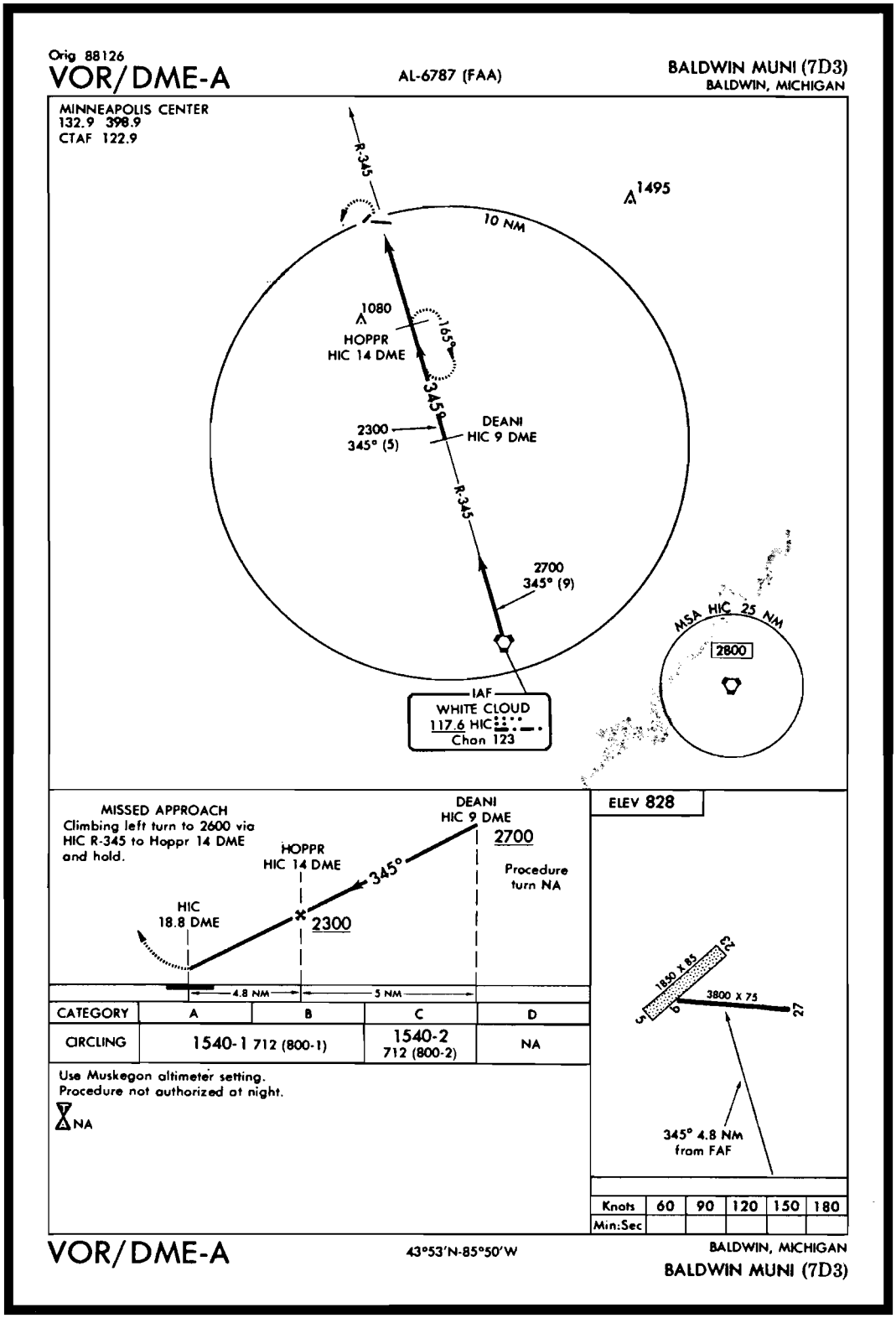


FIGURE 123.—VOR/DME-A (7D3).

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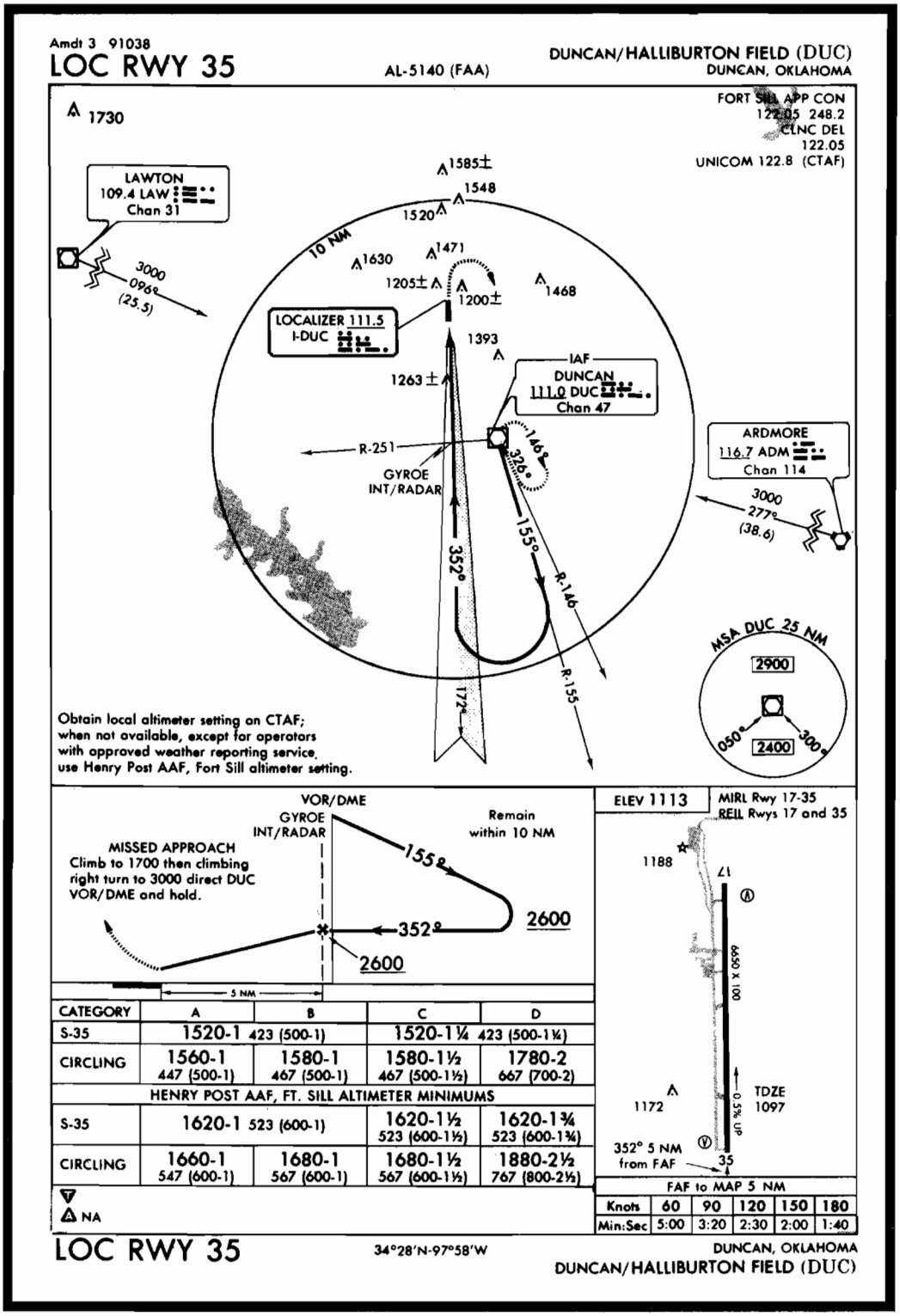

CATEGORY	A	B	C	D
S-35	1520-1 423 (500-1)		1520-1¼ 423 (500-1¼)	
CIRCLING	1560-1 447 (500-1)	1580-1 467 (500-1)	1580-1½ 467 (500-1½)	1780-2 667 (700-2)
HENRY POST AAF, FT. SILL ALTIMETER MINIMUMS				
S-35	1620-1 523 (600-1)		1620-1½ 523 (600-1½)	1620-1¾ 523 (600-1¾)
CIRCLING	1660-1 547 (600-1)	1680-1 567 (600-1)	1680-1½ 567 (600-1½)	1880-2½ 767 (800-2½)

FIGURE 124.—LOC RWY 35, Duncan, Oklahoma.

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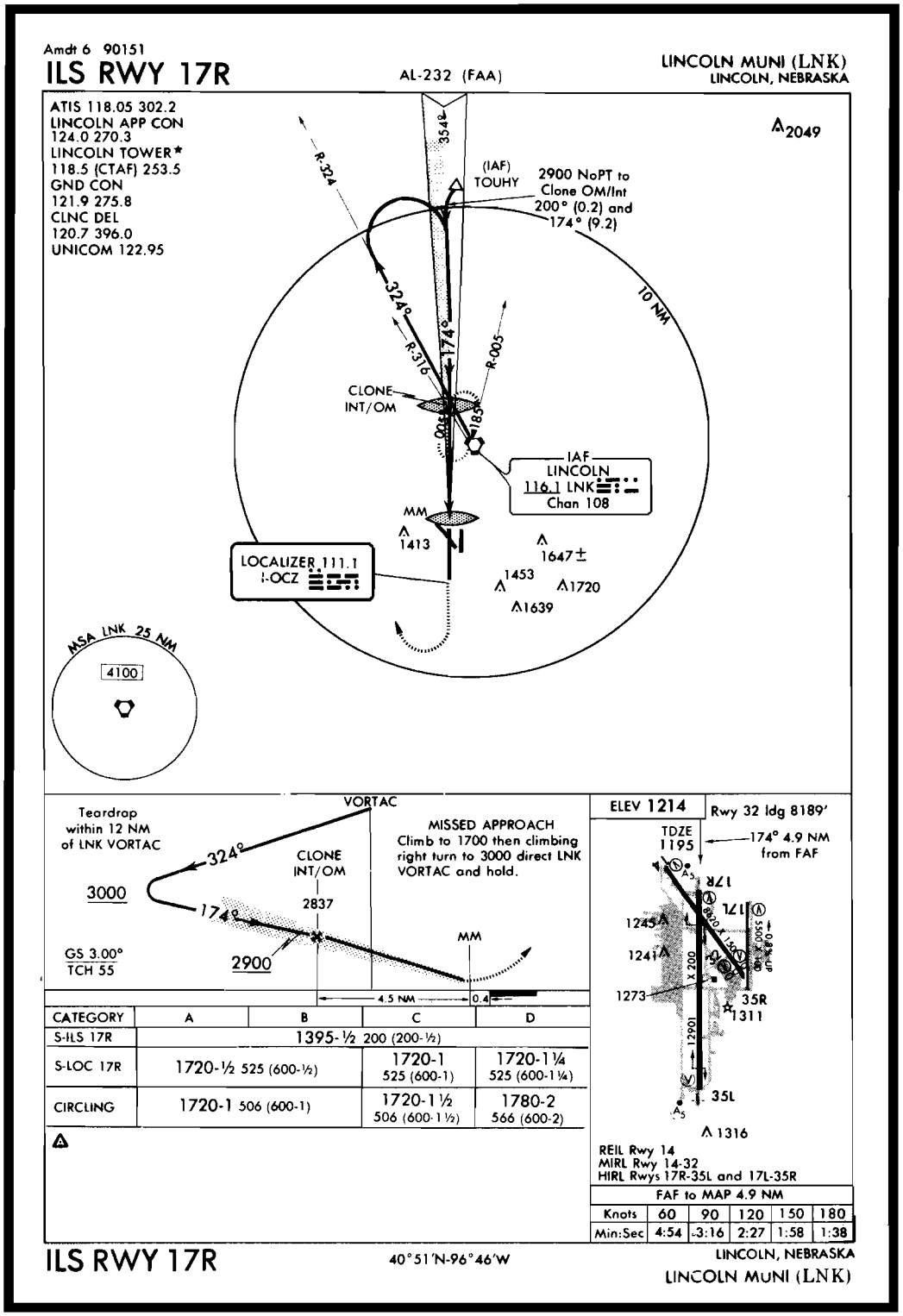

CATEGORY	A	B	C	D
S-ILS 17R	1395-½ 200 (200-½)			
S-LOC 17R	1720-½ 525 (600-½)		1720-1 525 (600-1)	1720-1¼ 525 (600-1¼)
CIRCLING	1720-1 506 (600-1)		1720-1½ 506 (600-1½)	1780-2 566 (600-2)

Knots	60	90	120	150	180
Min:Sec	4:54	3:16	2:27	1:58	1:38

FIGURE 125.—ILS RWY 17R, Lincoln, Nebraska.

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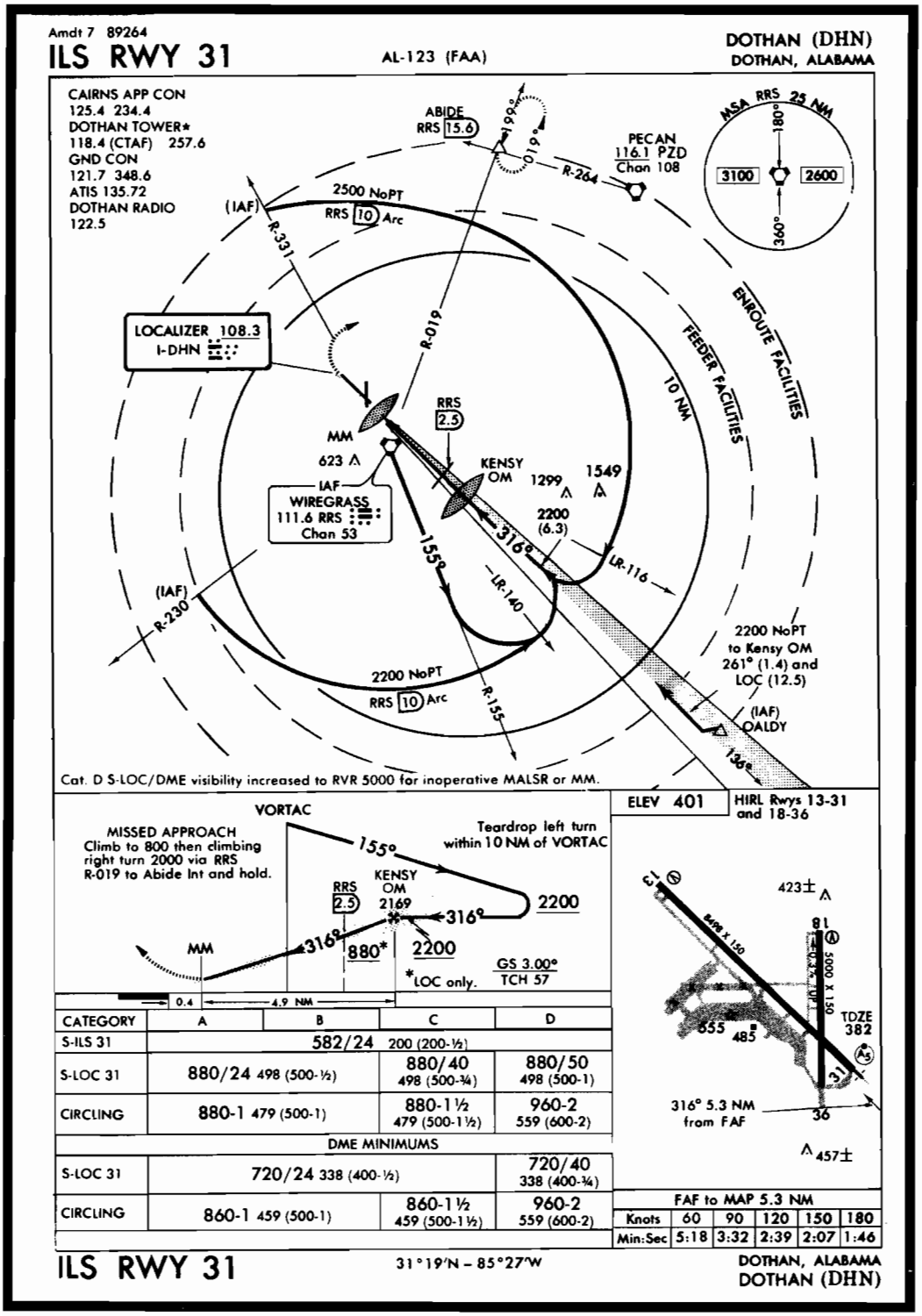

FIGURE 126.—ILS RWY 31, Dothan, Alabama.

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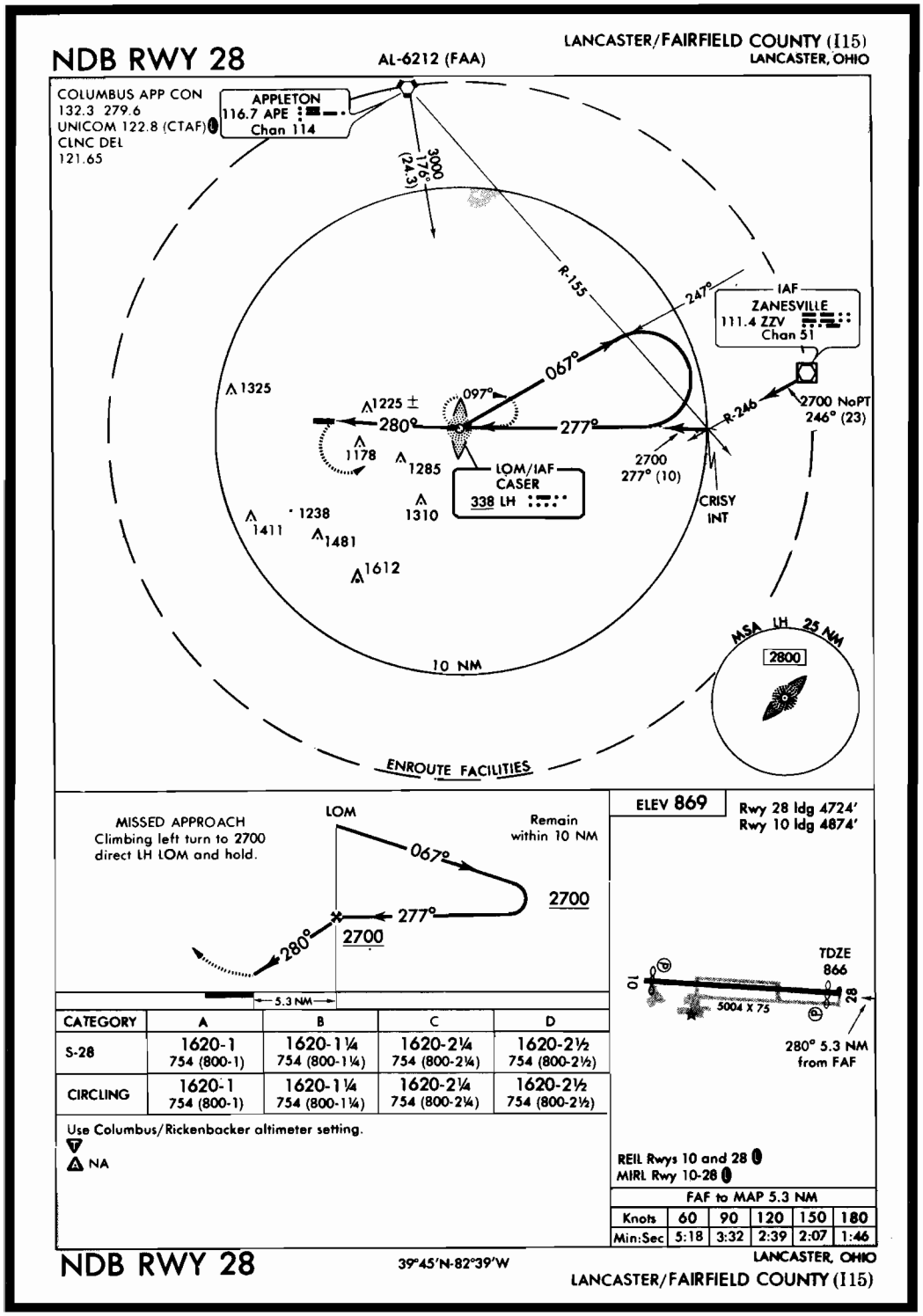

FIGURE 127.—NDB RWY 28, Lancaster/Fairfield County.

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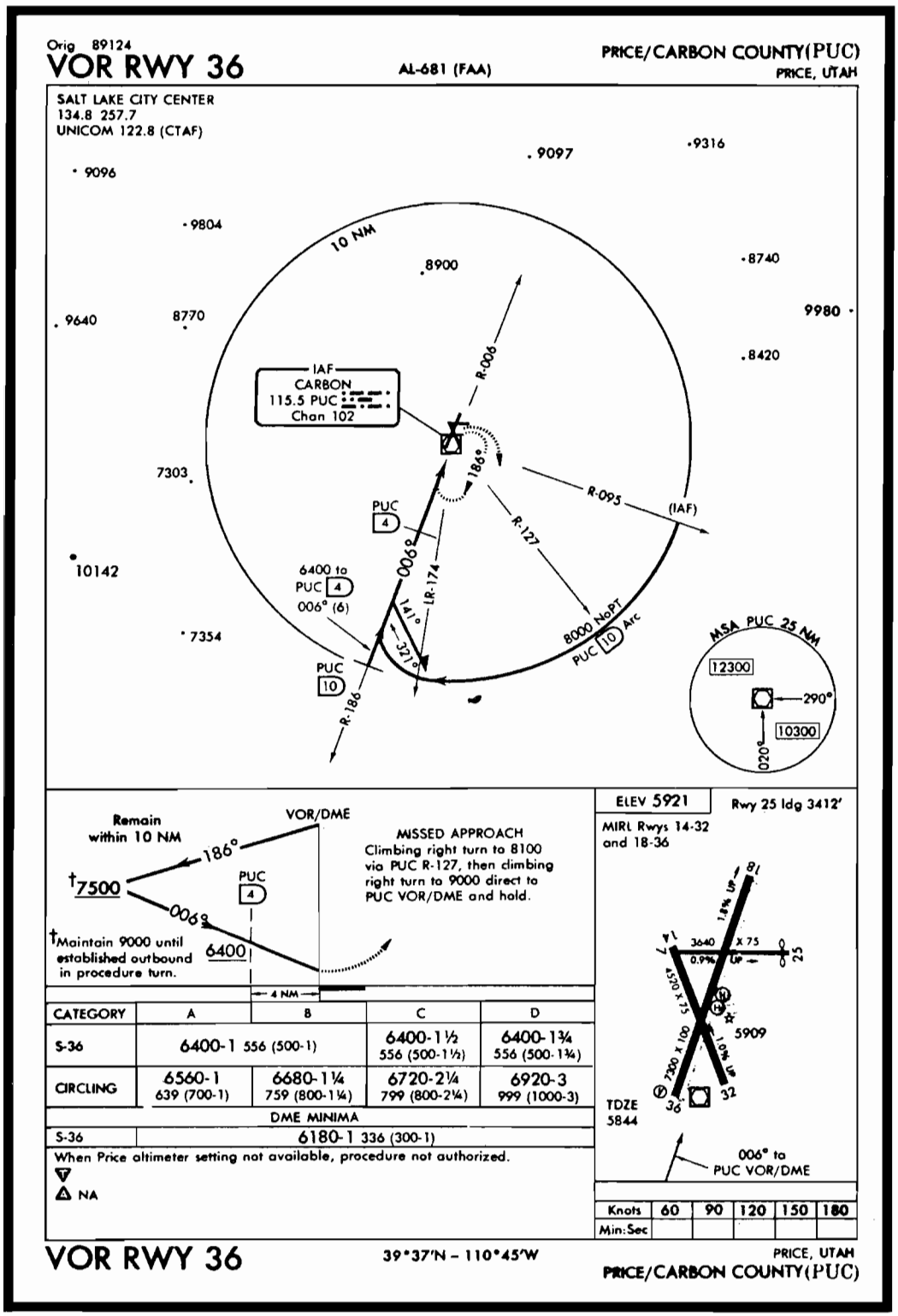

FIGURE 128.—VOR RWY 36 (PUC).

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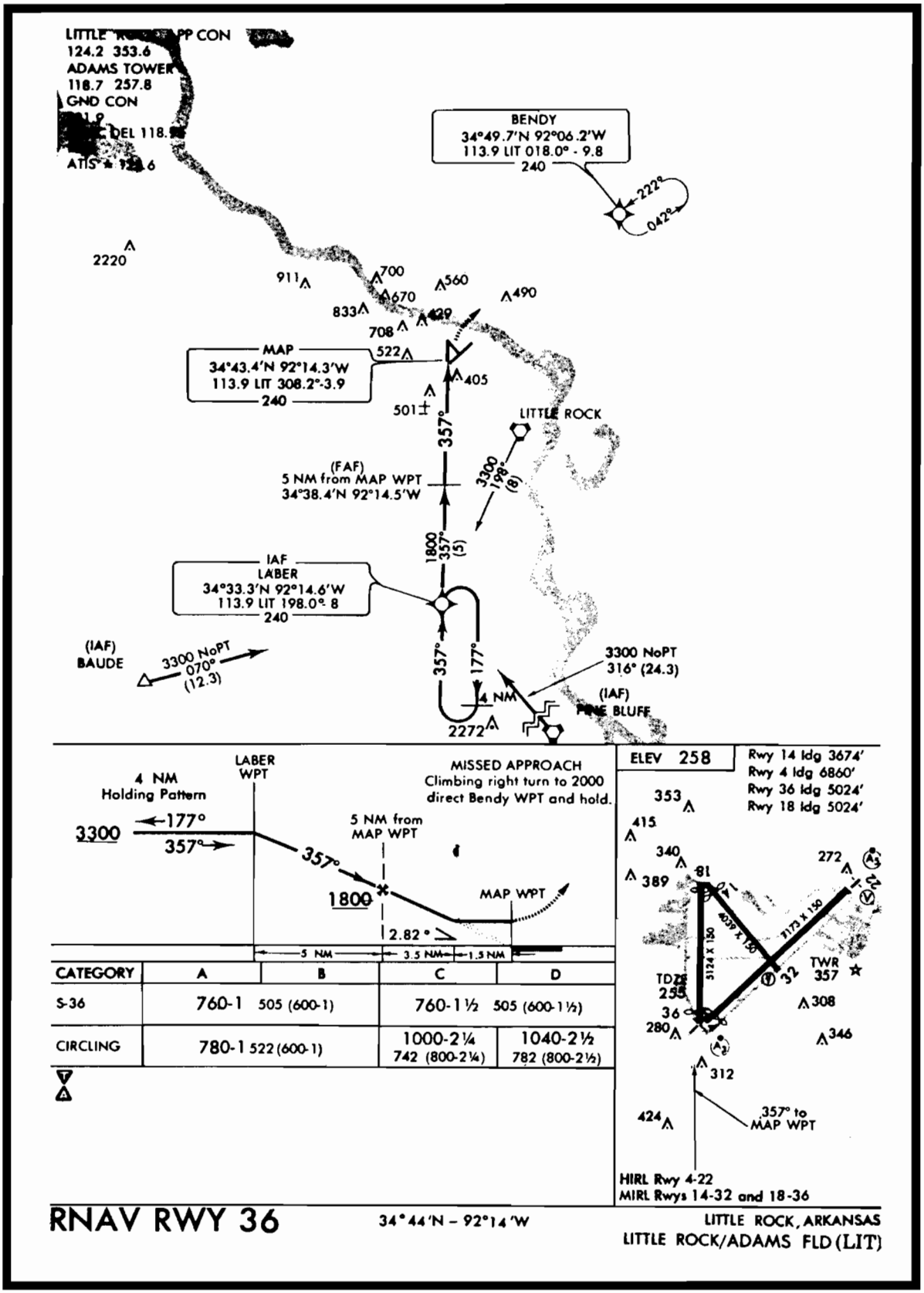

FIGURE 129.—RNAV RWY 36 (LIT).

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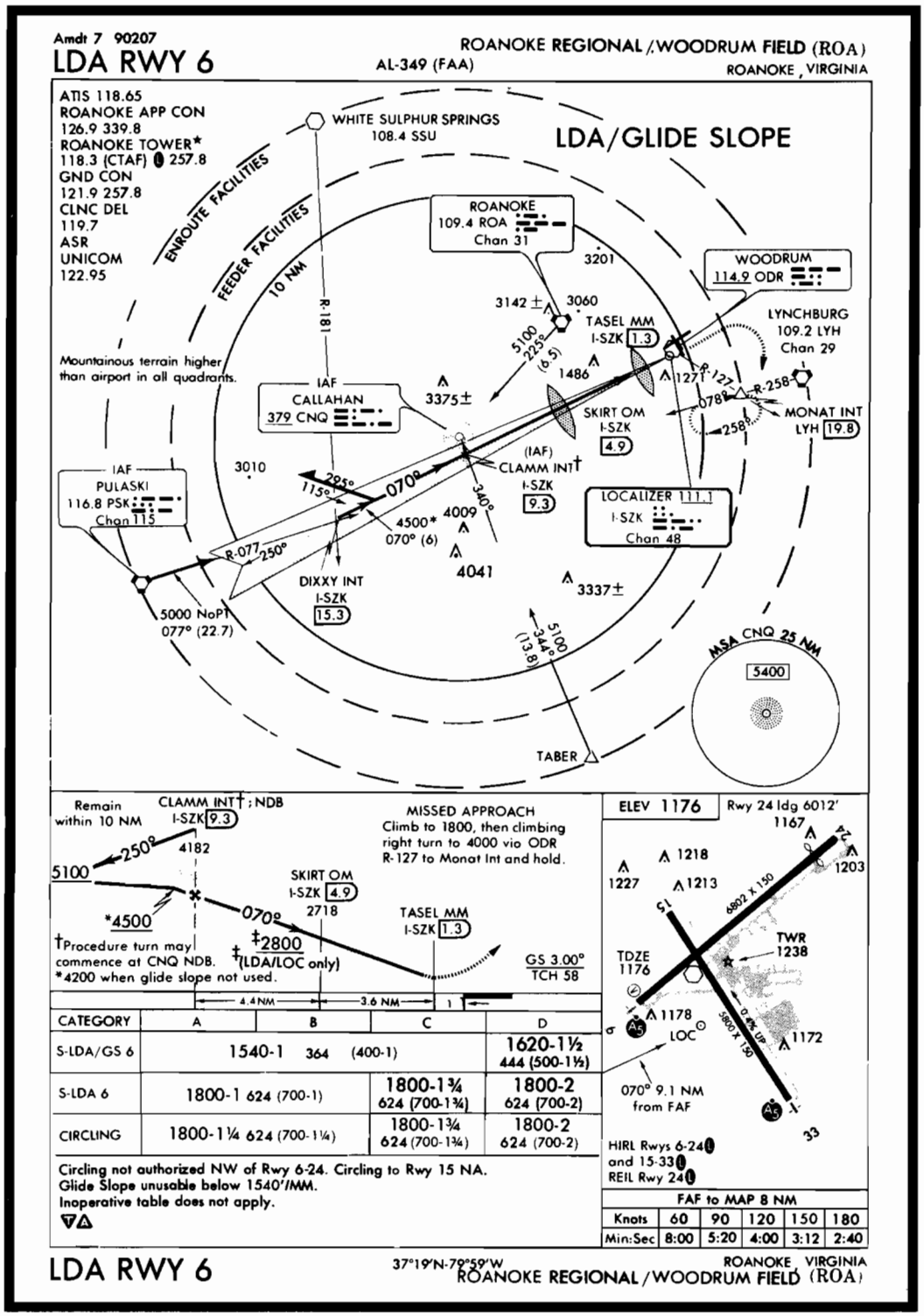

FIGURE 130.—LDA RWY 6 (ROA).

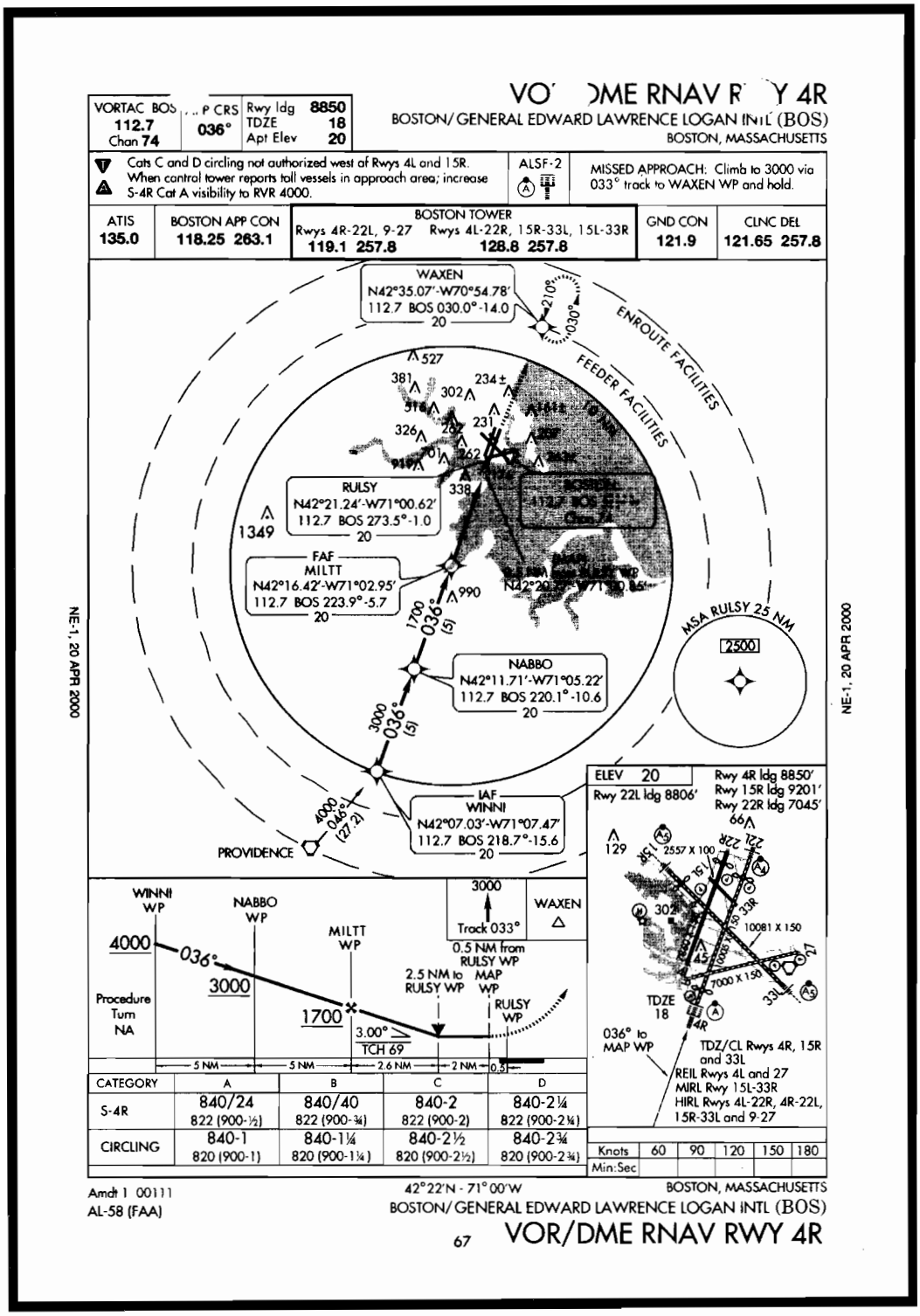

FIGURE 131.—VOR/DME RNAV RWY 4R.

Figure 132.—Deleted.

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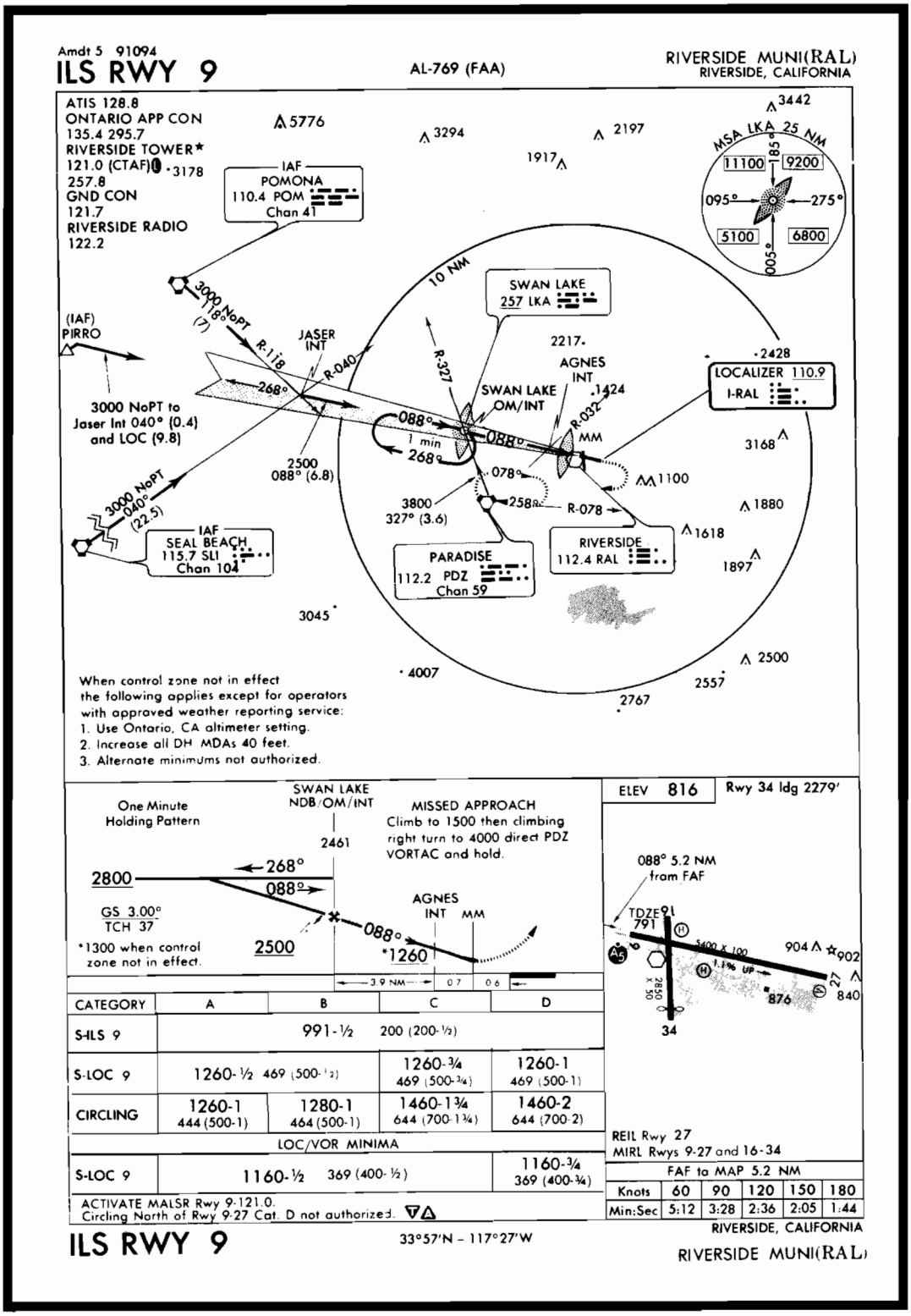

FIGURE 133.—ILS RWY 9 (RAL).

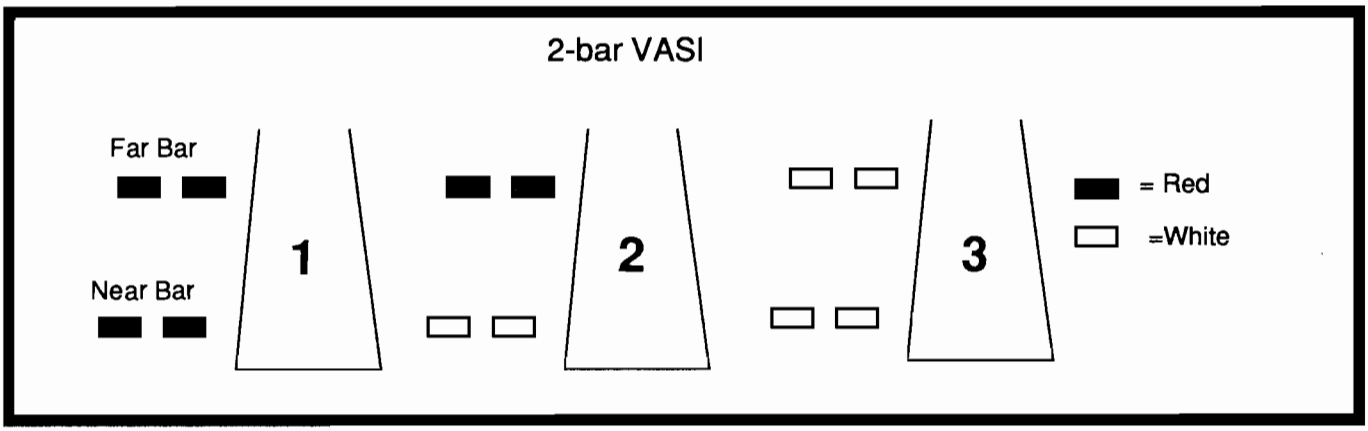

FIGURE 134.—2-BAR VASI.

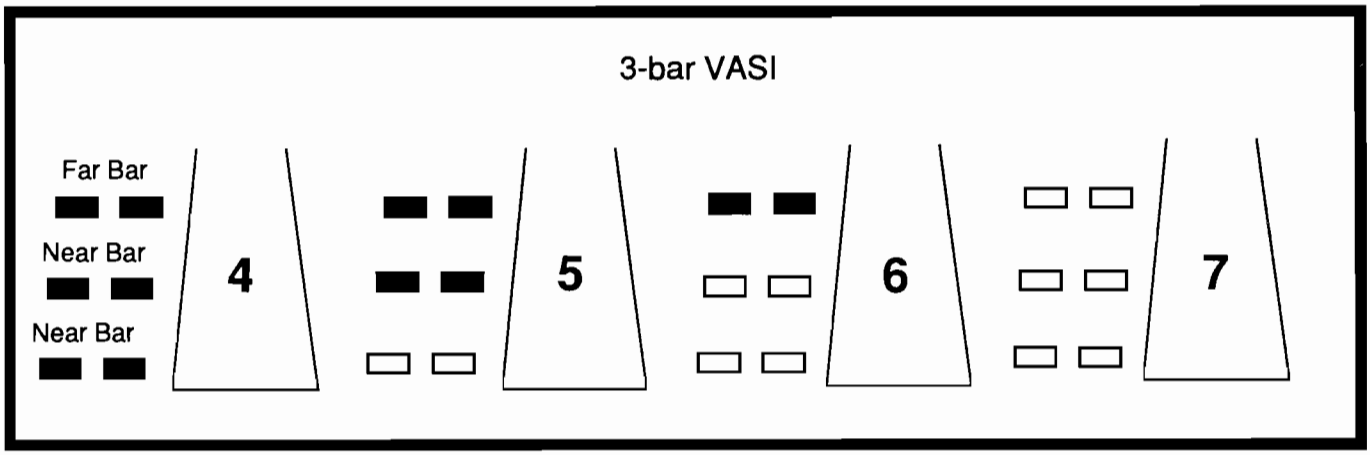

FIGURE 135.—3-BAR VASI.

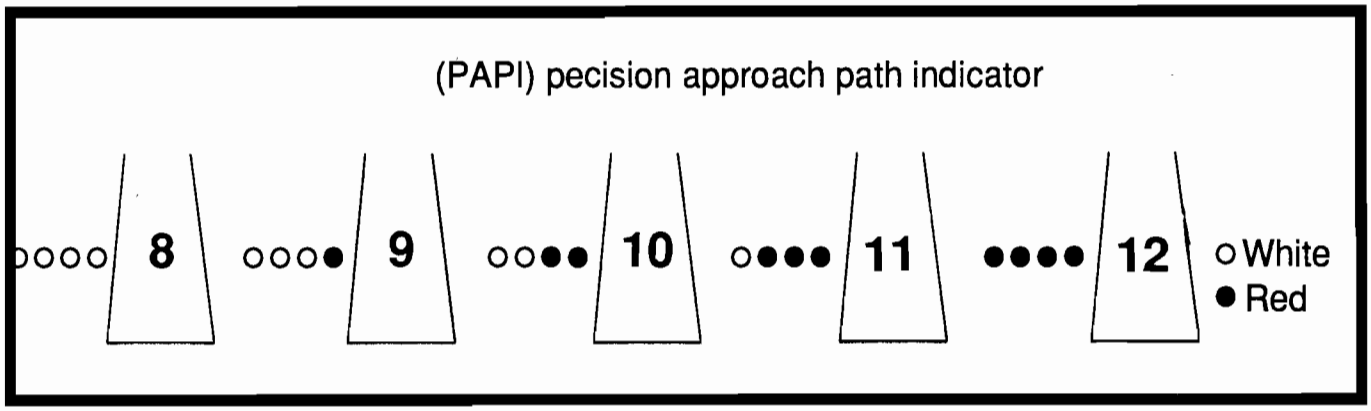

FIGURE 136.—Precision Approach Path Indicator (PAPI).

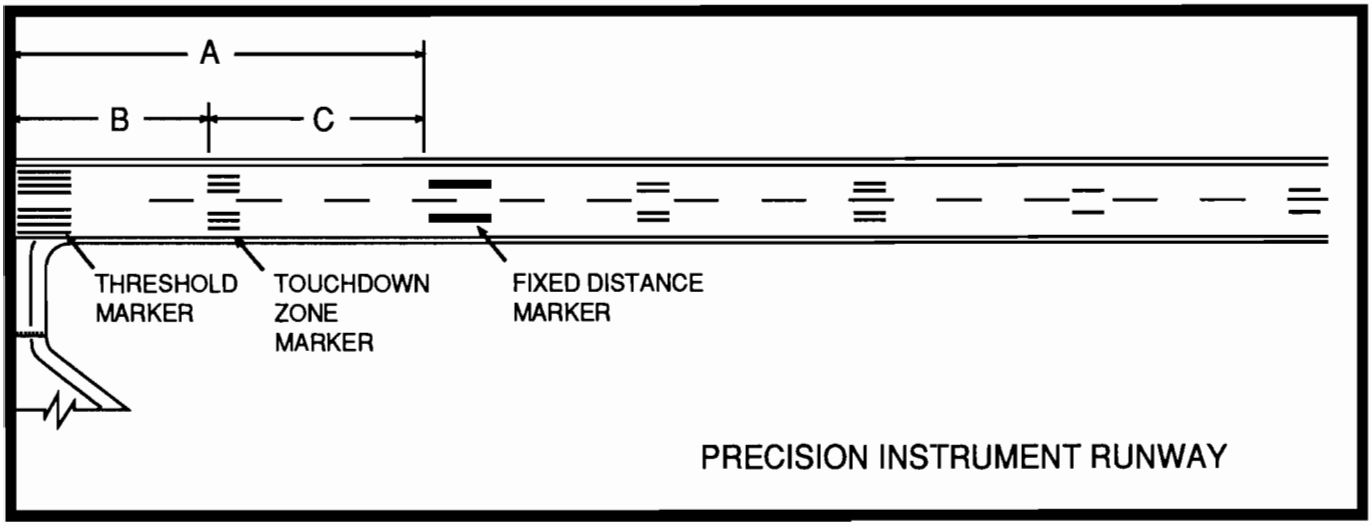

FIGURE 137.—Precision Instrument Runway.

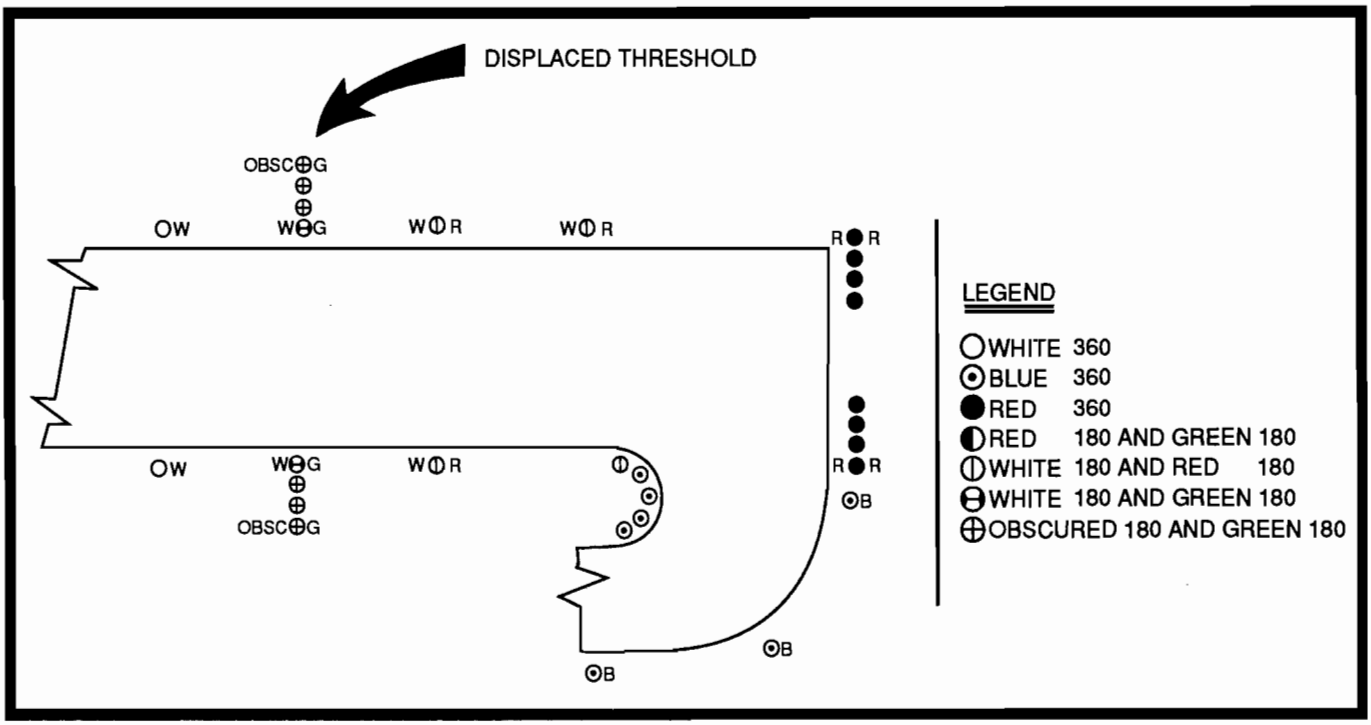

FIGURE 138.—Runway Legend.

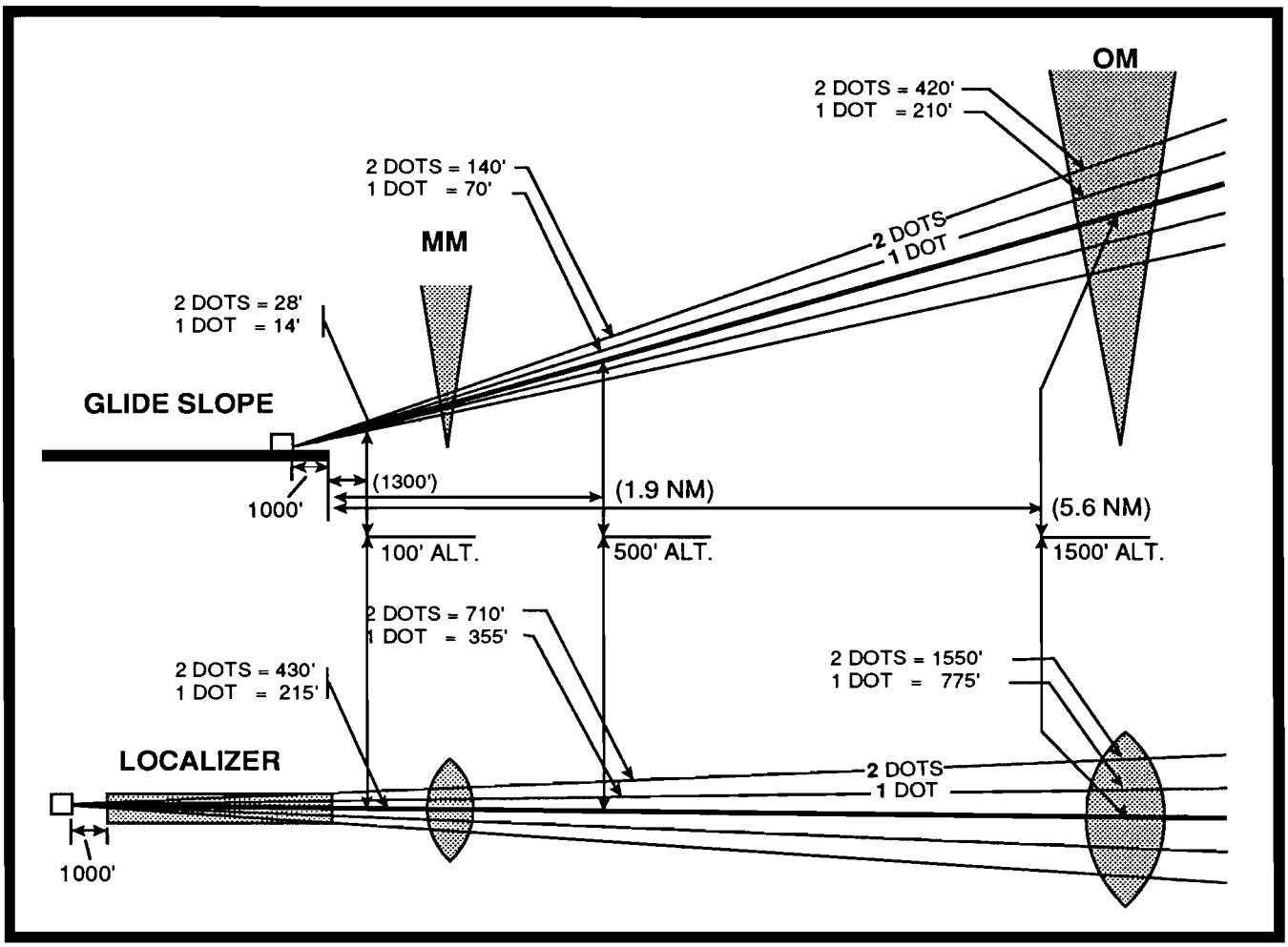

FIGURE 139.—Glide Slope and Localizer Illustration.

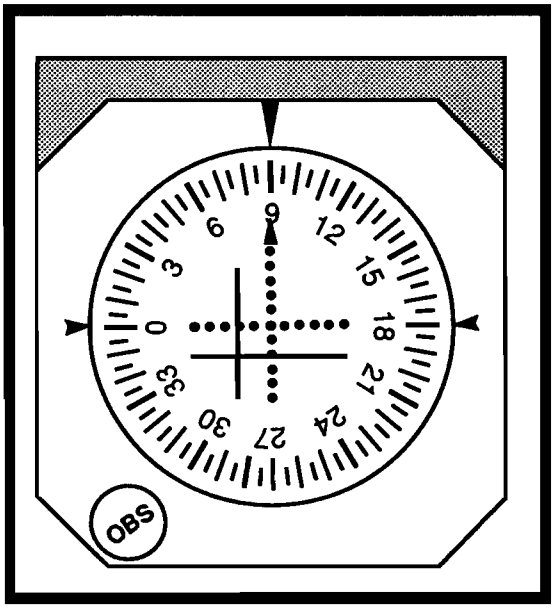

FIGURE 140.—OBS, ILS, and GS Displacement.

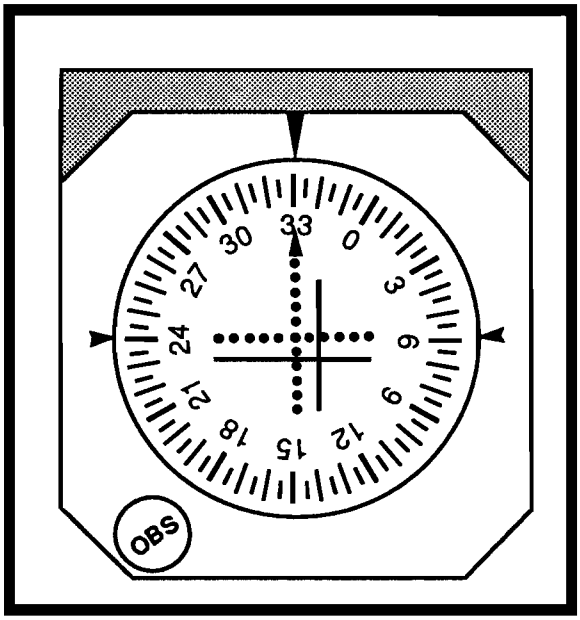

FIGURE 141.—OBS, ILS, and GS Displacement.

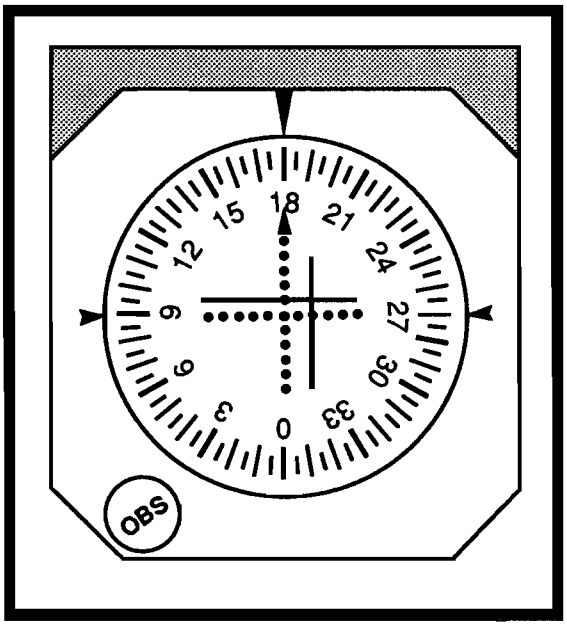

FIGURE 142.—OBS, ILS, and GS Displacement.

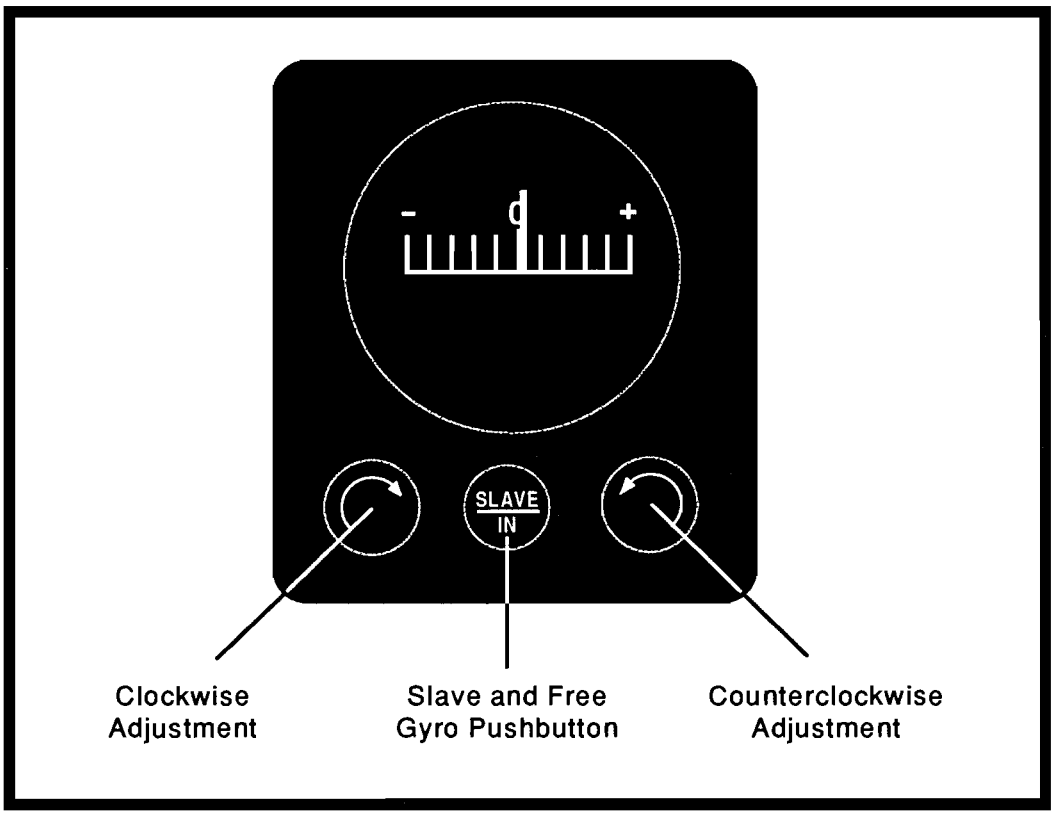

FIGURE 143.—Slaved Gyro Illustration.

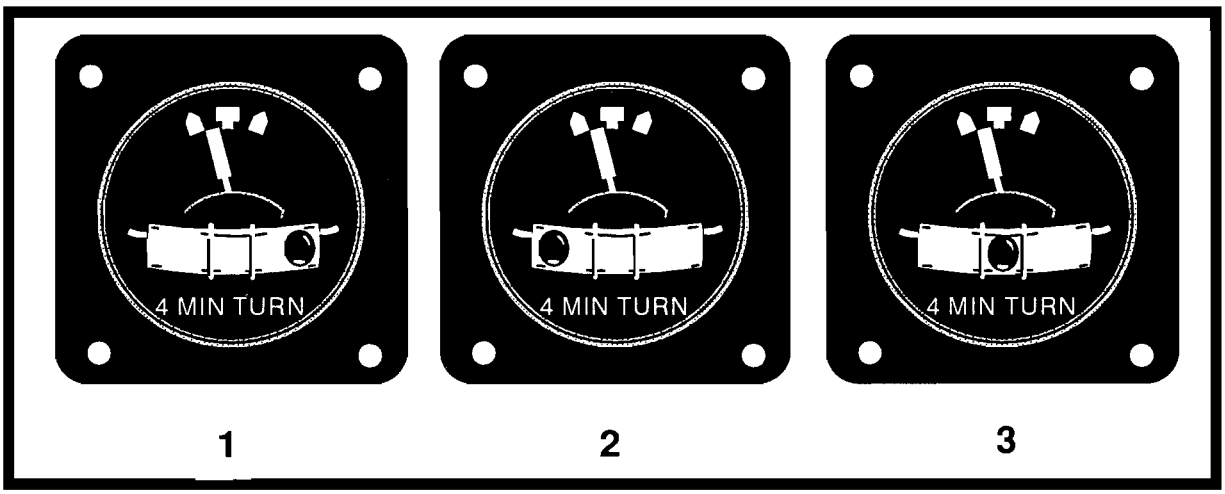

FIGURE 144.—Turn-and-Slip Indicator.

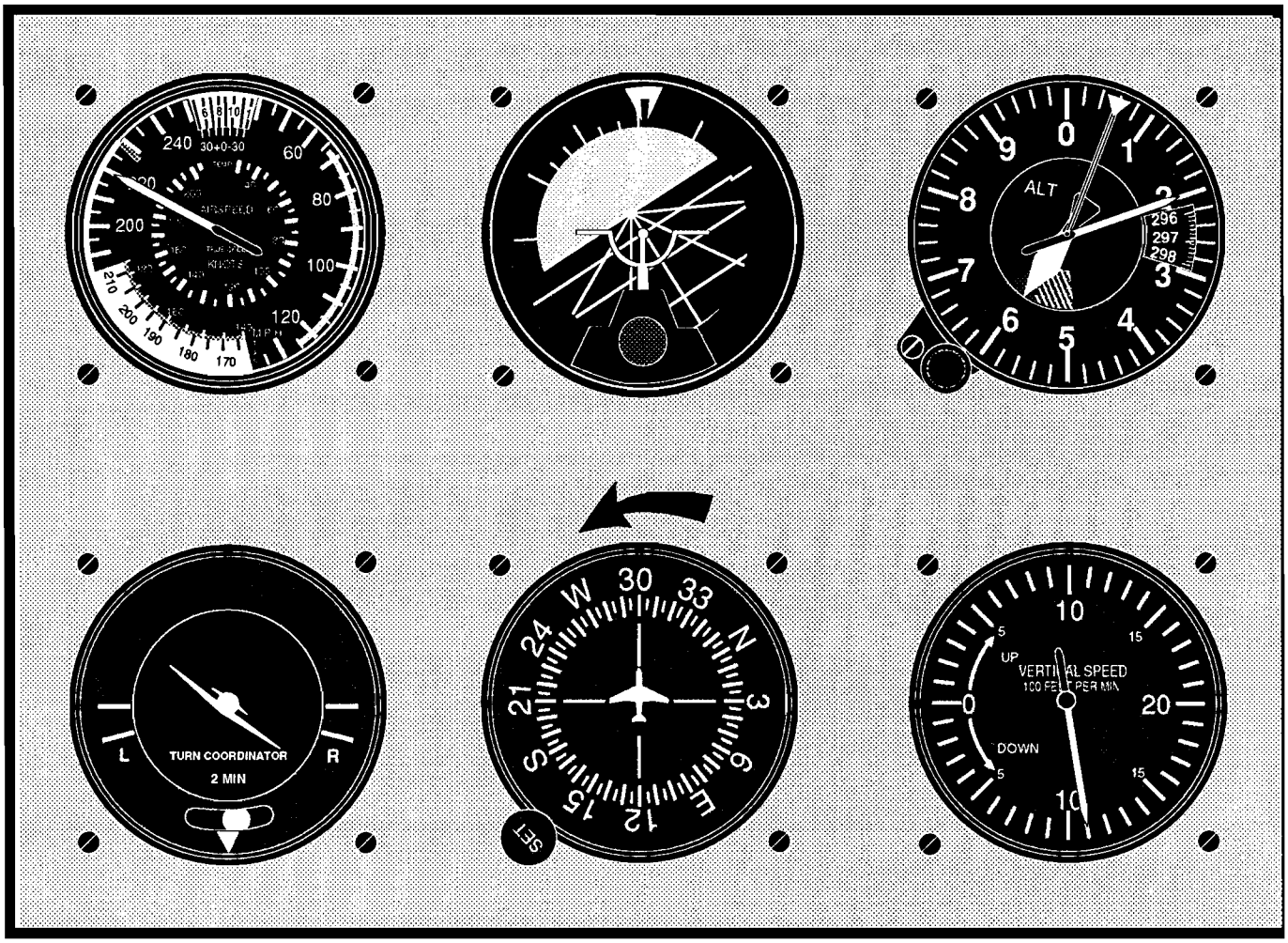

FIGURE 145.—Instrument Sequence (Unusual Attitude).

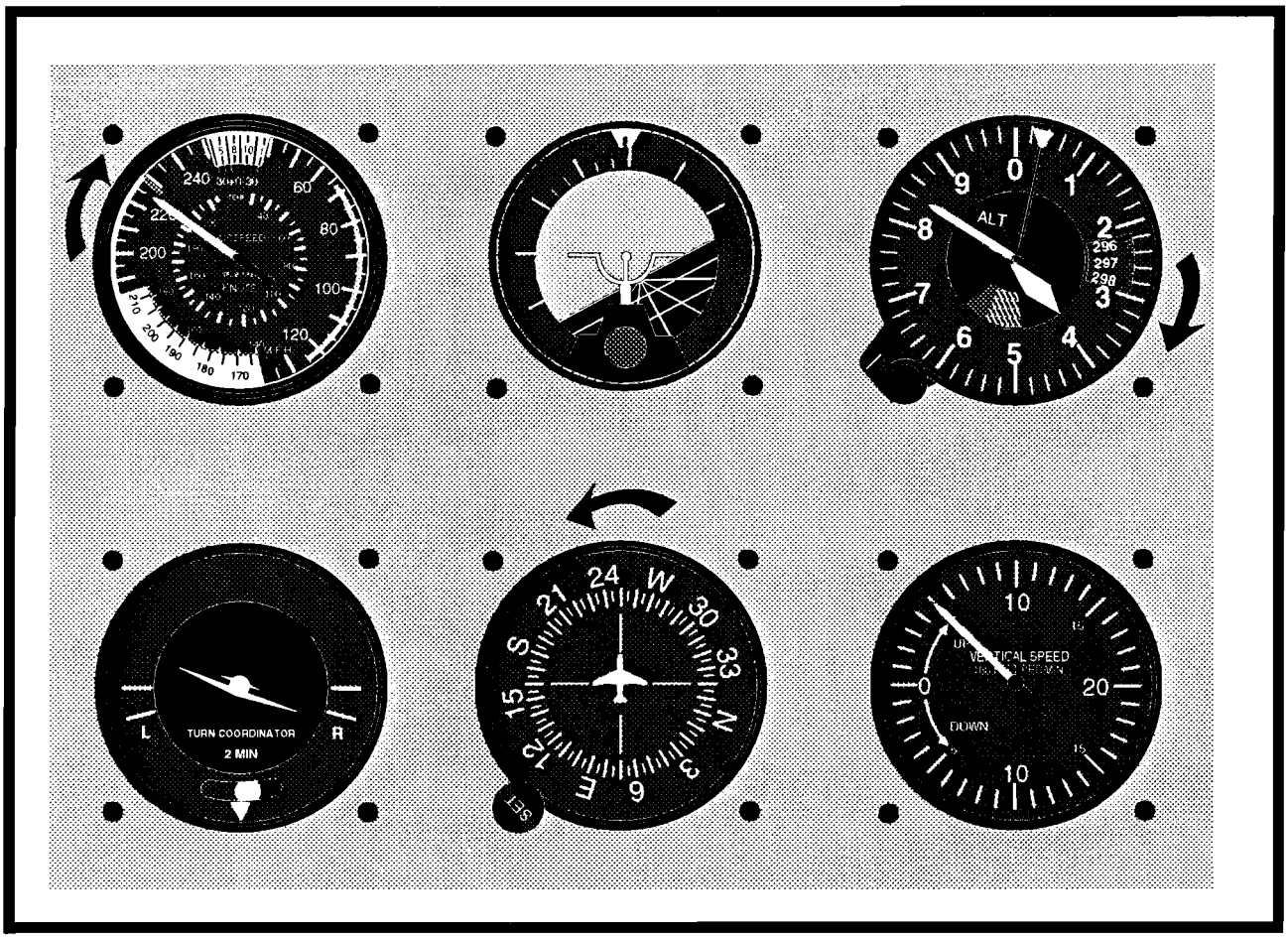

FIGURE 146.—Instrument Sequence (System Failed).

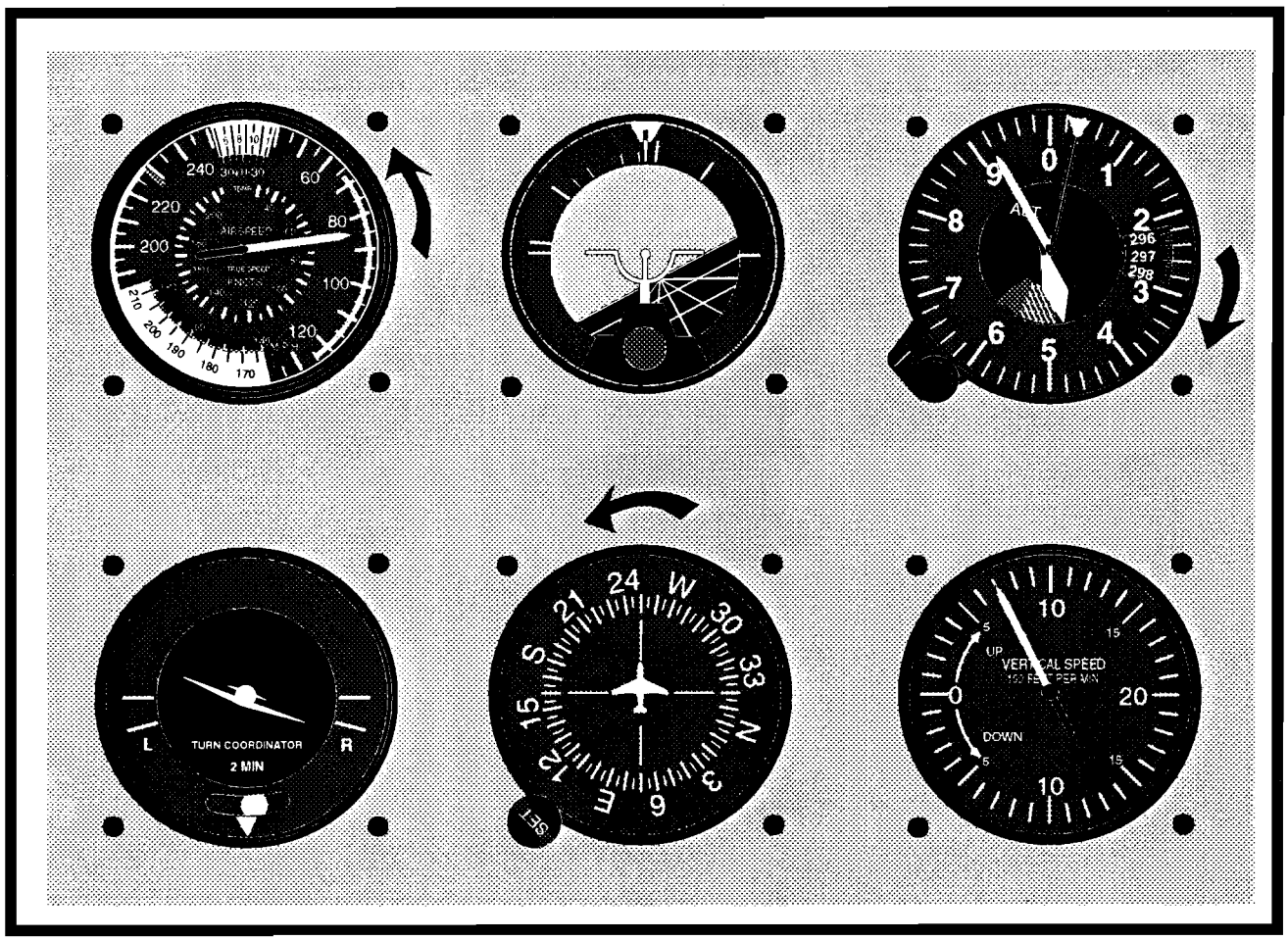

FIGURE 147.—Instrument Sequence (Unusual Attitude).

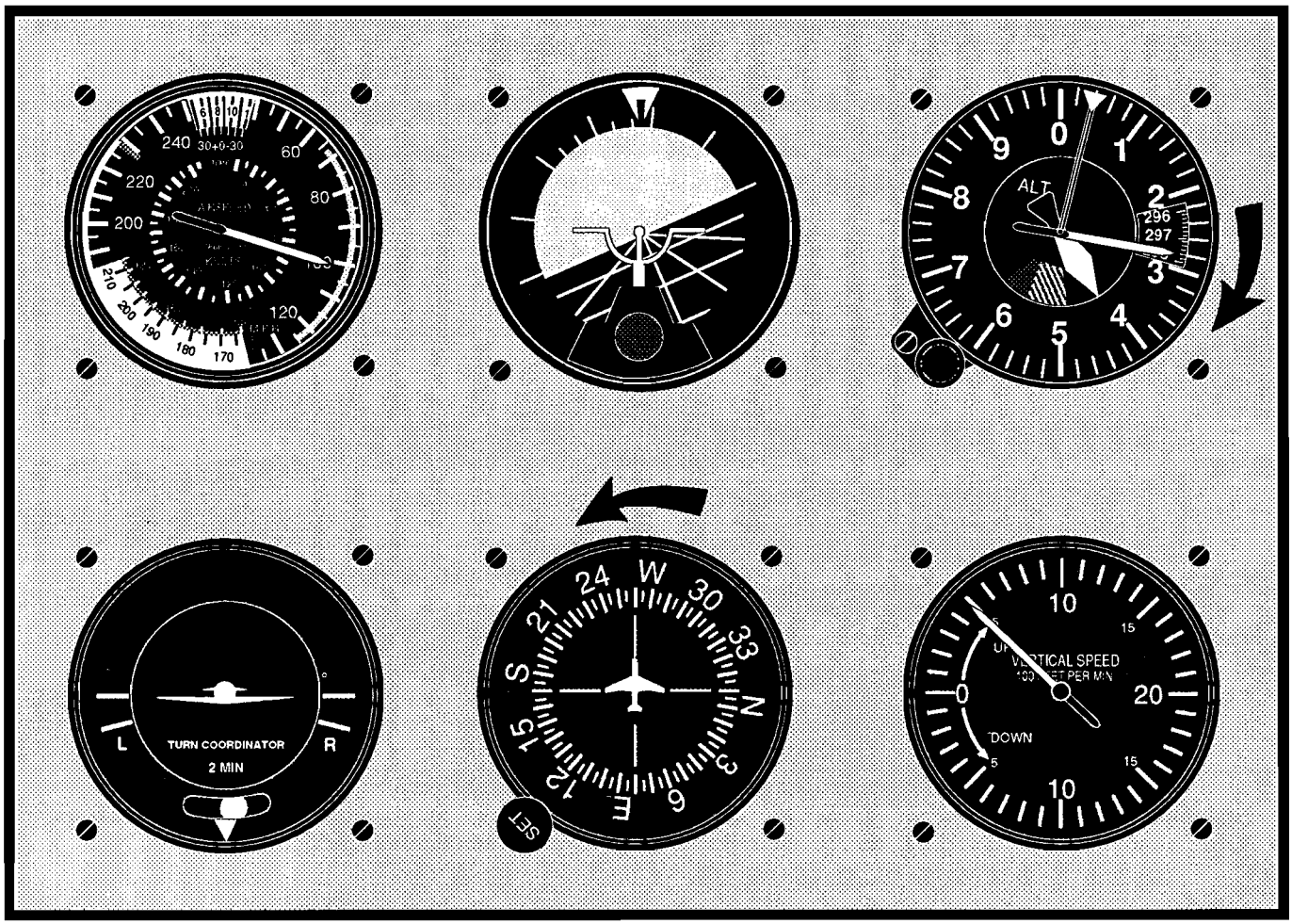

FIGURE 148.—Instrument Interpretation (System Malfunction).

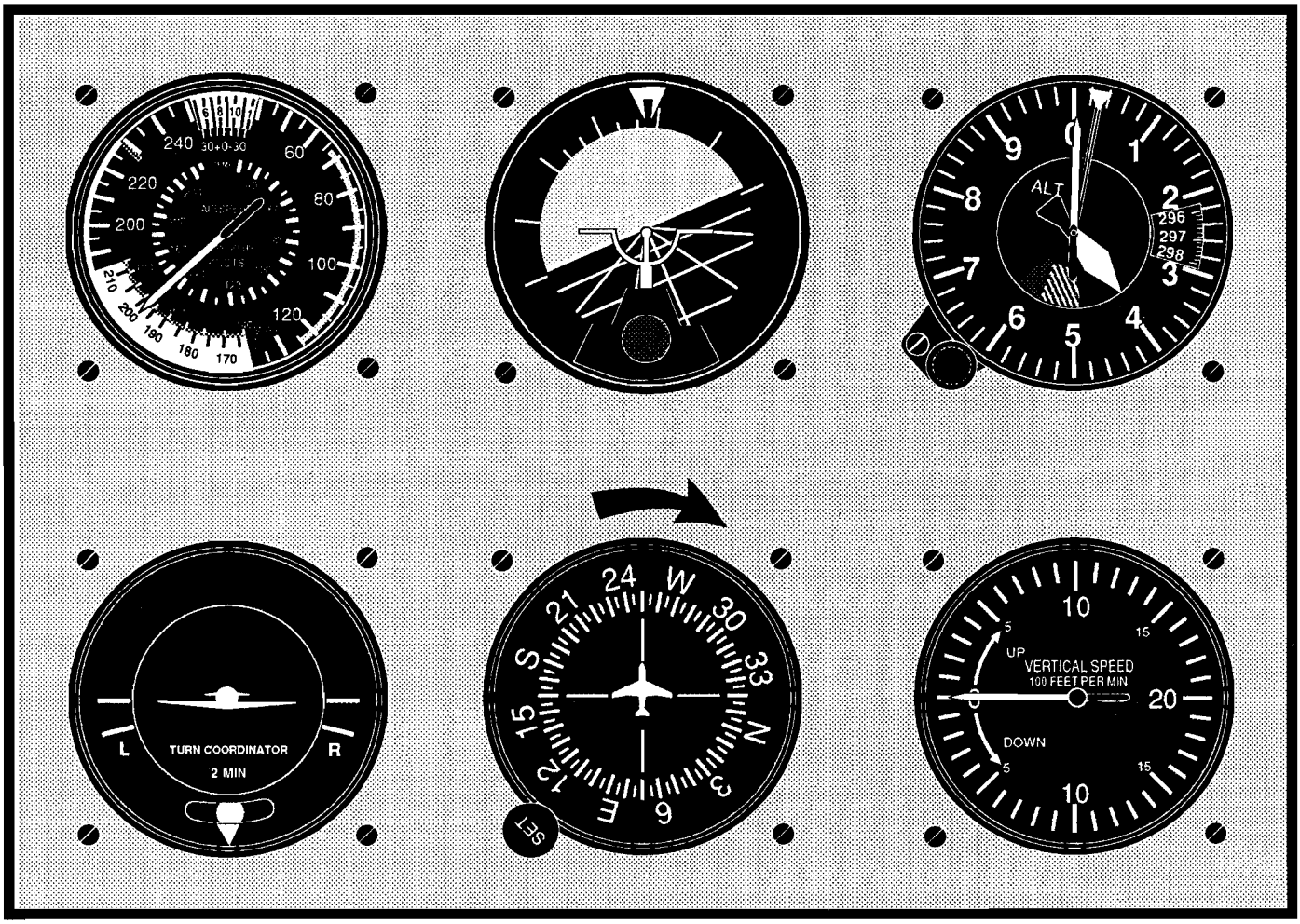

FIGURE 149.—Instrument Interpretation (System Malfunction).

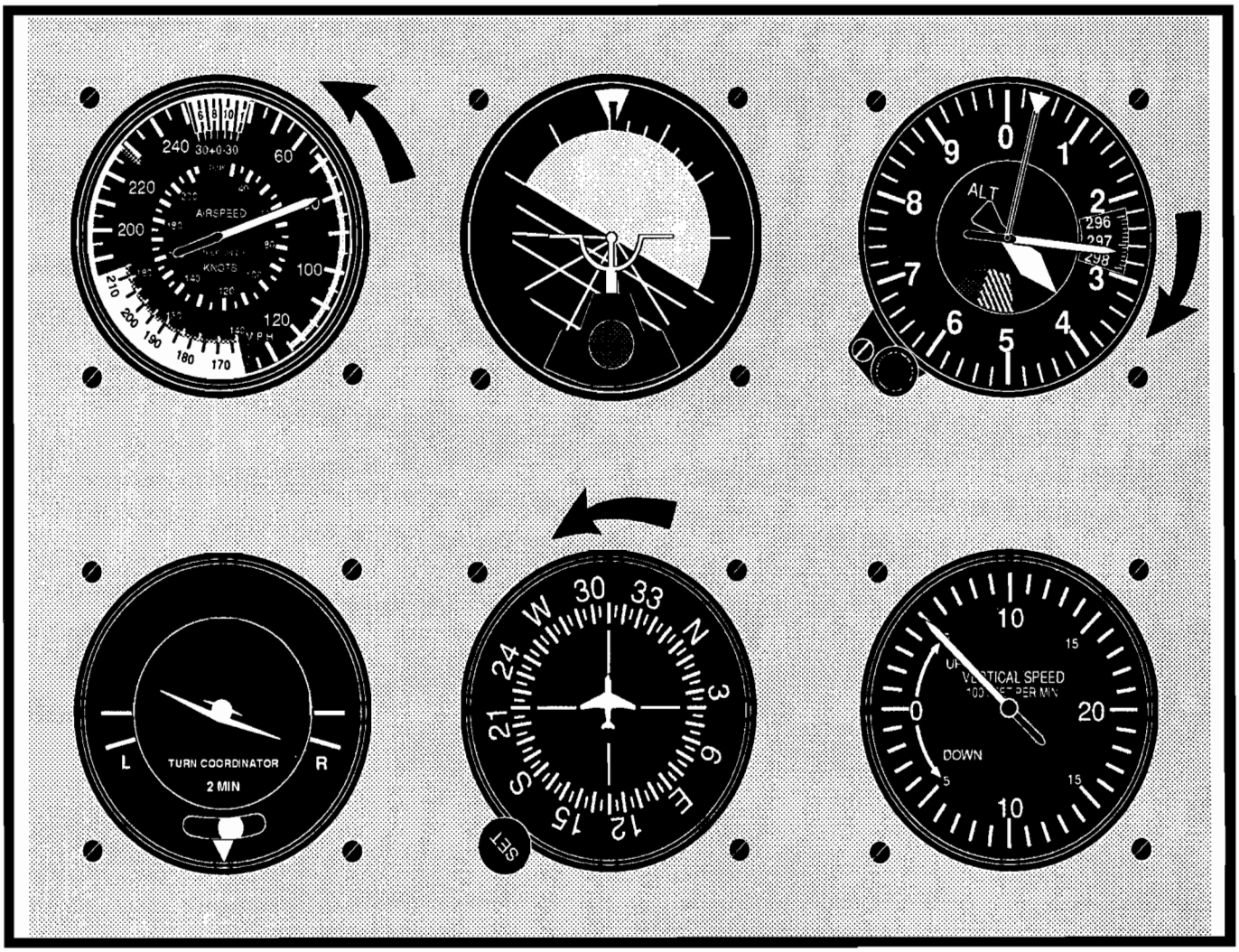

FIGURE 150.—Instrument Interpretation (Instrument Malfunction).

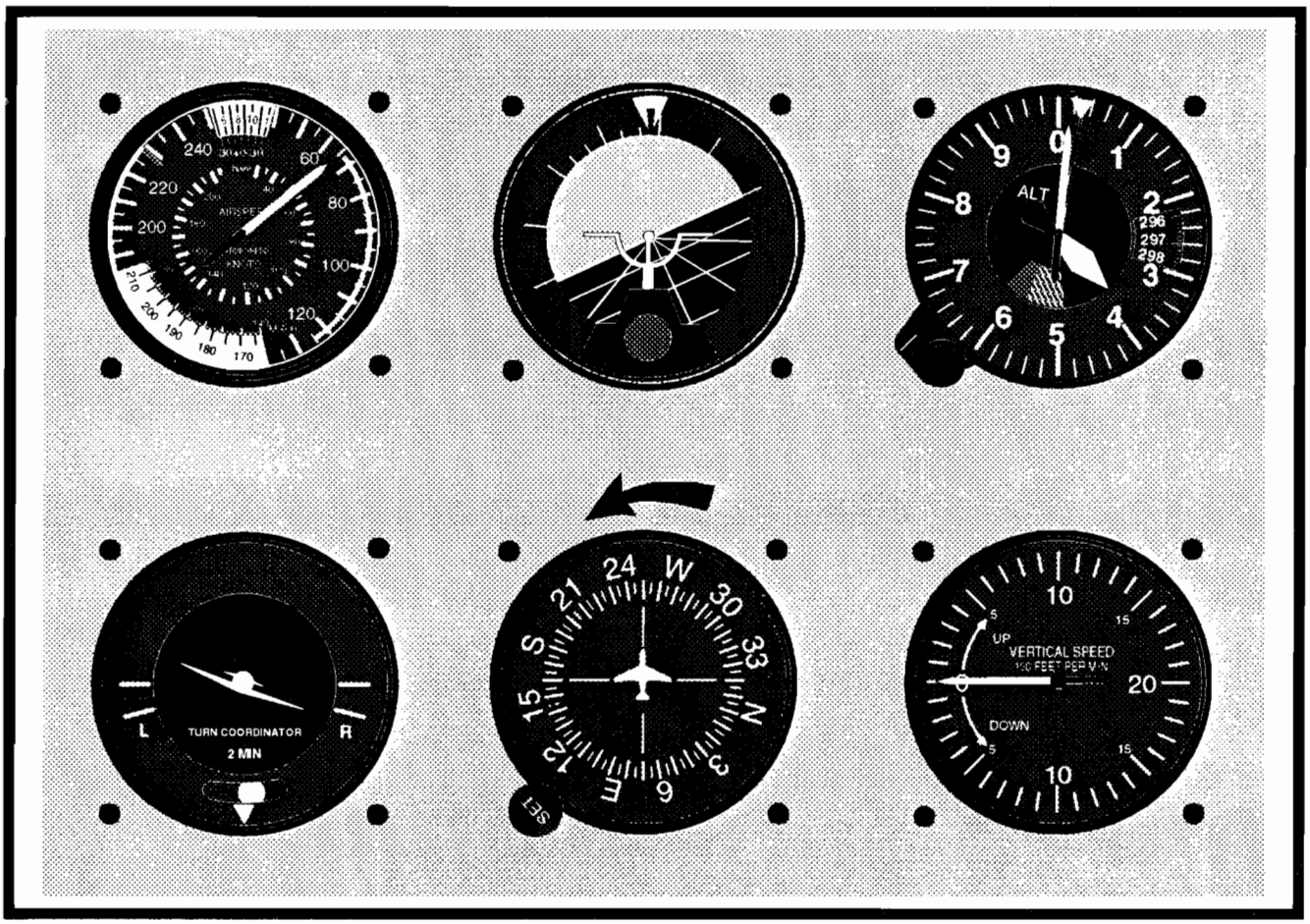

FIGURE 151.—Instrument Interpretation (Instrument Malfunction).

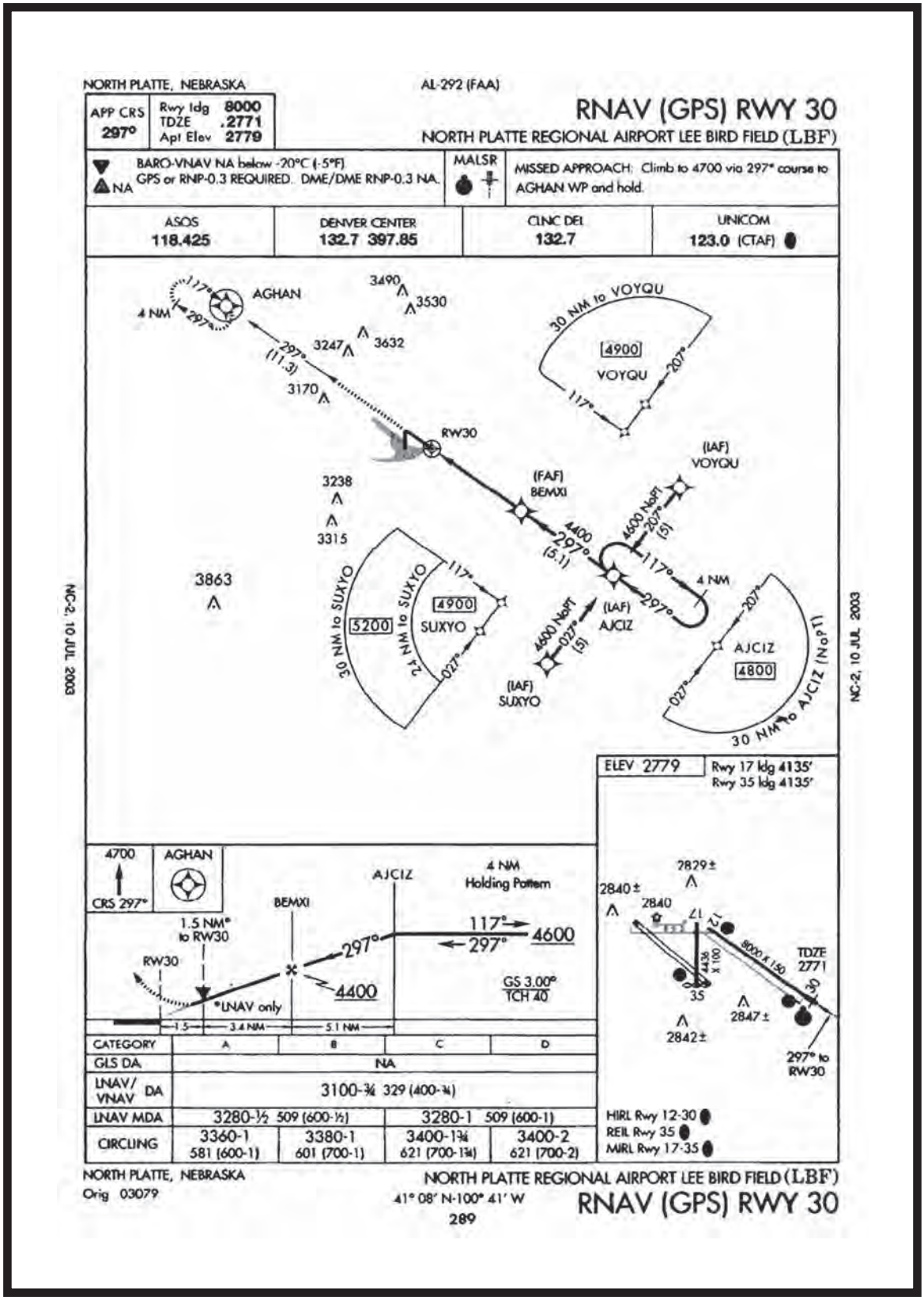

FIGURE 152.—RNAV (GPS) RWY 30, North Plate Regional Airport Lee Bird Field (LBF).

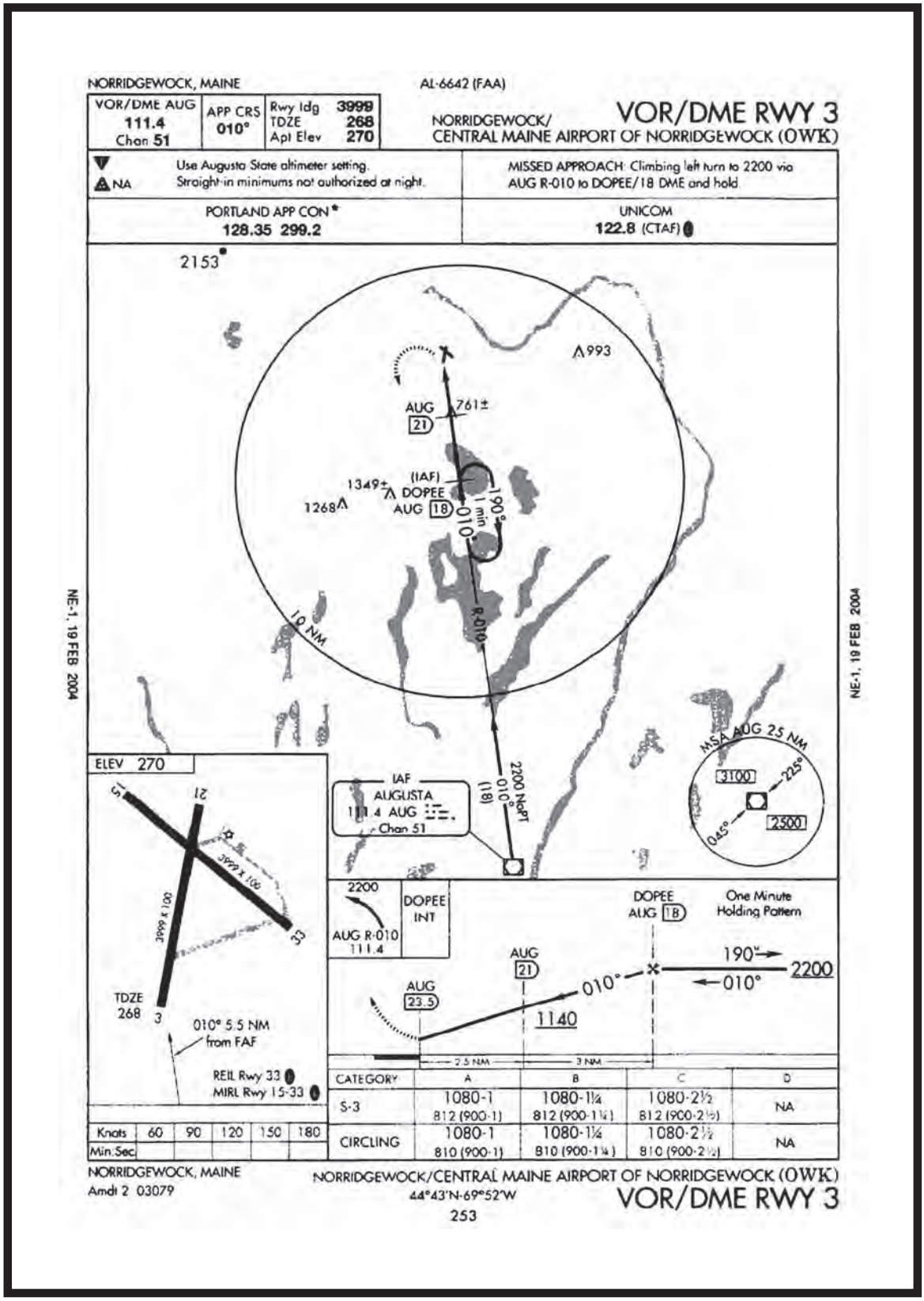

FIGURE 153.—VOR/DME RWY 3, Norridgewock/Central Maine Airport of Norridgewock (OWK).

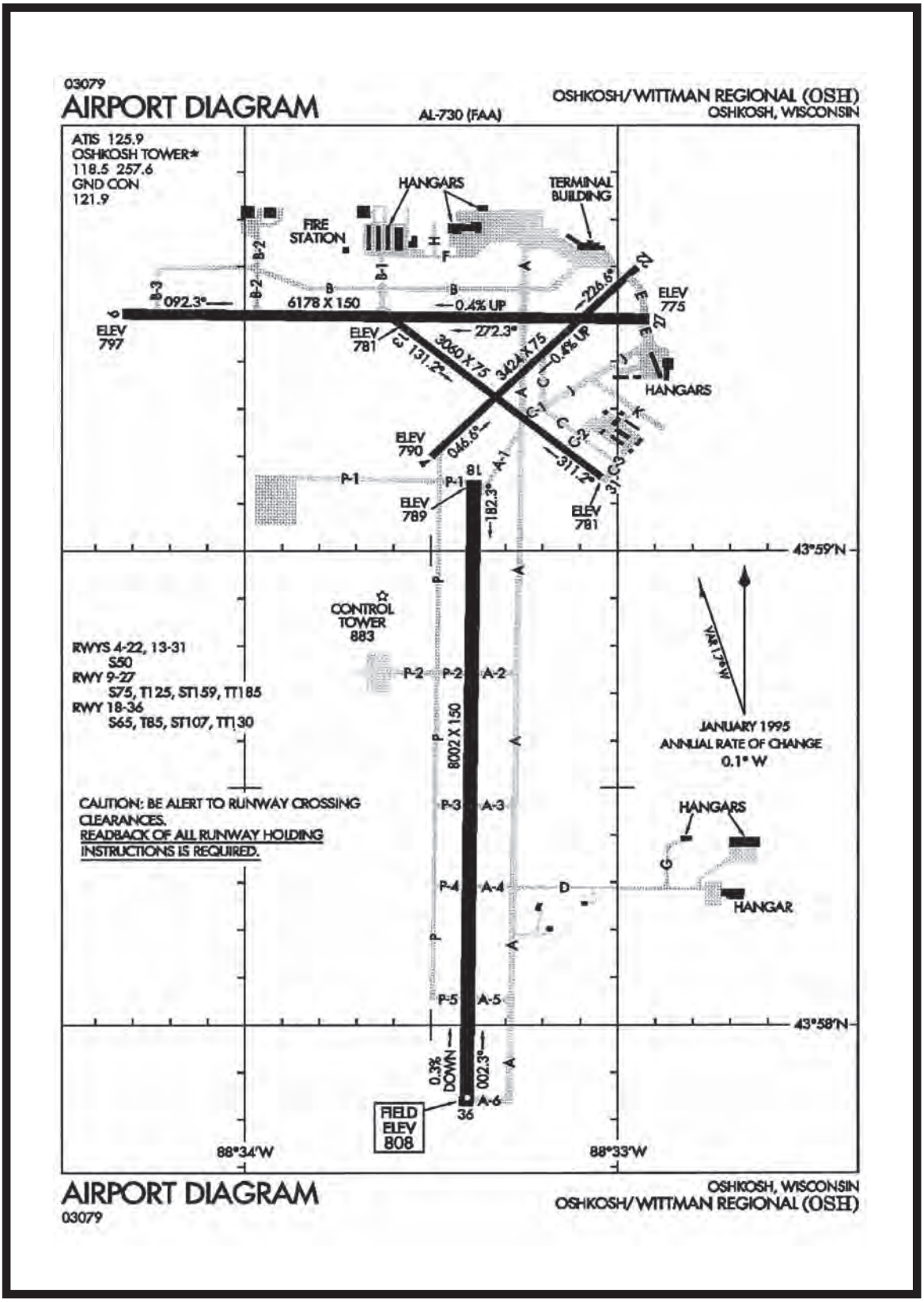

FIGURE 154.—Osh Kosh/Wittman Regional (OSH).