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COMPUTER TESTING SUPPLEMENT FOR AIRLINE TRANSPORT PILOT AND AIRCRAFT DISPATCHER

DO NOT MARK IN THIS BOOK

U.S. Department of Transportation
Federal Aviation Administration

COMPUTER TESTING SUPPLEMENT
FOR
AIRLINE TRANSPORT PILOT
AND
AIRCRAFT DISPATCHER

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:

Airline Transport Pilot (FAR 121) Airplane (ATP)
Airline Transport Pilot (FAR 135) Airplane (ATA)
Airline Transport Pilot (FAR 135) Added Rating—Airplane (ARA)
Airline Transport Pilot (FAR 135) Helicopter (ATH)
Airline Transport Pilot (FAR 135) Added Rating—Helicopter (ARH)
Aircraft Dispatcher

FAA-CT-8080-7C supercedes FAA-CT-8080-7B dated 1998.

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
P.O. Box 25082
Oklahoma City, OK 73125

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APPENDIX 1

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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
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
CTAF	Common Traffic Advisory Frequency
CW	Clockwise
DH	Decision Heights
DME	Distance Measuring Equipment
DR	Dead Reckoning
ELEV	Elevation
FAF	Final Approach Fix
FM	Fan Marker
GPI	Ground Point of Interception
GPS	Global Positioning System
GS	Glide Slope
HAA	Height Above 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	Low Intensity Runway Lights
LOC	Localizer
LR	Lead Radial. Provides 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 Systems 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-directional Radio Beacon
NM	Nautical Miles
NoPT	No Procedure Turn Required (Procedure Turn shall not be executed without ATC clearance)
ODALS	Omnidirectional Approach Light System
OM	Outer Marker
R	Radial
RA	Radio Altimeter setting height
Radar Required	Radar vectoring required for this approach
RAIL	Runway Alignment Indicator Lights
RBn	Radio Beacon
RCLS	Runway Centerline Light System
REIL	Runway End Identifier Lights
RNAV	Area Navigation
RPI	Runway Point of Intercept(ion)
RRL	Runway Remaining Lights
Runway Touchdown Zone	First 3000' of Runway
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	Touchdown 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
WPT	Waypoint (RNAV)
X	Radar Only Frequency

PILOT CONTROLLED AIRPORT LIGHTING SYSTEMS

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

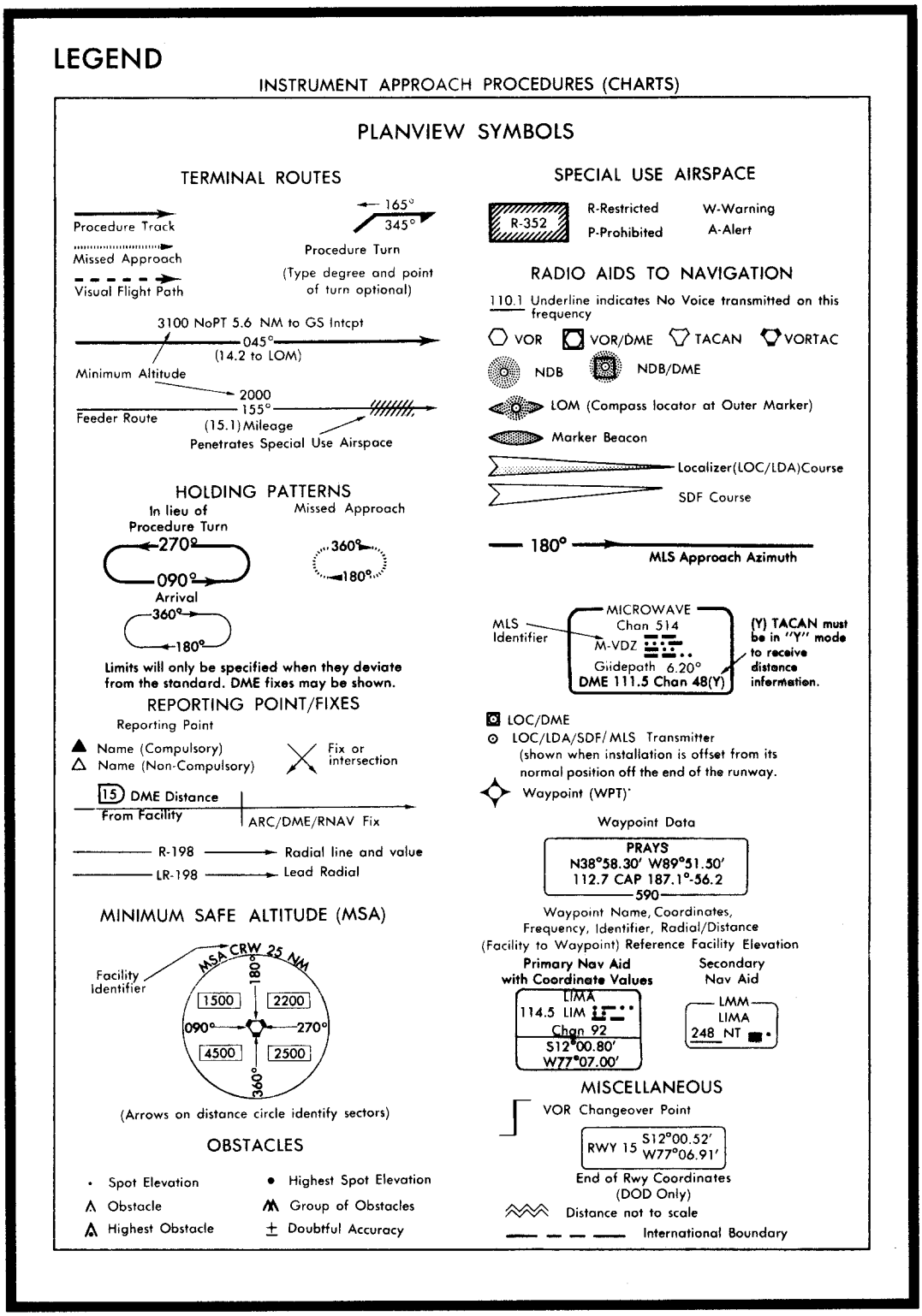
1. Approach lighting systems that bear a system identification are symbolized using negative symbology, e.g., (A1), (V), (✪)
2. Approach lighting systems that do not bear a system identification are indicated with a negative " (L) " beside the name.

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

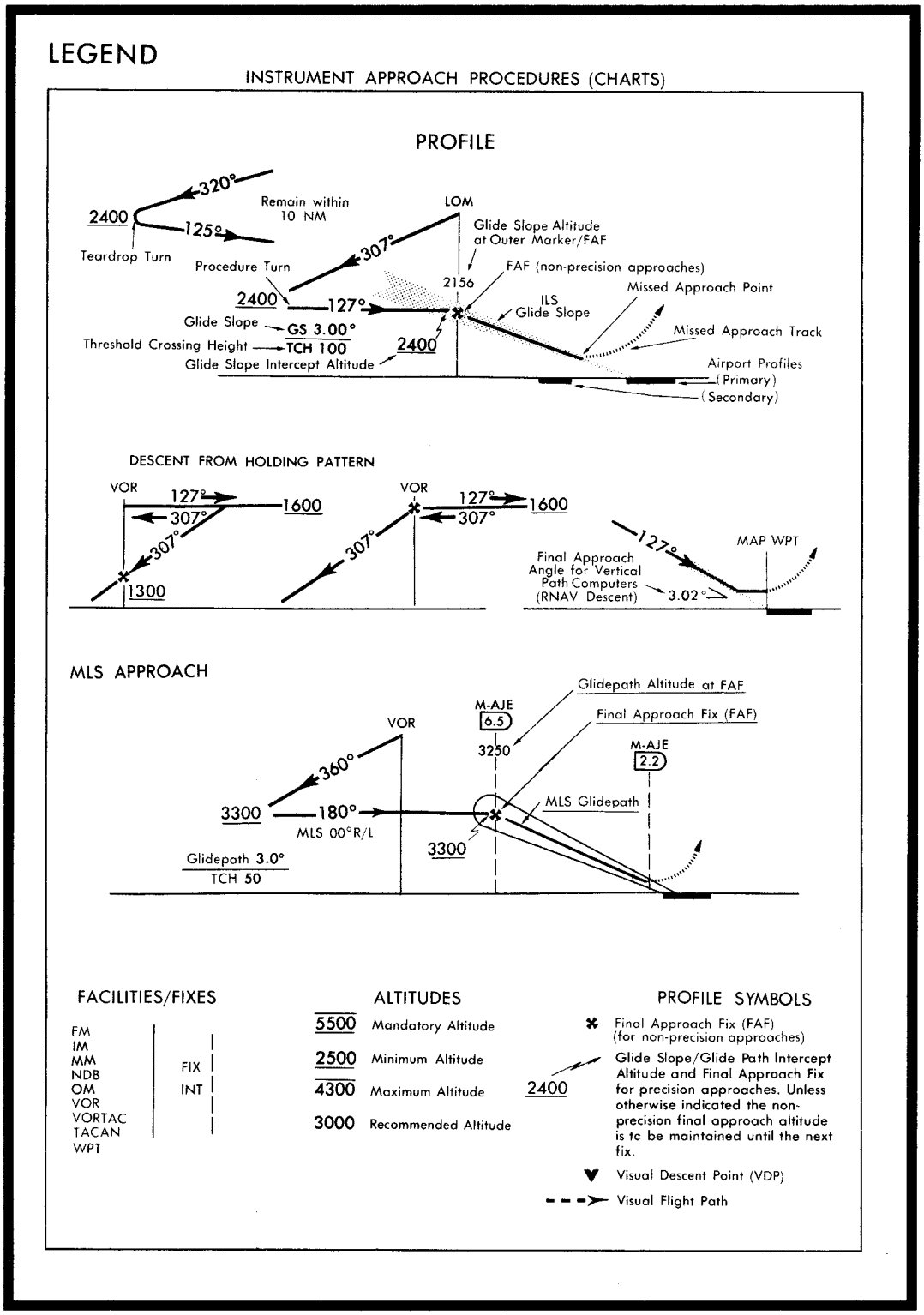
To activate lights use frequency indicated in the communication section of the chart with a (L) or the appropriate lighting system identification e.g., UNICOM 122.8 (L), (A1), (V)

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)

LEGEND 1.—General Information and Abbreviations.



LEGEND 2.—Planview Symbols.



LEGEND 3.—Profile.

94286

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 overruns or 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'.

Runway Weight Bearing Capacity is shown as a codified expression. Refer to the appropriate Supplement/Directory for applicable codes, e.g., RWY 14-32 S75, T185, ST175, TT325

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 or longer.

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

Approach light symbols are shown in the Flight Information Handbook.

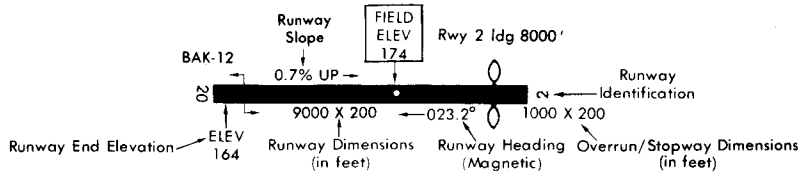
Airport diagram scales are variable.

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 accuracy within ±600 feet unless otherwise noted on the chart.

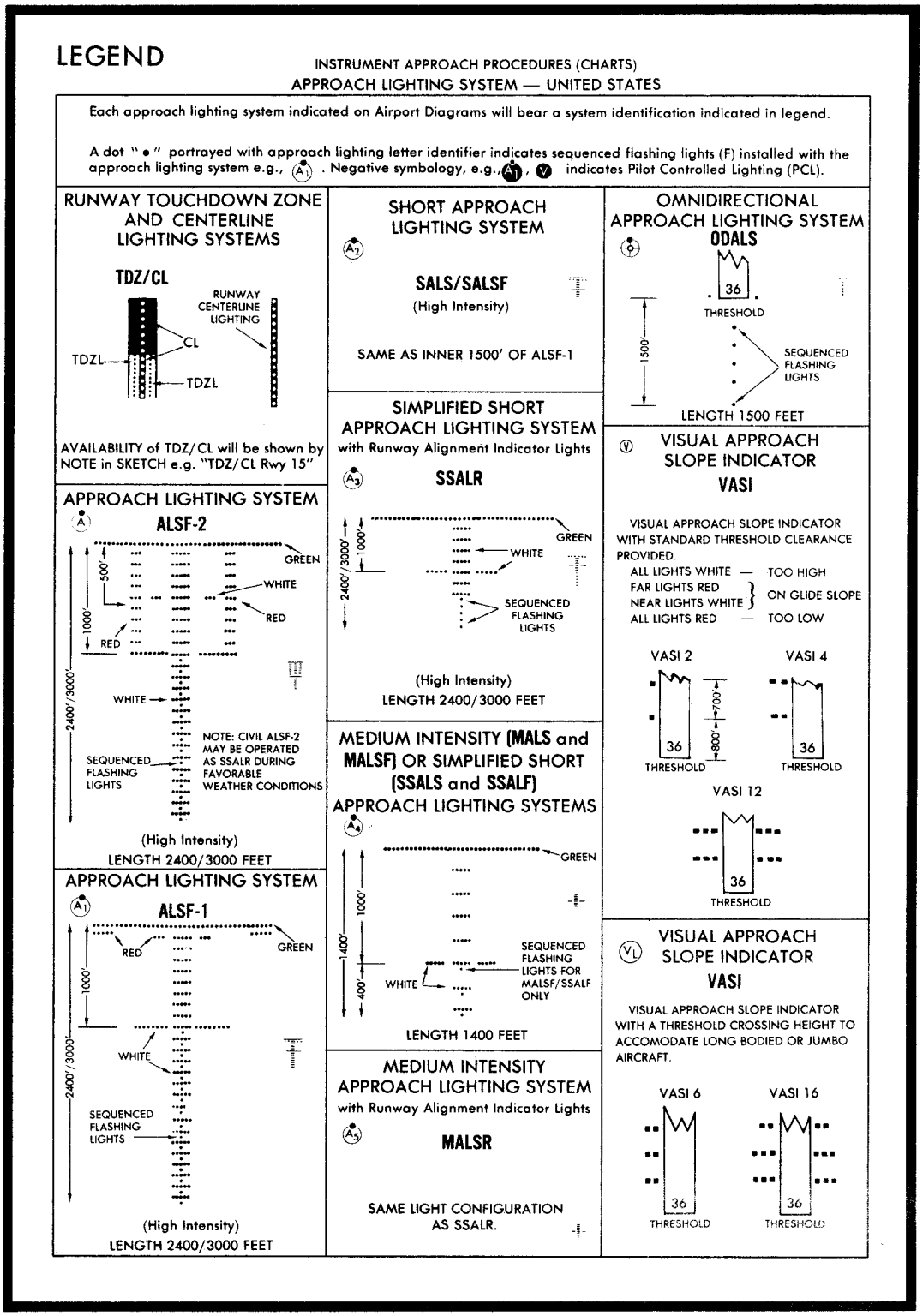
NOTE:
All new and revised airport diagrams are shown referenced to the World Geodetic System (W G S) (noted on appropriate diagram), and may not be compatible with local coordinates published in FLIP. (Foreign Only)



SCOPE

Airport diagrams are specifically designed to 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) aboard 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.

LEGEND 4.—Airport Diagram/Airport Sketch.



LEGEND 5.—Approach Lighting System—United States.

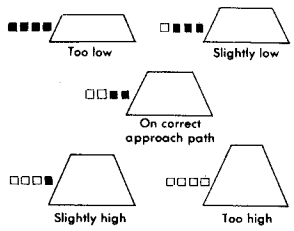
94286
LEGEND

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.

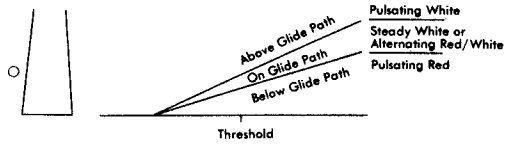
A dot " • " portrayed with approach lighting letter identifier indicates sequenced flashing lights (F) installed with the approach lighting system e.g., (A•1) Negative symbology, e.g., (A•1), (V) indicates Pilot Controlled Lighting (PCL).

(P) PRECISION APPROACH PATH INDICATOR
PAPI



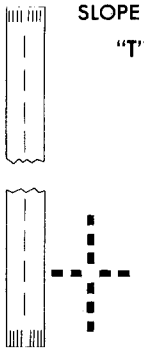
Legend: □White ■ Red

(V2) PULSATING VISUAL APPROACH SLOPE INDICATOR
PVASI



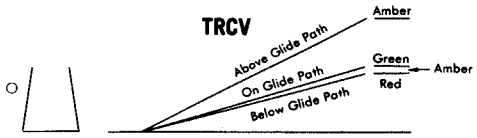
CAUTION: When viewing the pulsating visual approach slope indicators in the pulsating white or pulsating red sectors, it is possible to mistake this lighting aid for another aircraft or a ground vehicle. Pilots should exercise caution when using this type of system.

(V1) "T"-VISUAL APPROACH SLOPE INDICATOR
"T"-VASI



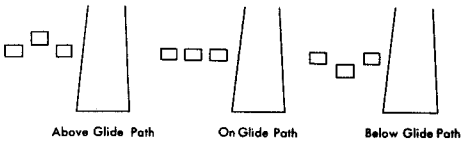
"T" ON BOTH SIDES OF RWY ALL LIGHTS VARIABLE WHITE. CORRECT APPROACH SLOPE-ONLY CROSS BAR VISIBLE. UPRIGHT "T" - FLY UP INVERTED "T" - FLY DOWN RED "T" - GROSS UNDERSHOOT.

(VT) 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.

(VA) ALIGNMENT OF ELEMENTS SYSTEMS
APAP



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

LEGEND 6.—Approach Lighting System—United States.

TERMS/LANDING MINIMA DATA

IFR LANDING MINIMA

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 portrayal of landing minima is as follows:

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 approach Category B minimums when circling to land. See following category limits:

MANEUVERING TABLE

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

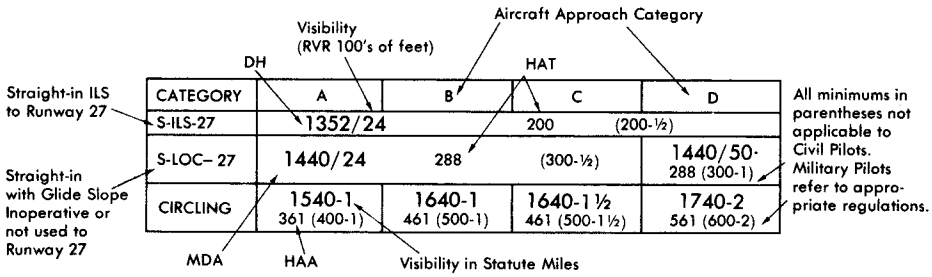
RVR/Meteorological Visibility Comparable Values

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

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

LANDING MINIMA FORMAT

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



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

LEGEND 7.—IFR Landing Minima.

TERMS/LANDING MINIMA DATA

91262

RADAR MINIMA

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

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—¾)				
ASR	10		ABC	**560**/40	463	(500—¾)	D	**560**/50	463	(500—1)
			E	**580**/60	463	(500—1¾)				
	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)				

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.

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

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

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

EXPLANATION OF TERMS

The United States Standard for Terminal Instrument Procedures (TERPS) is the approved criteria for formulating instrument approach procedures.

LEGEND 8.—Radar Minima.

INSTRUMENT APPROACH PROCEDURE CHARTS
RATE OF DESCENT TABLE
(ft. per min.)

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, attitude combination can be programmed which will result in a stable glide rate and attitude favorable for executing a landing if minimums exist upon breakout. Care should always be exercised so that the minimum descent altitude and missed approach point are not exceeded.

ANGLE OF DESCENT (degrees and tenths)	GROUND SPEED (knots)										
	30	45	60	75	90	105	120	135	150	165	180
2.0	105	160	210	265	320	370	425	475	530	585	635
2.5	130	200	265	330	395	465	530	595	665	730	795
3.0	160	240	320	395	480	555	635	715	795	875	955
3.5	185	280	370	465	555	650	740	835	925	1020	1110
4.0	210	315	425	530	635	740	845	955	1060	1165	1270
4.5	240	355	475	595	715	835	955	1075	1190	1310	1430
5.0	265	395	530	660	795	925	1060	1190	1325	1455	1590
5.5	290	435	580	730	875	1020	1165	1310	1455	1600	1745
6.0	315	475	635	795	955	1110	1270	1430	1590	1745	1905
6.5	345	515	690	860	1030	1205	1375	1550	1720	1890	2065
7.0	370	555	740	925	1110	1295	1480	1665	1850	2035	2220
7.5	395	595	795	990	1190	1390	1585	1785	1985	2180	2380
8.0	425	635	845	1055	1270	1480	1690	1905	2115	2325	2540
8.5	450	675	900	1120	1345	1570	1795	2020	2245	2470	2695
9.0	475	715	950	1190	1425	1665	1900	2140	2375	2615	2855
9.5	500	750	1005	1255	1505	1755	2005	2255	2510	2760	3010
10.0	530	790	1055	1320	1585	1845	2110	2375	2640	2900	3165
10.5	555	830	1105	1385	1660	1940	2215	2490	2770	3045	3320
11.0	580	870	1160	1450	1740	2030	2320	2610	2900	3190	3480
11.5	605	910	1210	1515	1820	2120	2425	2725	3030	3335	3635
12.0	630	945	1260	1575	1890	2205	2520	2835	3150	3465	3780

LEGEND 9.—Rate-of-Descent Table.

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 10.—Rate-of-Climb Table.

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 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 category(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
TDZI 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, 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
MALS, SSALS, ODALS	ABD	1/4 mile
	ABC	1/4 mile

LEGEND 11.—Inoperative Components or Visual Aids Table.

DIRECTORY LEGEND

ABBREVIATIONS

The following abbreviations are those commonly used within this directory. Other abbreviations may be found in the Legend and are not duplicated below:

AAS	airport advisory service	ldg	landing
acft	aircraft	med	medium
apch	approach	NFCT	non-federal control tower
arpt	airport	ngt	night
avbl	available	NSTD	nonstandard
bcn	beacon	ntc	notice
blo	below	opr	operate
byd	beyond	ops	operates operation
clsd	closed	ovrn	overrun
ctc	contact	p-line	power line
dalgt	daylight	PPR	prior permission required
dsplc	displace	req	request
dsplcd	displaced	rqr	requires
durn	duration	rgt tfc	right traffic
emerg	emergency	rwy	runway
extd	extend, extended	svc	service
fld	field	tmpry	temporary, temporarily
FSS	Flight Service Station	tkf	takeoff
ints	intensity	tfc	traffic
lgtd	lighted	thld	threshold
lgts	lights	twr	tower

LEGEND 12.—Abbreviations.

2

DIRECTORY LEGEND
SAMPLE

(1) (3) (4) (5) (6) (7)

CITY NAME
AIRPORT NAME (ORL) 4 E UTC-5(-4DT) N28°32.72′ W81°21.17′ **JACKSONVILLE**
200 B S4 **FUEL** 100, JET A OX 1, 2,3 TPA—1000(800) AOE ARFF Index A Not insp. **COPTER**
H-4G, L-19C
IAP (8)

(9) (10) (11) (12) (13) (14) (15) (16) (17)

(18) **RWY 07-25:** H6000X150 (ASPH-PFC) S-90, D-160, DT-300 HIRL CL 0.4% up E
RWY 07: ALSF1. Trees. **RWY 25:** REIL. Rgt tfc.
RWY 13-31: H4620X100 (ASPH) HIRL
RWY 13: SAVASI(S2L)—GA 3.3° TCH 89′. Pole. **RWY 31:** PAPI(P2L)—GA 3.1° TCH 36′. Tree. Rgt tfc.
RUNWAY DECLARED DISTANCE INFORMATION

RWY 07:	TORA-6000	TODA-6700	ASDA-5700	LDA-5500
RWY 25:	TORA-6000	TODA-6000	ASDA-6000	LDA-5700
RWY 13:	TORA-4620	TODA-4620	ASDA-4420	LDA-4420
RWY 31:	TORA-4620	TODA-4620	ASDA-4620	LDA-4420

(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: ATIS** 127.25 **UNICOM** 122.95
NAME FSS (ORL) on arpt. 123.65 122.65 122.2. TF 1-800-WX-BRIEF. NOTAM FILE ORL. (2)
Ⓡ **NAME APP/DEP CON** 128.35 (1200-0400Z‡)
TOWER 118.7 **GND CON** 121.7 **CLNC DEL** 125.55 **PRE TAXI CLNC** 125.5
(22) **AIRSPACE: CLASS B** See VFR Terminal Area Chart.
(23) **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° beyond 15 NM below 5000′.
HERNY NDB (LOM) 221 OR N28°30.40′ W81°26.05′ 067° 5.4 NM to fld.
ILS 109.9 I-ORL Rwy 07. LOM HERNY NDB.
ASR/PAR
(24) **COMM/NAVAID REMARKS:** Emerg frequency 121.5 not available at tower.

• •

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.

D AIRPORT NAME (MCO) 6 SE UTC-5(-4DT) N28°25.88′ W81°19.48′ **JACKSONVILLE**
96 B **FUEL** 100, JET A, MOGAS LRA **H-4G, L-19C**
RWY 18R-36L: H12004X300 (CONC-GRVD) S-100, D-200, DT-400 HIRL **IAP**
RWY 18R: ALSF1. REIL. Rgt tfc. 0.3% up. **RWY 36L:** ALSF1. 0.4% down.
RWY 18L-36R: H12004X200 (ASPH) S-165, D-200, DT-400 HIRL
RWY 18L: LDIN. ALSF1. TDZ. REIL. VASI(V4L)—GA 3.5° TCH 36′. Thld dsplcd 300′. Trees. Rgt tfc. Arresting device.
AIRPORT REMARKS: Attended 1200-0300Z‡. ACTIVATE HIRL Rwy 18L-36R—CTAF.
COMMUNICATIONS: CTAF 124.3 **ATIS** 127.75 **UNICOM** 122.8
NAME FSS (MCO) TF 1-800-WX-BRIEF. LC 894-0869. NOTAM FILE MCO.
Ⓡ **APP CON** 124.8 (337°-179°) 120.1 (180°-336°) **DEP CON** 120.15
TOWER 124.3 NFCT (1200-0400Z‡) **GND CON** 121.85 **CLNC DEL** 134.7
AIRSPACE: CLASS D svc effective 1200-0400Z‡ other times CLASS E.
RADIO AIDS TO NAVIGATION: NOTAM FILE MCO.
(H) VORTAC 112.2 MCO Chan 59 N28°32.55′ W81°20.12′ 173° 5.7 NM to fld. 1110/8E. **HIWAS.**
MLS Chan 514 Rwy 36R

All Bearings and Radials are Magnetic unless otherwise specified.
All mileages are nautical unless otherwise noted.
All times are UTC except as noted.
HORIZONTAL DATUM: Alaska, Canada and Conterminous United States based on 1983 North American Datum.
All other areas based on local datum.

LEGEND 13.—Directory Legend Sample.

DIRECTORY LEGEND 3

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 Airman's 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 page.

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 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.

③ 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.

④ 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.

⑤ 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 and that portion of Indiana in the Eastern Time Zone and Puerto Rico and the Virgin Islands.

⑥ GEOGRAPHIC POSITION OF AIRPORT

Positions are shown in degrees, minutes and hundredths of a minute.

⑦ 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.

⑧ INSTRUMENT APPROACH PROCEDURES

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

⑨ ELEVATION

Elevation is given in feet above mean sea level and is the highest point on the landing surface. 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 14.—Directory Legend.

4

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-50°C.
A1 +	Jet A-1—Kerosene with icing inhibitor, freeze point-50° 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.
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 cetificate 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.

LEGEND 15.—Directory Legend.

DIRECTORY LEGEND 5

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.

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, gradient 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.

RUNWAY LIGHTING

Lights are in operation sunset to sunrise. Lighting available by prior arrangement only or operating part of the night only and/or pilot controlled and with specific operating hours are indicated under airport remarks. Since obstructions are usually lighted, obstruction lighting is not included in this code. Unlighted obstructions on or surrounding an airport will be noted in airport remarks. Runway lights nonstandard (NSTD) are systems for which the light fixtures are not FAA approved L-800 series: color, intensity, or spacing does not meet FAA standards. Nonstandard runway lights, VASI, or any other system not listed below will be shown in airport remarks.

Temporary, emergency or limited runway edge lighting such as flares, smudge pots, lanterns or portable runway lights will also be shown in airport remarks.

Types of lighting are shown with the runway or runway end they serve.

NSTD—Light system fails to meet FAA standards.
LIRL—Low Intensity Runway Lights
MIRL—Medium Intensity Runway Lights
HIRL—High Intensity Runway Lights
RAIL—Runway Alignment Indicator Lights
REIL—Runway End Identifier Lights
CL—Centerline Lights
TDZ—Touchdown Zone Lights
ODALS—Omni Directional Approach Lighting System.
AF OVRN—Air Force Overrun 1000′ Standard Approach Lighting System.
LDIN—Lead-In Lighting System.
MALS—Medium Intensity Approach Lighting System.
MALSF—Medium Intensity Approach Lighting System with Sequenced Flashing Lights.

LEGEND 16.—Directory Legend.

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MALSR—Medium Intensity Approach Lighting System with Runway Alignment Indicator Lights.
SALS—Short Approach Lighting System.
SALSF—Short Approach Lighting System with Sequenced Flashing Lights.
SSALS—Simplified Short Approach Lighting System.
SSALF—Simplified Short Approach Lighting System with Sequenced Flashing Lights.
SSALR—Simplified Short Approach Lighting System with Runway Alignment Indicator Lights.
ALSAF—High Intensity Approach Lighting System with Sequenced Flashing Lights
ALSF1—High Intensity Approach Lighting System with Sequenced Flashing Lights, Category I, Configuration.
ALSF2—High Intensity Approach Lighting System with Sequenced Flashing Lights, Category II, Configuration.
VASI—Visual Approach Slope Indicator System.

NOTE: Civil ALSF-2 may be operated as SSALR during favorable weather conditions.

VISUAL GLIDESLOPE INDICATORS

APAP—A system of panels, which may or may not be lighted, used for alignment of approach path.
- PNIL APAP on left side of runway
- PNIR APAP on right side of runway

PAPI—Precision Approach Path Indicator
- P2L 2-identical light units placed on left side of runway
- P2R 2-identical light units placed on right side of runway
- P4L 4-identical light units placed on left side of runway
- P4R 4-identical light units placed on right side of runway

PVASI—Pulsating/steady burning visual approach slope indicator, normally a single light unit projecting two colors.
- PSIL- PVASI on left side of runway
- PSIR- PVASI on right side of runway

SAVASI—Simplified Abbreviated Visual Approach Slope Indicator
- S2L 2-box SAVASI on left side of runway
- S2R 2-box SAVASI on right side of runway

TRCV—Tri-color visual approach slope indicator, normally a single light unit projecting three colors.
- TRIL TRCV on left side of runway
- TRIR TRCV on right side of runway

VASI—Visual Approach Slope Indicator
- V2L 2-box VASI on left side of runway
- V2R 2-box VASI on right side of runway
- V4L 4-box VASI on left side of runway
- V4R 4-box VASI on right side of runway
- V6L 6-box VASI on left side of runway
- V6R 6-box VASI on right side of runway
- V12 12-box VASI on both sides of runway
- V16 16-box VASI on both sides of runway

NOTE: Approach slope angle and threshold crossing height will be shown when available; i.e., -GA 3.5° TCH 37'.

PILOT CONTROL OF AIRPORT LIGHTING

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)

Available systems will be indicated in the Airport Remarks, as follows:

ACTIVATE MALSR Rwy 07, HIRL Rwy 07-25-122.8 (or CTAF).
or
ACTIVATE MIRL Rwy 18-36-122.8 (or CTAF).
or
ACTIVATE VASI and REIL, Rwy 07-122.8 (or CTAF).

Where the airport is not served by an instrument approach procedure and/or has an independent type system of different specification installed by the airport sponsor, descriptions of the type lights, method of control, and operating frequency will be explained in clear text. See AIM, "Basic Flight Information and ATC Procedures," for detailed description of pilot control of airport lighting.

RUNWAY SLOPE

Runway slope will be shown only when it is 0.3 percent or more. On runways less than 8000 feet: When available the direction of the slope upward will be indicated, ie., 0.3% up NW. On runways 8000 feet or greater: When available the slope will be shown on the runway end line, ie., RWY 13: 0.3% up., RWY 21: Pole. Rgt tfc. 0.4% down.

RUNWAY END DATA

Lighting systems such as VASI, MALSR, REIL; obstructions; displaced thresholds will be shown on the specific runway end. "Rgt tfc"—Right traffic indicates right turns should be made on landing and takeoff for specified runway end.

LEGEND 17.—Directory Legend Visual Glide Slope Indicators.

DIRECTORY LEGEND

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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.

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 18.—Directory Legend.

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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
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) AIRSPACE

CLASS C—CLASS C service provided
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

(23) 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) ABVORTAC 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° beyond 26 NM below 3500′

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.

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 U.S. Government Instrument Approach Procedures.

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.

LEGEND 19.—Directory Legend.

DIRECTORY LEGEND 9

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.
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).
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
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.

FREQUENCY PAIRING PLAN AND MLS CHANNELING

MLS CHANNEL	VHF FREQUENCY	TACAN CHANNEL	MLS CHANNEL	VHF FREQUENCY	TACAN CHANNEL	MLS CHANNEL	VHF FREQUENCY	TACAN CHANNEL
500	108.10	18X	568	109.45	31Y	634	114.05	87Y
502	108.30	20X	570	109.55	32Y	636	114.15	88Y
504	108.50	22X	572	109.65	33Y	638	114.25	89Y
506	108.70	24X	574	109.75	34Y	640	114.35	90Y
508	108.90	26X	576	109.85	35Y	642	114.45	91Y
510	109.10	28X	578	109.95	36Y	644	114.55	92Y
512	109.30	30X	580	110.05	37Y	646	114.65	93Y
514	109.50	32X	582	110.15	38Y	648	114.75	94Y
516	109.70	34X	584	110.25	39Y	650	114.85	95Y
518	109.90	36X	586	110.35	40Y	652	114.95	96Y
520	110.10	38X	588	110.45	41Y	654	115.05	97Y
522	110.30	40X	590	110.55	42Y	656	115.15	98Y
524	110.50	42X	592	110.65	43Y	658	115.25	99Y
526	110.70	44X	594	110.75	44Y	660	115.35	100Y
528	110.90	46X	596	110.85	45Y	662	115.45	101Y
530	111.10	48X	598	110.95	46Y	664	115.55	102Y
532	111.30	50X	600	111.05	47Y	666	115.65	103Y
534	111.50	52X	602	111.15	48Y	668	115.75	104Y
536	111.70	54X	604	111.25	49Y	670	115.85	105Y
538	111.90	56X	606	111.35	50Y	672	115.95	106Y
540	108.05	17Y	608	111.45	51Y	674	116.05	107Y
542	108.15	18Y	610	111.55	52Y	676	116.15	108Y
544	108.25	19Y	612	111.65	53Y	678	116.25	109Y
546	108.35	20Y	614	111.75	54Y	680	116.35	110Y
548	108.45	21Y	616	111.85	55Y	682	116.45	111Y
550	108.55	22Y	618	111.95	56Y	684	116.55	112Y
552	108.65	23Y	620	113.35	80Y	686	116.65	113Y
554	108.75	24Y	622	113.45	81Y	688	116.75	114Y
556	108.85	25Y	624	113.55	82Y	690	116.85	115Y
558	108.95	26Y	626	113.65	83Y	692	116.95	116Y
560	109.05	27Y	628	113.75	84Y	694	117.05	117Y
562	109.15	28Y	630	113.85	85Y	696	117.15	118Y
564	109.25	29Y	632	113.95	86Y	698	117.25	119Y
566	109.35	30Y						

Legend 20.—Frequency Pairing Plan and MLS Channeling.

DIRECTORY LEGEND

FREQUENCY PAIRING PLAN AND MLS CHANNELING

The following is a list of paired VOR/ILS VHF frequencies with TACAN channels and MLS channels.

TACAN CHANNEL	VHF FREQUENCY	MLS CHANNEL	TACAN CHANNEL	VHF FREQUENCY	MLS CHANNEL	TACAN CHANNEL	VHF FREQUENCY	MLS CHANNEL
17X	108.00	-	50Y	111.35	606	94X	114.70	-
17Y	108.05	540	51X	111.40	-	94Y	114.75	648
18X	108.10	500	51Y	111.45	608	95X	114.80	-
18Y	108.15	542	52X	111.50	534	95Y	114.85	650
19X	108.20	-	52Y	111.55	610	96X	114.90	-
19Y	108.25	544	53X	111.60	-	96Y	114.95	652
20X	108.30	502	53Y	111.65	612	97X	115.00	-
20Y	108.35	546	54X	111.70	536	97Y	115.05	654
21X	108.40	-	54Y	111.75	614	98X	115.10	-
21Y	108.45	548	55X	111.80	-	98Y	115.15	656
22X	108.50	504	55Y	111.85	616	99X	115.20	-
22Y	108.55	550	56X	111.90	538	99Y	115.25	658
23X	108.60	-	56Y	111.95	618	100X	115.30	-660
23Y	108.65	552	57X	112.00	-	100Y	115.35	-
24X	108.70	506	57Y	112.05	-	101X	115.40	662
24Y	108.75	554	58X	112.10	-	101Y	115.45	-
25X	108.80	-	58Y	112.15	-	102X	115.50	664
25Y	108.85	556	59X	112.20	-	102Y	115.55	-
26X	108.90	508	59Y	112.25	-	103X	115.60	666
26Y	108.95	558	70X	112.30	-	103Y	115.65	-
27X	109.00	-	70Y	112.35	-	104X	115.70	668
27Y	109.05	560	71X	112.40	-	104Y	115.75	-
28X	109.10	510	71Y	112.45	-	105X	115.80	670
28Y	109.15	562	72X	112.50	-	105Y	115.85	-
29X	109.20	-	72Y	112.55	-	106X	115.90	672
29Y	109.25	564	73X	112.60	-	106Y	115.95	-
30X	109.30	512	73Y	112.65	-	107X	116.00	674
30Y	109.35	566	74X	112.70	-	107Y	116.05	-
31X	109.40	-	74Y	112.75	-	108X	116.10	676
31Y	109.45	568	75X	112.80	-	108Y	116.15	-
32X	109.50	514	75Y	112.85	-	109X	116.20	678
32Y	109.55	570	76X	112.90	-	109Y	116.25	-
33X	109.60	-	76Y	112.95	-	110X	116.30	680
33Y	109.65	572	77X	113.00	-	110Y	116.35	-
34X	109.70	516	77Y	113.05	-	111X	116.40	682
34Y	109.75	574	78X	113.10	-	111Y	116.45	-
35X	109.80	-	78Y	113.15	-	112X	116.50	684
35Y	109.85	576	79X	113.20	-	112Y	116.55	-
36X	109.90	518	79Y	113.25	-	113X	116.60	686
36Y	109.95	578	80X	113.30	-	113Y	116.65	-
37X	110.00	-	80Y	113.35	620	114X	116.70	688
37Y	110.05	580	81X	113.40	-	114Y	116.75	-
38X	110.10	520	81Y	113.45	622	115X	116.80	690
38Y	110.15	582	82X	113.50	-	115Y	116.85	-
39X	110.20	-	82Y	113.55	624	116X	116.90	692
39Y	110.25	584	83X	113.60	-	116Y	116.95	-
40X	110.30	522	83Y	113.65	626	117X	117.00	694
40Y	110.35	586	84X	113.70	-	117Y	117.05	-
41X	110.40	-	84Y	113.75	628	118X	117.10	696
41Y	110.45	588	85X	113.80	-	118Y	117.15	-
42X	110.50	524	85Y	113.85	630	119X	117.20	698
42Y	110.55	590	86X	113.90	-	119Y	117.25	-
43X	110.60	-	86Y	113.95	632	120X	117.30	-
43Y	110.65	592	87X	114.00	-	120Y	117.35	-
44X	110.70	526	87Y	114.05	634	121X	117.40	-
44Y	110.75	594	88X	114.10	-	121Y	117.45	-
45X	110.80	-	88Y	114.15	636	122X	117.50	-
45Y	110.85	596	89X	114.20	-	122Y	117.55	-
46X	110.90	528	89Y	114.25	638	123X	117.60	-
46Y	110.95	598	90X	114.30	-	123Y	117.65	-
47X	111.00	-	90Y	114.35	640	124X	117.70	-
47Y	111.05	600	91X	114.40	-	124Y	117.75	-
48X	111.10	530	91Y	114.45	642	125X	117.80	-
48Y	111.15	602	92X	114.50	-	125Y	117.85	-
49X	111.20	-	92Y	114.55	644	126X	117.90	-
49Y	111.25	604	93X	114.60	-	126Y	117.95	
50X	111.30	532	93Y	114.65	646			

23 COMM/NAVAID REMARKS:

Pertinent remarks concerning communications and NAVAIDS.

LEGEND 21.—Frequency Pairing Plan and MLS Channeling.

AIRPORT LORAN TD CORRECTION TABLE

The following LORAN - C time difference (TD) table contains the TD correction values for each airport with a published LORAN RNAV instrument approach procedure. This TD correction value must be entered into the LORAN airborne receiver prior to beginning the approach. TD values from this table should be transferred to the TD correction box shown in the plan view of the LORAN RNAV approach for the destination airport.

Pilots are advised to check LORAN (LRN) NOTAM's to obtain the status of the LORAN chain or group repetition interval (GRI) and NOTAM's for the LORAN monitor location identifier (MLID) at their destination and alternate airport.

	AIRPORT										
CITY	ST	NAME	LID	MLID	GRI	TRI	V	W	X	Y	Z
BURLINGTON	VT	BURLINGTON INTL	BTV	BTV	9960	MWX		10.0	09.8		
COLUMBUS	OH	OHIO STATE UNIV.	OSU	OSU	9960	MYZ				08.6	11.6
NEW ORLEANS	LA	LAKEFRONT	NEW	NEW	7980	MWX		11.5	11.2		
ORLANDO	FL	ORLANDO EXEC.	ORL	ORL	7980	MYZ				11.3	11.7
PORTLAND	OR	PORTLAND INTL.	PDX	PDX	9940	MWX		11.7	09.4		
VENICE	LA	CHEVRON	8LA5	NEW	7980	MWX		11.5	11.2		

LEGEND 22.—Airport Loran TD Correction Table.

EXCERPT FROM CFR 49 PART 175

PART 175—CARRIAGE BY AIRCRAFT

Subpart A—General Information and Regulations

Sec.
175.1 Purpose and scope.
175.3 Unacceptable hazardous materials shipments.
175.5 Applicability.
175.10 Exceptions.
175.20 Compliance.
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175.33 Notification of pilot-in-command.
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Subpart B—Loading, Unloading and Handling

175.75 Quantity limitations aboard aircraft.
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175.305 Self-propelled vehicles.
175.310 Transportation of flammable liquid fuel in small, passenger-carrying aircraft.
175.320 Cargo-only aircraft; only means of transportation.
175.630 Special requirements for poisons.

LEGEND 23.—Excerpt from CFR 49 Part 175.

EXCERPT FROM CFR 49 PART 175

Sec.
175.640 Special requirements for other regulated materials.
175.700 Special requirements for radioactive materials.
175.710 Special requirements for fissile Class III radioactive materials.

AUTHORITY: 49 U.S.C. 1803, 1804, 1808; 49 CFR 1.53(e), unless otherwise noted.

SOURCE: Amdt. 175-1, 41 FR 16106, Apr. 15, 1976, unless otherwise noted.

NOTE: Nomenclature changes to Part 175 appear at 43 FR 48645, Oct. 19, 1978 (Amdt. 175-6).

Subpart A—General Information and Regulations

§ 175.1 Purpose and scope.

This part prescribes requirements, in addition to those contained in Parts 171, 172 and 173 of this subchapter, to be observed by aircraft operators with respect to the transportation of hazardous materials aboard (including attached to or suspended from) civil aircraft.

§ 175.3 Unacceptable hazardous materials shipments.

A shipment of hazardous materials that is not prepared for shipment in accordance with Parts 172 and 173 of this subchapter may not be accepted for transportation or transported aboard an aircraft.

§ 175.5 Applicability.

This part contains regulations pertaining to the acceptance of hazardous materials for transportation, and the loading and transportation of hazardous materials, in any civil aircraft in the United States and in civil aircraft of United States registry anywhere in air commerce, except aircraft of United States registry under lease to and operated solely by foreign nationals outside the United States.

§ 175.10 Exceptions.

(a) This subchapter does not apply to—

(1) Aviation fuel and oil in tanks that are in compliance with the installation provisions of 14 CFR, Chapter 1.

(2) Aircraft parts, equipment, and supplies (other than fuel) carried by an aircraft operator if authorized or required aboard his aircraft for their operation including:

(i) Fire extinguishers;

(ii) Cylinders containing compressed gases;

(iii) Aerosol dispensers;

(iv) Distilled spirits;

(v) Hydraulic accumulators;

(vi) Non-spillable batteries;

(vii) First-aid kits;

(viii) Signaling devices;

(ix) Tires; and

(x) Items of replacement therefor, except that batteries, aerosol dispensers, and signaling devices must be packed in strong outside containers, and tires must be deflated to a pressure not greater than 100 p.s.i.g.

(3) Hazardous materials loaded and carried in hoppers or tanks of aircraft certificated for use in aerial seeding, dusting, spraying, fertilizing, crop improvement, or pest control, to be dispensed during such an operation.

(4) Medicinal and toilet articles carried by a crewmember or passenger in his baggage (including carry-on baggage) when:

(i) The total capacity of all the containers used by a crewmember or passenger does not exceed 75 ounces (net weight ounces and fluid ounces);

(ii) The capacity of each container other than an aerosol container does not exceed 16 fluid ounces or 1 pound of material.

(5) Small-arms ammunition for personal use carried by a crewmember or passenger in his baggage (excluding carry-on baggage) if securely packed in fiber, wood, or metal boxes.

(6) Prior to May 3, 1981, radioactive materials which meet the requirements of § 173.391(a), (b), or (c) of this subchapter in effect on May 3, 1979.

(7) Oxygen, or any hazardous material used for the generation of oxygen, carried for medical use by a passenger in accordance with 14 CFR 121.574 or 135.114.

(8) Human beings and animals with an implanted medical device, such as a heart pacemaker, that contains radioactive material or with radio-pharmaceuticals that have been injected or ingested.

LEGEND 24.—Excerpt from CFR 49 Part 175.

EXCERPT FROM CFR 49 PART 175

(9) Smoke grenades, flares, or similar devices carried only for use during a sport parachute jumping activity.

(10) Personal smoking materials intended for use by any individual when carried on his person except lighters with flammable liquid reservoirs and containers containing lighter fluid for use in refilling lighters.

(11) Smoke grenades, flares, and pyrotechnic devices affixed to aircraft carrying no person other than a required flight crewmember during any flight conducted at and as a part of a scheduled air show or exhibition of aeronautical skill. The affixed installation accommodating the smoke grenades, flares, or pyrotechnic devices on the aircraft must be approved by the FAA for its intended use.

(12) Hazardous materials which are loaded and carried on or in cargo-only aircraft and which are to be dispensed or expended during flight for weather control, forest preservation and protection, or avalanche control purposes when the following requirements are met:

(i) Operations may not be conducted over densely populated areas, in a congested airway, or near any airport where air carrier passenger operations are conducted.

(ii) Each operator shall prepare and keep current a manual containing operational guidelines and handling procedures, for the use and guidance of flight, maintenance, and ground personnel concerned in the dispensing or expending of hazardous materials. The manual must be approved by the FAA District Office having jurisdiction over the operator's certificate, if any, or the FAA Regional Office in the region where the operator is located. Each operation must be conducted in accordance with the manual.

(iii) No person other than a required flight crewmember, FAA inspector, or person necessary for handling or dispensing the hazardous material may be carried on the aircraft.

(iv) The operator of the aircraft must have advance permission from the owner of any airport to be used for the dispensing or expending operation.

(v) When dynamite and blasting caps are carried for avalanche control flights, the explosives must be handled, and, at all times be, under the control of a blaster who is licensed under a state or local authority identified in writing to the FAA district office having jurisdiction over the operator's certificate, if any, or the FAA regional office in the region where the operator is located.

(49 U.S.C. 1803, 1804, 1806, 1808; 49 CFR 1.53 and App. A to Part 1)

[Amdt. 175-1, 41 FR 16106, Apr. 15, 1976, as amended by Amdt. 175-1A, 41 FR 40686, Sept. 20, 1976]

NOTE: For amendments to § 175.10 see the List of CFR Sections Affected appearing in the Finding Aids section of this volume.

§ 175.20 Compliance.

Unless the regulations in this subchapter specifically provide that another person must perform a duty, each operator shall comply with all the regulations in Parts 102, 171, 172, and 175 of this subchapter and shall thoroughly instruct his employees in relation thereto. (See 14 CFR 121.135, 121.401, 121.433a, 135.27 and 135.140.)

§ 175.30 Accepting shipments.

(a) No person may accept a hazardous material for transportation aboard an aircraft unless the hazardous material is—

(1) Authorized, and is within the quantity limitations specified for carriage aboard aircraft according to § 172.101 of this subchapter;

(2) Described and certified on a shipping paper prepared in duplicate in accordance with Subpart C of Part 172 of this subchapter. The originating aircraft operator must retain one copy of each shipping paper for 90 days;

(3) Labeled and marked, or placarded (when required), in accordance with Subparts D, E and F of Part 172 of this subchapter; and

(4) Labeled with a "CARGO AIRCRAFT ONLY" label (see § 172.448 of this subchapter) if the material as presented is not permitted aboard passenger-carrying aircraft.

(b) Except as provided in paragraph (c) of this section, no person may carry any hazardous material aboard an aircraft unless, prior to placing the material aboard the aircraft, the operator of the aircraft has inspected the package, or the outside container pre-

LEGEND 25.—Excerpt from CFR 49 Part 175.

EXCERPT FROM CFR 49 PART 175

pared in accordance with § 173.25 of this subchapter which contains the material, and has determined that—it has no holes, leakage, or other indication that its integrity has been compromised, and for radioactive materials that the package seal has not been broken.

(c) The requirements of paragraph (b) of this section do not apply to ORM-D materials packed in a freight container and offered for transportation by one consignor.

[Amdt. 175-1, 41 FR 16106, Apr. 15, 1976, as amended by Amdt. 175-1A, 41 FR 40686, Sept. 20, 1976; Amdt. 175-1B, 41 FR 57072, Dec. 30, 1976]

§ 175.33 Notification of pilot-in-command.

When materials subject to the provisions of this subchapter are carried in an aircraft, the operator of the aircraft shall give the pilot-in-command the following information in writing before takeoff:

(a) The information required by §§ 172-202 and 172.203 of this subchapter;

(b) The location of the hazardous material in the aircraft; and

(c) The results of the inspection required by § 175.30(b).

[Amdt. 175-1A, 41 FR 40686, Sept. 20, 1976]

§ 175.35 Shipping papers aboard aircraft.

(a) A copy of the shipping papers required by § 175.30(a)(2) must accompany the shipment it covers during transportation aboard an aircraft.

(b) The documents required by paragraph (a) of this section and § 175.33 may be combined into one document if it is given to the pilot-in-command before departure of the aircraft.

§ 175.40 Keeping and replacement of labels.

(a) Aircraft operators who engage in the transportation of hazardous materials must keep an adequate supply of the labels specified in Subpart E of Part 172 of this subchapter, on hand at each location where shipments are loaded aboard aircraft.

(b) Lost or detached labels for packages of hazardous materials must be replaced in accordance with the information provided on the shipping papers.

§ 175.45 Reporting hazardous materials incidents.

(a) Each operator that transports hazardous materials shall report to the nearest Air Carrier District Office (ACDO), Flight Standards District Office (FSDO), General Aviation District Office (GADO) or other FAA facility, except that in place of reporting to the nearest of those facilities a certificate holder under 14 CFR Part 121, 127, or 135 may report to the FAA District Office holding the carrier's operating certificate and charged with overall inspection of its operations, by telephone at the earliest practicable moment after each incident that occurs during the course of transportation (including loading, unloading or temporary storage) in which as a direct result of any hazardous material—

(1) A person is killed;

(2) A person receives injuries requiring his or her hospitalization;

(3) Estimated carrier or other property damage, or both, exceeds $50,000;

(4) Fire, breakage, or spillage or suspected radioactive contamination occurs involving shipment of radioactive materials (see § 175.700(b));

(5) Fire, breakage, spillage, or suspected contamination occurs involving shipment of etiologic agents. In addition to the report required by paragraph (a) of this section, a report on an incident involving etiologic agents should be telephoned directly to the Director, Center for Disease Control, U.S. Public Health, Atlanta, Georgia, area code 404-633-5313; or

(6) A situation exists of such a nature that, in the judgment of the carrier, it should be reported to the Department even though it does not meet the criteria of paragraph (b)(1), (2), or (3) of this section, e.g., a continuing danger to life exists at the scene of the incident.

(7) If the operator conforms to the provisions of this section, the carrier requirements of § 171.15 except § 171.15(c) of this subchapter shall be deemed to have been satisfied.

(b) The following information shall be furnished in each report:

LEGEND 26.—Excerpt from CFR 49 Part 175.

EXCERPT FROM CFR 49 PART 175

(1) Name of reporting person;

(2) Name and address of carrier represented by reporter;

(3) Phone number where reporter can be contacted;

(4) Date, time, and location of incident;

(5) The extent of the injuries, if any; and

(6) Classification, name and quantity of hazardous material involvement and whether a continuing danger to life exists at the scene.

(c) Each operator who transports hazardous materials shall report in writing, in duplicate, on DOT Form F 5800.1 within 15 days of the date of discovery, each incident that occurs during the course of transportation (including loading, unloading, or temporary storage) in which, as a direct result to hazardous materials, any of the circumstances set forth in paragraph (a) of this section occurs or there has been an unintentional release of hazardous materials from a package. Each operator making a report under this section shall send that report to the Materials Transportation Bureau, Office of Hazardous Materials Regulation, Department of Transportation, Washington, D.C. 20590, with a separate copy to the FAA facility indicated in paragraph (a) of this section.

[Amdt. 175-1, 41 FR 16106, Apr. 15, 1976, as amended by Amdt. 175-1A, 41 FR 40686, Sept. 20, 1976]

Subpart B—Loading, Unloading and Handling

§ 175.75 Quantity limitations aboard aircraft.

(a) Except as provided in § 175.85(b), no person may carry on an aircraft—

(1) A hazardous material except as permitted in Part 172 of this subchapter;

(2) More than 50 pounds net weight of hazardous material (and in addition thereto, 150 pounds net weight of nonflammable compressed gas) permitted to be carried aboard passenger-carrying aircraft—

(i) In an inaccessible cargo compartment,

(ii) In any freight container within an accessible cargo compartment, or

(iii) In any accessible cargo compartment in a cargo-only aircraft in a manner that makes it inaccessible unless in a freight container;

(3) Packages containing radioactive materials when their combined transport indices exceed 50.

(b) No limitation applies to the number of packages of ORM material aboard an aircraft.

[Amdt. 175-1A, 41 FR 40686, Sept. 20, 1976]

§ 175.78 Stowage compatibility of cargo.

(a) No person may stow a package of a corrosive material on an aircraft next to or in a position that will allow contact with a package of flammable solids, oxidizing materials, or organic peroxides.

(b) No person may stow a package labeled BLASTING AGENT on an aircraft next to, or in a position that will allow contact with a package of special fireworks or railway torpedoes.

[Amdt. 175-1, 41 FR 16106, Apr. 15, 1976, as amended by Amdt. 175-8, 44 FR 31184, May 31, 1979]

§ 175.79 Orientation of cargo.

(a) A package containing hazardous materials marked "THIS SIDE UP", "THIS END UP", or with arrows to indicate the proper orientation of the package, must be stored, loaded abroad an aircraft in accordance with such markings, and secured in a manner that will prevent any movement which would change the orientation of the package.

(b) A package containing liquid hazardous materials not marked as indicated in paragraph (a) of this section must be stored and loaded with closures up.

§ 175.85 Cargo location.

(a) No person may carry a hazardous material subject to the requirements of this subchapter in the cabin of a passenger-carrying aircraft.

(b) Each person carrying materials acceptable only for cargo-only aircraft shall carry those materials in a location accessible to a crewmember during flight. However, when materials acceptable for cargo-only or pas-

LEGEND 27.—Excerpt from CFR 49 Part 175.

EXCERPT FROM CFR 49 PART 175

senger carrying aircraft are carried on a small, single pilot, cargo-only aircraft being used where other means of transportation are impracticable or not available, they may be carried without quantity limitation as specified in § 175.75 in a location that is not accessible to the pilot subject to the following conditions.

(1) No person other than the pilot, an FAA inspector, the shipper or consignee of the material or a representative of the shipper or consignee so designated in writing, or a person necessary for handling the material may be carried on the aircraft.

(2) The pilot must be provided with written instructions on characteristics and proper handling of the material.

(3) Whenever a change of pilots occurs while the material is on board, the new pilot must be briefed under a hand-to-hand signature service provided by the operator of the aircraft.

(c) No person may load magnetized material (which might cause an erroneous magnetic compass reading) on an aircraft, in the vicinity of a magnetic compass, or compass master unit, that is a part of the instrument equipment of the aircraft, in a manner that affects its operation. If this requirement cannot be met, a special aircraft swing and compass calibration may be made. No person loading magnetized materials may obscure the warning labels.

(d) No person may carry materials subject to the requirements of this subchapter in an aircraft unless they are suitably safeguarded to prevent their becoming a hazard by shifting. For packages bearing "RADIOACTIVE YELLOW-II" or "RADIOACTIVE YELLOW-III" labels, such safeguarding must prevent movement that would permit the package to be closer to a space that is occupied by a person or an animal than is permitted by § 175.700.

(e) No person may carry a material subject to the requirements of this subchapter that is acceptable for carriage in a passenger-carrying aircraft (other than magnetized materials) unless it is located in the aircraft in a place that is inaccessible to persons other than crew-members.

[Amdt. 175-1, 41 FR 16106, Apr. 15, 1976, as amended by Amdt. 175-1A, 41 FR 40686, Sept. 20, 1976]

§ 175.90 Damaged shipments.

Except as provided for in § 175.700, the operator of an aircraft shall remove from the aircraft any package subject to this subchapter that appears to be damaged or leaking. No person shall place or transport a package that is damaged or appears to be damaged or leaking aboard an aircraft subject to this Part.

[Amdt. 175-1, 41 FR 16106, Apr. 15, 1976, as amended by Amdt 175-1A, 41 FR 40686, Sept. 20, 1976]

Subpart C—Specific Regulations Applicable According to Classification of Material

§ 175.305 Self-propelled vehicles.

(a) Self-propelled vehicles are exempt from the drainage requirements of § 173.120 of this subchapter when carried in aircraft designed or modified for vehicle ferry operations and when all of the following conditions are met:

(1) Authorization for this type operation has been given by the appropriate authority in the government of the country in which the aircraft is registered;

(2) Each vehicle is secured in an upright position;

(3) Each fuel tank is filled in a manner and only to a degree that will preclude spillage of fuel during loading, unloading, and transportation; and

(4) Ventilation rates to be maintained in the vehicle storage compartment have been approved by the appropriate authority in the government of the country in which the aircraft is registered.

§ 175.310 Transportation of flammable liquid fuel in small, passenger-carrying aircraft.

A small aircraft or helicopter operated entirely within the State of Alaska or into a remote area elsewhere in the United States may carry, in other than scheduled passenger operations, not more than 20 gallons of flammable liquid fuel, if—

LEGEND 28.—Excerpt from CFR 49 Part 175.

EXCERPT FROM CFR 49 PART 175

(a) Transportation by air is the only practical means of providing suitable fuel;

(b) The flight is necessary to meet the needs of a passenger;

(c) The fuel is carried in metal containers that are either—

(1) DOT Specification 2A containers of not more than 5 gallons capacity, each packed inside a DOT Specification 12B fiberboard box or each packed inside a DOT Specification 15A, 15B, 15C, 16A, 19A or 19B wooden box, or in the case of a small aircraft in Alaska, each packed inside a wooden box of at least one-half inch thickness;

(2) Airtight, leakproof, inside containers of not more than 10 gallons capacity and of at least 28-gauge metal, each packed inside a DOT Specification 15A, 15B, 15C, 16A, 19A, or 19B wooden box or, in the case of a small aircraft in Alaska, each packed inside a wooden box of at least one-half inch thickness;

(3) DOT Specification 17E containers of not more than 5 gallons capacity; or

(4) Fuel tanks attached to flammable liquid fuel powered equipment under the following conditions:

(i) Each piece of equipment is secured in an upright position;

(ii) Each fuel tank is filled in a manner that will preclude spillage of fuel during loading, unloading, and transportation; and

(iii) Ventilation rates which are maintained in the compartment in which the equipment is carried have been approved by the FAA district office responsible for inspection and surveillance of the aircraft on which the equipment is carried.

(d) In the case of a helicopter, the fuel is carried on external cargo racks;

(e) The area or compartment in which the fuel is loaded is ventilated so as to prevent the accumulation of fumes;

(f) Before each flight, the pilot-in-command—

(1) Informs each passenger of the location of the fuel and the hazards involved; and

(2) Prohibits smoking, lighting matches, the carrying of any lighted cigar, pipe, cigarette or flame, and the use of anything that might cause an open flame or spark, while loading or unloading or in flight; and

(g) Fuel is transferred to the fuel tanks only while the aircraft is on the surface.

[Amdt. 175-1, 41 FR 16106, Apr. 15, 1976, as amended by Amdt. 175-1A, 41 FR 40686, Sept. 20, 1976]

§ 175.320 Cargo-only aircraft; only means of transportation.

(a) Notwithstanding § 172.101, when means of transportation other than air are impracticable or not available, hazardous materials listed in the following table may be carried on a cargo-only aircraft subject to the conditions stated in the table and in paragraph (b) of this section and, when appropriate, paragraph (c) of this section:

Material description	Class	Conditions
Electric blasting caps (more than 1,000).	Class A explosives	Permitted only when no other cargo is aboard the aircraft. However, if the electric blasting caps are packed in an IME 22 container (see 49 CFR 171.7(d)(9)), they may be transported in the same aircraft with materials that are not classed as hazardous materials.
Electric blasting caps (1,000 or less).	Class C explosives	Permitted only when no other cargo is aboard the aircraft. However, if the electric blasting caps are packed in a DOT MC 201 container (49 CFR 178.318) or an IME 22 container (see 49 CFR 171.7(d)(9)), they may be transported in the same aircraft with materials other than class A or class B explosives.
Gasoline	Flammable liquid	Permitted in metal drums having rated capacities of 55 gal. or less. May not be transported in the same aircraft with materials classed as class A, B, or C explosives, blasting agents, corrosive materials or oxidizing materials. Permitted in installed tanks each having a capacity of more than 110 gal. Subject to the conditions specified in para. (c) of this section.

LEGEND 29.—Excerpt from CFR 49 Part 175.

EXCERPT FROM CFR 49 PART 175

§ 175.320 **Title 49—Transportation**

Material description	Class	Conditions
High explosives	Class A explosives	Limited to explosives to be used for blasting. Permitted only when no other cargo is aboard the aircraft or when being transported in the same aircraft with an authorized shipment of any 1 or more of the following materials to be used for blasting: Ammonium nitrate-fuel oil mixtures Blasting agent, n.o.s. Cordeau detonant fuse. Propellant explosive (solid) class B (water gels only). Propellant explosive (liquid) class B (water gels only).
Oil n.o.s.; petroleum oil or petroleum oil, n.o.s.	Flammable liquid	Permitted in metal drums having rated capacities of 55 gal. or less. May not be transported in the same aircraft with materials classed as class A, B, or C explosives, blasting agents, corrosive materials, or oxidizing materials. Permitted in installed tanks each having a capacity of more than 110 gal. subject to the conditions specified in para. (c) of this section.
Combustible liquid, n.o.s	Combustible liquid	Permitted in installed tanks each having a capacity of more than 110 gal subject to the conditions specified in par. (c) of this section.

(b) The following conditions apply to the carriage of hazardous materials performed under the authority of this section:

(1) No person other than a required flight crewmember, an FAA inspector, the shipper or consignee of the material or a representative of the shipper or consignee so designated in writing, or a person necessary for handling the material may be carried on the aircraft.

(2) The operator of the aircraft must have advance permission from the owner or operator of each manned airport where the material is to be loaded or unloaded or where the aircraft is to land while the material is on board. When the destination is changed after departure because of weather or other unforeseen circumstances, permission from the owner or operator of the alternate airport should be obtained as soon as practicable before landing.

(3) At any airport where the airport owner or operator or authorized representative thereof has designated a location for loading or unloading the material concerned, the material may not be loaded or unloaded at any other location.

(4) If the material concerned can create destructive forces or have lethal or injurious effects over an appreciable area as a result of an accident involving the aircraft or the material, the loading and unloading of the aircraft and its operation in takeoff, en route, and in landing must be conducted at a safe distance from heavily populated areas and from any place of human abode or assembly.

(5) If the aircraft is being operated by a holder of a certificate issued under 14 CFR Part 121, Part 127, or Part 135, operations must be conducted in accordance with conditions and limitations specified in the certificate holder's operations specifications or operations manual accepted by the FAA. If the aircraft is being operated under 14 CFR Part 91, operations must be conducted in accordance with an operations plan accepted and acknowledged in writing by the operator's FAA District Office.

(6) Each pilot of the aircraft must be provided written instructions stating the conditions and limitations of the operation being conducted and the name of the airport official[s] granting the advance permission required by the first sentence of paragraph (b)(2) of this section.

(7) The aircraft and the loading arrangement to be used must be approved for safe carriage of the particular materials concerned by the FAA District Office holding the operator's certificate and charged with overall inspection of its operations, or the appropriate FAA District Office serving the place where the material is to be loaded.

LEGEND 30.—Excerpt from CFR 49 Part 175.

EXCERPT FROM CFR 49 PART 175

(8) When Class A explosives are carried under the authority of this section, the operator of the aircraft shall obtain route approval from the FAA inspector in the operator's FAA District Office.

(9) During loading and unloading, no person may smoke, carry a lighted cigarette, cigar, or pipe, or operate any device capable of causing an open flame or spark within 50 feet of the aircraft.

(c) The following additional conditions apply to the carriage of flammable liquids and combustible liquids in tanks each having a capacity of more than 110 gallons under the authority of this section:

(1) The tanks and their associated piping and equipment and the installation thereof must have been approved for the material to be transported by the appropriate FAA Regional Office.

(2) In the case of an aircraft being operated by a certificate holder, the operator shall list the aircraft and the approval information in its operating specifications. If the aircraft is being operated by other than a certificate holder, a copy of the FAA Regional Office approval required by this section must be carried on the aircraft.

(3) The crew of the aircraft must be thoroughly briefed on the operation of the particular bulk tank system being used.

(4) During loading and unloading and thereafter until any remaining fumes within the aircraft are dissipated:

(i) Only those electrically operated bulk tank shutoff valves that have been approved under a supplemental type certificate may be electrically operated.

(ii) No engine or electrical equipment, avionic equipment, or auxiliary power units may be operated, except position lights in the steady position and equipment required by approved loading or unloading procedures, as set forth in the operator's operations manual, or for operators that are not certificate holders, as set forth in a written statement.

(iii) No person may fill a container, other than an approved bulk tank, with a flammable or combustible liquid or discharge a flammable or combustible liquid from a container, other than an approved bulk tank, while that container is inside or within 50 feet of the aircraft.

(iv) When filling an approved bulk tank by hose from inside the aircraft, the doors and hatches must be fully open to insure proper ventilation.

(v) Static ground wires must be connected between the storage tank or fueler and the aircraft, and between the aircraft and a positive ground device.

[Amdt. 175-1, 41 FR 16106, Apr. 15, 1976, as amended by Amdt. 175-1A, 41 FR 40686, Sept. 20, 1976]

NOTE: For amendments to § 175.320 see the List of CFR Sections Affected appearing in the Finding Aids section of this volume.

§ 175.630 Special requirements for poisons.

(a) No person may transport a package bearing a POISON label aboard an aircraft in the same cargo compartment with material which is marked as or known to be food stuff, feed, or any other edible material intended for consumption by humans or animals.

(b) No person may operate an aircraft that has been used to transport any package bearing a POISON label unless, upon removal of such package, the area in the aircraft in which it was carried is visually inspected for evidence of leakage, spillage, or other contamination. All contamination discovered must be either isolated or removed from the aircraft. The operation of an aircraft contaminated with such poisons is considered to be the carriage of poisonous materials under paragraph (a) of this section.

§ 175.640 Special requirements for other regulated materials.

Asbestos must be loaded, handled, and unloaded, and any asbestos contamination of aircraft removed, in a manner that will minimize occupational exposure to airborne asbestos particles released incident to transportation. (See § 173.1090 of this subchapter.)

[Amdt. 175-7, 43 FR 56668, Dec. 4, 1978]

§ 175.700 Special requirements for radioactive materials.

(a) No person may place any package of radioactive materials bearing

LEGEND 31.—Excerpt from CFR 49 Part 175.

EXCERPT FROM CFR 49 PART 175

§ 175.700 **Title 49—Transportation**

"RADIOACTIVE YELLOW-II" or "RADIOACTIVE YELLOW-III" labels in an aircraft closer than the distances shown in the following table to a space (or dividing partition between spaces) which may be continuously occupied by people, or shipments of animals, or closer than the distances shown in the following table to any package containing undeveloped film (if so marked). If more than one of these packages is present, the distance shall be computed from the following table on the basis of the total transport index numbers shown on labels of the individual packages in the aircraft:

Total transport index	Minimum separation distances in feet to the nearest undeveloped film for various times of transit					Minimum distance in feet to area of persons, or minimum distance in feet from dividing partition of cargo compartment
	Up to 2 hr	2-4 hr	4-8 hr	8-12 hr	Over 12 hr	
None	0	0	0	0	0	0
0.1 to 1.0	1	2	3	4	5	1
1.1 to 5.0	3	4	6	8	11	2
5.1 to 10.0	4	6	9	11	15	3
10.1 to 20.0	5	8	12	16	22	4
20.1 to 30.0	7	10	15	20	29	5
30.1 to 40.0	8	11	17	22	33	6
40.1 to 50.0	9	12	19	24	36	7

(b) In addition to the reporting requirements of § 175.45, the carrier must also notify the shipper at the earliest practicable moment following any incident in which there has been breakage, spillage, or suspected radioactive contamination involving radioactive materials shipments. Aircraft in which radioactive materials have been spilled may not be again placed in service or routinely occupied until the radiation does rate at any accessible surface is less than 0.5 millirem per hour and there is no significant removable radioactive surface contamination (see § 173.397 of this subchapter). In these instances, the package or materials should be segregated as far as practicable from personnel contact. If radiological advice or assistance is needed, the U.S. Energy Research and Development Administration should also be notified. In case of obvious leakage, or if it appears likely that the inside container may have been damaged, care should be taken to avoid inhalation, ingestion, or contact with the radioactive materials. Any loose radioactive materials should be left in a segregated area pending disposal instructions from qualified persons.

(c) No person may carry aboard a passenger-carrying aircraft any package of radioactive material which contains a large quantity (large radioactive source) of radioactivity (as defined in § 173.389(b) of this subchapter), except as specifically approved by the Director, Office of Hazardous Materials Regulation, Materials Transportation Bureau, Department of Transportation.

(d) Except as provided in this paragraph, no person may carry aboard a passenger-carrying aircraft any radioactive material other than a radioactive material intended for use in, or incident to, research or medical diagnosis or treatment. Prior to May 3, 1981, this prohibition does not apply to materials which meet the requirements of § 173.391(a), (b), or (c) of this subchapter in effect on May 3, 1979.

(49 U.S.C. 1803, 1804, 1806, 1808; 49 CFR 1.53 and App. A to Part 1)

[Amdt. 175-1, 41 FR 16106, Apr. 15, 1976, as amended by Amdt. 175-4, 42 FR 22367, May 3, 1977]

NOTE: For amendments to § 175.700 see the List of CFR Sections Affected appearing in the Finding Aids section of this volume.

LEGEND 32.—Excerpt from CFR 49 Part 175.

EXCERPT FROM CFR 49 PART 175

Chapter I—Research and Special Programs Administration **§ 175.710**

§ 175.710 Special requirements for fissile Class III radioactive materials.

(a) No person may carry aboard any aircraft any package of fissile Class III radioactive material (as defined in § 173.389(a)(3) of this subchapter), except as follows:

(1) On a cargo-only aircraft which has been assigned for the sole use of the consignor for the specific shipment of fissile radioactive material. Instructions for such sole use must be provided for in special arrangements between the consignor and carrier, with instructions to that effect issued with shipping papers; or

(2) On any aircraft on which there is no other package of radioactive materials required to bear one of the RADIOACTIVE labels described in §§ 172.436, 172.438, and 172.440 of this subchapter. Specific arrangements must be effected between the shipper and carriers, with instructions to that effect issued with the shipping papers; or

(3) In accordance with any other procedure specifically approved by the Director, Office of Hazardous Materials Regulation, Materials Transportation Bureau.

[Amdt. 175-1, 41 FR 16106, Apr. 15, 1976, as amended by Amdt. 175-6, 43 FR 48645, Oct. 19, 1978]

LEGEND 33.—Excerpt from CFR 49 Part 175.

§172.101 Hazardous Materials Table (cont'd)

(1)	(2)	(3)	(4)	(5)		(6)		(7)		
				Packaging		Maximum net quantity in one package		Water shipments		
□/ W/ A	Hazardous materials descriptions and proper shipping names	Hazard class	Label(s) required (if not excepted)	(a) Exceptions	(b) Specific requirements	(a) Passenger carrying aircraft or railcar	(b) Cargo only aircraft	(a) Cargo vessel	(b) Passenger vessel	(c) Other requirements
	Accumulator, pressurized (pneumatic or hydraulic), containing nonflammable gas	Nonflammable gas	Nonflammable gas	173.306		No limit	No limit	1,2	1,2	
	Acetal	Flammable liquid	Flammable liquid	173.118	173.119	1 quart	10 gallons	1,3	4	
	Acetaldehyde (ethyl aldehyde)	Flammable liquid	Flammable liquid	None	173.119	Forbidden	10 gallons	1,3	5	
A	Acetaldehyde ammonia	ORM-A	None	173.505	173.510	No limit	No limit			
□	Acetic acid (aqueous solution)	Corrosive material	Corrosive	173.244	173.245	1 quart	10 gallons	1,2	1,2	Stow separate from nitric acid or oxidizing materials.
	Acetic acid, glacial	Corrosive material	Corrosive	173.244	173.245	1 quart	10 gallons	1,2	1,2	Stow separate from nitric acid or oxidizing materials. Segregation same as for flammable liquids
	Acetic anhydride	Corrosive material	Corrosive	173.244	173.245	1 quart	1 gallon	1,2	1,2	
	Acetone	Flammable liquid	Flammable liquid	173.118	173.119	1 quart	10 gallons	1,3	4	
	Acetone cyanohydrin	Poison B	Poison	None	173.346	Forbidden	55 gallons	1	5	Shade from radiant heat. Stow away from corrosive materials.
	Acetone oil	Flammable liquid	Flammable liquid	173.118	173.119	1 quart	10 gallons	1,2	1	
	Acetonitrile	Flammable liquid	Flammable liquid	173.118	173.119	1 quart	10 gallons	1	4	Shade from radiant heat.
	Acetyl benzoyl peroxide, solid	Forbidden								
	Acetyl benzoyl peroxide solution, not over 40% peroxide	Organic peroxide	Organic peroxide	None	173.222	Forbidden	1 quart	1,2	1	
	Acetyl bromide	Corrosive material	Corrosive	173.244	173.247	1 quart	1 gallon	1	1	Keep dry. Glass carboys not permitted on passenger vessels.

LEGEND 34.—Hazardous Materials Table (CFR 49 Part 172).

§172.101 Hazardous Materials Table (cont'd)

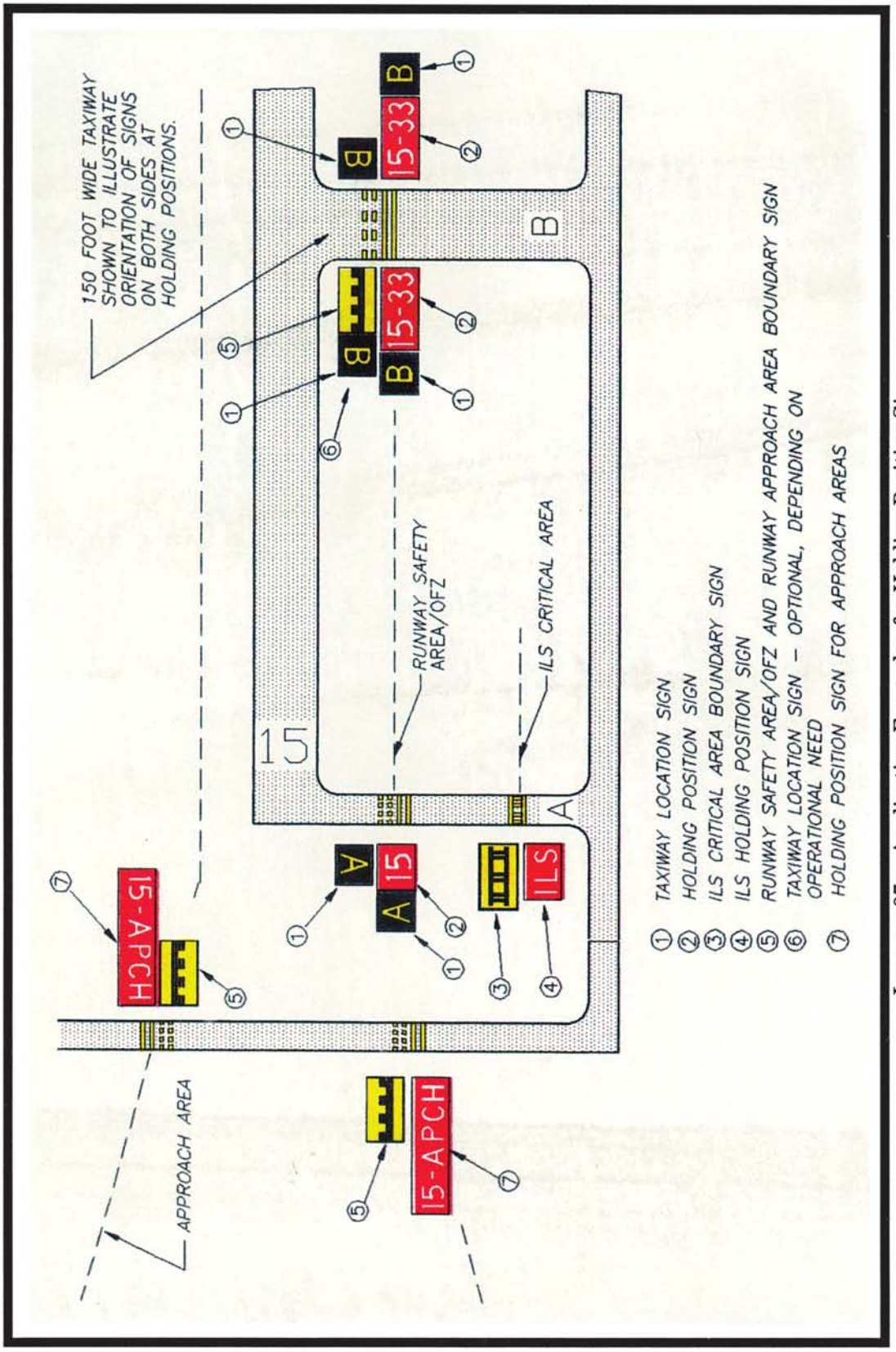
(1) □/W/A	(2) Hazardous materials descriptions and proper shipping names	(3) Hazard class	(4) Label(s) required (if not excepted)	(5) Packaging (a) Exceptions	(5) Packaging (b) Specific requirements	(6) Maximum net quantity in one package (a) Passenger carrying aircraft or railcar	(6) Maximum net quantity in one package (b) Cargo only aircraft	(7) Water shipments (a) Cargo vessel	(7) Water shipments (b) Passenger vessel	(7) Water shipments (c) Other requirements
	Acetyl chloride	Flammable liquid	Flammable liquid	173.244	173.247	1 quart	1 gallon	1	1	Stow away from alcohols. Keep cool and dry. Separate longitudinally by an intervening complete compartment or hold from explosives.
	Acetylene	Flammable gas	Flammable gas	None	173.303	Forbidden	300 pounds	1	1	Shade from radiant heat.
A	Acetylene tetrabromide	ORM-A	None	173.505	173.510	10 gallons	55 gallons			
	Acetyl iodide	Corrosive material	Corrosive	173.244	173.247	1 quart	1 gallon	1	1	Keep dry. Glass carboys not permitted on passenger vessels.
	Acetyl peroxide solution, not over 25% peroxide	Organic peroxide	Organic peroxide	173.153	173.222	Forbidden	1 quart	1,2	1	
	Acid butyl phosphate	Corrosive material	Corrosive	173.244	173.245	1 quart	5 gallons	1,2	1,2	Glass carboys in hampers not permitted under deck.
	Acid carboy empty. See Carboy, empty									
□	Acid, liquid, n.o.s.	Corrosive material	Corrosive	173.244	173.245	1 quart	5 pints	1	4	Keep cool.
□	Acid, sludge	Corrosive material	Corrosive	None	173.248	Forbidden	1 quart	1,2	1	
	Acrolein, inhibited	Flammable liquid	Flammable liquid and Poison	None	173.122	Forbidden	1 quart	1,2	5	Keep cool. Stow away from living quarters.
	Acrylic acid	Corrosive material	Corrosive	173.244	173.245	1 quart	5 pints	1	1	
	Acrylonitrile	Flammable liquid	Flammable liquid and Poison	None	173.119	Forbidden	1 quart	1,2	5	Keep cool.

LEGEND 35.—Hazardous Materials Table (CFR 49 Part 172) (Cont'd).

§172.101 Hazardous Materials Table (cont'd)

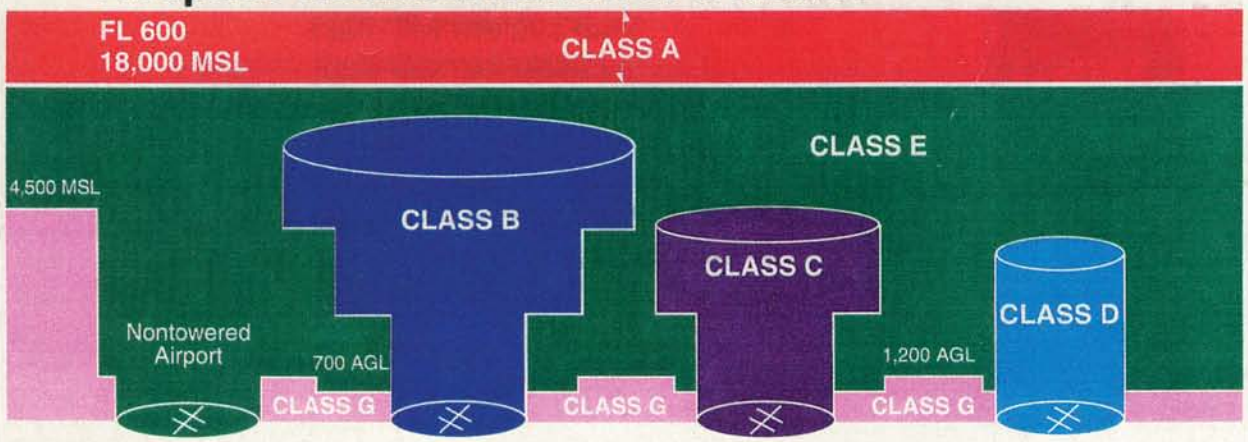
(1)	(2)	(3)	(4)	(5)		(6)		(7)		
				Packaging		Maximum net quantity in one package		Water shipments		
□/ W/ A	Hazardous materials descriptions and proper shipping names	Hazard class	Label(s) required (if not excepted)	(a) Exceptions	(b) Specific requirements	(a) Passenger carrying aircraft or railcar	(b) Cargo only aircraft	(a) Cargo vessel	(b) Passenger vessel	(c) Other requirements
	Alkyl aluminum halides. See Pyrophoric liquid, n.o.s.									
A	Allethrin	ORM-A	None	173.505	173.510	No limit	No limit			
	Allyl alcohol	Flammable liquid	Flammable liquid and Poison	173.118	173.119	1 quart	10 gallons	1,2	1	
	Allyl bromide	Flammable liquid	Flammable liquid	173.118	173.119	Forbidden	10 gallons	1,2	1	
	Allyl chloride	Flammable liquid	Flammable liquid	None	173.119	Forbidden	10 gallons	1,3	5	
	Allyl chlorocarbonate	Flammable liquid	Flammable liquid	None	173.288	Forbidden	5 pints	1	5	Keep dry. Separate longitudinally by an intervening complete hold or compartment from explosives. Segregation same as for corrosive materials.
	Allyl chloroformate. See Allyl chlorocarbonate									
	Allyl trichlorosilane	Corrosive material	Corrosive	None	173.280	Forbidden	10 gallons	1	1	Keep dry.
	Aluminum alkyls. See Pyrophoric liquid n.o.s.									
	Aluminum bromide, anhydrous	Corrosive material	Corrosive	173.244	173.245b	25 pounds	100 pounds	1,2	1,2	Keep dry.
	Aluminum dross, wet or hot. See Sec. 173.173									
	Aluminum hydride	Flammable solid	Flammable solid and Dangerous when wet	None	173.206	Forbidden	25 pounds	1,2	5	Segregation same as for flammable solid labeled Dangerous When Wet.

LEGEND 36.—Hazardous Materials Table (CFR 49 Part 172) (Cont'd).



LEGEND 37.—Application Examples for Holding Position Signs.

Airspace Reclassification at a Glance



AGL - above ground level FL - flight level MSL - mean sea level Effective September 16, 1993

And an Easy-to-Read Chart

Airspace Features	Class A	Class B	Class C	Class D	Class E	Class G
Former Airspace Equivalent	Positive Control Area (PCA)	Terminal Control Area (TCA)	Airport Radar Service Area (ARSA)	Airport Traffic Area (ATA) and Control Zone (CZ)	General Controlled Airspace	Uncontrolled Airspace
Operations Permitted	IFR	IFR and VFR	IFR and VFR	IFR and VFR	IFR and VFR	IFR and VFR
Entry Requirements	ATC clearance	ATC clearance	ATC clearance for IFR. All require radio contact.	ATC clearance for IFR. All require radio contact.	ATC clearance for IFR. All IFR require radio contact.	None
Minimum Pilot Qualifications	Instrument Rating	Private or student certificate	Student certificate	Student certificate	Student certificate	Student certificate
Two-way Radio Communications	Yes	Yes	Yes	Yes	Yes for IFR	No
VFR Minimum Visibility	N/A	3 statute miles	3 statute miles	3 statute miles	[1]3 statute miles	[2]1 statute mile
VFR Minimum Distance from Clouds	N/A	Clear of clouds	500' below, 1,000' above, and 2,000' horizontal	500' below, 1,000' above, and 2,000' horizontal	[1]500' below, 1,000' above, and 2,000' horizontal	Clear of clouds
Aircraft Separation	All	All	IFR, SVFR, and runway operations	IFR, SVFR, and runway operations	IFR and SVFR	None
Conflict Resolution	N/A	N/A	Between IFR and VFR ops	No	No	No
Traffic Advisories	N/A	N/A	Yes	Workload permitting	Workload permitting	Workload permitting
Safety Advisories	Yes	Yes	Yes	Yes	Yes	Yes
Differs from ICAO	No	[3]Yes	[3, 4]Yes	[4]Yes for VFR	No	[5]Yes for VFR
Changes the Existing Rule	No	[6]Yes for VFR	No	[7, 8, 9]Yes	No	No

[1] Different visibility minima and distance from cloud requirements exist for operations above 10,000 feet MSL

[2] Different visibility minima and distance from cloud requirements exist for night operations above 10,000 feet MSL, and operations below 1,200 feet AGL

[3] ICAO does not have speed restrictions in this class - U.S. will retain the 250 KIAS rule

[4] ICAO requires an ATC clearance for VFR

[5] ICAO requires 3 statute miles visibility

[6] Reduces the cloud clearance distance from standard to clear of clouds

[7] Generally, the upper limits of the Control Zone have been lowered from 14,500 MSL to 2,500 feet AGL

[8] Generally, the upper limits of the Airport Traffic Area has been lowered from 2,999 feet AGL to 2,500 feet AGL

[9] The requirement for two-way communications for Airport Traffic Areas has been retained

LEGEND 38.—Airspace Reclassification.

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GENERAL INFO

GENERAL INFORMATION

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

STANDARD TERMINAL ARRIVAL AND STANDARD INSTRUMENT DEPARTURES

The use of the associated codified STAR/SID 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/SID with a transition, the first three coded characters of the STAR and the last three coded characters of the SID 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).

PROFILE DESCENT PROCEDURAL NOTE

A profile descent is an uninterrupted descent (except where level flight is required for speed adjustment, e.g., 250 knots at 10,000 feet MSL) from cruising altitude/level to interception of a glide slope or to a minimum altitude specified for the initial or intermediate approach segment of a non-precision instrument approach. The profile descent normally terminates at the approach gate or where the glide slope or other appropriate minimum altitude is intercepted.

Profile descent clearances are subject to traffic conditions and may be altered by ATC if necessary. Acceptance, by the pilot, of a profile descent clearance; i.e., "cleared for Runway 28 profile descent," requires the pilot to adhere to all depicted procedures on the profile descent chart.

After a profile descent has been issued and accepted:

(1) Any subsequent ATC revision of altitude or route cancels the remaining portion of the charted profile descent procedure. ATC will then assign necessary altitude, route, and speed clearances.

(2) Any subsequent revision of depicted speed restriction voids all charted speed restrictions. Charted route and altitude restrictions are not affected by revision to depicted speed restrictions. If the pilot cannot comply with charted route and/or altitude restrictions because of revised speed, he is expected to so advise ATC.

THE PROFILE DESCENT CLEARANCES DOES NOT CONSTITUTE CLEARANCE TO FLY AN INSTRUMENT APPROACH PROCEDURE (IAP). The last "maintain altitude" specified in the PROFILE DESCENT procedure constitutes that the last ATC assigned altitude and the pilot must maintain such altitude until he is cleared for an approach unless another altitude is assigned by ATC.

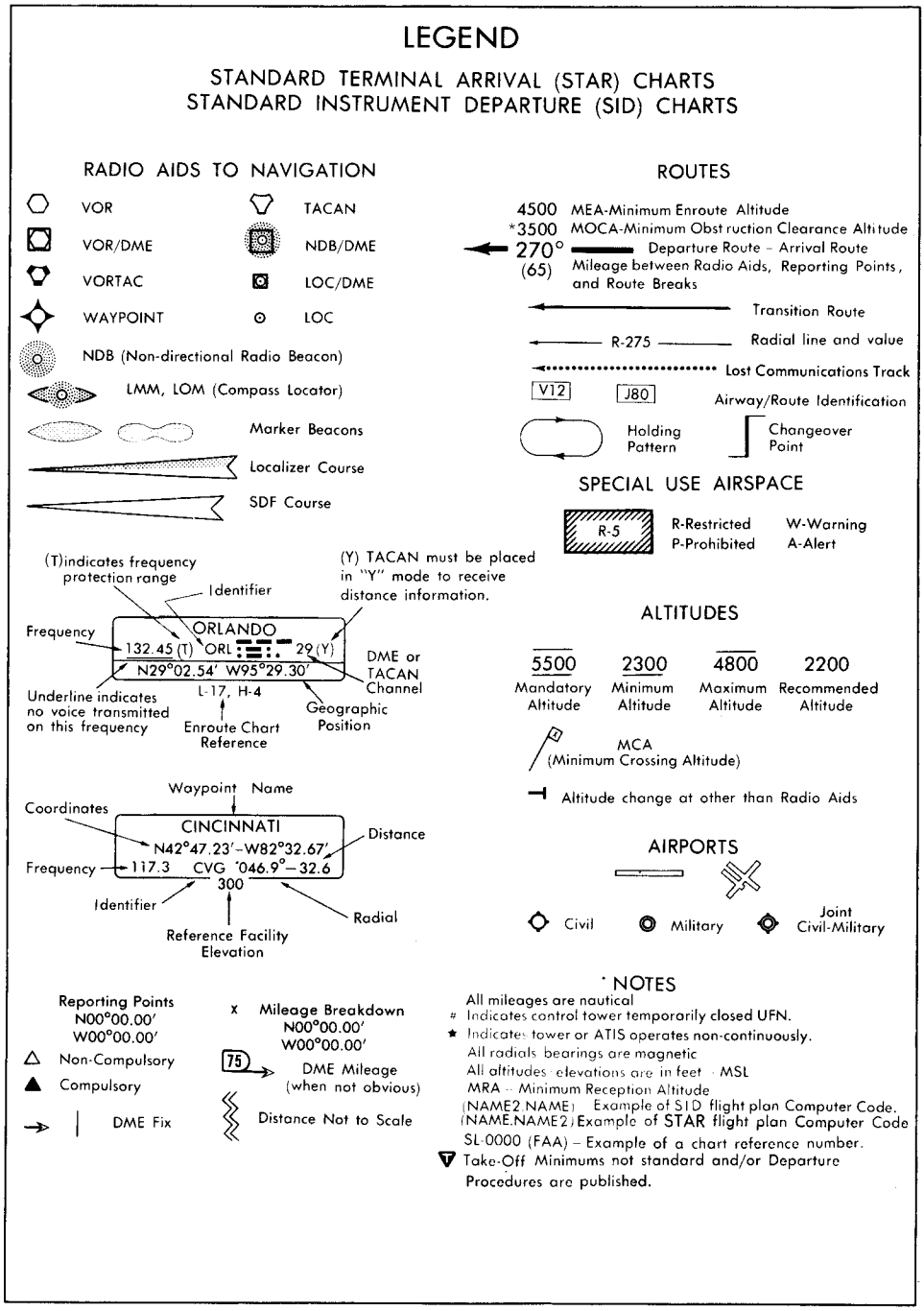
PILOTS SHOULD REVIEW RUNWAY PROFILE DESCENT CHARTS BEFORE FLIGHT INTO AIRPORTS WITH CHARTED PROCEDURES.

MISCELLANEOUS

★ Indicates control tower or ATIS operates non-continuously.
# Indicates control tower temporarily closed UFN.
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 (WGS84).

LEGEND 39.—General Information on SIDs, STARs, and PROFILE DESCENTS.

LEGEND



LEGEND 40.—SIDs and STARs.

LEGEND

LEGEND

PROFILE DESCENT PROCEDURES

RADIO AIDS TO NAVIGATION

VOR

VORTAC

NDB (Non-Directional Radiobeacon)

LOM (Compass Locator)

Marker Beacon

Localizer Course

NAME
000.0 NAM 00 — DME or TACAN Channel

Underline indicates no voice transmitted on this frequency

R-117 — Radial line and value

Reporting Point
N00°00.00′
W00°00.00′

△ Non-Compulsory
▲ Compulsory

DME fix

15 → DME Mileage (when not obvious)

x Mileage Breakdown
N00°00.00′
W00°00.00′

Changeover Point

ROUTES

Non-Radar Route

2900 MEA
169°
(69) Mileage

Radar Route
Headings are approximate)
270°

Transition Route
15000 MEA
214°
(28) Mileage

Altitude change at other than Radio Aids

(65) Mileage between Radio Aids, Reporting Points and Route Breaks

V25 J54 Airway/Route identification

Holding Pattern

4200 MEA-Minimum Enroute Altitude

* 3600 MOCA – Minimum Obstruction Clearance Altitude

RENO, (RNO.MOD4) – Computer Code

AIR TRAFFIC CLEARANCE

Cross at or above *13,000′*.
Descend and maintain *11,000′*
Turn left *350°*. Vector to final.

All radials/bearings are magnetic
All mileages are nautical
All altitudes in feet – MSL

LEGEND 41.—Profile Descent Procedures.

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TOWER ENROUTE CONTROL (TEC)

Within the national airspace system it is possible for a pilot to fly IFR from one point to another without leaving approach control airspace. This is referred to as "tower enroute" which allows flight beneath the enroute structure. The tower enroute concept has been expanded (where practical) by reallocating airspace vertically/geographically to allow flight planning between city pairs while remaining within approach control airspace. Pilots are encouraged to solicit tower enroute information from FSS's and to use the route descriptions provided in this directory when filing flight plans. Other airways which appear to be more direct between two points may take the aircraft out of approach control airspace thereby resulting in additional delays or other complications. All published TEC routes are designed to avoid enroute airspace and the majority are within radar coverage. Additional routes and other changes will appear in forthcoming editions as necessary. The acronym "TEC" should be included in the remarks section of the flight plan. This will advise ATC that the pilot intends to remain within approach control airspace for the entire flight. The following items should be noted before using the graphics and route descriptions:

1. The graphic is not to be used for navigation nor detailed flight planning. Not all city pairs are depicted. It is intended to show general geographic areas connected by tower enroute control. Pilots should refer to route descriptions for specific flight planning.
2. The route description contains four columns of information; i.e., the approach control area (listed alphabetically) within which the departure airport is located (check appropriate flight information publications), the specific route (airway, radial, etc.), the highest altitude allowed for the route, and the destination airport (listed alphabetically).
3. The word "DIRECT" will appear as the route when radar vectors will be used or no airway exists. Also, this indicates that a Standard Instrument Departure (SID) or Standard Terminal Arrival Route (STAR) may be applied by ATC.
4. When a NAVAID or intersection identifier appears with no airway immediately preceding or following the identifier, the routing is understood to be DIRECT to or from that point unless otherwise cleared by ATC.
5. Routes beginning or ending with an airway indicate that the airway essentially overflies the airport or radar vectors will be applied.
6. Where more than one route is listed to the same destination, the pilot may select which route is desired. Unless otherwise stated, all routes may be flown in either direction.
7. Routes are effective only during each respective terminal facility's normal operating hours. Pilots are cautioned to check NOTAMS to ensure appropriate terminal facilities will be operating for the planned flight time.
8. All identifiers used for NAVAIDS, airports, and intersections are official identifiers.
9. Altitudes are listed in thousands of feet. ATC may require altitude changes to maintain flight within approach control airspace. ATC will provide radar monitoring and, if necessary, course guidance if the highest altitude assigned by ATC is below the Minimum Enroute Altitude (MEA).
10. Although all airports are not listed under the destination column, IFR flight may be planned to satellite airports in proximity to major airports via the same routing.
11. Flight plans should be filed with a Flight Service Station (FSS).

TOWER ENROUTE CONTROL CITY PAIRS

(1) Single Engine only.
(2) Props less than 210 KT IAS.
(3) Props less than 250 KT IAS.
(4) Jets and Props greater than 210 KT IAS.
Boston—NO SATS = BED/LWM/BVY/AYE/FIT/B09/6B6/2B2
SO SATS = BOS/OWD/NZW/1B9/3B2

Approach Control Area (Including Satellites)		Route	Highest Altitude	Destination
Albany	.....	V14 V428 V29	6000	Binghamton
	.....	V130	7000	Bradley
	.....	V14	10,000	Buffalo
	.....	V14 V428	8000	Elmira
	.....	V14 V428	8000	Ithaca
	.....	V2	10,000	Rochester
	.....	V14 BEEPS	10,000	Rochester
	.....	V2	10,000	Utica/Rome
Allentown	.....	FJC V149 LHY	8000	Albany
	.....	ETX LHY	8000	Albany
	.....	FJC ARD V276 DIXIE V229	5000 (only)	Atlantic City
	.....	V93 LRP	8000	Baltimore
	.....	ETX V162 DUMMR V93 LRP	6000	Baltimore
	.....	V39 LRP	8000 (only)	Baltimore
	.....	FJC BWZ	5000 (only)	Caldwell, NJ
	.....	(2) ETX V30 SBJ	5000 (only)	Farmingdale, NY
	.....	(2) FJC V6 SBJ	5000 (only)	Farmingdale, NY
	.....	ETX V162 HAR	8000	Harrisburg
	.....	ETX ETX004 WEISS	4000 (only)	Hazleton
	.....	ETX V39	4000	Lancaster
	.....	(2) ETX V30 SBJ	5000 (only)	Newark

LEGEND 42.—Tower Enroute Control (NE).

TOWER ENROUTE CONTROL

Approach Control Area (Including Satellites)	Route	Highest Altitude	Destination
New York /Kennedy	SAX V249 SBJ V30 ETX (Non jet/Non turboprop)	8000	Allentown
	DIXIE V229 ACY (Props only)	6000	Atlantic City
	DIXIE V1 HOWIE (Jets only)	8000	Atlantic City
	DIXIE V1 V308 OTT (Props only)	6000	Andrews AFB
	DIXIE V16 ENO V268 SWANN (Props only)	6000	Baltimore
	COL	2000	Belmar
	BDR MAD V475 V188 TMU	9000	Block Island
	BDR V229 HFD V3 WOONS	9000	Boston
	BDR V229 HFD HFD053 DREEM	9000	Boston (North)
	BDR BDR014 JUDDS V419 BRISS	9000	Bradley
	BDR BDR014 JUDDS V419 BRISS (Jets only)	10000	Bradley
	BDR	3000	Bridgeport
	SAX V249 SBJ V30 ETX V162 HAR (Non jet/Non turboprop)	8000	Capital City
	DIXIE V1 LEEAH V268 BAL BAL291 KROLL AML (Non-pressurized aircraft only)	6000	Dulles
	BDR MAD MAD126 MONDI	9000	Groton
	R/V CCC 232 CCC HTO	3000	Hampton
	BDR V229 HFD	9000	Hartford
	BDR V229 HFD V167 PVD V151 GAILS	9000	Hyannis
	R/V ILS 6 LOC (Text Info)	3000	Islip
	R/V CCC232 CCC	3000	Islip
	Direct	2000	LaGuardia
	SAX V249 SBJ V30 ETX V162 V93 LRP (Props only)	8000	Lancaster
	DIXIE V16 CYN	6000	McGuire
	BDR MAD V475 V188 TMU V374 MVY	9000	Martha's Vineyard
	BDR MAD	3000	Meriden Markham
	DIXIE V16 VCN (Props only)	6000	Millville
	BDR MAD V475 V188 TMU V374 MVY	9000	Nantucket
	COL V232 SBJ	3000	Newark
	BDR MAD V475 V188 TMU V374 MINNK	9000	New Bedford
	DIXIE V1 (Props only)	6000	Norfolk
	DIXIE V276 ARD	4000	N. Philadelphia
	DIXIE V16 CYN V312 OOD (Props only)	6000	Philadelphia
	DIXIE V16 CYN V312 OOD (Jets only)	8000	Philadelphia
	BDR MAD V475 V188 TMU (210 kts +)	9000	Providence
	BDR MAD V475 V188 TMU	9000	Quonset
	SAX V249 SBJ V30 ETX V39 FLOAT (Non jet/Non turboprop only)	8000	Reading
	DIXIE V16 (Props only)	6000	Richmond
	DIXIE V1 (Props only)	6000	Salisbury
	DIXIE V1 V308 OTT (Props only)	6000	Washington
	DPK V483 CMK	2000	Westchester Co
	BDR MAD V475 V188 TMU	9000	Westerly
	DIXIE V229 PANZE V44 SIE (Props only)	6000	Wildwood
	DIXIE V1 HOWIE (Jets only)	8000	Wildwood
	BDR MAD V1 GRAYM	9000	Worcester
New York/ LaGuardia	SAX V249 SBJ V30 ETX	8000	Allentown
	DIXIE V229 ACY (Props only)	6000	Atlantic City
	DIXIE V1 HOWIE (Jets only)	8000	Atlantic City
	ABBYS V403 GLOMO V408 V93 BAL (Props only)	7000	Andrews AFB
	ABBYS V403 BELAY V378 BAL (Props only)	7000	Baltimore
	JFK COL	6000	Belmar
	BDR MAD V475 V188 TMU	9000	Block Island
	BDR V229 HFD V3 WOONS	9000	Boston
	BDR V229 HFD HFD053 DREEM	9000	Boston (North)
	BDR BDR014 JUDDS V419 BRISS (Props only)	9000	Bradley
	BDR BDR014 JUDDS V419 BRISS (Jets only)	10000	Bradley
	BDR 248 CCC285 PUGGS V229 BDR	5000	Bridgeport
	R/V BDR248 BDR. . .(Helicopter Route)	5000	Bridgeport (Points NE)
	SAX V249 SBJ V30 ETX V162 HAR	8000	Capital City
	SAX V249 SBJ V30 ETX V162 V93 V143 ROBRT AML (Props only)	8000	Dulles

LEGEND 42A—Tower Enroute Control Continued.

346 **TOWER ENROUTE CONTROL**

Approach Control Area (Including Satellites)	Route	Highest Altitude	Destination
	ABBYS V403 GLOMO V408 V93 BAL (Props only)	7000	Washington
	DIXIE V229 PANZE V44 SIE (Props only)	6000	Wildwood
	DIXIE V1 HOWIE (Jets only)	8000	Wildwood
	CMK V3 HFD V1 GRAYM	9000	Worcester
Norfolk	CCV CCV345 PXT175 PXT	5000	Patuxent River
	HPW V260 RIC (West-bound only)	9000	Richmond
	CCV V1 SBY	5000	Salisbury
	CCV V139 SWL (Northeast-bound only)	5000	Snow Hill
	HCM HCM330 SVILL	7000	Washington
Patuxent	SWL V139	5000	Atlantic City
	PXT V16 V44	5000	Atlantic City
	SBY V1 V44	5000	Atlantic City
	SBY332 BAL130	4000	Baltimore
	PXT V93	5000	Baltimore
	SBY V29 ENO	5000	Dover AFB
	PXT V16 ENO	5000	Dover AFB
	PXT V16	5000	Dover AFB
	SBY VI ATR	5000	Dover AFB
	PXT V213 V286 FLUKY	6000	Dulles
	COLIN V33 HCM	6000	Newport News
	SBY V1 CCV	6000	Norfolk
	SWL V139 CCV	6000	Norfolk
	WHINO V33 V286 STEIN	5000	Norfolk
	PXT V213 ENO V29 DQO	5000	Philadelphia
	SBY V29 DQO	5000	Philadelphia
	PXT V16	6000	Richmond
	SBY V1 JAMIE HCM	6000	Richmond
	COLIN V33 HCM	6000	Richmond
	PXT V31 OTT (No Overflight of D.C. Area)	4000	Washington
	SBY CHURK OTT (No Overflight of D.C. Area)	4000	Washington
Pease	RAYMY LWM	8000	Boston
	EXALT V139 V141 GAILS	10000	Hyannis
	V106 GDM V14 ORW V16 CCC	10000	Islip
	V106 GDM V14 ORW V16 DPK	10000	Kennedy
	EXALT V139 BURDY	10000	Providence
Philadelphia	RV FJC180 FJC	4000	Allentown
	OOD VCN V184 ACY	3000	Atlantic City
	MXE V378 BAL	6000	Baltimore
	DQO V166 V378 BAL	6000	Baltimore
	OOD V157 ENO	4000	Dover AFB
	DQO V29 ENO	4000	Dover AFB
	MXE V408 ROBRT AML	8000	Dulles
	MXE V184 MXE283027 V469 HAR	6000	Harrisburg
	PNE PNE090 ARD126 V16 DIXIE (Direct) (Single Engine only)	5000	Kennedy
	PNE PNE090 ARD126 V16 V276 ZIGGI (Direct) (No Single Engine)	5000	Kennedy
	RBV V123 PROUD	7000	LaGuardia
	MXE MXE295 HABER LRP137 LRP	4000	Lancaster
	ARD V214 METRO (Non Turbojets only)	5000	Newark
	RBV V213 WARRD (Turbojets only)	7000	Newark
	MXE MXE334 HUMEL	4000	Reading
	ARD V214 METRO	5000	Teterboro
	MXE V408 VINNY V93 BAL	8000	Washington
	DQO V166 V93 BAL	8000	Washington
	RV FJC180 FJC BWZ SAX V39 BREZY	5000	Westchester Co.
	RV FJC180 FJC V149 RITTY	5000	Wilkes Barre/Scranton
Pittsburgh	BSV (Westbound only)	8000	Akron-Canton
	V37 (Southbound only)	8000	Clarksburg
	EWC V37 (Northbound only)	8000	Erie

LEGEND 42B.—Tower Enroute Control Continued.

TOWER ENROUTE CONTROL 235

(TEC)

Within the national airspace system it is possible for a pilot to fly IFR from one point to another without leaving approach control airspace. This is referred to as "Tower Enroute" which allows flight beneath the enroute structure. The tower enroute concept has been expanded (where practical) by reallocating airspace vertically/geographically to allow flight planning between city pairs while remaining within approach control airspace. Pilots are encouraged to use the TEC route descriptions provided in the Southwest U.S. Airport/Facility Directory when filing flight plans. Other airways which appear to be more direct between two points may take the aircraft out of approach control airspace thereby resulting in additional delays or other complications. All published TEC routes are designed to avoid enroute airspace and the majority are within radar coverage. The following items should be noted before using the graphics and route descriptions.

1. The graphic is not to be used for navigation nor detailed flight planning. Not all city pairs are depicted. It is intended to show geographic areas connected by tower enroute control. Pilots should refer to route descriptions for specific flight planning.
2. The route description contains four colums of information after approach control area listed in the heading, where the departure airport is located; i.e., the airport/airports of intended landing using FAA three letter/letter-two number identifiers, the coded route number (this should be used when filing the flight plan and will be used by ATC in lieu of reading out the full route description), the specific route (airway, radial, etc.), the altitude allowed for type of aircraft and the routes.
3. The word "DIRECT" will appear as the route when radar vectors will be used or no airway exists. Also this indicates that a Standard Instrument Departure (SID) or Standard Terminal Arrival (STAR) may be applied by ATC.
4. When a NAVAID or intersection identifier appears with no airway immediately preceding or following the identifier, the routing is understood to be DIRECT to or from that point unless otherwise cleared by ATC or radials are listed (See item 5).
5. Routes beginning and ending with an airway indicate that the airway essentially overflies the airport or radar vectors will be applied.
6. Where more than one route is listed to the same destination, ensure you file correct route for type of aircraft which are denoted after the route in the altitude column using J,M,P, or Q. These are listed after item 10 under Aircraft Classification.
7. Although all airports are not listed under the destination column, IFR flight may be planned to satellite airports in the proximity to major airports via the same routing.
8. Los Angeles International Airport (LAX) and four other airports (ONT-SAN-TOA-SNA) have two options due to winds and these affect the traffic flows and runways in use. To indicate the difference the following symbols are used after the airport: Runway Number, W for west indicating normal conditions, E for East and N for North indicating other than normal operation. If nothing follows the airport use this route on either West, East or North plan. Other destinations have different arrivals due to LAX being East and they have the notation "(LAXE)." Torrance Airport is also unique in that the airport is split between Los Angeles and Coast TRACON, for Runway 11 departures use Coast TRACON routings and for Runway 29 departures use LAX TRACON routings.
9. When filing flight plans, the coded route identifier i.e. SANJ2, VTUJ4, POMJ3 may be used in lieu of the route of flight.
10. Aircraft types i.e. J, M, P, and Q are listed at the beginning of the altitude and should be used with the route of flight filed. (See Aircraft Classification below). The altitudes shown are to be used for the route. This allows for separation of various arrival routes, departure routes, and overflights to, from, and over all airports in the Southern California area.

LEGENDS

AIRCRAFT CLASSIFICATION

(J) = Jet powered
(M) = Turbo Props/Special (cruise speed 190 knots or greater)
(P) = Non-jet (cruise speed 190 knots or greater)
(Q) = Non-jet (cruise speed 189 knots or less)

LEGEND 43.—Tower Enroute Control (SW).

236 **TOWER ENROUTE CONTROL**

BURBANK TRACON
FROM: BUR VNY WHP

TO:	ROUTE ID	ROUTE	ALTITUDE
FUL LGB SLI TOA (RWY 29)	BURJ1	V186 V394 SLI	MPQ50
LAX	BURJ2	V186 PURMS	JMPQ40
LAX (LAXE)	BURJ3	VNY SMO	JM50PQ40
TOA (RWY 11)	BURJ4	VNY VNY095 DARTS SMO	JMPQ40
SMO	BURJ5	V186 DARTS	JMPQ30
CCB CNO EMT HMT L12 L65 L66 L67 F70 ONT POC RAL RIR RIV SBD	BURJ6	V186 PDZ	JM70PQ50
CRQ NFG NKX L39 L32	BURJ7	V186 V363 V23 OCN	JM70PQ50
MYF NRS NZY SAN SDM SEE	BURJ8	V186 V363 V23 MZB	PQ50
MYF NRS NZY SAN SDM SEE	BURJ9	V186 POM164 V208 MZB320 MZB	JM70
OXR CMA	BURJ10	VNY	JMPQ40
SBA	BURJ11	FIM V186 V27 KWANG	JMPQ60
SNA	BURJ12	V186 V363 V8 SLI	JMPQ50
SAN (SANE)	BURJ13	V186 V363 V23 V165 SARGS	PQ50
SAN (SANE)	BURJ14	V186 POM164 V25 V165 SARGS	JM70
NZJ NTK	BURJ15	V186 V363 V23 DAMPS	JM70PQ50
AVX	BURJ16	V186 V363 KRAUZ SXC	JM70PQ50
HHR	BURJ17	V186 ELMOO	JMPQ40
LGB	BURJ18	V186 V363 V23 SLI	J70

COAST TRACON
FROM: FUL LGB SLI SNA TOA (RWY 11) NTK NZJ

TO:	ROUTE ID	ROUTE	ALTITUDE
BUR VNY WHP	CSTJ1	SLI V23 LAX LAX316 SILEX	JM60PQ40
BUR VNY WHP (LAXE)	CSTJ2	SLI SLI333 V186 VNY	JM50PQ40
CMA OXR (LAXE)	CSTJ3	SLI SLI333 V186 FIM	JM50PQ40
LAX	CSTJ4	SLI	JM70PQ40
LAX (LAXE)	CSTJ5	SLI V8 TANDY	JM50PQ40
SMO	CSTJ6	SLI V23 LAX LAX046 ELMOO	JM70PQ40
SMO (LAXE)	CSTJ7	SLI SLI333 V186 DARTS	JM50PQ40
CCB EMT POC	CSTJ8	SLI V8 V363 POM	JMPQ50
CNO HMT L12 L65 L66 L67 F70 ONT RAL RIR RIV SBD	CSTJ9	SLI V8 PDZ (SNA RWY 19 ONLY)	JM60
CNO HMT L12 L65 L66 L67 F70 ONT RAL RIR RIV SBD	CSTJ10	SLI V8 PDZ	JMPQ50
CRQ L39 NFG NKX L32	CSTJ12	V25 V208 OCN	JM70
MYF NRS NZY SAN SDM SEE	CSTJ14	V25 V208 MZB320 MZB	J110M90
OXR CMA	CSTJ15	SLI V23 LAX VNY	M50PQ40
OXR CMA	CSTJ16	SXC SXC295 VTU160 VTU	J80
SBA	CSTJ17	SLI V23 LAX VTU KWANG	PQ40
SBA (LAXE)	CSTJ18	SLI SLI333 V186 V27 KWANG	M50PQ40
SBA	CSTJ19	SXC SXC295 VTU160 VTU KWANG	JM80
SAN (SANE)	CSTJ21	V25 V165 SARGS	J110M90
HHR	CSTJ26	SLI SLI340 WELLZ LOC	JM70PQ40

FROM: SNA NTK NZJ and when SNAN FUL LGB SLI TOA RWY 11

TO:	ROUTE ID	ROUTE	ALTITUDE
CRQ L39 NFG NKX L32	CSTJ11	V23 OCN	PQ50
MYF NRS NZY SAN SDM SEE	CSTJ13	V23 MZB	PQ50
SAN (SANE)	CSTJ20	V23 V165 SARGS	PQ50

FROM: AVX (DEPARTURES ONLY)

TO:	ROUTE ID	ROUTE	ALTITUDE
CRQ L39 NFG NKX L32	CSTJ22	SXC V208 OCN	JMPQ50
MYF NRS NZY SAN SDM SEE	CSTJ23	SXC V208 MZB320 MZB	J110M90
MYF NRS NZY SAN SDM SEE (SANE)	CSTJ24	SXC V208 OCN V165 SARGS	PQ50
MYF NRS NZY SAN SDM SEE	CSTJ25	SXC V208 OCN V23 MZB	PQ50

LEGEND 43A.—Tower Enroute Control Continued.

APPENDIX 2

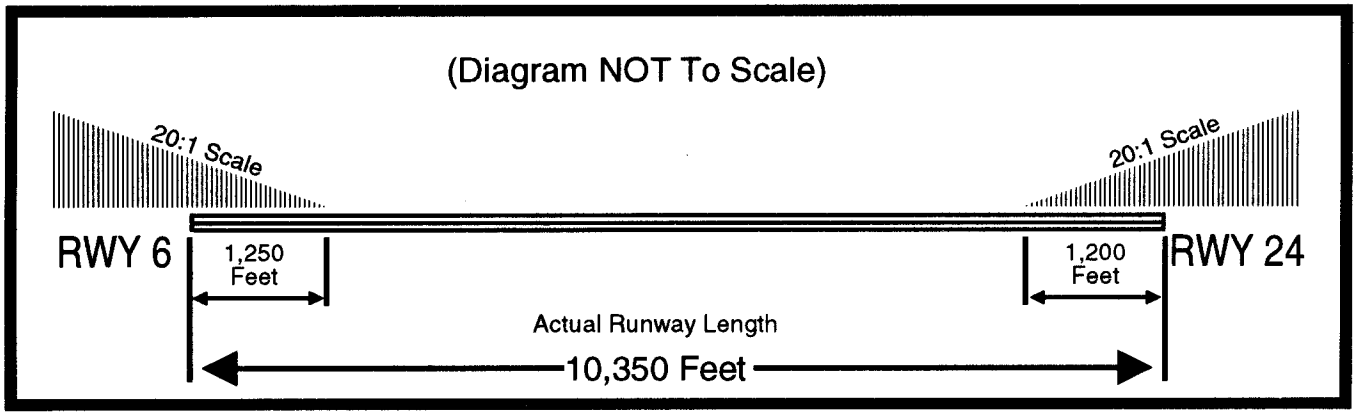


FIGURE 1.—Runway Diagram.

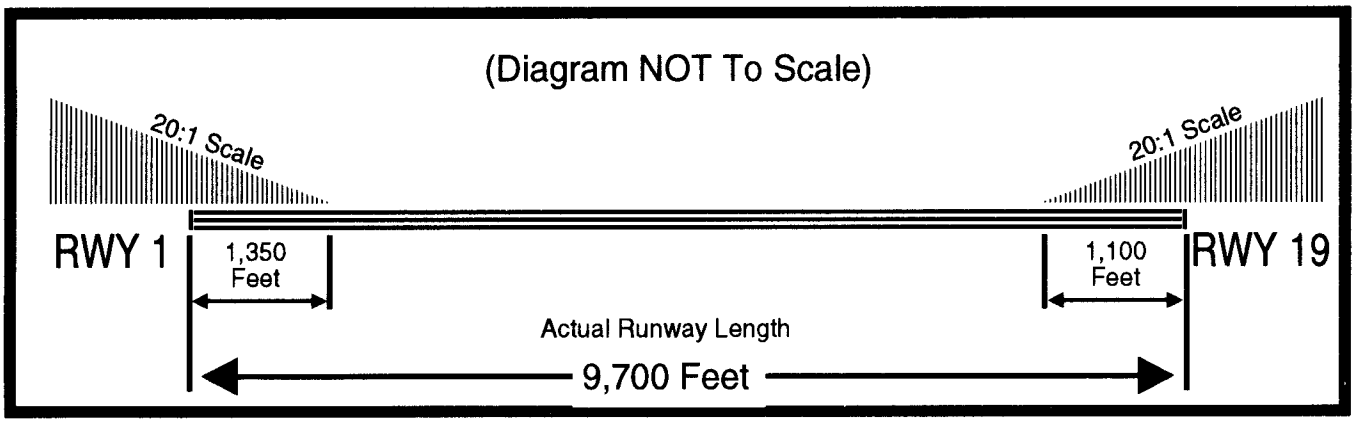


FIGURE 2.—Runway Diagram.

LOADING CONDITIONS	BE-1	BE-2	BE-3	BE-4	BE-5
CREW	360	340	350	340	360
PASSENGERS ROW 1	350	300	120	-	-
ROW 2	260	250	340	370	-
ROW 3	200	190	350	400	170
ROW 4	340	170	300	290	200
ROW 5	120	190	170	200	290
ROW 6	400	340	-	170	400
ROW 7	120	190	-	210	370
ROW 8	250	-	-	190	340
ROW 9	-	-	-	420	430
BAGGAGE NOSE	60	-	80	-	100
FWD CABIN	250	100	120	-	200
AFT (FWD SEC)	500	200	250	800	-
AFT (AFT SEC)	-	600	500	-	-
FUEL GAL	370	390	400	290	340
TYPE	JET B	JET A	JET B	JET A	JET B
TEMP	+5 °C	+15 °C	-15 °C	+10 °C	+25 °C

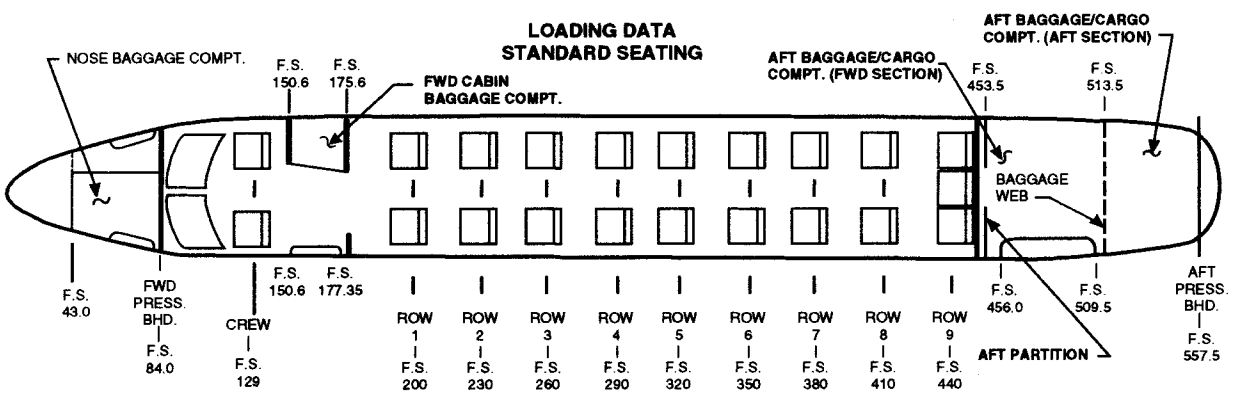
FIGURE 3.—Beech 1900 – Loading Passenger Configuration.

LOADING CONDITIONS	BE-6	BE-7	BE-8	BE-9	BE-10
CREW	360	340	350	370	420
CARGO SECTION A	500	-	600	600	350
B	500	400	200	600	450
C	550	450	400	600	450
D	550	600	400	600	550
E	600	600	200	550	550
F	600	600	200	350	600
G	450	500	200	250	600
H	-	-	200	250	-
J	350	-	300	150	-
K	-	-	250	200	-
L	-	-	100	100	-
FUEL GAL	340	370	390	290	400
TYPE	JET B	JET B	JET A	JET A	JET B
TEMP	+25 °C	+5 °C	+15 °C	+10 °C	-15 °C
BASIC OPERATING WEIGHT - 9,005 POUNDS, 25,934 MOM/100					

FIGURE 4.—Beech 1900 – Loading Cargo Configuration.

OPERATING CONDITIONS	BE-11	BE-12	BE-13	BE-14	BE-15
BASIC EMPTY WT					
WEIGHT	9,225	9,100	9,000	8,910	9,150
MOM/100	25,820	24,990	24,710	24,570	25,240
CREW WEIGHT	340	380	360	400	370
PASS AND BAG					
WEIGHT	4,200	4,530	4,630	4,690	4,500
MOM/100	15,025	16,480	16,743	13,724	13,561
FUEL (6.8 LB/GAL)					
RAMP LOAD-GAL	360	320	340	310	410
USED START AND TAXI	20	20	10	20	30
REMAIN AT LDG	100	160	140	100	120

FIGURE 5.—Beech 1900 – Loading Limitations.



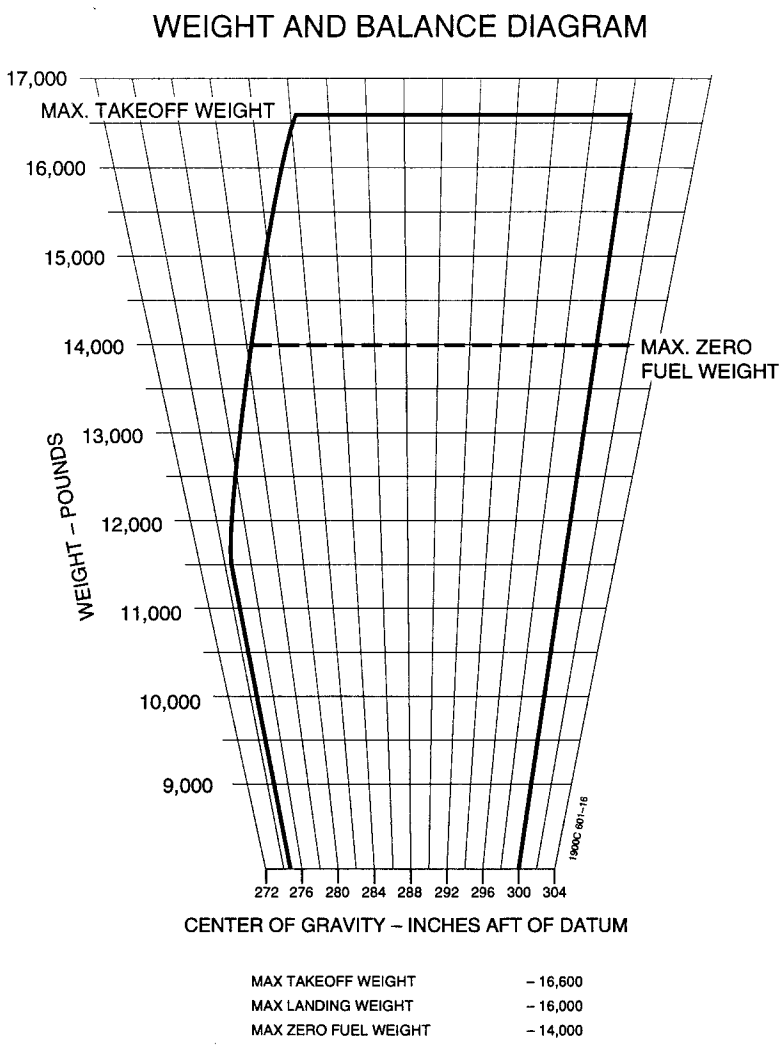
BAGGAGE/CARGO LOCATION		CAPACITY – POUNDS	CENTROID (FUSELAGE STATION)
NOSE BAGGAGE COMPARTMENT		150	65.5
FORWARD CABIN BAGGAGE COMPARTMENT (INCLUDES UP TO 100 POUNDS WHICH MAY BE SUSPENDED FROM CLOTHES ROD)		250	163.6
AFT BAGGAGE/CARGO COMPARTMENT	– FWD SECTION	880	483.5
	– AFT SECTION	630	533.0

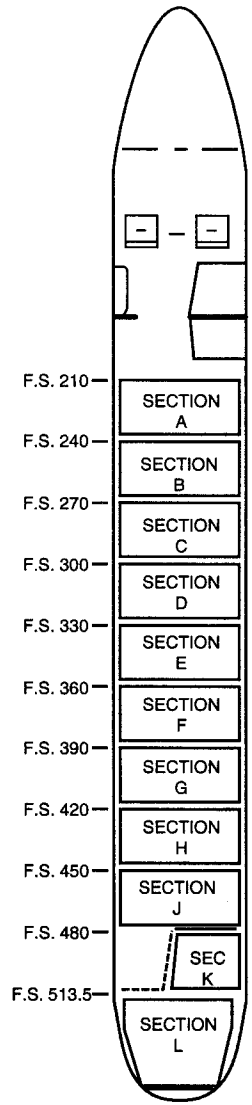
NOTE:

1. For compartment loadings which result in only partial utilization of total compartment volume, load items must be distributed or secured in a manner to preclude shifting under normally anticipated operating conditions.

BASIC EMPTY WEIGHT 9,226 LB
BASIC MOMENT/100 25,823

FIGURE 6.—Airplane – Loading Data.





LOADING DATA
CARGO CONFIGURATION

SECTION	MAXIMUM STRUCTURAL CAPACITY	CENTROID ARM
A	600	F.S. 225
B	600	F.S. 255
C	600	F.S. 285
D	600	F.S. 315
E	600	F.S. 345
F	600	F.S. 375
G	600	F.S. 405
H	600	F.S. 435
J	600	F.S. 465
K	250	F.S. 499.5
L	565	F.S.533

NOTES:

1. ALL CARGO IN SECTIONS A THROUGH J MUST BE SUPPORTED ON THE SEAT TRACKS AND SECURED TO THE SEAT TRACKS AND SIDE SEAT RAILS BY AN FAA APPROVED SYSTEM.
2. CONCENTRATED CARGO LOADS IN SECTIONS A THROUGH L MUST NOT EXCEED 100 LBS. PER SQUARE FOOT.
3. CARGO IN SECTIONS K AND L MUST BE RETAINED BY BAGGAGE WEBS AND PARTITIONS PROVIDED AS PART OF STANDARD AIRPLANE.
4. ANY EXCEPTIONS TO THE ABOVE PROCEDURES WILL REQUIRE APPROVAL BY A LOCAL FAA OFFICE.

1900–603–50

FIGURE 7.—Beech 1900 – CG Envelope and Cargo Loading Data.

USEFUL LOAD WEIGHTS AND MOMENTS

BAGGAGE

WEIGHT	NOSE BAGGAGE COMPART-MENT F.S. 65.5	FORWARD CABIN BAGGAGE COMPART-MENT F.S. 163.6	AFT BAGGAGE/ CARGO COMPART-MENT (FORWARD SECTION) F.S. 483.5	AFT BAGGAGE/ CARGO COMPART-MENT (AFT SECTION) F.S. 533.0
	MOMENT/100			
10	7	16	48	53
20	13	33	97	107
30	20	49	145	160
40	26	65	193	213
50	33	82	242	266
60	39	98	290	320
70	46	115	338	373
80	52	131	387	426
90	59	147	435	480
100	66	164	484	533
150	98	245	725	800
200		327	967	1066
250		409	1209	1332
300			1450	1599
350			1692	1866
400			1934	2132
450			2176	2398
500			2418	2665
550			2659	2932
600			2901	3198
630			3046	3358
650			3143	
700			3384	
750			3626	
800			3868	
850			4110	
880			4255	

FIGURE 8.—Airplane – Weights and Moments – Baggage.

USEFUL LOAD WEIGHTS AND MOMENTS

OCCUPANTS

WEIGHT	CREW	CABIN SEATS								
	F.S. 129	F.S. 200	F.S. 230	F.S. 260	F.S. 290	F.S. 320	F.S. 350	F.S. 380	F.S. 410	F.S. 440
	MOMENT/100									
80	103	160	184	208	232	256	280	304	328	352
90	116	180	207	234	261	288	315	342	369	396
100	129	200	230	260	290	320	350	380	410	440
110	142	220	253	286	319	352	385	418	451	484
120	155	240	276	312	348	384	420	456	492	528
130	168	260	299	338	377	416	455	494	533	572
140	181	280	322	364	406	448	490	532	574	616
150	194	300	345	390	435	480	525	570	615	660
160	206	320	368	416	464	512	560	608	656	704
170	219	340	391	442	493	544	595	646	697	748
180	232	360	414	468	522	576	630	684	738	792
190	245	380	437	494	551	608	665	722	779	836
200	258	400	460	520	580	640	700	760	820	880
210	271	420	483	546	609	672	735	798	861	924
220	284	440	506	572	638	704	770	836	902	968
230	297	460	529	598	667	736	805	874	943	1012
240	310	480	552	624	696	768	840	912	984	1056
250	323	500	575	650	725	800	875	950	1025	1100

Note: Weights reflected in above table represent weight per seat.

FIGURE 9.—Beech 1900 – Weights and Moments – Occupants.

DENSITY VARIATION OF AVIATION FUEL

BASED ON AVERAGE SPECIFIC GRAVITY

FUEL	AVERAGE SPECIFIC GRAVITY AT 15 °C (59 °F)
AVIATION KEROSENE JET A AND JET A1	.812
JET B (JP-4)	.785
AV GAS GRADE 100/130	.703

NOTE: The Fuel Quantity Indicator is calibrated for correct indication when using Aviation Kerosene Jet A and Jet A1. When using other fuels, multiply the indicated fuel quantity in pounds by .99 for Jet B (JP-4) or by .98 for Aviation Gasoline (100/130) to obtain actual fuel quantity in pounds.

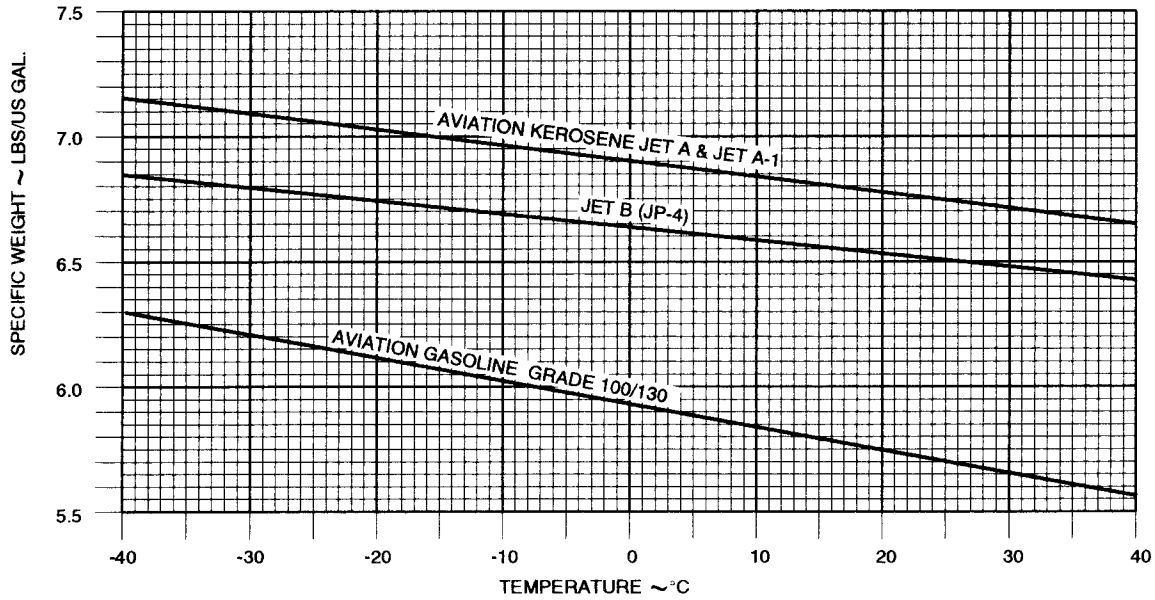


FIGURE 10.—Density Variation of Aviation Fuel.

USEFUL LOAD WEIGHTS AND MOMENTS

USABLE FUEL

GALLONS	6.5 LB/GAL		6.6 LB/GAL		6.7 LB/GAL		6.8 LB/GAL	
	WEIGHT	MOMENT 100	WEIGHT	MOMENT 100	WEIGHT	MOMENT 100	WEIGHT	MOMENT 100
10	65	197	66	200	67	203	68	206
20	130	394	132	401	134	407	136	413
30	195	592	198	601	201	610	204	619
40	260	789	264	802	268	814	272	826
50	325	987	330	1002	335	1018	340	1033
60	390	1185	396	1203	402	1222	408	1240
70	455	1383	462	1404	469	1426	476	1447
80	520	1581	528	1605	536	1630	544	1654
90	585	1779	594	1806	603	1834	612	1861
100	650	1977	660	2007	670	2038	680	2068
110	715	2175	726	2208	737	2242	748	2275
120	780	2372	792	2409	804	2445	816	2482
130	845	2569	858	2608	871	2648	884	2687
140	910	2765	924	2808	938	2850	952	2893
150	975	2962	990	3007	1005	3053	1020	3099
160	1040	3157	1056	3205	1072	3254	1088	3303
170	1105	3351	1122	3403	1139	3454	1156	3506
180	1170	3545	1188	3600	1206	3654	1224	3709
190	1235	3739	1254	3797	1273	3854	1292	3912
200	1300	3932	1320	3992	1340	4053	1360	4113
210	1365	4124	1386	4187	1407	4250	1428	4314
220	1430	4315	1452	4382	1474	4448	1496	4514
230	1495	4507	1518	4576	1541	4646	1564	4715
240	1560	4698	1584	4770	1608	4843	1632	4915
250	1625	4889	1650	4964	1675	5040	1700	5115
260	1690	5080	1716	5158	1742	5236	1768	5315
270	1755	5271	1782	5352	1809	5433	1836	5514
280	1820	5462	1848	5546	1876	5630	1904	5714
290	1885	5651	1914	5738	1943	5825	1972	5912
300	1950	5842	1980	5932	2010	6022	2040	6112
310	2015	6032	2046	6125	2077	6218	2108	6311
320	2080	6225	2112	6321	2144	6416	2176	6512
330	2145	6417	2178	6516	2211	6615	2244	6713
340	2210	6610	2244	6711	2278	6813	2312	6915
350	2275	6802	2310	6907	2345	7011	2380	7116
360	2340	6995	2376	7103	2412	7210	2448	7318
370	2405	7188	2442	7299	2479	7409	2516	7520
380	2470	7381	2508	7495	2546	7609	2584	7722
390	2535	7575	2574	7691	2613	7808	2652	7924
400	2600	7768	2640	7888	2680	8007	2720	8127
410	2665	7962	2706	8085	2747	8207	2788	8330
420	2730	8156	2772	8282	2814	8407	2856	8532
425	2763	8259	2805	8386	2848	8513	2890	8640

FIGURE 11.—Beech 1900 – Weights and Moments – Usable Fuel.

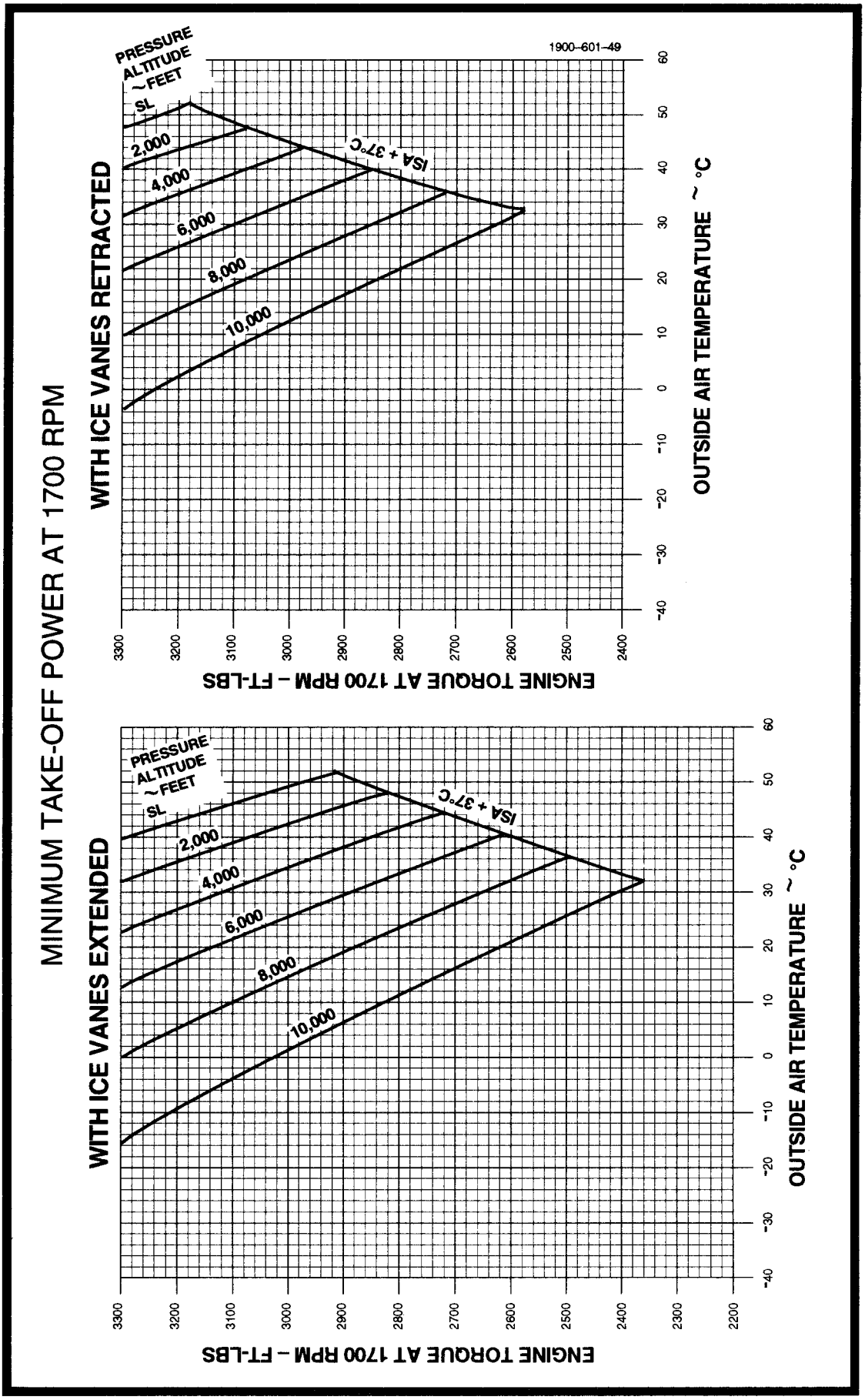


FIGURE 12.—Minimum Takeoff Power at 1700 RPM.

TAKE-OFF DISTANCE – FLAPS TAKEOFF

ASSOCIATED CONDITIONS:
POWER ..... TAKE-OFF POWER SET BEFORE BRAKE RELEASE
LANDING GEAR ..... RETRACT AFTER LIFT-OFF
RUNWAY ..... PAVED, LEVEL, DRY SURFACE

NOTE: FOR OPERATION WITH ICE VANES EXTENDED ADD 5 °C TO THE ACTUAL OAT BEFORE ENTERING GRAPH.

WEIGHT ~ POUNDS	TAKE-OFF SPEED ~ KNOTS	
	V_1	V_2
16,600	108	115
16,000	107	114
14,000	102	112
12,000	102	112
10,000	102	112

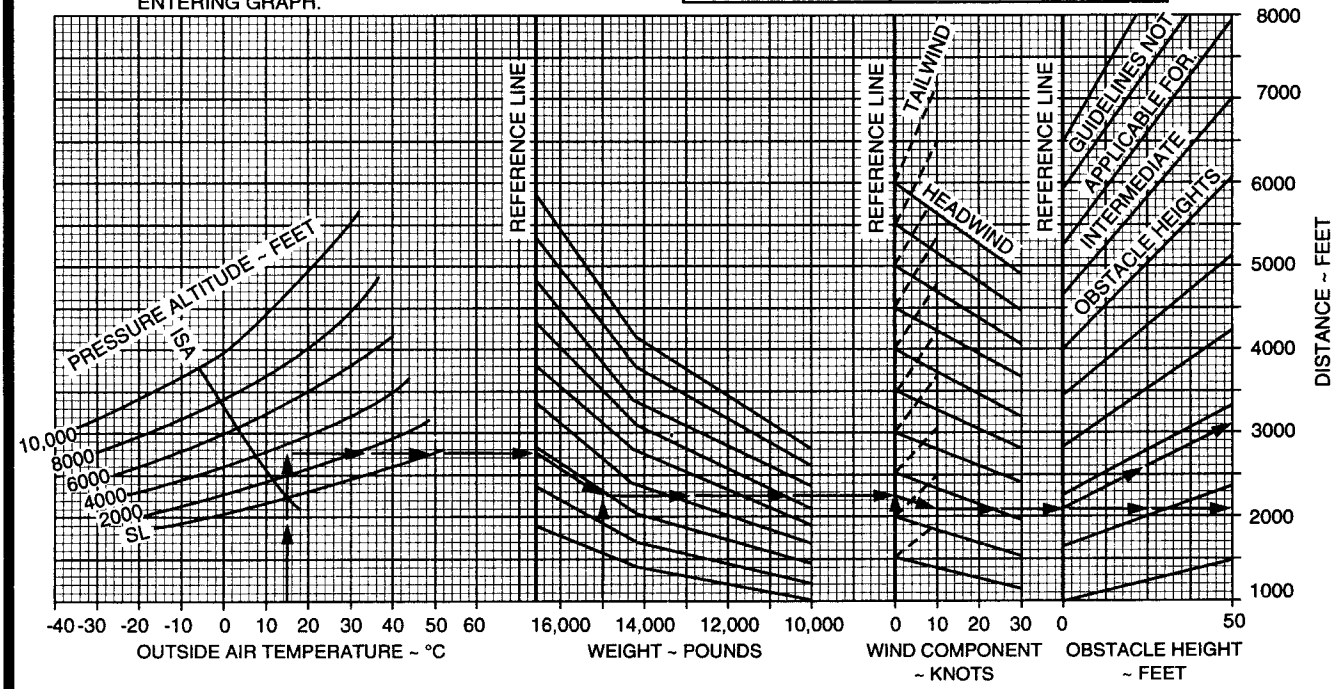


FIGURE 13.—Takeoff Distance – Flaps Takeoff.

ACCELERATE–STOP — FLAPS TAKEOFF

ASSOCIATED CONDITIONS:

POWER ..... 1. TAKE-OFF POWER SET BEFORE BRAKE RELEASE
2. BOTH ENGINES IDLE AT V_1 SPEED

AUTOFEATHER ..... ARMED

BRAKING ..... MAXIMUM

RUNWAY ..... PAVED, LEVEL, DRY SURFACE

NOTE: FOR OPERATION WITH ICE VANES EXTENDED, ADD 3 °C TO THE ACTUAL OAT BEFORE ENTERING GRAPH.

WEIGHT ~ POUNDS	V_1 ~ KNOTS
16,600	108
16,000	107
14,000	102
12,000	102
10,000	102

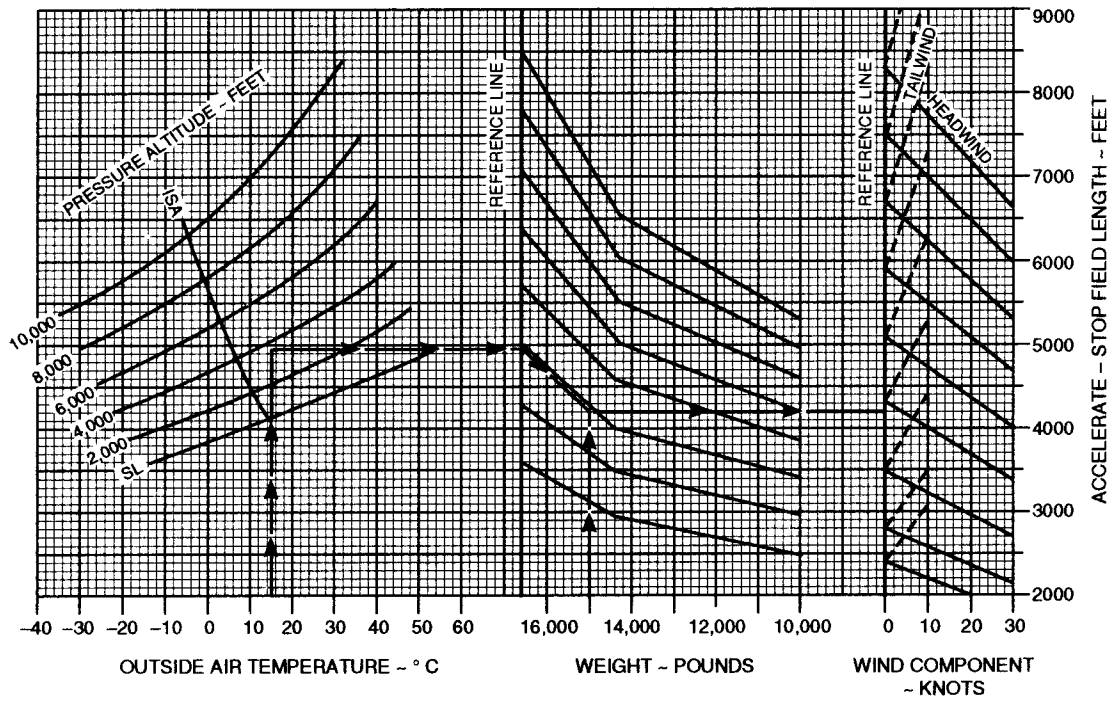


FIGURE 14.—Accelerate-Stop – Flaps Takeoff.

OPERATING CONDITIONS	BE-21	BE-22	BE-23	BE-24	BE-25
OAT AT TAKEOFF	+10 °C	0 °C	+20 °C	+25 °C	–10 °C
OAT AT CRUISE	–20 °C	–25 °C	ISA	0 °C	–40 °C
AIRPORT PRESS ALTITUDE	2,000	1,000	3,000	4,000	5,000
CRUISE ALTITUDE	16,000	18,000	20,000	14,000	22,000
INITIAL CLIMB WEIGHT	16,600	14,000	15,000	16,000	14,000
ICE VANES	RETRACT	EXTEND	RETRACT	RETRACT	EXTEND

FIGURE 15.— Beech 1900 – Climb.

CLIMB — TWO ENGINES — FLAPS UP

ASSOCIATED CONDITIONS:

POWER ..... MAXIMUM CONTINUOUS
FLAPS ..... UP
LANDING GEAR ..... UP

WEIGHT ~ POUNDS	CLIMB SPEED ~ KNOTS
16,600	135
16,000	134
14,000	130
12,000	125
10,000	121

NOTE: DURING OPERATION WITH ICE VANES EXTENDED, RATE OF CLIMB WILL BE REDUCED APPROXIMATELY 240 FEET PER MINUTE.

EXAMPLE:

OAT ..... –4 °C
PRESSURE ALTITUDE ..... 9,000 FT
WEIGHT ..... 14,500 LBS
RATE OF CLIMB ..... 2490 FT/MIN
CLIMB GRADIENT ..... 14.7 %
CLIMB SPEED ..... 131 KTS

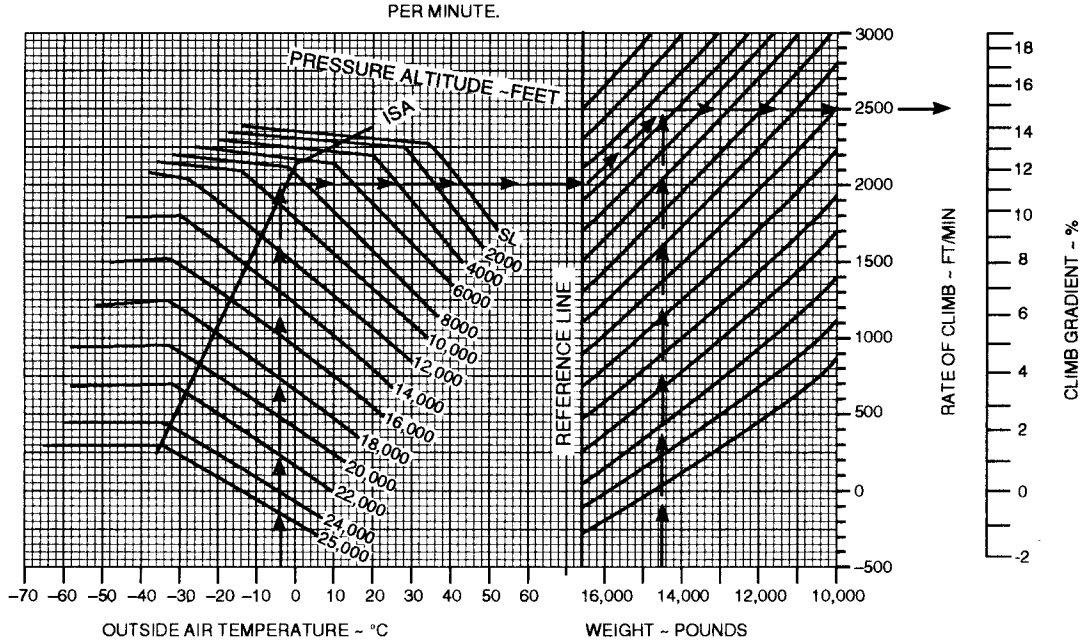


FIGURE 16.—Climb – Two Engines – Flaps Up.

CLIMB — ONE ENGINE INOPERATIVE

BLEED AIR ON

ASSOCIATED CONDITIONS:

POWER ..... MAXIMUM CONTINUOUS
FLAPS ..... UP
LANDING GEAR ..... UP
INOPERATIVE PROPELLER .... FEATHERED

WEIGHT ~ POUNDS	CLIMB SPEED ~ KNOTS
16,600	125
16,000	124
14,000	119
12,000	116
10,000	112

NOTES: DURING OPERATION WITH ICE VANES EXTENDED, RATE OF CLIMB WILL BE REDUCED APPROXIMATELY 115 FEET PER MINUTE.

EXAMPLE:

OAT ..... –4 °C
PRESSURE ALTITUDE ..... 9,000 FT
WEIGHT ..... 14,500 LBS

RATE OF CLIMB ..... 450 FT/MIN
CLIMB GRADIENT ..... 3.1 %
CLIMB SPEED ..... 120 KTS

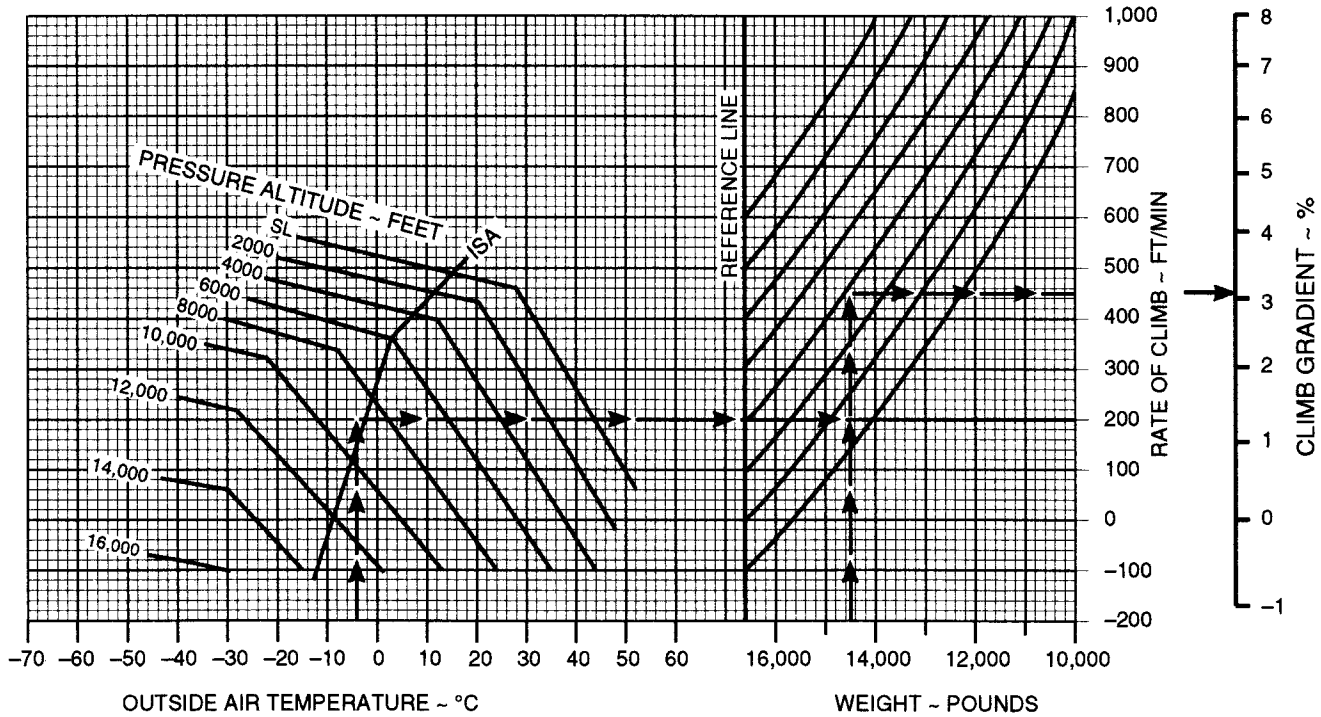


FIGURE 17.—Climb – One Engine Inoperative.

TIME, FUEL, AND DISTANCE TO CRUISE CLIMB

ASSOCIATED CONDITIONS:

PROPELLER SPEED ..... 1550 RPM
POWER:
ITT ..... 750 °C
OR TORQUE ..... 3400 FT–LBS

NOTES: 1. ADD 110 LBS FUEL FOR START, TAXI, AND TAKEOFF

2. FOR OPERATION WITH ICE VANES EXTENDED, ADD 10 °C TO THE ACTUAL OAT BEFORE ENTERING THE GRAPH

ALTITUDE ~ FEET	CLIMB SPEED ~ KNOTS
SL TO 10,000	160
10,000 TO 15,000	150
15,000 TO 20,000	140
20,000 TO 25,000	130

EXAMPLE:

OAT AT TAKEOFF ..... 15 °C
OAT AT CRUISE ..... –10 °C
AIRPORT PRESSURE ALTITUDE ..... 3499 FT
CRUISE ALTITUDE ..... 11,000 FT
INITIAL CLIMB WEIGHT ..... 15,000 LBS

TIME TO CLIMB (4.8–.8) ..... 4 MIN
FUEL TO CLIMB (93–25) ..... 68 LBS
DISTANCE TO CLIMB (13–2) ..... 11 NM

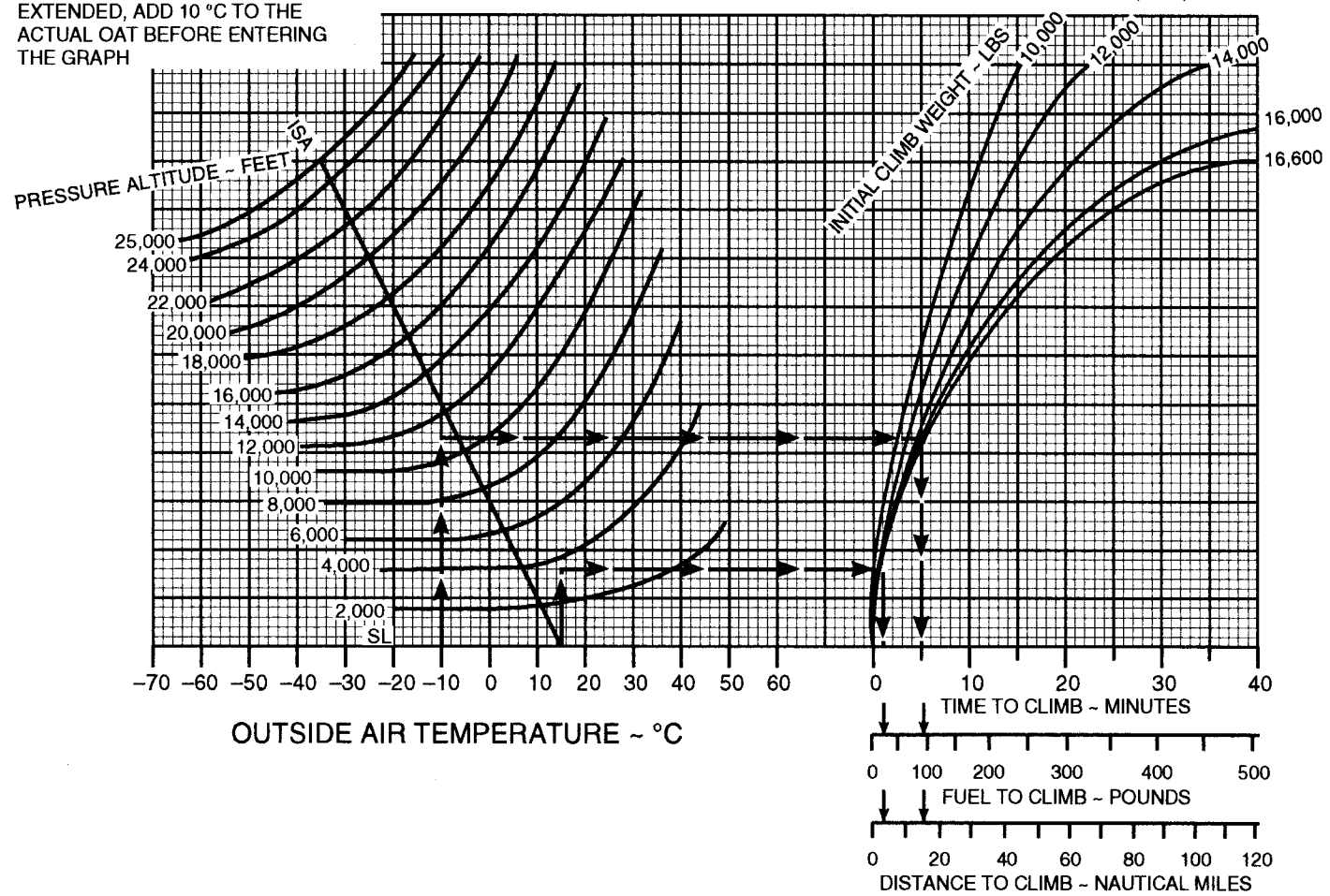


FIGURE 18.—Time, Fuel, and Distance to Cruise Climb.

OPERATING CONDITIONS	BE-26	BE-27	BE-28	BE-29	BE-30
OAT AT MEA	–8 °C	+30 °C	+5 °C	+18 °C	+22 °C
WEIGHT	15,500	16,600	16,000	16,300	14,500
ROUTE SEGMENT MEA	6,000	5,500	9,000	7,000	9,500
BLEED AIR	ON	ON	OFF	ON	OFF

FIGURE 19.—Beech 1900 – Service Ceiling.

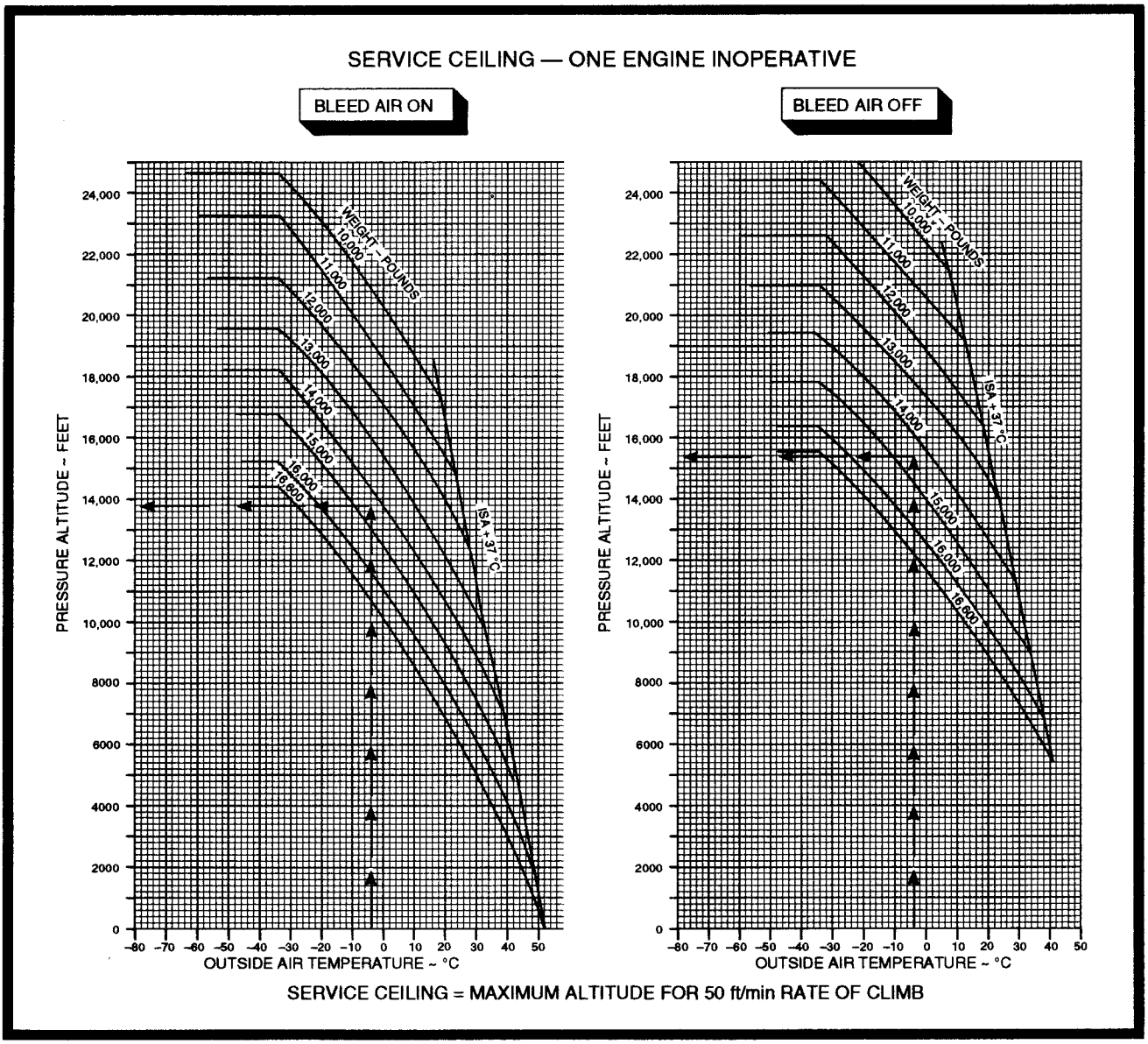


FIGURE 20.—Service Ceiling – One Engine Inoperative.

OPERATING CONDITIONS	BE-31	BE-32	BE-33	BE-34	BE-35
WEIGHT	15,000	14,000	13,000	16,000	11,000
PRESSURE ALTITUDE	22,000	17,000	20,000	23,000	14,000
TEMPERATURE (OAT)	–19 °C	–19 °C	–35 °C	–31 °C	–3 °C
TRUE COURSE	110	270	185	020	305
WIND	180/30	020/35	135/45	340/25	040/50
CRUISE DISTANCE	280	320	400	230	300

FIGURE 21.—Beech 1900 – Cruise.

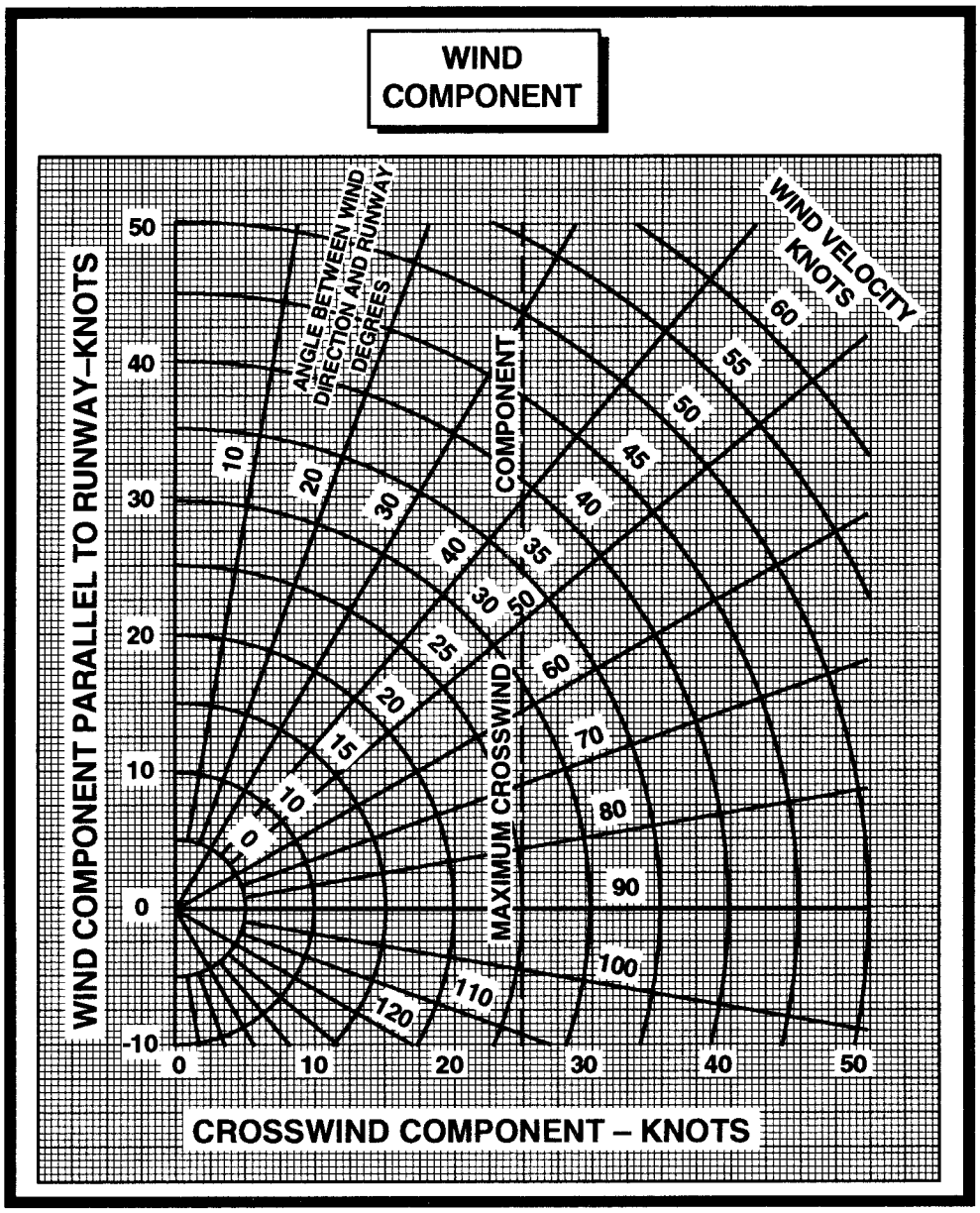


FIGURE 22.—Wind Component Chart.

RECOMMENDED CRUISE POWER

1550 RPM

ISA +10 °C

WEIGHT			16,000 POUNDS					14,000 POUNDS					12,000 POUNDS					10,000 POUNDS				
PRESSURE ALTITUDE	IOAT	OAT	TORQUE PER ENG	FUEL FLOW PER ENG	TOTAL FUEL FLOW	IAS	TAS	TORQUE PER ENG	FUEL FLOW PER ENG	TOTAL FUEL FLOW	IAS	TAS	TORQUE PER ENG	FUEL FLOW PER ENG	TOTAL FUEL FLOW	IAS	TAS	TORQUE PER ENG	FUEL FLOW PER ENG	TOTAL FUEL FLOW	IAS	TAS
FEET	°C	°C	FT-LBS	LBS/HR	LBS/HR	KTS	KTS	FT-LBS	LBS/HR	LBS/HR	KTS	KTS	FT-LBS	LBS/HR	LBS/HR	KTS	KTS	FT-LBS	LBS/HR	LBS/HR	KTS	KTS
SL	30	25	3294	577	1154	232	239	3301	577	1154	235	241	3307	577	1154	237	243	3312	577	1154	238	245
2000	26	21	3191	551	1102	227	240	3198	551	1102	230	243	3204	552	1104	232	245	3209	552	1104	233	247
4000	22	17	3092	527	1054	222	242	3100	528	1056	224	244	3106	528	1056	227	247	3111	528	1056	228	249
6000	19	13	2992	504	1008	216	243	3000	505	1010	219	246	3006	505	1010	222	249	3012	505	1010	224	251
8000	15	9	2886	481	962	211	244	2896	482	964	214	247	2903	482	964	216	250	2909	482	964	219	253
10,000	11	5	2778	458	916	205	244	2789	458	916	208	248	2797	459	918	211	252	2804	459	918	213	254
12,000	7	1	2636	432	864	198	243	2648	433	866	202	248	2657	433	866	205	252	2664	434	868	207	255
14,000	3	-3	2495	408	816	190	241	2508	409	818	195	247	2518	409	818	198	251	2525	409	818	201	255
16,000	-1	-7	2352	384	768	182	239	2367	385	770	188	246	2378	385	770	192	251	2386	386	772	195	255
18,000	-6	-11	2208	361	722	174	235	2226	362	724	180	243	2239	363	726	185	250	2248	363	726	188	254
20,000	-10	-15	2063	338	676	164	229	2085	340	680	172	240	2100	341	682	177	248	2111	341	682	181	253
22,000	-14	-19	1911	316	632	153	221	1939	317	634	163	235	1957	319	638	169	245	1969	319	638	174	252
24,000	-19	-23	1749	292	584	137	206	1790	295	590	152	229	1812	297	594	161	241	1827	298	596	167	249
25,000	-21	-25	1649	279	558	122	187	1714	284	568	147	224	1739	286	572	156	238	1756	287	574	163	248

FIGURE 23.—Recommended Cruise Power – ISA + 10 °C.

RECOMMENDED CRUISE POWER

1550 RPM

ISA

WEIGHT			16,000 POUNDS					14,000 POUNDS					12,000 POUNDS					10,000 POUNDS				
PRESSURE ALTITUDE	IOAT	OAT	TORQUE PER ENG	FUEL FLOW PER ENG	TOTAL FUEL FLOW	IAS	TAS	TORQUE PER ENG	FUEL FLOW PER ENG	TOTAL FUEL FLOW	IAS	TAS	TORQUE PER ENG	FUEL FLOW PER ENG	TOTAL FUEL FLOW	IAS	TAS	TORQUE PER ENG	FUEL FLOW PER ENG	TOTAL FUEL FLOW	IAS	TAS
FEET	°C	°C	FT-LBS	LBS/HR	LBS/HR	KTS	KTS	FT-LBS	LBS/HR	LBS/HR	KTS	KTS	FT-LBS	LBS/HR	LBS/HR	KTS	KTS	FT-LBS	LBS/HR	LBS/HR	KTS	KTS
SL	20	15	3400	586	1172	237	239	3400	585	1170	239	241	3400	585	1170	241	243	3400	585	1170	242	244
2000	17	11	3400	573	1146	234	244	3400	573	1146	236	246	3400	572	1144	238	248	3400	572	1144	240	249
4000	13	7	3400	560	1120	232	248	3400	559	1118	234	250	3400	559	1118	236	252	3400	559	1118	237	254
6000	9	3	3397	548	1096	229	252	3400	548	1096	231	255	3400	547	1094	233	257	3400	547	1094	235	259
8000	5	-1	3253	521	1042	223	253	3260	522	1044	225	256	3265	522	1044	228	258	3270	522	1044	229	260
10,000	1	-5	3092	494	988	216	252	3100	494	988	219	256	3107	495	990	221	258	3112	495	990	223	261
12,000	-3	-9	2929	466	932	208	251	2937	467	934	212	255	2945	467	934	214	258	2950	467	934	217	261
14,000	-7	-13	2772	440	880	201	250	2781	441	882	205	255	2789	441	882	208	258	2795	442	884	210	261
16,000	-11	-17	2606	414	828	193	248	2618	414	828	197	253	2626	415	830	201	258	2633	415	830	203	261
18,000	-15	-21	2435	288	776	184	244	2449	389	778	189	251	2459	389	778	193	256	2467	390	780	196	260
20,000	-19	-25	2263	363	726	175	239	2282	364	728	181	248	2294	365	730	186	254	2302	365	730	189	259
22,000	-24	-29	2094	338	676	164	233	2118	340	680	172	244	2133	341	682	178	251	2144	342	684	182	257
24,000	-28	-33	1931	315	630	152	223	1960	317	634	163	238	1979	318	636	169	248	1991	319	638	174	255
25,000	-30	-35	1846	303	606	145	216	1880	305	610	157	235	1901	307	614	165	246	1915	308	616	170	253

FIGURE 24.—Recommended Cruise Power – ISA.

RECOMMENDED CRUISE POWER

1550 RPM

ISA -10 °C

WEIGHT			16,000 POUNDS					14,000 POUNDS					12,000 POUNDS					10,000 POUNDS				
PRESSURE ALTITUDE	IOAT	OAT	TORQUE PER ENG	FUEL FLOW PER ENG	TOTAL FUEL FLOW	IAS	TAS	TORQUE PER ENG	FUEL FLOW PER ENG	TOTAL FUEL FLOW	IAS	TAS	TORQUE PER ENG	FUEL FLOW PER ENG	TOTAL FUEL FLOW	IAS	TAS	TORQUE PER ENG	FUEL FLOW PER ENG	TOTAL FUEL FLOW	IAS	TAS
FEET	°C	°C	FT-LBS	LBS/HR	LBS/HR	KTS	KTS	FT-LBS	LBS/HR	LBS/HR	KTS	KTS	FT-LBS	LBS/HR	LBS/HR	KTS	KTS	FT-LBS	LBS/HR	LBS/HR	KTS	KTS
SL	10	5	3400	582	1164	238	237	3400	582	1164	240	239	3400	581	1162	242	240	3400	581	1162	243	242
2000	6	1	3400	569	1138	236	241	3400	569	1138	238	243	3400	568	1136	240	245	3400	568	1136	241	246
4000	3	-3	3400	558	1116	233	245	3400	557	1114	236	248	3400	557	1114	237	249	3400	557	1114	239	251
6000	-1	-7	3400	548	1096	231	250	3400	547	1094	233	252	3400	547	1094	235	254	3400	546	1092	236	256
8000	-5	-11	3400	538	1076	228	254	3400	538	1076	231	257	3400	538	1076	232	259	3400	537	1074	234	261
10,000	-9	-15	3400	530	1060	226	259	3400	530	1060	228	262	3400	530	1060	230	264	3400	529	1058	232	266
12,000	-13	-19	3200	499	998	218	258	3208	500	1000	221	261	3215	500	1000	223	264	3220	501	1002	225	266
14,000	-17	-23	3010	470	940	210	256	3019	471	942	213	260	3026	471	942	216	263	3032	472	944	218	266
16,000	-21	-27	2823	442	884	202	254	2833	442	884	205	258	2841	443	886	209	262	2848	443	886	211	265
18,000	-25	-31	2641	414	828	193	251	2652	415	830	198	256	2661	416	832	201	261	2668	416	832	204	264
20,000	-29	-35	2456	387	774	184	247	2471	388	776	189	254	2481	389	778	193	259	2489	390	780	196	263
22,000	-33	-39	2277	361	722	174	242	2296	363	726	181	250	2308	363	726	185	256	2318	364	728	189	261
24,000	-37	-43	2105	336	672	163	234	2128	338	676	172	246	2144	339	678	177	254	2155	340	680	181	260
25,000	-40	-45	2017	324	648	157	230	2044	326	652	167	243	2061	327	654	173	252	2073	328	656	177	258

FIGURE 25.—Recommended Cruise Power – ISA –10 °C.

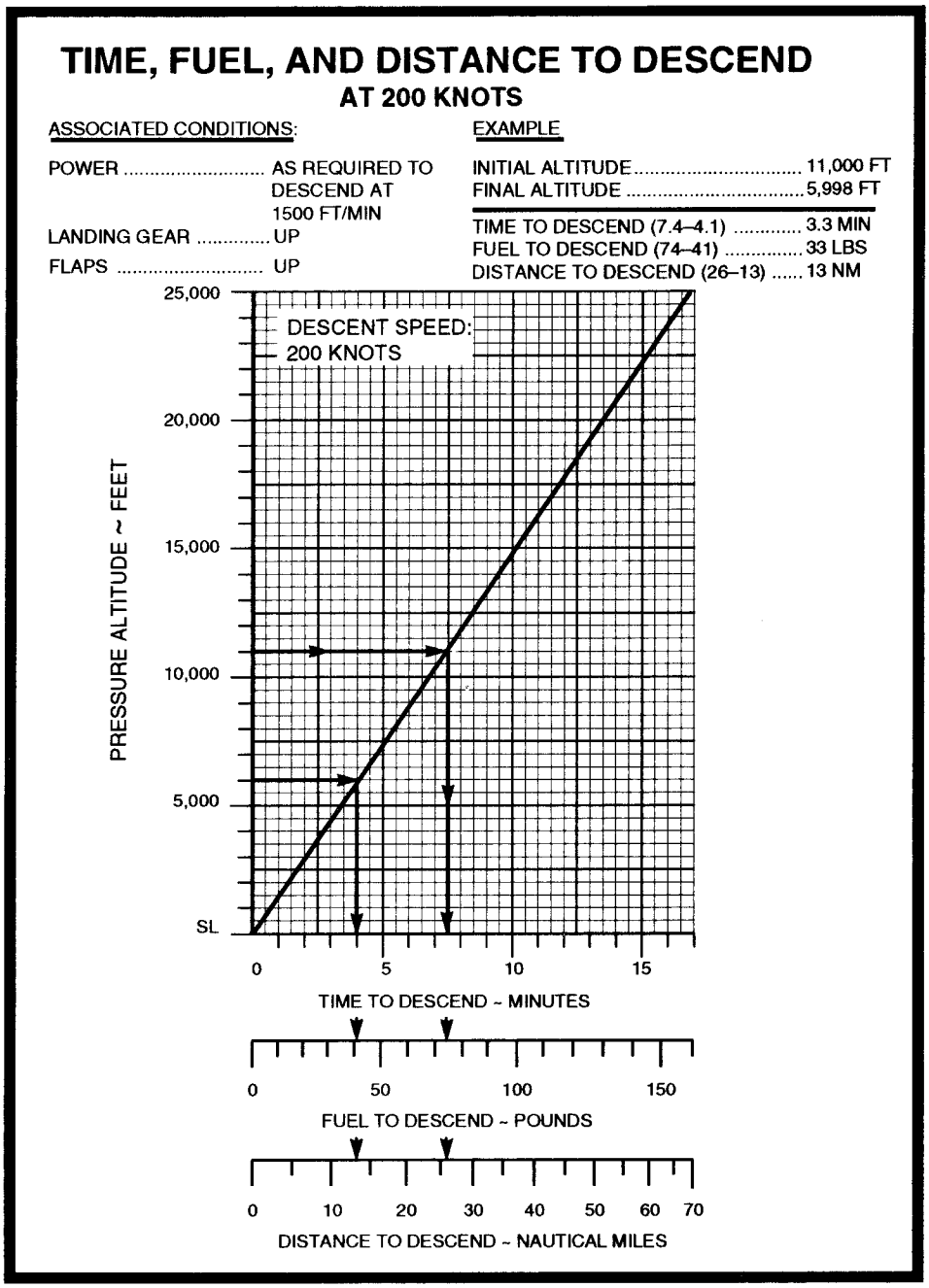


FIGURE 26.—Time, Fuel, and Distance to Descend.

OPERATING CONDITIONS	B–36	B–37	B–38	B–39	B–40
PRESSURE ALTITUDE	SL	1,000	2,000	4,000	5,000
TEMPERATURE (OAT)	+30 °C	+16 °C	0 °C	+20 °C	ISA
WEIGHT	16,000	14,500	13,500	15,000	12,500
WIND COMPONENT (KTS)	20 HW	10 TW	15 HW	5 TW	25 HW
RUNWAY LENGTH (FT)	4,000	4,500	3,800	5,000	4,000

FIGURE 27.—Beech 1900 – Landing.

NORMAL LANDING DISTANCE — FLAPS LANDING

ANTI–SKID ON

ASSOCIATED CONDITIONS:

POWER ..... RETARD TO MAINTAIN 800 FT/MIN ON FINAL APPROACH
RUNWAY ..... PAVED, LEVEL, DRY SURFACE
APPROACH SPEED..... IAS AS TABULATED
BRAKING ..... MAXIMUM

WEIGHT ~ POUNDS	APPROACH SPEED ~ KNOTS
16,100	113
14,000	107
12,000	101
10,000	93

EXAMPLE:

OAT ..... 25 °C
PRESSURE ALTITUDE ..... 5998 FT
LANDING WEIGHT ..... 14,182 LBS
HEADWIND COMPONENT ..... 10 KTS

GROUND ROLL ..... 1150 FT
TOTAL OVER 50–FT OBSTACLE ..... 2195 FT
APPROACH SPEED ..... 108 KTS

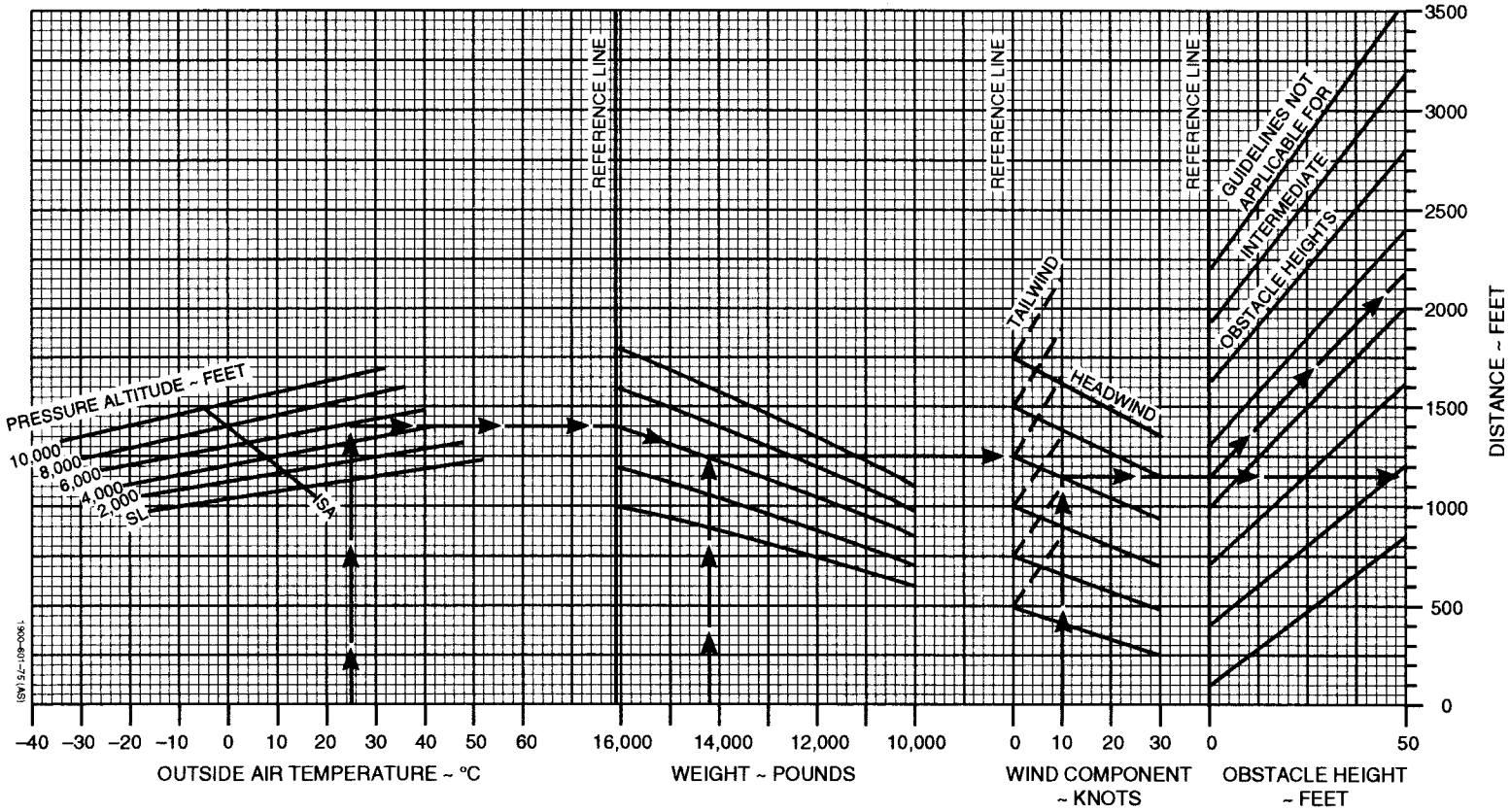


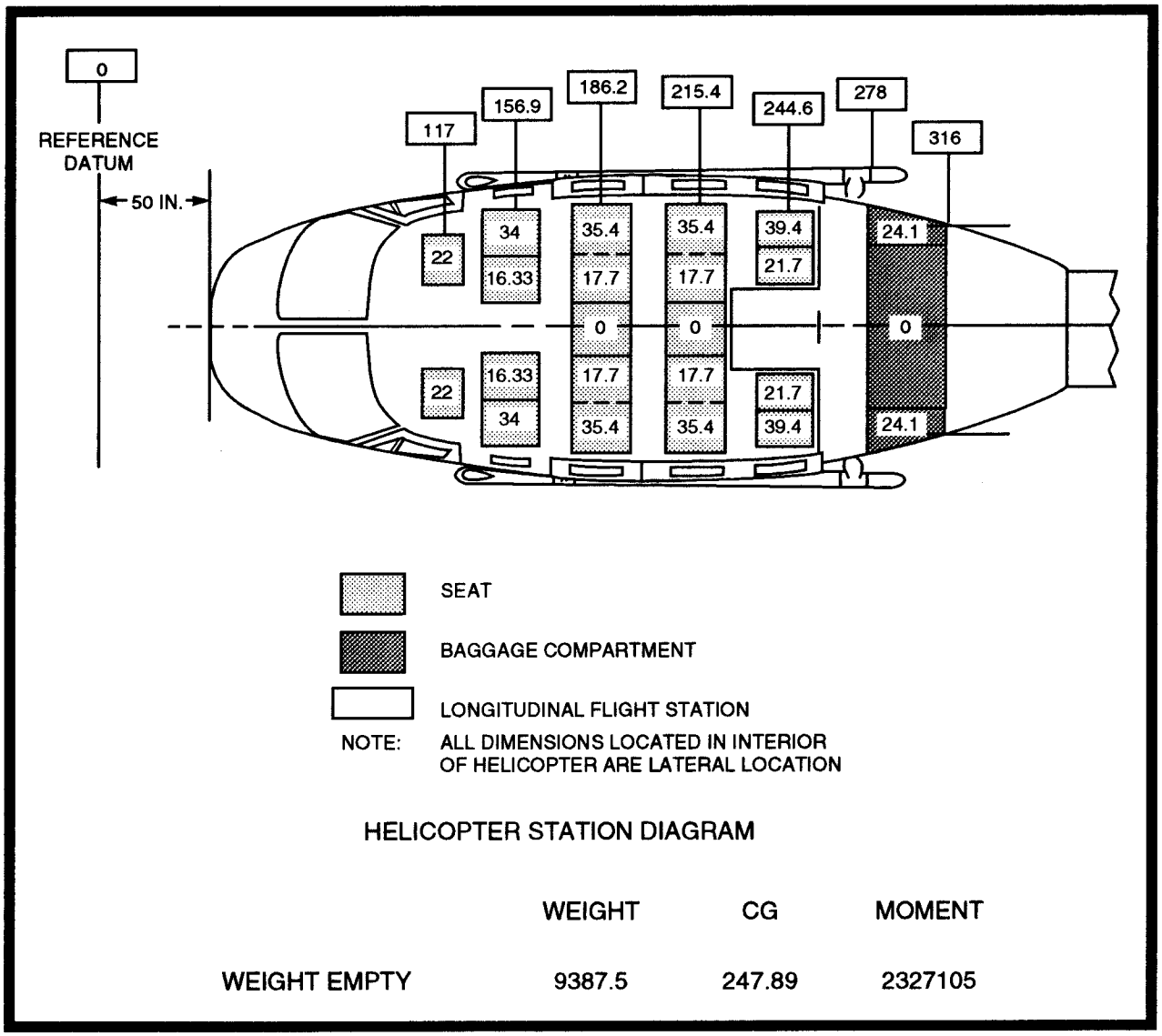
FIGURE 28.—Normal Landing Distance – Flaps Landing.

OPERATING CONDITIONS	BL-1	BL-2	BL-3	BL-4	BL-5
CREW WEIGHT	340	400	360	380	370
PASSENGER WT ROW 1	700	620	—	180	680
ROW 2	830	700	750	800	950
ROW 3	800	680	810	720	850
ROW 4	—	400	650	200	500
BAGGAGE CENTER	500	550	300	200	450
LEFT AND RIGHT	200	250	—	100	—
FUEL GALLONS	300	250	360	400	260
TYPE	JET A	JET B	JET A	JET B	JET A

FIGURE 29.—Bell 214 ST – Loading.

LOADING CONDITIONS	BL-6	BL-7	BL-8	BL-9	BL-10
BASIC WEIGHT	10,225	9,450	9,000	9,510	9,375
BASIC MOM/100	25562.5	23236.0	22020.5	23499.9	23296.8
CREW WEIGHT	340	380	410	360	400
PASSENGER WEIGHT	3,280	2,880	3,150	2,040	2,400
PASSENGER MOM/100	6722.5	5418.6	6425.8	4732.2	4560.7
BAGGAGE (CENTER)	700	600	300	550	650
FUEL LOAD (6.8 LB/GAL)	435	290	220	435	380
TRIP FUEL BURN (GAL)	355	190	190	325	330
LATERAL CG IS ON LONGITUDINAL AXIS					

FIGURE 30.—Bell 214 ST – Weight Shift and Limits.



HELICOPTER STATION DIAGRAM

	WEIGHT	CG	MOMENT
WEIGHT EMPTY	9387.5	247.89	2327105

FIGURE 31.—Helicopter – Loading Data.

CREW AND PASSENGER TABLE OF MOMENTS (IN-LB)

WEIGHT LBS	CREW SEATS F.S. 117	AIRLINE PASSENGEER SEATS FIRST ROW (FOUR PASSENGER) SEATS F.S. 156.9	SECOND ROW (FIVE PASSENGER) SEATS F.S. 186.2	THIRD ROW (FIVE PASSENGER) SEATS F.S. 215.4	FOURTH ROW (FOUR PASSENGER) SEATS F.S. 244.6
100	11700	15690	18620	21540	24460
110	12870	17259	20482	23694	26906
120	14040	18828	22344	25848	29352
130	15210	20397	24206	28002	31798
140	16380	21966	26068	30156	34244
150	17550	23535	27930	32310	36690
160	18720	25104	29792	34464	39136
170	19890	26673	31654	36618	41582
180	21060	28242	33516	38772	44028
190	22230	29811	35378	40926	46474
200	23400	31380	37240	43080	48920
210	24570	32949	39102	45234	51366
220	25740	34518	40964	47388	53812

BAGGAGE COMPARTMENT LOADING TABLE (IN-LB ÷ 100)

BAGGAGE WEIGHT LBS	LEFT AND RIGHT BAGGAGE COMPARTMENT STA. 278.0 TO 316.0 F.S. 295.2	CENTER BAGGAGE COMPARTMENT STA. 278.0 TO 316.0 F.S. 297.0
50	147.6	148.5
100	295.2	297.0
150	442.8	445.5
200	590.4	594.0
250	738.0	742.5
300	885.6	891.0
350	1033.2	1039.5
400	1180.8	1188.0
450	1328.4	1336.5
500	1476.0	1485.0
530	1564.6	1574.1
550		1633.5
600		1782.0
650		1930.5
700		2079.0
740		2197.8

FIGURE 32.—Helicopter – Weights and Moments – Crew, Passengers, and Baggage.

USABLE FUEL LOADING TABLE (ENGLISH)

JET A, JET A-1, JP-5 (6.8 LBS/GAL)

U.S. GAL	WEIGHT LBS	C.G.	MOMENT IN. LB. ÷ 100	U.S. GAL	WEIGHT LBS	C.G.	MOMENT IN. LB. ÷ 100
10	68	244.3	166	220	1496	246.9	3694
20	136	244.3	332	230	1564	244.3	3820
30	204	244.4	499	240	1632	241.8	3947
**37.1	252	244.4	616	250	1700	239.6	4073
40	272	242.8	660	260	1768	237.6	4200
50	340	237.8	808	270	1836	235.6	4326
60	408	234.5	957	280	1904	233.9	4453
70	476	232.1	1105	290	1972	232.2	4579
80	544	230.9	1256	**291.4	1982	232.0	4597
90	612	229.2	1403	300	2040	233.1	4754
*99.7	678	228.2	1546	310	2108	234.0	4934
*109.2	743	228.2	1695	320	2176	235.1	5115
110	748	228.5	1709	330	2244	236.0	5296
120	816	231.7	1890	340	2312	236.9	5477
130	884	234.4	2072	350	2380	237.7	5658
140	952	236.7	2253	360	2448	238.5	5839
150	1020	238.6	2434	370	2516	239.3	6021
160	1088	240.4	2615	380	2584	240.0	6202
170	1156	242.0	2798	390	2652	240.7	6383
180	1224	243.3	2978	400	2720	241.3	6564
190	1292	244.5	3159	410	2788	241.9	6745
200	1360	245.6	3340	420	2856	242.5	6927
210	1428	246.6	3521	430	2924	243.1	7108
*218.4	1484	247.3	3673	435.0	2958	243.4	7199

JET B, JP-4 (6.5 LBS/GAL)

U.S. GAL	WEIGHT LBS	C.G.	MOMENT IN. LB. ÷ 100	U.S. GAL	WEIGHT LBS	C.G.	MOMENT IN. LB. ÷ 100
10	65	244.3	159	220	1430	246.9	3531
20	130	244.3	318	230	1495	244.3	3652
30	195	244.5	477	240	1560	241.8	3772
**37.1	241	244.4	589	250	1625	239.6	3894
40	260	242.8	631	260	1690	237.6	4015
50	325	237.8	773	270	1755	235.6	4135
60	390	234.5	915	280	1820	233.9	4257
70	455	232.1	1056	290	1885	232.2	4377
80	520	230.9	1201	**291.4	1894	232.0	4394
90	585	229.2	1341	300	1950	233.1	4545
*99.7	648	228.2	1479	310	2015	234.0	4715
*109.2	710	228.2	1620	320	2080	235.1	4890
110	715	228.5	1634	330	2145	236.0	5062
120	780	231.7	1807	340	2210	236.9	5235
130	845	234.4	1981	350	2275	237.7	5408
140	910	236.7	2154	360	2340	238.5	5581
150	975	238.6	2326	370	2405	239.3	5755
160	1040	240.4	2500	380	2470	240.5	5928
170	1105	242.0	2674	390	2535	240.7	6102
180	1170	243.3	2847	400	2600	241.3	6274
190	1235	244.5	3020	410	2665	241.9	6447
200	1300	245.6	3193	420	2730	242.5	6620
210	1365	246.6	3366	430	2795	243.1	6795
*218.4	1420	247.3	3512	435	2827.5	243.4	6882

* Extreme limits of fuel C.G.
** Point of C.G. direction change.

Weights given are nominal weights at 15 °C.

FIGURE 33.—Helicopter – Weights and Moments – Usable Fuel.

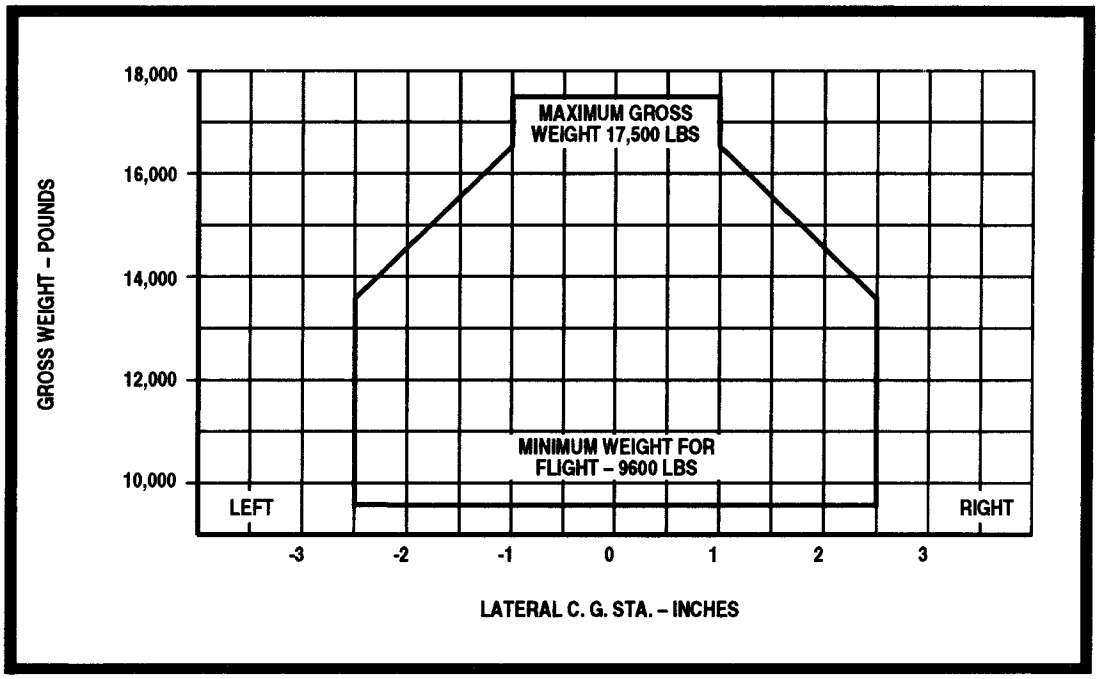


FIGURE 34.—Helicopter – Lateral CG Envelope.

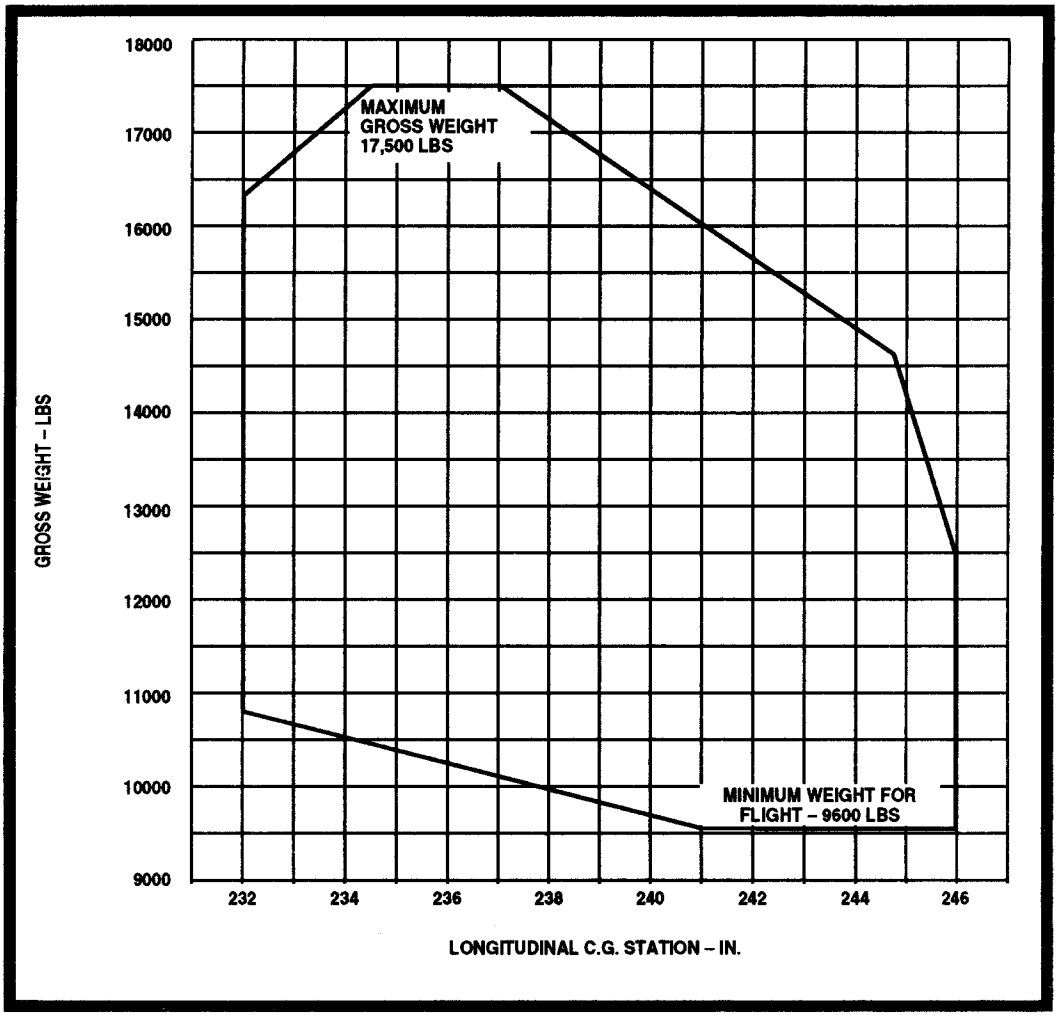


FIGURE 35.—Helicopter – Longitudinal CG Envelope.

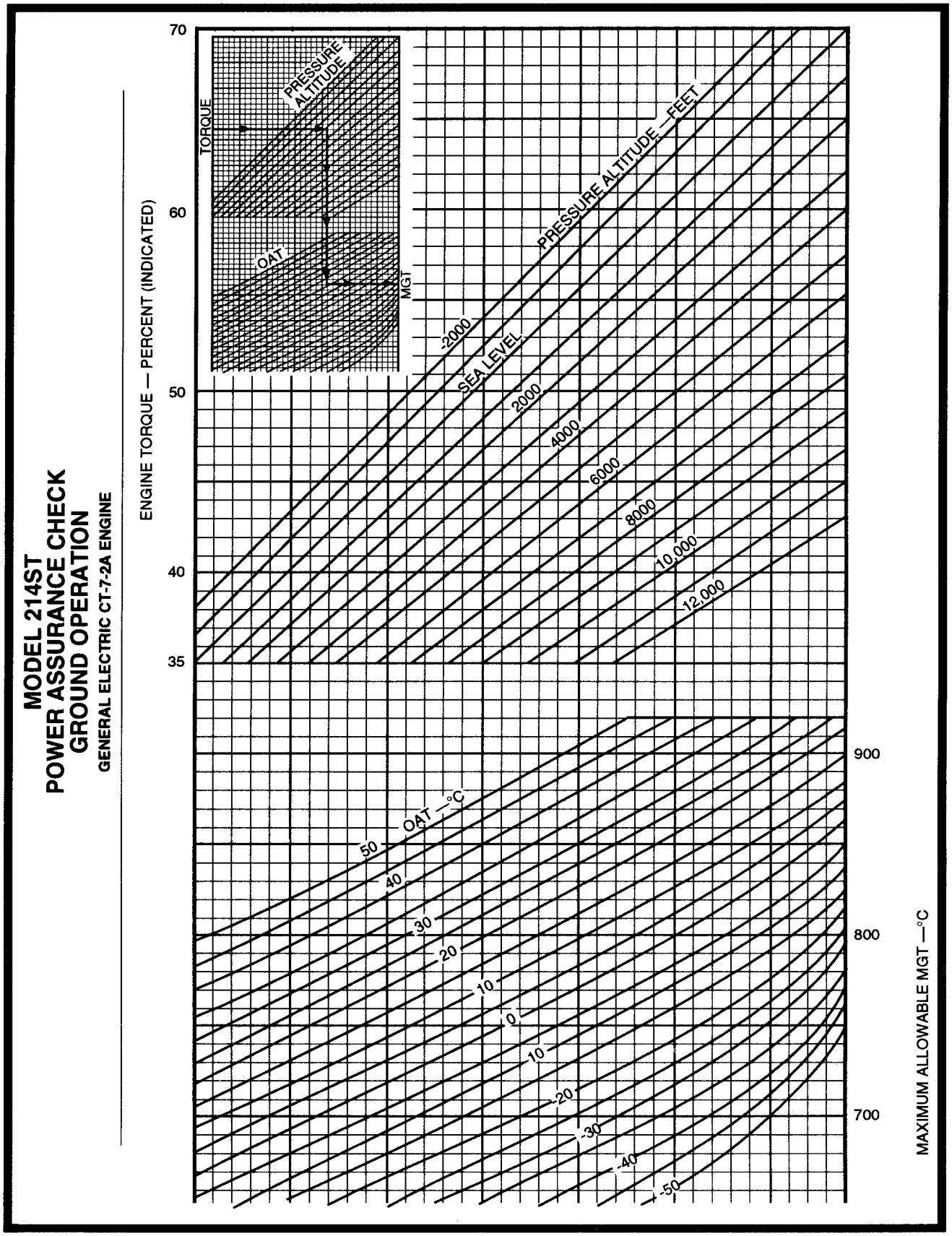


FIGURE 36.—Bell 214 – Power Assurance Check.

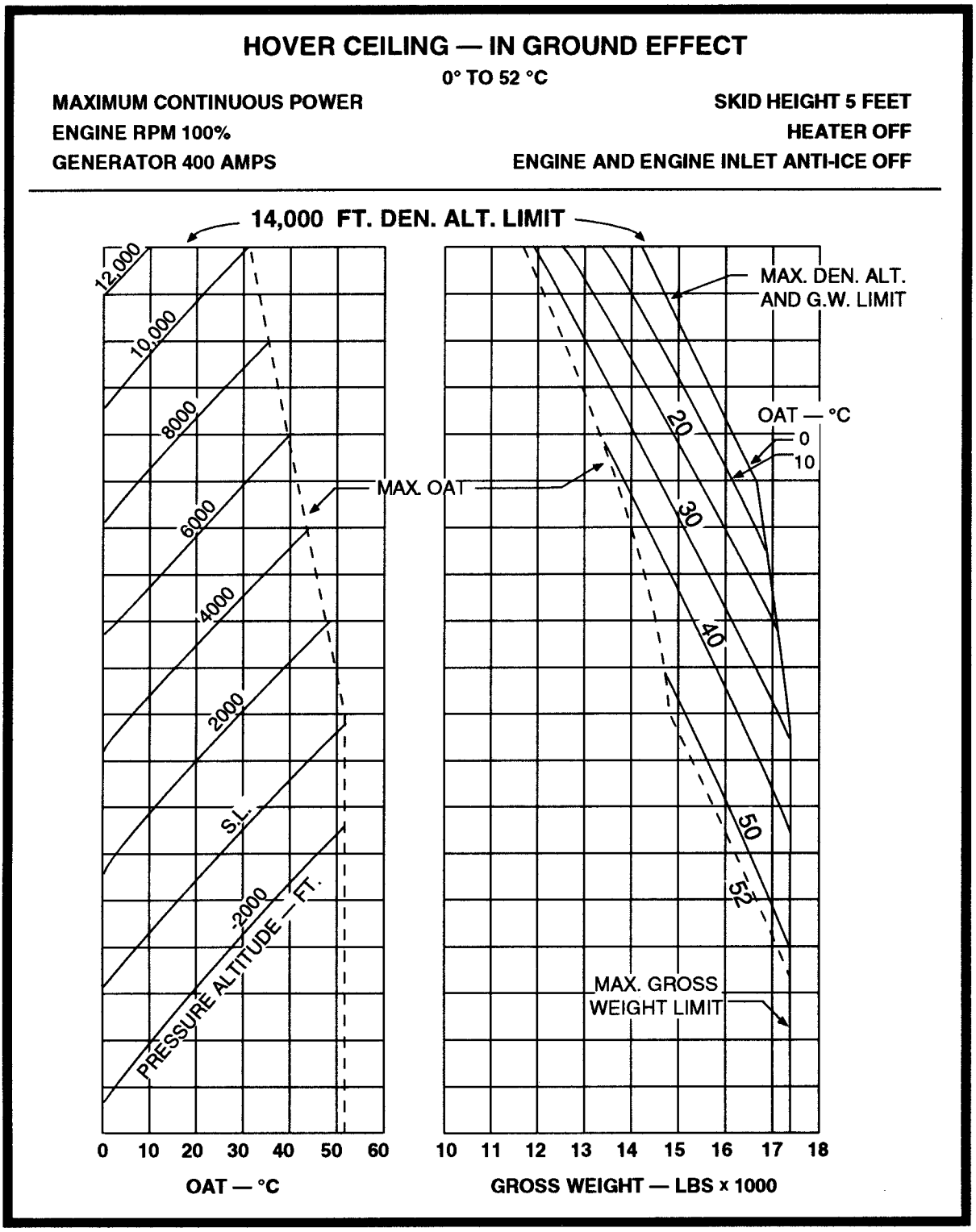


FIGURE 37.—Hovering Ceiling – In Ground Effect.

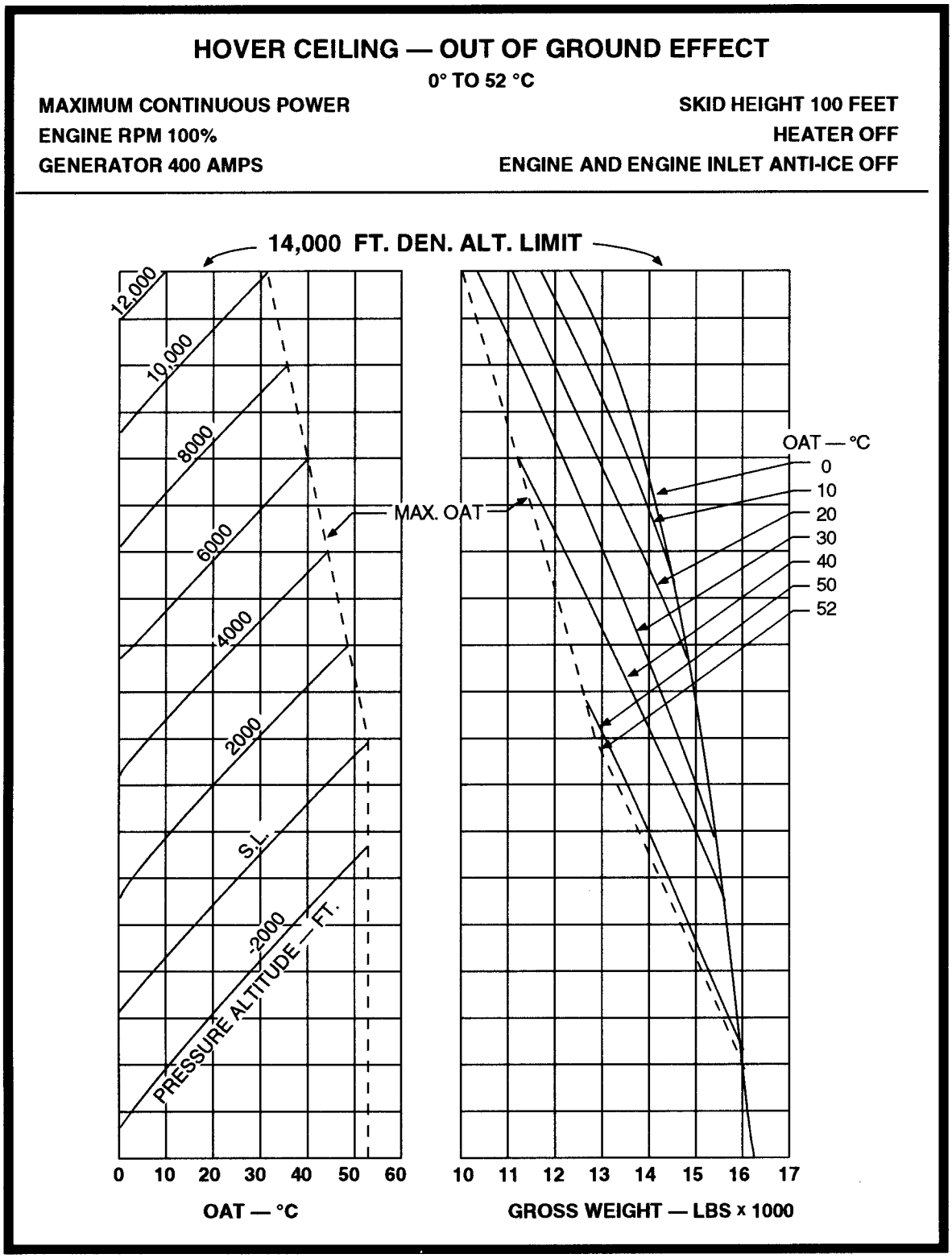


FIGURE 38.—Hovering Ceiling – Out of Ground Effect.

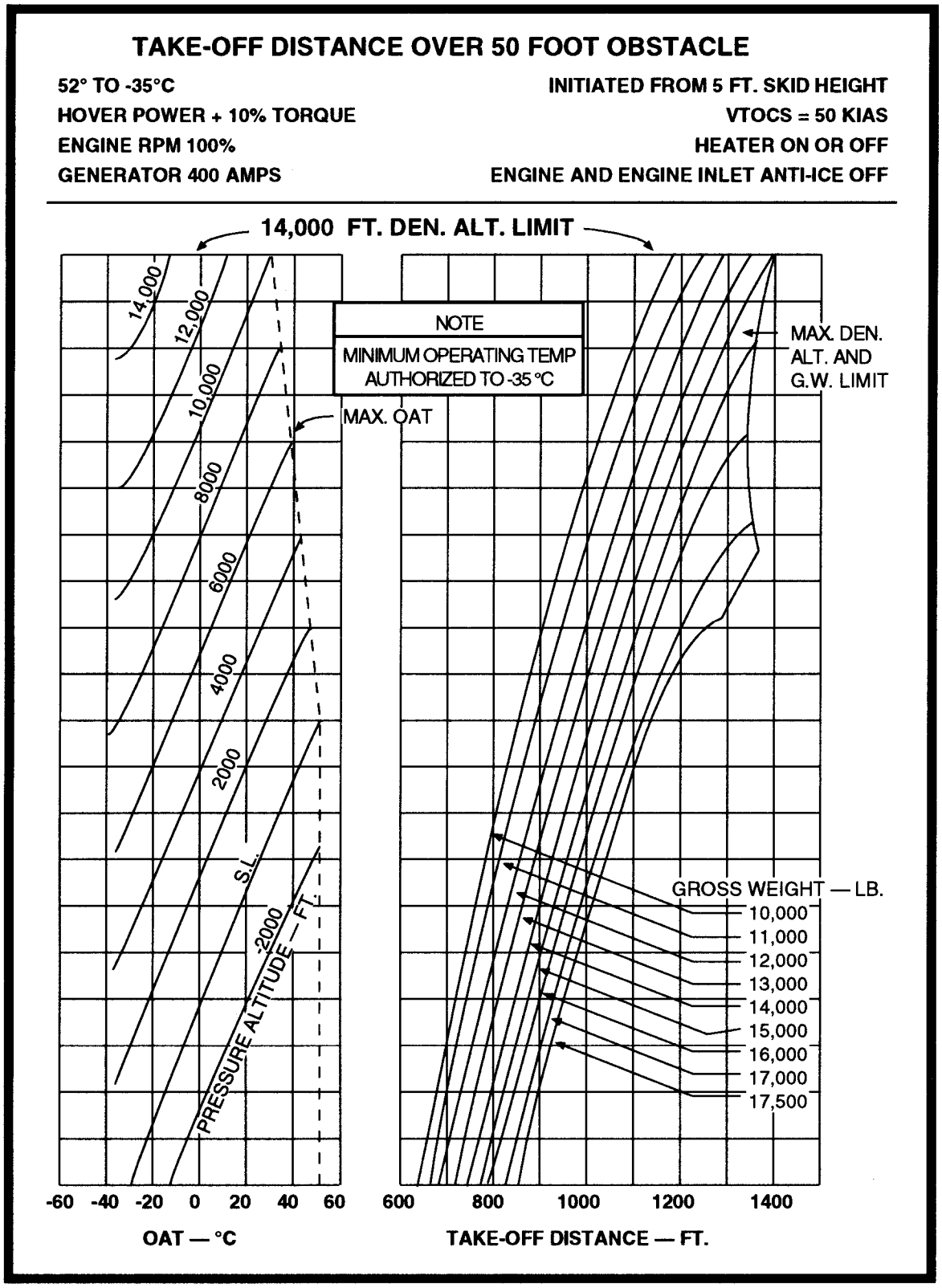
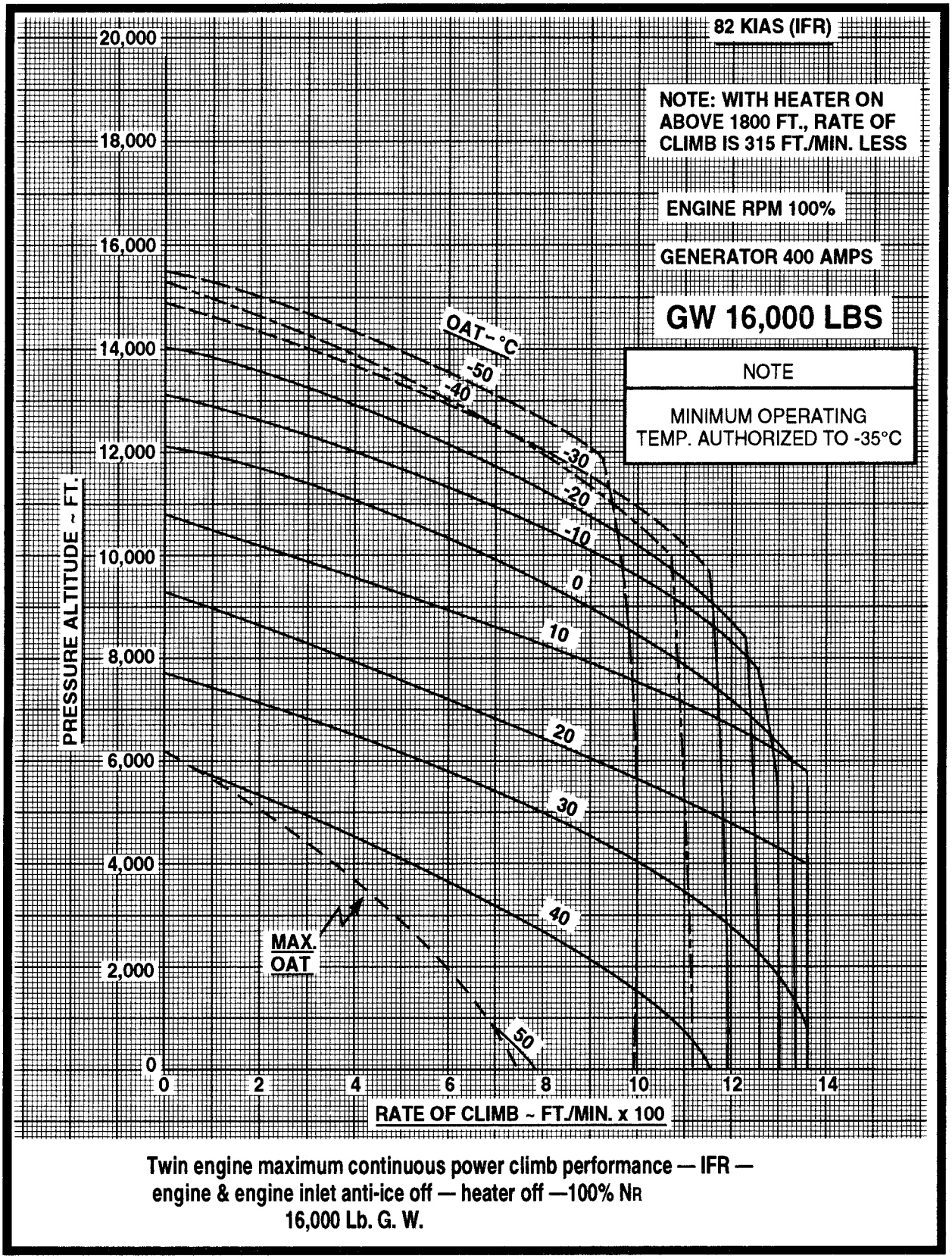
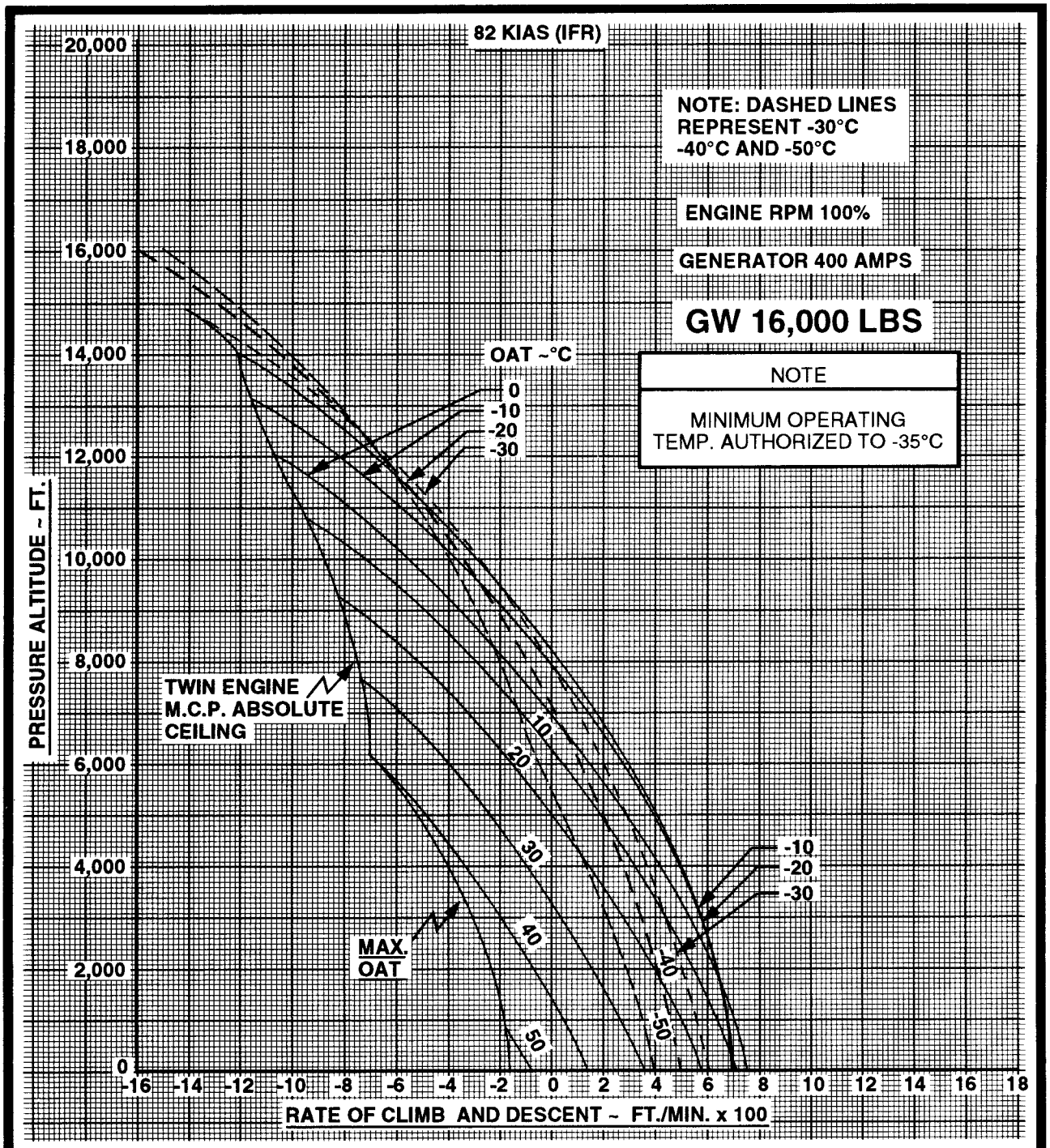


FIGURE 39.—Takeoff Distance Over 50-Foot Obstacle.



Twin engine maximum continuous power climb performance — IFR — engine & engine inlet anti-ice off — heater off —100% NR 16,000 Lb. G. W.

FIGURE 40.—Twin-Engine Climb Performance.



Single engine maximum-continuous (OEI) power climb and descent — IFR — performance — engine & engine inlet anti-ice off — 100% N_R
16,000 Lb. G. W.

FIGURE 41.—Single-Engine Climb Performance.

12500 LB	AIRSPEED LIMIT (VNE) - KIAS										
OAT °C	PRESS ALT - FT X1000										
	0	2	4	6	8	10	12	14	16	18	20
51.7	155	-	-	-	-	-	-	-	-	-	-
40	159	150	140	-	-	-	-	-	-	-	-
20	159	159	149	139	128	118	109	99	-	-	-
0	155	150	144	139	134	128	118	108	98	-	-
-15	142	136	131	126	121	116	112	106	103	95	-
-25	132	127	122	117	113	108	104	100	96	92	88
-35	122	117	113	108	104	100	96	92	88	84	81

13500 LB	AIRSPEED LIMIT (VNE) - KIAS										
OAT °C	PRESS ALT - FT X1000										
	0	2	4	6	8	10	12	14	16	18	20
51.7	150	-	-	-	-	-	-	-	-	-	-
40	154	154	135	-	-	-	-	-	-	-	-
20	154	154	144	134	123	113	104	94	-	-	-
0	154	150	144	139	133	123	113	103	93	-	-
-15	142	136	131	126	121	116	112	106	99	89	-
-25	132	127	122	117	113	108	104	100	96	92	86
-35	122	117	113	108	104	100	96	92	88	84	81

14500 LB	AIRSPEED LIMIT (VNE) - KIAS										
OAT °C	PRESS ALT - FT X1000										
	0	2	4	6	8	10	12	14	16	18	20
51.7	145	-	-	-	-	-	-	-	-	-	-
40	149	140	129	-	-	-	-	-	-	-	-
20	149	149	139	128	118	108	99	89	-	-	-
0	149	149	144	138	127	118	108	98	88	-	-
-15	142	136	131	126	121	116	112	104	94	84	-
-25	132	127	122	117	113	108	104	100	96	88	79
-35	122	117	113	108	104	100	96	92	88	84	81

15500 LB	AIRSPEED LIMIT (VNE) - KIAS										
OAT °C	PRESS ALT - FT X1000										
	0	2	4	6	8	10	12	14	16	18	20
51.7	139	-	-	-	-	-	-	-	-	-	-
40	144	134	122	-	-	-	-	-	-	-	-
20	144	143	133	121	110	99	89	78	-	-	-
0	144	144	143	132	120	109	98	88	77	-	-
-15	142	136	131	126	121	116	105	94	83	72	-
-25	132	127	122	117	113	108	104	100	89	77	-
-35	122	117	113	108	104	100	96	92	88	83	-

16500 LB	AIRSPEED LIMIT (VNE) - KIAS										
OAT °C	PRESS ALT - FT X1000										
	0	2	4	6	8	10	12	14	16	18	20
51.7	133	-	-	-	-	-	-	-	-	-	-
40	139	124	110	-	-	-	-	-	-	-	-
20	139	138	123	108	93	79	-	-	-	-	-
0	139	139	138	122	107	92	78	-	-	-	-
-15	139	136	131	126	118	103	87	72	-	-	-
-25	132	127	122	117	113	108	93	78	-	-	-
-35	122	117	113	108	104	100	96	87	75	-	-

17500 LB	AIRSPEED LIMIT (VNE) - KIAS										
OAT °C	PRESS ALT - FT X1000										
	0	2	4	6	8	10	12	14	16	18	20
51.7	122	-	-	-	-	-	-	-	-	-	-
40	128	115	102	-	-	-	-	-	-	-	-
20	128	127	114	101	-	-	-	-	-	-	-
0	128	128	127	113	100	-	-	-	-	-	-
-15	128	128	128	123	110	94	-	-	-	-	-
-25	128	127	122	117	113	101	87	-	-	-	-
-35	122	117	113	108	104	100	93	-	-	-	-

FIGURE 42.—Airspeed Limit.

SINGLE ENGINE LANDING DISTANCE OVER 50 FT. OBSTACLE

2.5 MIN. OEI POWER AS REQUIRED
ENGINE RPM 100%
GENERATOR 400 AMPS
INOPERATIVE ENGINE SECURED

52° TO -35 C
HEATER OFF

RATE OF DESCENT 500 FT/MIN
HARD SURFACED RUNWAY
45 KIAS AT 50 FEET
ENGINE AND ENGINE INLET ANTI-ICE OFF

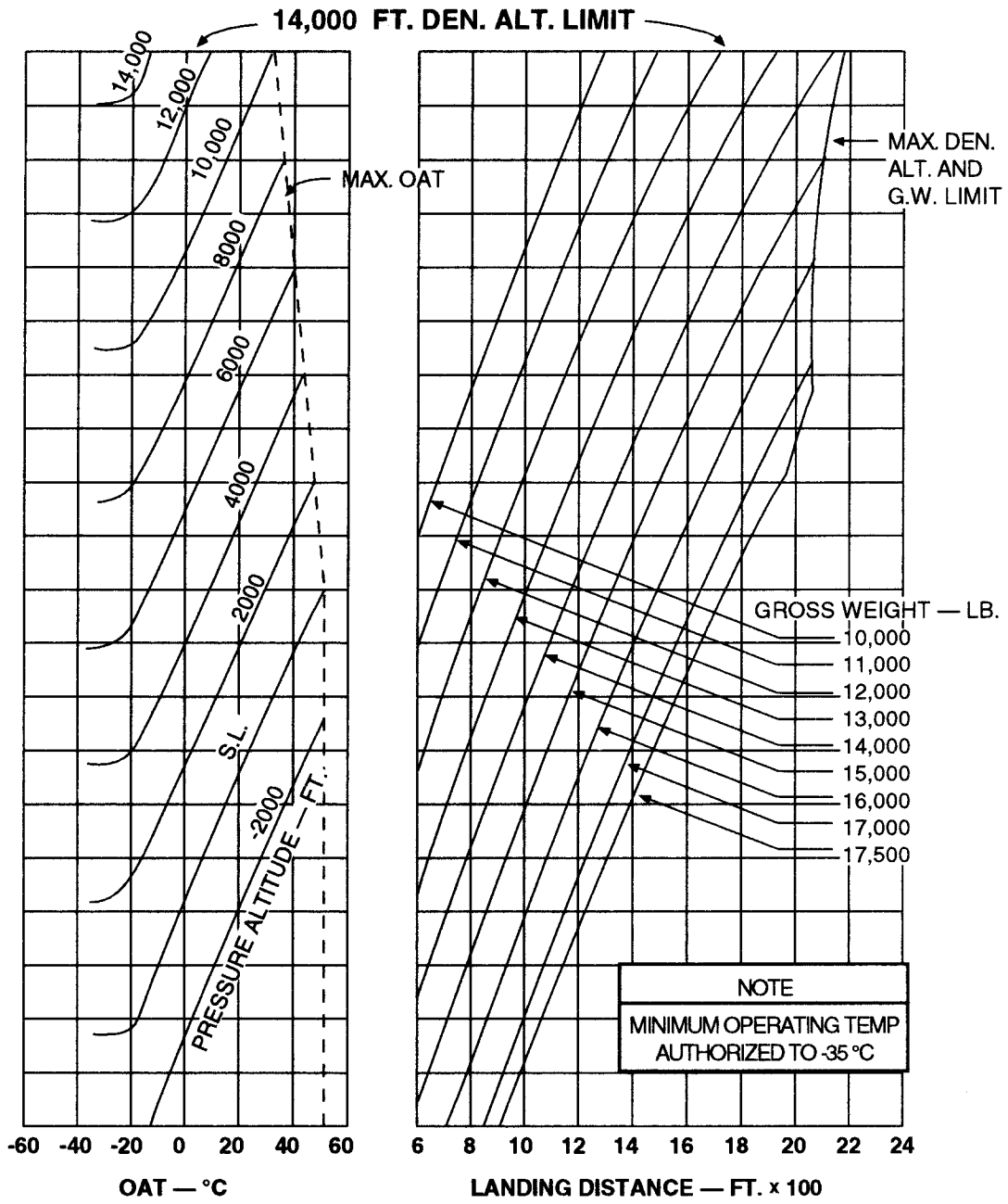


FIGURE 43.—Single-Engine Landing Distance Over 50-Foot Obstacle.

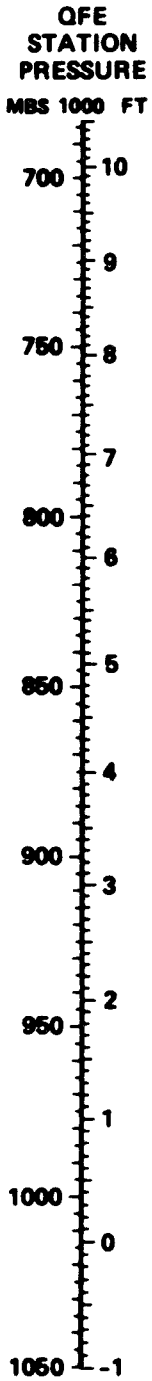
LOADING CONDITIONS	WS-1	WS-2	WS-3	WS-4	WS-5
LOADED WEIGHT	90,000	85,000	84,500	81,700	88,300
LOADED CG (% MAC)	22.5%	28.4%	19.8%	30.3%	25.5%
WEIGHT CHANGE (POUNDS)	2,500	1,800	3,000	2,100	3,300
FWD COMPT CENTROID – STA 352.1 AND –227.9 INDEX ARM AFT COMPT CENTROID – STA 724.9 AND +144.9 INDEX ARM MAC – 141.5 INCHES, LEMAC – STA 549.13, AND –30.87 INDEX ARM					

FIGURE 44.—DC-9 – Weight Shift.

OPERATING CONDITIONS	A-1	A-2	A-3	A-4	A-5
FIELD ELEVATION	2,500	600	4,200	5,100	2,100
ALTIMETER SETTING	29.40"	30.50"	1020mb	29.35"	1035mb
AMBIENT TEMPERATURE	+10 °F	+80 °F	0 °C	+30 °F	+20 °C
WEIGHT (X1000)	75	85	90	80	65
FLAP POSITION	20°	20°	20°	20°	20°
RUNWAY SLOPE %	+1%	–1.5%	0	+1.5%	–2%
WIND COMPONENT	10 HW	10 TW	15 HW	5 TW	20 HW
ICE PROTECTION	BOTH	NONE	BOTH	ENGINE	NONE
CG STATION	590.2	—	580.3	—	594.4
CG INDEX ARM	—	–3.1	—	+5.9	—
INDEX ARM REF – STA 580.0, LEMAC – STA 549.13, AND –30.87 INDEX, MAC 141.5 CG % MAC = STAB TRIM SETTING					

FIGURE 45.—DC-9 – Takeoff.

ALTIMETER SETTING TO STATION PRESSURE



QNH TO PRESSURE ALTITUDE

QNH IN. HG.	CORRECTION TO ELEVATION FOR PRESS. ALT FT	QNH MILLIBARS
28.81 to 28.91	1000	976 to 979
28.91 to 29.02	900	979 to 983
29.02 to 29.12	800	983 to 986
29.12 to 29.23	700	986 to 990
29.23 to 29.34	600	990 to 994
29.34 to 29.44	500	994 to 997
29.44 to 29.55	400	997 to 1001
29.55 to 29.66	300	1001 to 1004
29.66 to 29.76	200	1004 to 1008
29.76 to 29.87	100	1008 to 1012
29.87 to 29.97	0	1012 to 1015
29.97 to 30.08	-100	1015 to 1019
30.08 to 30.19	-200	1019 to 1022
30.19 to 30.30	-300	1022 to 1026
30.30 to 30.41	-400	1026 to 1030
30.41 to 30.52	-500	1030 to 1034
30.52 to 30.63	-600	1034 to 1037
30.63 to 30.74	-700	1037 to 1041
30.74 to 30.85	-800	1041 to 1045
30.85 to 30.96	-900	1045 to 1048
30.96 to 31.07	-1000	1048 to 1052

EXAMPLE: ELEVATION = 2500 FT
QNH = 29.48 IN.HG
CORRECTION = 400 FT.
PRESS ALT = 2900 FT

FIGURE 46.—Altimeter Setting to Pressure Altitude.

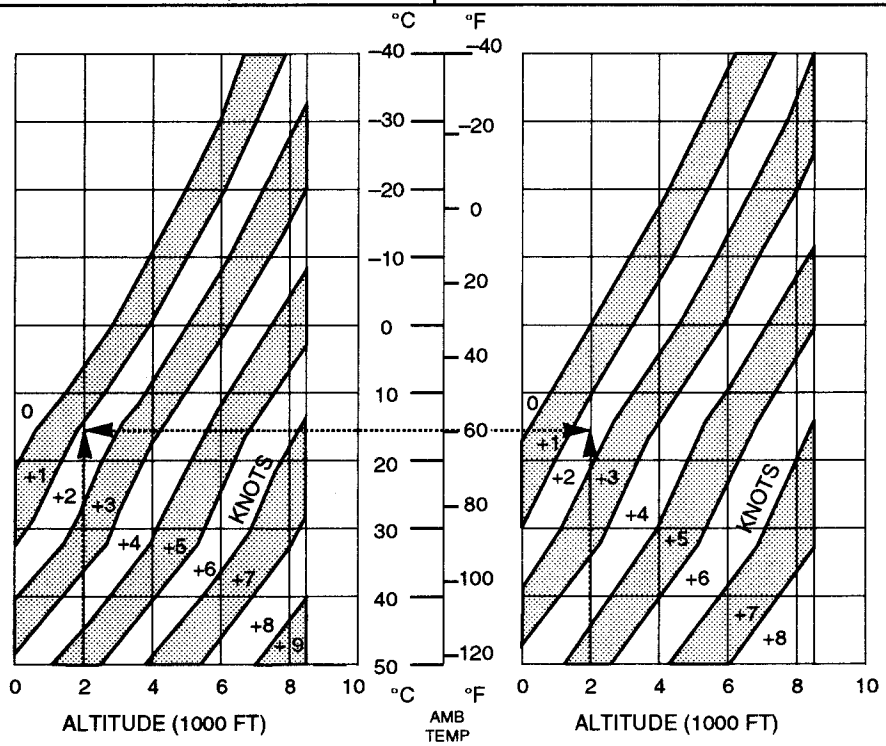
MODEL DC–9
TAKEOFF SPEEDS
JT8D–1 ENGINES

TAKEOFF SPEED – 20 ° FLAPS

EITHER NO ICE PROTECTION OR ENGINE ICE PROTECTION ONLY

TAKEOFF WEIGHT (1000 LB)	60	65	70	75	80	85	90	95
V_1 (KNOTS, IAS)	104.0	110.0	115.0	120.5	125.0	129.5	133.5	136.0
V_R (KNOTS, IAS)	106.5	112.5	118.0	123.5	129.0	134.0	139.0	143.5
V_2 (KNOTS, IAS)	117.0	121.5	126.5	130.5	135.0	139.0	143.0	147.0

CORRECTION TO SPEEDS

		V_1	V_R	V_2
AMBIENT TEMPERATURE AND AIRPORT PRESSURE ALTITUDE				0
SLOPE PER 1%	UPHILL	+ 1.5* KNOTS	+ 0.9 KNOTS	0
	DOWNHILL	– 1.5 KNOTS	– 0.9 KNOTS	
WIND PER 10 KNOTS	HEADWIND	+0.30* KNOTS	0 KNOTS	0
	TAILWIND	–0.8 KNOTS		
ENGINE AND AIRPLANE ICE PROTECTION		+ 0.8 KNOTS	+ 0.8 KNOTS	0

* IF V_1 EXCEEDS V_R, SET V_1 EQUAL TO V_R

FIGURE 47.—DC-9 – Takeoff Speeds.

OPERATING CONDITIONS	W-1	W-2	W-3	W-4	W-5
CLIMB SCHEDULE	LR	HS	LR	HS	HS
INITIAL WEIGHT (X1000)	84	86	78	88	92
CRUISE PRESS ALTITUDE	34,000	28,000	32,000	22,000	24,000
ISA TEMPERATURE	ISA	ISA	ISA	ISA	ISA
AVG WIND COMP (KTS)	20 HW	30 HW	10 TW	20 TW	40 HW

FIGURE 48.—DC-9 – En Route Climb.

TIME, FUEL, AND DISTANCE TO CLIMB
JT8D-1 ENGINES - NORMAL BLEED
DC-9 SERIES 10 - HIGH SPEED CLIMB SCHEDULE
CLIMB AT 320 KNOTS IAS TO 23500 FT ALTITUDE THEN CLIMB AT M .74

INITIAL WEIGHT = 86000. POUNDS

PRES. ALT. FEET	TIME MIN.	FUEL BURNED LB.	DIST. N. MI.
0.	0.	0.	0.
2000.	0.5	133.	2.8
4000.	1.1	267.	5.9
6000.	1.7	403.	9.3
8000.	2.3	541.	13.0
10000.	3.0	684.	17.2
12000.	3.8	830.	21.3
14000.	4.6	982.	27.0
16000.	5.5	1141.	32.9
18000.	6.4	1309.	39.6
20000.	7.6	1489.	47.4
22000.	8.8	1684.	56.6
23500.	9.9	1845.	64.7
23500.	9.9	1845.	64.7
24000.	10.2	1886.	66.8
26000.	11.4	2052.	75.9
28000.	12.8	2225.	85.8
30000.	14.3	2410.	97.1
32000.	16.2	2613.	110.3
34000.	18.4	2844.	126.3
36000.	21.4	3136.	147.8

INITIAL WEIGHT = 90000. POUNDS

PRES. ALT. FEET	TIME MIN.	FUEL BURNED LB.	DIST. N. MI.
0.	0.	0.	0.
2000.	0.6	140.	3.0
4000.	1.1	282.	6.3
6000.	1.8	426.	9.8
8000.	2.5	573.	13.8
10000.	3.2	724.	18.2
12000.	4.0	879.	23.1
14000.	4.8	1041.	28.6
16000.	5.8	1211.	34.9
18000.	6.9	1390.	42.1
20000.	8.0	1583.	50.4
22000.	9.4	1793.	60.3
23500.	10.6	1968.	69.1
23500.	10.6	1968.	69.1
24000.	10.9	2013.	71.5
26000.	12.3	2196.	81.5
28000.	13.8	2389.	92.6
30000.	15.5	2598.	105.4
32000.	17.6	2833.	120.6
34000.	20.3	3110.	139.8
36000.	24.3	3494.	168.0

INITIAL WEIGHT = 88000. POUNDS

0.	0.	0.	0.
2000.	0.5	136.	2.9
4000.	1.1	274.	6.1
6000.	1.7	414.	9.6
8000.	2.4	557.	13.4
10000.	3.1	703.	17.7
12000.	3.9	855.	22.5
14000.	4.7	1012.	27.8
16000.	5.6	1176.	33.9
18000.	6.6	1349.	40.8
20000.	7.8	1535.	48.9
22000.	9.1	1738.	58.4
23500.	10.3	1906.	66.9
23500.	10.3	1906.	66.9
24000.	10.6	1949.	69.1
26000.	11.9	2123.	78.6
28000.	13.3	2306.	89.1
30000.	14.9	2502.	101.2
32000.	16.9	2720.	115.3
34000.	19.3	2973.	132.8
36000.	22.7	3304.	157.2

INITIAL WEIGHT = 92000. POUNDS

0.	0.	0.	0.
2000.	0.6	144.	3.1
4000.	1.2	290.	6.4
6000.	1.8	438.	10.1
8000.	2.5	589.	14.2
10000.	3.3	744.	18.7
12000.	4.1	905.	23.8
14000.	5.0	1072.	29.5
16000.	6.0	1247.	36.0
18000.	7.1	1432.	43.4
20000.	8.3	1631.	52.0
22000.	9.7	1850.	62.3
23500.	11.0	2032.	71.5
23500.	11.0	2032.	71.5
24000.	11.3	2079.	73.9
26000.	12.7	2272.	84.4
28000.	14.3	2476.	96.2
30000.	16.2	2693.	109.8
32000.	18.4	2951.	126.2
34000.	21.4	3258.	147.4
36000.	26.1	3713.	181.0

FIGURE 49.—High-Speed Climb Schedule.

TIME, FUEL, AND DISTANCE TO CLIMB
JT8D-1 ENGINES - NORMAL BLEED
DC-9 SERIES 10 - LONG RANGE CLIMB SCHEDULE
CLIMB AT 290 KNOTS IAS TO 26860 FT ALTITUDE THEN CLIMB AT M .72

INITIAL WEIGHT = 78000. POUNDS

PRES. ALT. FEET	TIME MIN.	FUEL BURNED LB.	DIST. N. MI.
0.	0.	0.	0.
2000.	0.5	113.	2.2
4000.	0.9	227.	4.6
6000.	1.5	342.	7.3
8000.	2.0	457.	10.2
10000.	2.6	574.	13.3
12000.	3.2	693.	16.8
14000.	3.9	815.	20.7
16000.	4.6	941.	25.0
18000.	5.4	1070.	29.9
20000.	6.3	1205.	35.4
22000.	7.2	1347.	41.7
24000.	8.3	1498.	49.0
26000.	9.5	1661.	57.6
26860.	10.1	1736.	61.8
26860.	10.1	1736.	61.8
28000.	10.7	1813.	66.2
30000.	11.9	1953.	74.6
32000.	13.3	2102.	84.2
34000.	14.9	2267.	95.4
36000.	16.9	2456.	109.2

INITIAL WEIGHT = 82000. POUNDS

PRES. ALT. FEET	TIME MIN.	FUEL BURNED LB.	DIST. N. MI.
0.	0.	0.	0.
2000.	0.5	120.	2.4
4000.	1.0	241.	4.9
6000.	1.5	363.	7.7
8000.	2.1	486.	10.8
10000.	2.7	610.	14.2
12000.	3.4	737.	17.9
14000.	4.1	868.	22.1
16000.	4.9	1002.	26.7
18000.	5.7	1141.	31.9
20000.	6.7	1286.	37.9
22000.	7.7	1439.	44.6
24000.	8.9	1602.	52.5
26000.	10.2	1780.	61.9
26860.	10.9	1863.	66.5
26860.	10.9	1863.	66.5
28000.	11.6	1948.	71.4
30000.	12.9	2104.	80.8
32000.	14.4	2274.	91.7
34000.	16.3	2464.	104.6
36000.	18.7	2693.	121.3

INITIAL WEIGHT = 80000. POUNDS

0.	0.	0.	0.
2000.	0.5	117.	2.3
4000.	1.0	234.	4.8
6000.	1.5	352.	7.5
8000.	2.1	471.	10.5
10000.	2.7	592.	13.7
12000.	3.3	715.	17.4
14000.	4.0	841.	21.4
16000.	4.7	971.	25.9
18000.	5.6	1105.	30.9
20000.	6.5	1245.	36.6
22000.	7.5	1392.	43.2
24000.	8.6	1549.	50.7
26000.	9.9	1719.	59.7
26860.	10.5	1798.	64.1
26860.	10.5	1798.	64.1
28000.	11.1	1879.	68.7
30000.	12.4	2027.	77.7
32000.	13.8	2186.	87.8
34000.	15.6	2362.	99.8
36000.	17.7	2570.	114.9

INITIAL WEIGHT = 84000. POUNDS

0.	0.	0.	0.
2000.	0.5	124.	2.4
4000.	1.0	248.	5.1
6000.	1.6	374.	8.0
8000.	2.2	500.	11.1
10000.	2.8	629.	14.6
12000.	3.5	760.	18.5
14000.	4.2	894.	22.8
16000.	5.1	1033.	27.6
18000.	5.9	1177.	33.0
20000.	6.9	1327.	39.1
22000.	8.0	1486.	46.2
24000.	9.2	1656.	54.4
26000.	10.6	1841.	64.1
26860.	11.3	1928.	69.0
26860.	11.3	1928.	69.0
28000.	12.0	2018.	74.1
30000.	13.4	2183.	84.1
32000.	15.0	2364.	95.7
34000.	17.1	2570.	109.7
36000.	19.7	2826.	128.3

FIGURE 50.—Long-Range Climb Schedule.

OPERATING CONDITIONS	L-1	L-2	L-3	L-4	L-5
WEIGHT (START TO ALT)	85,000	70,000	86,000	76,000	82,000
DISTANCE (NAM)	110	190	330	50	240
WIND COMPONENT (KTS)	15 HW	40 TW	50 HW	20 TW	45 HW
HOLDING TIME AT ALT (MIN)	15	15	15	15	15

FIGURE 51.—DC-9 – Alternate Planning.

ALTERNATE PLANNING CHART

DIST. - NAM	20	30	40	50	60	70	80	90	100	110	120	130	140
OPTM. ALT.	2000	3000	4000	5000	6000	7000	8000	9000	10000	11000	12000	13000	14000
TIME:	:16	:17	:19	:20	:22	:23	:25	:26	:28	:29	:30	:32	:33
FUEL	2500	2600	2700	2800	2900	3000	3100	3200	3300	3400	3500	3600	3700
TAS	275	280	283	286	289	292	296	300	303	306	309	312	315
DIST. NAM	150	160	170	180	190	200	210	220	230	240	250	260	270
OPTM. ALT.	15000	16000	17000	18000	19000	20000	21000	22000	23000	24000	25000	26000	27000
TIME:	:35	:36	:38	:39	:40	:42	:43	:45	:46	:48	:49	:50	:52
FUEL	3800	3900	4000	4100	4200	4300	4400	4500	4600	4700	4800	4900	5000
TAS	319	323	326	330	334	338	341	345	349	353	357	361	365
DIST. - NAM	280	290	300	310	320	330	340	350	360	370	380	390	400
OPTM. ALT.	27000	28000	28000	29000	29000	30000	30000	31000	31000	31000	31000	31000	31000
TIME:	:53	:55	:56	:58	:59	1:00	1:02	1:03	1:04	1:05	1:07	1:08	1:10
FUEL	5150	5250	5350	5450	5600	5700	5800	5900	6050	6150	6250	6350	6500
TAS	368	372	376	380	385	388	392	397	397	397	397	397	397

NOTES:

1. Fuel includes 1/2 climb distance en route credit, fuel to cruise remaining distance at LRC schedule, 15 minutes holding at alternate, and 800 lbs. for descent.

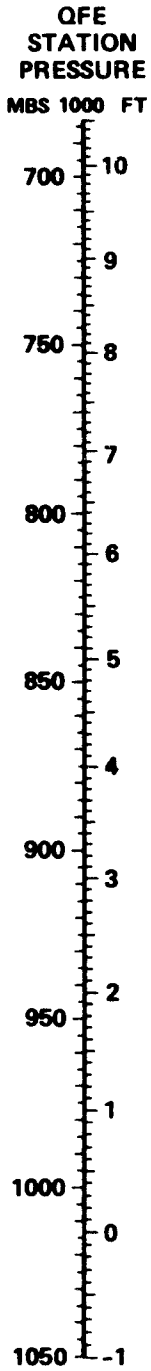
2. Time includes 1/2 climb distance credit, time to cruise distance shown at LRC schedule and 8 minutes for descent. 15 minutes holding is not included in time.

FIGURE 52.—DC-9 – Alternate Planning Chart.

OPERATING CONDITIONS	R-1	R-2	R-3	R-4	R-5
FIELD ELEVATION	100	4,000	950	2,000	50
ALTIMETER SETTING	29.50"	1032 mb	29.40"	1017 mb	30.15"
TEMPERATURE (OAT)	+50 °F	–15 °C	+59 °F	0 °C	+95 °F
WEIGHT (X1000)	90	110	100	85	95
FLAP POSITION	15°	5°	5°	1°	1°
WIND COMPONENT (KTS)	5 HW	5 TW	20 HW	10 TW	7 HW
RUNWAY SLOPE %	1% UP	1% DN	1% UP	2% DN	1.5% UP
AIR CONDITIONING	ON	ON	OFF	ON	OFF
ENGINE ANTI-ICE	OFF	ON	OFF	ON	OFF
CG STATION	635.7	643.8	665.2	657.2	638.4
LEMAC STA 625.0, MAC 134.0					

FIGURE 53.—B-737 – Takeoff.

ALTIMETER SETTING TO STATION PRESSURE



QNH TO PRESSURE ALTITUDE

QNH IN. HG.	CORRECTION TO ELEVATION FOR PRESS. ALT FT	QNH MILLIBARS
28.81 to 28.91	1000	976 to 979
28.91 to 29.02	900	979 to 983
29.02 to 29.12	800	983 to 986
29.12 to 29.23	700	986 to 990
29.23 to 29.34	600	990 to 994
29.34 to 29.44	500	994 to 997
29.44 to 29.55	400	997 to 1001
29.55 to 29.66	300	1001 to 1004
29.66 to 29.76	200	1004 to 1008
29.76 to 29.87	100	1008 to 1012
29.87 to 29.97	0	1012 to 1015
29.97 to 30.08	-100	1015 to 1019
30.08 to 30.19	-200	1019 to 1022
30.19 to 30.30	-300	1022 to 1026
30.30 to 30.41	-400	1026 to 1030
30.41 to 30.52	-500	1030 to 1034
30.52 to 30.63	-600	1034 to 1037
30.63 to 30.74	-700	1037 to 1041
30.74 to 30.85	-800	1041 to 1045
30.85 to 30.96	-900	1045 to 1048
30.96 to 31.07	-1000	1048 to 1052

EXAMPLE: ELEVATION = 2500 FT
QNH = 29.48 IN.HG
CORRECTION = 400 FT.
PRESS ALT = 2900 FT

FIGURE 54.—Altimeter Setting to Pressure Altitude.

0 TO 60 KTS

TAKEOFF EPR

A/C ON

EPR BLEED CORRECTIONS	Δ EPR
AIR CONDITIONING OFF	+.03
ENGINE ANTI-ICE	ZERO

OAT																				
°F	-65	-49	-40	-31	-22	-13	-4	5	14	23	32	41	50	59	68	77	86	95	104	120
°C	-54	-45	-40	-35	-30	-25	-20	-15	-10	-5	0	5	10	15	20	25	30	35	40	49
TEMP LIMIT EPR	2.31	2.31	2.31	2.29	2.27	2.24	2.22	2.19	2.17	2.14	2.11	2.07	2.04	2.01	2.01	2.01	2.00	1.95	1.91	1.82
PRESS EPR	2.31 ALT 5660 AND ABOVE						2.22 4000		2.16 3000	2.11 2000		2.06 1000				2.01 S.L.	1.96 -1000			

1. FIND TEMP LIMIT EPR
2. FIND PRESS LIMIT EPR
3. USE THE SMALLER OF THE TWO LIMITS

V_1, V_R, V_2

ANTI-SKID ON

PRESSURE ALTITUDE 1000 FT		OAT					
9 to 10	F° / C°			-65 to -19 / -54 to -28	-18 to 18 / -27 to -8	19 to 45 / -7 to 7	46 to 86 / 8 to 30
7 to 9	F° / C°		-65 to -21 / -54 to -29	-20 to 10 / -28 to -23	11 to 39 / -22 to 4	40 to 87 / 5 to 31	88 to 101 / 32 to 38
5 to 7	F° / C°	-65 to -15 / -54 to -26	-14 to 15 / -27 to -9	16 to 40 / -8 to 4	41 to 87 / 5 to 31	88 to 105 / 32 to 40	106 to 109 / 41 to 43
3 to 5	F° / C°	-65 to 20 / -54 to -8	21 to 42 / -7 to 6	43 to 88 / 7 to 31	89 to 103 / 32 to 39	104 to 116 / 40 to 46	
1 to 3	F° / C°	-65 to 46 / -54 to 8	47 to 89 / 9 to 32	90 to 104 / 33 to 40	105 to 120 / 41 to 49		
-1 to 1	F° / C°	-65 to 91 / -54 to 33	92 to 105 / 34 to 40	106 to 120 / 41 to 49			

FLAPS	GROSS WT -1000 LB	V_1 V_R V_2	V_1 V_R V_2	V_1 V_R V_2	V_1 V_R V_2	V_1 V_R V_2	V_1 V_R V_2
1	120	159 161 164	160 162 164				
	110	150 152 155	151 153 155	152 154 155			
	100	141 143 147	142 143 147	142 144 147	143 145 147	144 146 147	
	90	131 133 138	132 134 138	133 135 138	133 136 138	134 136 138	135 137 138
	80	122 124 130	122 125 130	123 126 130	124 126 130	125 127 130	125 128 130
	70	112 116 123	113 117 123	113 117 122	114 118 122	115 119 122	116 119 122
5	120	153 155 158	154 156 158				
	110	144 146 150	145 147 150				
	100	135 137 142	136 138 142	137 139 142	138 140 142		
	90	126 128 133	127 129 133	128 130 133	129 131 133	130 132 133	
	80	116 118 125	117 119 125	118 121 125	119 122 125	120 123 125	121 124 125
	70	106 109 118	107 110 118	108 111 117	109 112 117	110 113 117	112 114 117
15	100	130 130 135	131 131 135	132 132 135			
	90	120 121 128	121 122 128	123 123 128	124 124 128	125 125 128	126 126 128
	80	111 112 119	112 113 119	113 114 119	114 115 119	115 116 119	117 117 119
	70	105 105 112	101 103 112	102 105 112	103 106 112	105 107 112	106 108 112
25	100	124 126 132	126 127 132				
	90	115 117 124	116 118 124	117 119 124	118 120 124		
	80	105 108 116	107 109 116	108 110 116	109 111 116	110 112 116	111 113 116
	70	105 105 108	104 104 108	101 101 108	99 102 108	100 103 108	101 104 108

SHADED AREA INDICATES PERFORMANCE AFFECTED BY MINIMUM CONTROL SPEED, MINIMUM FIELD LENGTH FOR LIGHTEST WEIGHT ABOVE SHADED AREA IS REQUIRED.

FLAP RETRACTION/ MANEUVERING SPEED

FLAP POS	KTS IAS
0	210
1	190
2	180
5	170
10	160
15	150
25	140

FOR MANEUVERS IMMEDIATELY AFTER TAKE-OFF EXCEEDING 15° BANK, MAINTAIN AT LEAST V2 + 15 AT TAKEOFF FLAPS

STAB, TRIM SETTING -UNITS AIRPLANE NOSE UP

CG	FLAPS ALL
6	8
8	7-3/4
10	7-1/2
12	7
14	6-3/4
16	6-1/4
18	5-3/4
20	5-1/2
22	5
24	4-1/2
26	4
28	3-1/2
30	3
32	2-1/2

SPEEDS NOT VALID WHEN WEIGHTS ARE PREDICTED ON USE OF CLEARWAY, STOPWAY, IMPROVED CLIMB OR ARE LIMITED BY BRAKE ENERGY

V_1 ADJUSTMENTS*

WIND	SLOPE
ADD 1 KT PER 20 KTS HEADWIND	ADD 1 KT PER 1% UP SLOPE
SUBTRACT 1 KT PER 5 KTS TAILWIND	SUBTRACT 1 KT PER 1% DOWN SLOPE

*V_1 MUST NOT EXCEED V_R

FIGURE 55.—B-737 – Takeoff Performance.

OPERATING CONDITIONS	V-1	V-2	V-3	V-4	V-5
BRK REL WEIGHT (X1000)	110	95	85	105	75
CRUISE PRESS ALT	33,000	27,000	35,000	22,000	31,000
AIRPORT ELEVATION	2,000	3,000	2,000	4,000	2,000
ISA TEMPERATURE	+10°	ISA	ISA	+10°	+10°
AVG WIND COMP (KTS)	20 HW	20 TW	30 HW	10 TW	40 HW

FIGURE 56.—B-737 – En Route Climb.

EN ROUTE CLIMB 280/.70 ISA

PRESSURE ALTITUDE -FT	UNITS MIN/LB NM/KNOTS	BRAKE RELEASE WEIGHT - LB										
		120000	115000	110000	105000	100000	95000	90000	85000	80000	75000	65000
37000	TIME/FUEL DIST./TAS		41/5700 251/387	32/4700 192/384	27/4100 162/382	24/3700 140/380	21/3400 124/379	19/3100 111/378	17/2800 100/377	16/2500 90/376	14/2300 82/375	12/1900 67/374
36000	TIME/FUEL DIST./TAS	41/ 5900 246/386	33/4900 194/383	28/4300 164/381	25/3900 143/379	22/3500 127/378	20/3200 114/377	18/2900 103/376	16/2700 93/375	15/2500 84/374	14/2300 77/374	11/1900 63/373
35000	TIME/FUEL DIST./TAS	33/5100 197/382	29/4500 168/380	25/4100 147/378	23/3700 131/377	21/3400 117/376	19/3100 106/375	17/2800 96/374	16/2600 87/373	14/2400 80/373	13/2200 73/372	11/1800 60/371
34000	TIME/FUEL DIST./TAS	29/4700 171/379	26/4300 150/377	23/3900 134/376	21/3500 120/375	19/3200 109/374	18/3000 99/373	16/2700 90/372	15/2500 82/372	14/2300 75/371	12/2100 69/371	10/1800 57/370
33000	TIME/FUEL DIST./TAS	27/4400 153/376	24/4000 137/375	22/3700 123/374	20/3400 112/373	18/3100 102/372	17/2900 93/371	15/2700 85/370	14/2500 78/370	13/2300 71/369	12/2100 65/369	10/1700 54/368
32000	TIME/FUEL DIST./TAS	25/4200 139/374	23/3900 126/372	21/3600 114/371	19/3300 104/370	17/3000 95/370	16/2800 87/369	15/2600 80/368	14/2400 74/368	12/2200 67/367	11/2000 62/367	10/1700 51/366
31000	TIME/FUEL DIST./TAS	23/4000 128/371	21/3700 117/370	19/3400 107/369	18/3200 98/368	16/2900 90/367	15/2700 82/367	14/2500 76/366	13/2300 70/366	12/2100 64/365	11/2000 59/365	9/1700 49/364
30000	TIME/FUEL DIST./TAS	22/3900 119/368	20/3600 109/367	18/3300 100/366	17/3100 92/365	16/2800 84/365	15/2600 78/364	13/2400 72/364	12/2300 66/363	11/2100 61/363	11/1900 56/363	9/1600 47/362
29000	TIME/FUEL DIST./TAS	21/3700 111/365	19/3400 102/364	18/3200 93/363	16/3000 86/363	15/2700 79/362	14/2500 73/362	13/2400 68/361	12/2200 62/361	11/2000 57/361	10/1900 53/360	9/1600 44/360
28000	TIME/FUEL DIST./TAS	19/3600 103/362	18/3300 95/361	17/3100 88/360	15/2900 81/360	14/2700 75/359	13/2500 69/359	12/2300 64/359	11/2100 59/358	11/2000 54/358	10/1800 50/358	8/1500 42/357
27000	TIME/FUEL DIST./TAS	19/3400 96/358	17/3200 89/358	16/3000 82/357	15/2800 76/357	14/2600 71/356	13/2400 65/356	12/2200 60/356	11/2100 56/356	10/1900 52/355	9/1800 47/355	8/1500 40/355
26000	TIME/FUEL DIST./TAS	17/3300 88/354	16/3000 82/354	15/2800 76/353	14/2600 70/353	13/2500 65/352	12/2300 60/352	11/2100 56/352	10/2000 52/352	10/1800 48/351	9/1700 44/351	7/1400 37/351
25000	TIME/FUEL DIST./TAS	16/3100 81/350	15/2900 75/350	14/2700 70/349	13/2500 65/349	12/2400 60/349	11/2200 56/348	11/2000 52/348	10/1900 48/348	9/1800 45/348	8/1600 41/348	7/1400 35/347
24000	TIME/FUEL DIST./TAS	15/3000 75/346	14/2800 69/346	13/2600 65/345	12/2400 60/345	12/2300 56/345	11/2100 52/345	10/2000 48/345	9/1800 45/344	9/1700 41/344	8/1600 38/344	7/1300 32/344
23000	TIME/FUEL DIST./TAS	14/2800 69/342	13/2700 64/342	13/2500 60/342	12/2300 56/342	11/2200 52/342	10/2000 48/341	9/1900 45/341	9/1800 41/341	8/1600 38/341	8/1500 35/341	6/1300 30/341
22000	TIME/FUEL DIST./TAS	14/2700 63/339	13/2500 59/339	12/2400 55/338	11/2200 51/338	10/2100 48/338	10/1900 45/338	9/1800 41/338	8/1700 38/338	8/1600 36/338	7/1400 33/338	6/1200 28/337
6000	TIME/FUEL DIST./TAS	4/1000 9/295	4/1000 9/295	4/900 8/295	4/800 8/295	3/800 7/295	3/700 7/295	3/700 6/295	3/700 6/295	3/600 5/295	2/600 5/295	2/500 4/295
1500	TIME/FUEL	2/600	2/600	2/500	2/500	2/500	2/400	2/400	2/400	1/400	1/300	1/300

FUEL ADJUSTMENT FOR HIGH ELEVATION AIRPORTS	AIRPORT ELEVATION	2000	4000	6000	8000	10000	12000
EFFECT ON TIME AND DISTANCE IS NEGLIGIBLE	FUEL ADJUSTMENT	-100	-200	-400	-500	-600	-700

FIGURE 57.—En Route Climb 280/.70 ISA.

EN ROUTE CLIMB 280/.70 ISA +10 °C

PRESSURE ALTITUDE -FT	UNITS MIM/LB NM/KNOTS	BRAKE RELEASE WEIGHT - LB										
		120000	115000	110000	105000	100000	95000	90000	85000	80000	75000	65000
37000	TIME/FUEL DIST./TAS			42/5700 263/395	34/4700 206/391	29/4100 174/389	25/3700 151/388	23/3300 133/386	20/3000 119/385	18/2700 107/384	16/2500 96/384	13/2100 78/382
36000	TIME/FUEL DIST./TAS		43/5900 266/394	35/5000 211/391	30/4400 179/389	26/3900 156/387	23/3500 138/385	21/3200 123/384	19/2900 111/383	17/2700 100/383	16/2400 90/382	13/2000 74/381
35000	TIME/FUEL DIST./TAS	45/6200 275/394	36/5300 219/390	31/4600 186/388	27/4100 162/386	24/3700 143/385	22/3400 128/384	20/3100 115/383	10/2800 104/382	16/2600 94/381	15/2400 85/380	12/2000 70/379
34000	TIME/FUEL DIST./TAS	38/5600 228/390	32/4900 193/387	28/4400 168/386	25/3900 149/384	23/3600 133/383	21/3300 120/382	19/3000 108/381	17/2700 98/380	16/2500 89/379	14/2300 81/379	12/1900 67/378
33000	TIME/FUEL DIST./TAS	34/5100 200/387	30/4600 174/385	26/4100 154/383	24/3800 138/382	22/3400 124/381	20/3100 113/380	18/2900 102/379	16/2600 93/378	15/2400 85/378	14/2200 77/377	11/1900 64/376
32000	TIME/FUEL DIST./TAS	31/4800 180/384	28/4400 160/382	25/4000 143/381	23/3600 129/379	21/3300 116/378	19/3000 106/378	17/2800 96/377	16/2600 88/376	14/2400 80/376	13/2200 73/375	11/1800 61/374
31000	TIME/FUEL DIST./TAS	29/4600 165/381	26/4200 147/379	23/3800 133/378	21/3500 120/377	20/3200 109/376	18/2900 100/375	16/2700 91/375	15/2500 83/374	14/2300 76/374	13/2100 70/373	11/1800 58/372
30000	TIME/FUEL DIST./TAS	27/4400 152/378	24/4000 137/376	22/3700 124/375	20/3400 113/374	19/3100 103/374	17/2900 94/373	16/2600 86/372	14/2400 79/372	13/2200 72/371	12/2100 66/371	10/1700 55/370
29000	TIME/FUEL DIST./TAS	25/4200 141/375	23/3800 128/374	21/3500 116/373	19/3200 106/372	18/3000 97/371	16/2800 89/370	15/2600 82/370	14/2400 75/369	13/2200 69/369	12/2000 63/369	10/1700 52/368
28000	TIME/FUEL DIST./TAS	24/4000 131/371	22/3700 119/370	20/3400 109/369	18/3100 100/369	17/2900 91/368	16/2700 84/368	14/2500 77/367	13/2300 71/367	12/2100 65/366	11/1900 60/366	9/1600 50/365
27000	TIME/FUEL DIST./TAS	22/3800 121/368	21/3500 111/367	19/3300 102/366	18/3000 93/366	16/2800 86/365	15/2600 79/364	14/2400 73/364	13/2200 67/364	12/2000 61/363	11/1900 56/363	9/1600 47/363
26000	TIME/FUEL DIST./TAS	21/3600 110/363	19/3400 101/362	18/3100 93/362	16/2900 86/361	15/2700 79/361	14/2500 73/360	13/2300 67/360	12/2100 62/360	11/2000 57/359	10/1800 52/359	9/1500 44/359
25000	TIME/FUEL DIST./TAS	19/3400 101/358	18/3200 93/358	17/3000 85/357	15/2800 79/357	14/2600 73/357	13/2400 67/356	12/2200 62/356	11/2000 57/356	10/1900 53/356	10/1700 48/355	8/1500 41/355
24000	TIME/FUEL DIST./TAS	18/3300 92/354	17/3000 85/354	16/2800 78/353	15/2600 72/353	13/2400 67/353	12/2300 62/352	12/2100 57/352	11/1900 53/352	10/1800 49/352	9/1700 45/352	8/1400 38/351
23000	TIME/FUEL DIST./TAS	17/3100 84/350	16/2900 78/350	15/2900 72/350	14/2500 67/349	13/2300 62/349	12/2200 57/349	11/2000 53/349	10/1900 49/348	9/1700 45/348	9/1600 42/348	7/1300 35/348
22000	TIME/FUEL DIST./TAS	16/3000 77/346	15/2800 71/346	14/2600 66/346	13/2400 61/346	12/2200 57/345	11/2100 53/345	10/1900 49/345	10/1800 45/345	9/1700 42/345	8/1500 38/345	7/1300 32/344
6000	TIME/FUEL DIST./TAS	5/1100 10/301	4/1000 10/301	4/900 9/301	4/900 9/301	4/800 8/301	3/800 8/301	3/700 7/301	3/700 7/301	3/600 6/301	3/600 6/301	2/500 5/301
1500	TIME/FUEL	3/600	2/600	2/500	2/500	2/500	2/500	2/400	2/400	2/400	1/300	1/300

FUEL ADJUSTMENT FOR HIGH ELEVATION AIRPORTS	AIRPORT ELEVATION	2000	4000	6000	8000	10000	12000
EFFECT ON TIME AND DISTANCE IS NEGLIGIBLE	FUEL ADJUSTMENT	-100	-300	-400	-500	-600	-800

FIGURE 58.—En Route Climb 280/.70 ISA +10 °C.

OPERATING CONDITIONS	T-1	T-2	T-3	T-4	T-5
TOTAL AIR TEMP (TAT)	+10 °C	0 °C	–15 °C	–30 °C	+15 °C
ALTITUDE	10,000	5,000	25,000	35,000	18,000
ENGINE ANTI-ICE	ON	ON	ON	ON	OFF
WING ANTI-ICE	OFF	2 ON	2 ON	1 ON	OFF
AIR CONDITIONING	ON	OFF	ON	ON	OFF

FIGURE 59.—B-737 – Climb and Cruise Power.

EN ROUTE

MAX CLIMB & MAX CONTINUOUS EPR

A/C AIRBLEED ON

MAX. CLIMB	MAX. CONT.	TAT °C -40	-35	-30	-25	-20	-15	-10	-5	0	5	10	15	20	25	30	35	40	45	50
S.L. TO 30000	S.L. TO 1500 20000 TO 30000	2.25	2.23	2.21	2.18	2.15	2.12	2.09	2.04	1.99	1.94	1.90	1.86	1.82	1.79	1.76	1.73	1.70	1.67	1.64
	1500 TO 20000	2.30	2.28	2.26	2.24	2.21	2.19	2.16	2.13	2.10	2.07	2.04	2.00	1.95	1.91	1.86	1.81	1.75	1.71	1.66
	35000 & 37000	2.24	2.22	2.20	2.17	2.14	2.11	2.07	2.02	1.97	1.92									

2.30 — 5660 AND ABOVE; 2.20 — 4000; 2.14 — 3000; 2.09 — 2000; 2.04 — 1000; 1.98 — S.L.

TEMP / PRESS — LIMIT EPR

1. FIND TEMP LIMIT EPR
2. FIND PRESS LIMIT EPR
3. USE THE SMALLER OF THE TWO LIMITS

MAX CRUISE EPR

TAT °C		-50	-45	-40	-35	-30	-25	-20	-15	-10	-5	0	5	10	15	20	25	30	35	40
PRESS ALT 1000 FT	6 TO 30	2.18	2.16	2.14	2.12	2.10	2.07	2.05	2.02	1.99	1.95	1.91	1.85	1.79	1.73	1.68	1.64	1.61	1.57	1.54
	35 & 37	2.28	2.26	2.24	2.22	2.20	2.17	2.14	2.11	2.07	2.02	1.97	1.92	1.87	1.84	1.80				

ANTI-ICE BLEED CORRECTIONS	Δ EPR
ENGINE ANTI-ICE	-.08
WING ANTI-ICE	2 ENG -.04
	1 ENG -.06

AIR COND-BLEED CORRECTIONS Δ EPR	A/C OFF
S. L. TO 37000	+ .04

BLEED CORRECTIONS APPLY TO MAX CLIMB, MAX CONTINUOUS, AND MAX CRUISE EPR SETTINGS

FIGURE 60.—B-737 – Climb and Cruise Power.

OPERATING CONDITIONS	X-1	X-2	X-3	X-4	X-5
DISTANCE (NM)	2,000	2,400	1,800	2,800	1,200
WIND COMPONENT (KTS)	50 TW	50 HW	20 HW	50 TW	30 HW
CRUISE PRESS ALTITUDE	27,000	35,000	20,000	29,000	37,000
ISA TEMPERATURE	+10°	ISA	+20°	–10°	+10°
LANDING WEIGHT (X1000)	70	75	75	65	90

FIGURE 61.—Flight Planning at .78 Mach Cruise.

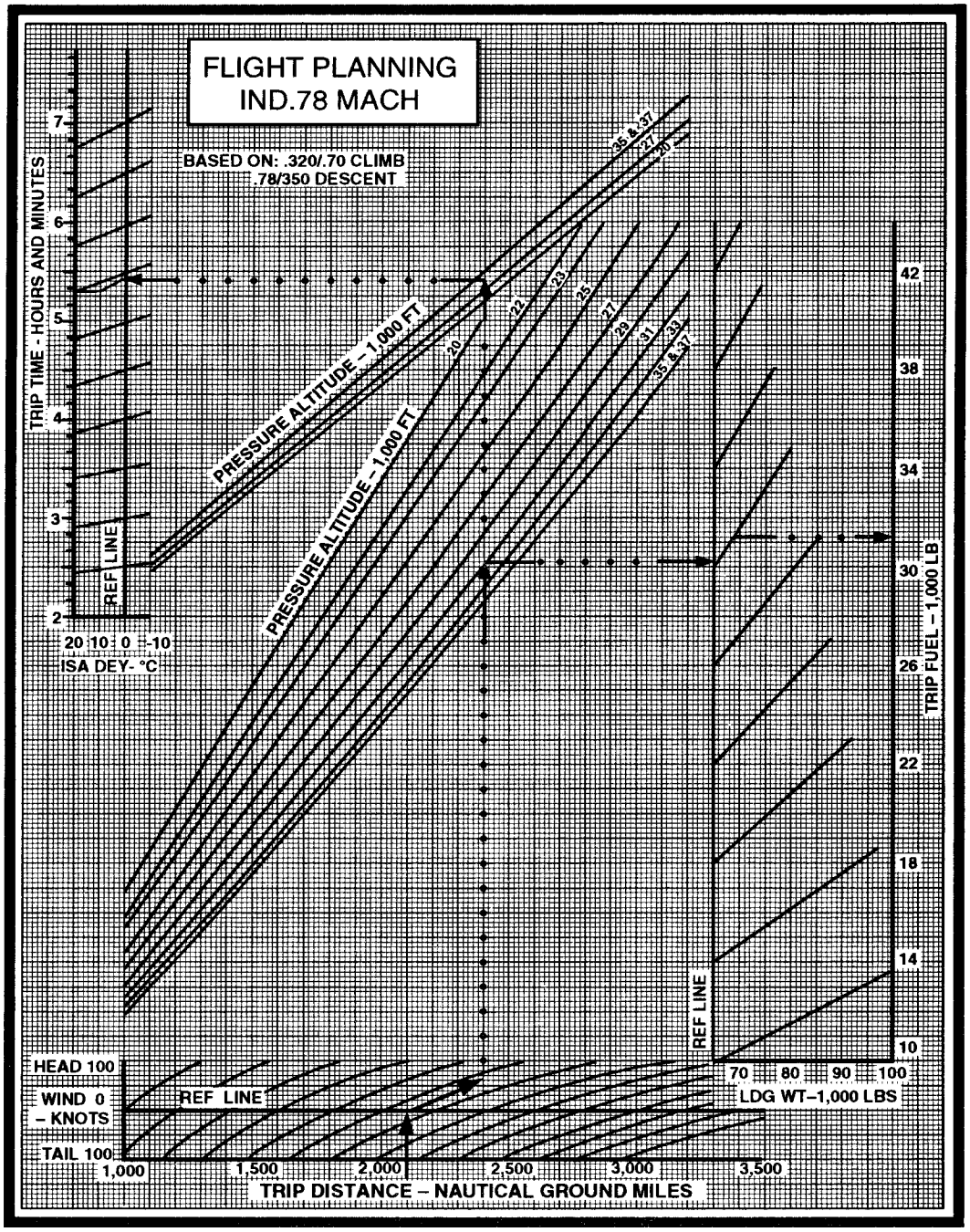


FIGURE 62.—B-737 – Flight Planning .78 Mach Indicated.

OPERATING CONDITIONS	Q–1	Q–2	Q–3	Q–4	Q–5
WEIGHT (X1000)	110	70	90	80	100
PRESSURE ALTITUDE	30,000	25,000	35,000	20,000	10,000
TOTAL AIR TEMP (TAT)	–8 °C	–23 °C	–16 °C	+4 °C	–6 °C

FIGURE 63.—B-737– Turbulent Air RPM.

TURBULENT AIR PENETRATION

TARGET SPEED IAS/MACH	PRESS ALT -1000 FT	GROSS WEIGHT - 1000 LB					ISA TAT -°C	% N_1 ADJUSTMENT PER 10 °C VARIATION FROM TABLE TAT COLDER - WARMER +
		70	80	90	100	110		
		APPROXIMATE POWER SETTING -%N1 RPM						
280/.70	35	77.1	79.0	81.0	83.4		-36	1.6
	30	77.2	78.2	79.4	81.1	82.4	-23	1.6
	25	76.7	77.5	78.3	79.2	80.1	-13	1.5
	20	74.7	75.4	76.1	77.0	77.9	-6	1.4
	15	72.7	73.5	74.2	74.8	75.7	1	1.2
	10	70.5	71.3	72.1	72.9	73.9	9	1.3

FIGURE 64.—B-737 – Turbulent Air Penetration.

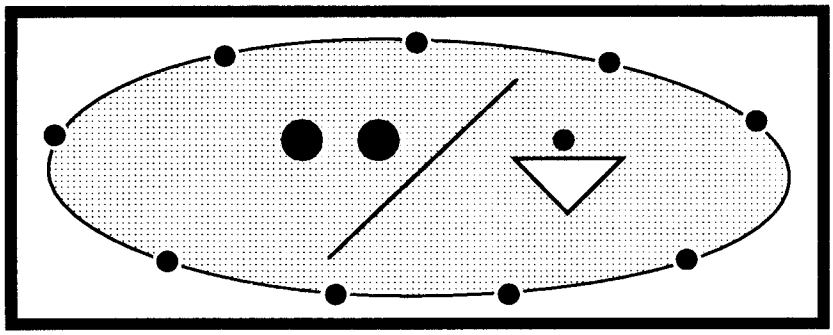


FIGURE 65.—Symbol Used on U.S. Low Level Significant Weather Prog Chart.

OPERATING CONDITIONS	Z-1	Z-2	Z-3	Z-4	Z-5
DISTANCE (NM)	340	650	900	290	400
AVG WIND COMP (KTS)	25 TW	45 HW	35 TW	25 HW	60 HW

FIGURE 66.—Flight Planning at .74 Mach Cruise.

ABBREVIATED FLIGHT PLANNING
.280/.70 CLIMB
.74/320/340 DESCENT
250 KTS CRUISE BELOW 10000 FT.
320 KTS CRUISE 10000 THRU 23000 FT.
.74 MACH CRUISE 24000 FT. AND ABOVE

DIST. N. MI.	REC. ALT.	TAS KTS	AIR TIME MINS.	FUEL LBS.
50	6000-7000	279	16	1800
60	6000-7000	279	18	1950
260	26000-27000	447	44	4600
270	26000-27000	447	45	4750
280	27000-28000	445	47	4850
290	28000-29000	443	48	4950
300	28000-29000	443	49	5100
310	28000-29000	443	51	5200
320	29000-31000	441	52	5300
330	29000-31000	441	53	5400
340	31000-33000	438	55	5550
350	31000-33000	438	56	5650
400	33000-35000	433	62	6250
450	33000-35000	433	69	6850
500	33000-35000	433	76	7500
550	33000-35000	433	82	8100
600	33000-35000	433	89	8700
650	33000-35000	433	96	9300
700	33000-35000	433	102	9900
750	33000-35000	433	109	10500
800	33000-35000	433	115	11100
850	33000-35000	433	122	11700
900	33000-35000	433	129	12300
950	33000-35000	433	135	12900
1000	33000-35000	433	142	13500

TIME AND FUEL CORRECTION FOR WIND
Δ TIME = TIME X WIND COMPONENT ÷ TAS
Δ FUEL = FUEL X WIND COMPONENT ÷ TAS
EXAMPLE: DIST. = 250
STILL AIR TIME = 43 MIN.
STILL AIR FUEL = 4500 LBS.
WIND COMPONENT = 20 KTS.

Δ TIME = 43 X 20 ÷ 449 = MIN.
Δ FUEL = 4500 X 20 = 449 = 200 LBS.
ADD Δ TIME AND Δ FUEL FOR THE HEADWIND; SUBTRACT FOR TAILWIND

FIGURE 67.—Abbreviated Flight Planning.

OPERATING CONDITIONS	O-1	O-2	O-3	O-4	O-5
ALTITUDE	31,000	23,000	17,000	8,000	4,000
WEIGHT (X1000)	102	93	104	113	109
ENGINES OPERATING	2	2	2	2	2
HOLDING TIME (MIN)	20	40	35	15	25

FIGURE 68.—B-737 – Holding.

HOLDING

EPR
IAS KNOTS
FF PER ENGINE LB/HR

FLIGHT LEVEL	GROSS WEIGHT 1000 LB										
	115	110	105	100	95	90	85	80	75	70	65
350	2.13	2.07	2.01	1.95	1.90	1.85	1.80	1.76	1.71	1.67	1.64
	234	228	223	217	211	210	210	210	210	210	210
	2830	2810	2630	2460	2290	2180	2070	1960	1870	1780	1700
300	1.86	1.82	1.79	1.75	1.71	1.67	1.64	1.60	1.57	1.54	1.51
	231	226	220	215	210	210	210	210	210	210	210
	2740	2600	2470	2370	2250	2140	2050	1960	1880	1790	1720
250	1.69	1.66	1.63	1.60	1.57	1.54	1.51	1.48	1.45	1.43	1.41
	229	224	218	213	210	210	210	210	210	210	210
	2710	2610	2490	2370	2260	2180	2080	1980	1920	1840	1780
200	1.56	1.53	1.50	1.48	1.45	1.43	1.40	1.38	1.36	1.34	1.32
	227	222	217	211	210	210	210	210	210	210	210
	2716	2590	2490	2390	2310	2230	2130	2060	2000	1920	1860
150	1.45	1.43	1.40	1.38	1.36	1.34	1.32	1.31	1.29	1.27	1.26
	226	221	216	210	210	210	210	210	210	210	210
	2790	2680	2570	2470	2380	2290	2220	2140	2070	2000	1990
100	1.36	1.34	1.33	1.31	1.29	1.28	1.26	1.25	1.24	1.22	1.21
	225	220	215	210	210	210	210	210	210	210	210
	2860	2780	2670	2560	2470	2390	2310	2240	2170	2100	2030
050	1.29	1.28	1.27	1.25	1.24	1.23	1.21	1.20	1.19	1.18	1.17
	224	219	214	210	210	210	210	210	210	210	210
	2960	2870	2770	2670	2580	2500	2420	2350	2290	2230	2150
015	1.25	1.24	1.23	1.22	1.21	1.20	1.19	1.18	1.17	1.16	1.15
	224	219	214	210	210	210	210	210	210	210	210
	3050	2950	2850	2790	2670	2590	2510	2430	2370	2300	2240

FIGURE 69.—B-737 – Holding Performance Chart.

INITIAL FUEL WEIGHT	ENDING FUEL WEIGHT - 1000 LB															
1000 LB	10	14	18	22	26	30	34	38	42	46	50	54	58	62	64	70
70	28	27	25	23	22	20	18	17	15	13	12	10	8	5	3	0
66	26	25	23	21	20	18	16	15	13	12	10	8	5	3	0	
62	23	23	20	18	17	15	13	11	10	8	7	5	3	0		
58	21	20	18	16	15	13	11	10	8	6	5	3	0			
54	18	16	15	13	12	10	8	7	5	3	2	0				
50	16	15	13	12	10	8	7	5	3	2	0					
46	15	13	12	10	8	7	5	3	2	0						
42	13	12	10	8	7	5	3	2	0		FUEL DUMP TIME					
38	12	10	8	7	5	3	2	0								
34	10	8	7	5	3	2	0									
30	8	7	5	3	2	0										
26	7	5	3	2	0											
22	5	3	2	0												
18	3	2	0						FUEL JETTISON TIME-MINUTES							
14	2	0														
10	0															

FIGURE 70.—Fuel Dump Time.

OPERATING CONDITIONS	D-1	D–2	D–3	D–4	D–5
WT AT ENG FAIL (X1000)	100	110	90	80	120
ENGINE ANTI-ICE	ON	OFF	ON	ON	ON
WING ANTI-ICE	OFF	OFF	ON	ON	OFF
ISA TEMPERATURE	ISA	+10°	–10°	–10°	+20°
AIR CONDITIONING	OFF	OFF	OFF	OFF	OFF

FIGURE 71. —B-737– Drift-Down.

1 ENGINE INOP

ENGINE A/I OFF

GROSS WEIGHT 1000 LB		OPTIMUM DRIFTDOWN SPEED KIAS	ISA DEV °C			
AT ENGINE FAILURE	AT LEVEL OFF (APPROX)		-10	0	10	20
			APPROX GROSS LEVEL OFF PRESS ALT FT			
80	77	184	27900	26800	25400	22800
90	86	195	25000	23800	21700	20000
100	96	206	22000	20500	20000	18500
110	105	216	20000	19100	17500	15400
120	114	224	18200	16600	14700	12200

ENGINE A/I ON

GROSS WEIGHT 1000 LB		OPTIMUM DRIFTDOWN SPEED KIAS	ISA DEV °C			
AT ENGINE FAILURE	AT LEVEL OFF (APPROX)		-10	0	10	20
			APPROX GROSS LEVEL OFF PRESS ALT FT			
80	77	184	25500	24600	22800	20000
90	86	195	23000	21400	20000	19400
100	96	206	20000	19400	18700	15600
110	105	216	18100	16600	14700	12200
120	114	224	15500	13800	11800	8800

ENGINE AND WING A/I ON

GROSS WEIGHT 1000 LB		OPTIMUM DRIFTDOWN SPEED KIAS	ISA DEV °C			
AT ENGINE FAILURE	AT LEVEL OFF (APPROX)		-10	0	10	20
			APPROX GROSS LEVEL OFF PRESS ALT FT			
80	77	184	24400	23400	21400	20000
90	86	195	21600	20100	19800	18000
100	96	206	19600	18000	16400	14200
110	105	216	16800	15100	13300	10700
120	114	224	14000	12200	10300	7200

NOTE:

WHEN ENGINE BLEED FOR AIR CONDITIONING IS OFF BELOW 17,000 FT., INCREASE LEVEL-OFF ALTITUDE BY 800 FT.

FIGURE 72.—Drift-Down Performance Chart.

OPERATING CONDITIONS	L-1	L-2	L-3	L-4	L-5
TEMPERATURE	+15 °C TAT	+27 °F OAT	−8 °C OAT	−10 °C TAT	+55 °F OAT
PRESSURE ALTITUDE	500	3,100	2,500	2,100	1,200
AIR CONDITIONING	OFF	ON	ON	ON	ON
WING ANTI-ICE	OFF	2 ON	1 ON	2 ON	OFF
WEIGHT (X1000)	100	95	90	105	85
FLAP SETTING	30°	25°	15°	40°	30°
RUNWAY ASSIGNED	35	04	27	34	09
SURFACE WIND	300/20	350/15	310/20	030/10	130/15

FIGURE 73.—B-737 – Landing.

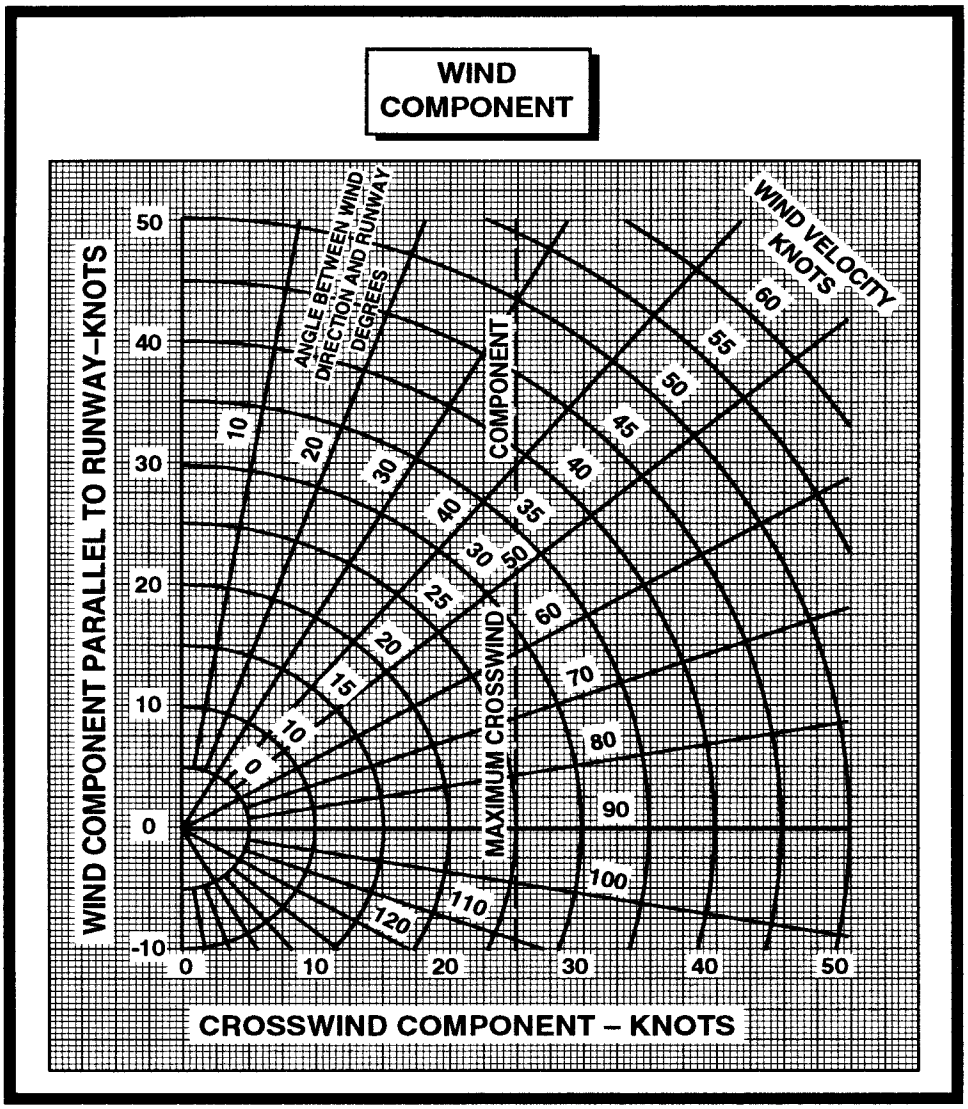


FIGURE 74.—Wind Component Chart.

LANDING

GO AROUND EPR
A/C BLEED ON

EPR BLEED CORRECTIONS	1 ENG	2 ENG
AIR CONDITIONING OFF	+.03	+.03
ENGINE ANTI-ICE ON	ZERO	ZERO
WING ANTI-ICE ON (FLT)	-.06	-.04

REPORTED	°F	-61	-52	-43	-35	-25	-17	-10	0	10	18	27	38	47	55	64	73	83	91	100	119
OAT	°C	-52	-47	-42	-37	-32	-27	-23	-18	-13	-8	-3	3	8	13	18	23	28	33	38	48
TAT °C		-50	-45	-40	-35	-30	-25	-20	-15	-10	-5	0	5	10	15	20	25	30	35	40	50
TEMP LIMIT EPR		2.30	2.30	2.30	2.29	2.26	2.24	2.21	2.19	2.16	2.13	2.10	2.07	2.04	2.00	1.98	1.98	1.98	1.94	1.90	1.80
PRESS				2.30				2.20		2.15		2.09		2.04				1.98	1.93		
				5660 AND ABOVE				4000		3000		2000		1000				S.L.	-1000		

1. FIND TEMP LIMIT EPR
2. FIND PRESS LIMIT EPR
3. USE THE SMALLER OF THE TWO LIMITS

FLAP EXTENSION/ MANEUVERING SPEED

NORMAL MANEUVER AND FLAP EXTENSION SPEEDS		
FLAP POS	NORMAL MANEUVER	SELECT FLAP
0	210	1
1	190	5
5	170	10/15
10	160	15
15	150	25/30/40
25	140	30/40
30	VREF	—
40	VREF	—

LANDING SPEED

GROSS WT -1000 LB	REFERENCE SPEED AT FLAP POSITION			
	40	30	25	15
110	138	142	153	158
105	134	138	149	154
100	130	135	144	150
95	127	131	140	145
90	123	127	136	141
85	119	124	132	136
80	115	120	127	132
75	113	116	123	127
70	109	112	119	123

ADD WIND FACTOR OF: 1/2 HEADWIND COMPONENT + GUST (MAX: 20 KTS)

FIGURE 75.—B-737 – Landing Performance Chart.

LOADING CONDITIONS	WT-1	WT-2	WT-3	WT-4	WT-5
PASSENGERS					
FORWARD COMPT	18	23	12	28	26
AFT COMPT	95	112	75	122	103
CARGO					
FORWARD HOLD	1,500	2,500	3,500	850	1,400
AFT HOLD	2,500	3,500	4,200	1,500	2,200
FUEL					
TANKS 1 AND 3 (EACH)	10,500	11,000	FULL	10,000	11,500
TANK 2	28,000	27,000	24,250	26,200	25,200

FIGURE 76.—B-727 – Loading.

LOADING CONDITIONS	WT-6	WT-7	WT-8	WT-9	WT-10
PASSENGERS					
FORWARD COMPT	10	27	6	29	21
AFT COMPT	132	83	98	133	127
CARGO					
FORWARD HOLD	5,000	4,500	1,300	975	2,300
AFT HOLD	6,000	5,500	3,300	1,250	2,400
FUEL					
TANKS 1 AND 3 (EACH)	9,500	9,000	FULL	11,000	10,500
TANK 2	21,700	19,800	12,000	29,300	22,700

FIGURE 77.—B-727 – Loading.

LOADING CONDITIONS	WT-11	WT-12	WT-13	WT-14	WT-15
PASSENGERS					
FORWARD COMPT	11	28	22	17	3
AFT COMPT	99	105	76	124	130
CARGO					
FORWARD HOLD	3,100	4,200	1,600	3,800	1,800
AFT HOLD	5,500	4,400	5,700	4,800	3,800
FUEL					
TANKS 1 AND 3 (EACH)	8,500	11,500	12,000	11,000	10,500
TANK 2	19,600	27,800	29,100	25,400	21,900

FIGURE 78.—B-727 – Loading.

AIRPLANE DATUM CONSTANTS

MAC	180.9 inches
L.E. of MAC	860.5 inches
Basic Operating Index	92,837.0 / 1,000

OPERATING LIMITATIONS

Maximum Takeoff Slope	±2%
Maximum Takeoff / Landing Crosswind Component	32 knots
Maximum Takeoff / Landing Tailwind Component	12 knots

WEIGHT LIMITATIONS

Basic Operating Weight	105,500 pounds
Maximum Zero Fuel Weight	138,500 pounds
Maximum Taxi Weight	185,700 pounds
Maximum Takeoff Weight (Brake Release)	184,700 pounds
Maximum In-flight Weight (Flaps 30)	155,500 pounds
(Flaps 40)	144,000 pounds
Maximum Landing Weight (Flaps 30)	155,000 pounds
(Flaps 40)	143,000 pounds

FIGURE 79.—B-727 – Table of Weights and Limits.

PASSENGER LOADING TABLE

Number of Pass.	Weight Lbs.	Moment 1000
Forward Compartment Centroid-582.0		
5	850	495
10	1,700	989
15	2,550	1,484
20	3,400	1,979
25	4,250	2,473
29	4,930	2,869
AFT Compartment Centroid-1028.0		
10	1,700	1,748
20	3,400	3,495
30	5,100	5,243
40	6,800	6,990
50	8,500	8,738
60	10,200	10,486
70	11,900	12,233
80	13,600	13,980
90	15,300	15,728
100	17,000	17,476
110	18,700	19,223
120	20,400	20,971
133	22,610	23,243

CARGO LOADING TABLE

	Moment 1000	
	Forward Hold	Aft Hold
Weight Lbs.	Arm 680.0	Arm 1166.0
6,000		6,966
5,000	3,400	5,830
4,000	2,720	4,664
3,000	2,040	3,498
2,000	1,360	2,332
1,000	680	1,166
900	612	1,049
800	544	933
700	476	816
600	408	700
500	340	583
400	272	466
300	204	350
200	136	233
100	68	117

NOTE: These computations are to be used for testing purposes only.

FUEL LOADING TABLE

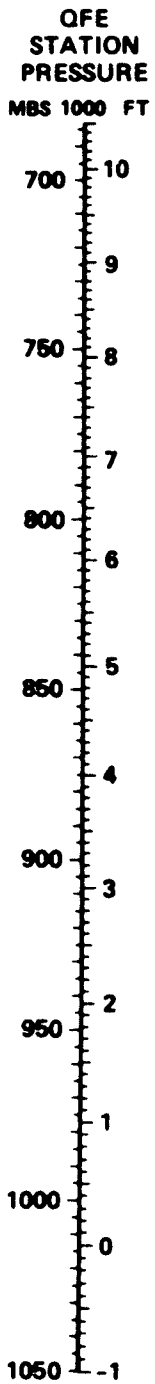
TANKS 1 & 3 (EACH)			TANKS 2 (3 CELL)					
Weight Lbs.	Arm	Moment 1000	Weight Lbs.	Arm	Moment 1000	Weight Lbs.	Arm	Moment 1000
8,500	992.1	8,433	8,500	917.5	7,799	22,500	914.5	20,576
9,000	993.0	8,937	9,000	917.2	8,255	23,000	914.5	21,034
9,500	993.9	9,442	9,500	917.0	8,711	23,500	914.4	21,488
10,000	994.7	9,947	10,000	916.8	9,168	24,000	914.3	21,943
10,500	995.4	10,451	10,500	916.6	9,624	24,500	914.3	22,400
11,000	996.1	10,957	11,000	916.5	10,082	25,000	914.2	22,855
11,500	996.8	11,463	11,500	916.3	10,537	25,500	914.2	23,312
12,000	997.5	11,970	12,000	916.1	10,993	26,000	914.1	23,767
FULL CAPACITY			**(See note at lower left)			26,500	914.1	24,244
						27,000	914.0	24,678
**Note: Computations for Tank 2 weights for 12,500 lbs. to 18,000 lbs. have been purposely omitted.			18,500	915.1	16,929	27,500	913.9	25,132
			19,000	915.0	17,385	28,000	913.9	25,589
			19,500	914.9	17,841	28,500	913.8	26,043
			20,000	914.9	18,298	29,000	913.7	26,497
			20,500	914.8	18,753	29,500	913.7	26,954
			21,000	914.7	19,209	30,000	913.6	27,408
			21,500	914.6	19,664	FULL CAPACITY		
			22,000	914.6	20,121			

FIGURE 80.—Loading Tables.

OPERATING CONDITIONS	G-1	G-2	G-3	G-4	G-5
FIELD ELEVATION FT	1,050	2,000	4,350	3,050	2,150
ALTIMETER SETTING	29.36"	1016 mb	30.10"	1010 mb	29.54"
TEMPERATURE	+23 °F	+10 °C	+68 °F	–5 °C	+5 °F
AIR COND ENGS 1 AND 3	OFF	ON	ON	ON	ON
ANTI-ICE ENG 2	ON	OFF	OFF	ON	ON
GROSS WEIGHT (X1000)	140	190	180	160	120
6TH STAGE BLEED	OFF	ON	ON	OFF	OFF
FLAP POSITION	15°	5°	25°	15°	5°
CG STATION	911.2	882.2	914.8	932.9	925.6
LEMAC – STA 860.5, MAC 180.9"					

FIGURE 81.—B-727 – Takeoff.

ALTIMETER SETTING TO STATION PRESSURE



QNH TO PRESSURE ALTITUDE

QNH IN. HG.	CORRECTION TO ELEVATION FOR PRESS. ALT FT	QNH MILLIBARS
28.81 to 28.91	1000	976 to 979
28.91 to 29.02	900	979 to 983
29.02 to 29.12	800	983 to 986
29.12 to 29.23	700	986 to 990
29.23 to 29.34	600	990 to 994
29.34 to 29.44	500	994 to 997
29.44 to 29.55	400	997 to 1001
29.55 to 29.66	300	1001 to 1004
29.66 to 29.76	200	1004 to 1008
29.76 to 29.87	100	1008 to 1012
29.87 to 29.97	0	1012 to 1015
29.97 to 30.08	-100	1015 to 1019
30.08 to 30.19	-200	1019 to 1022
30.19 to 30.30	-300	1022 to 1026
30.30 to 30.41	-400	1026 to 1030
30.41 to 30.52	-500	1030 to 1034
30.52 to 30.63	-600	1034 to 1037
30.63 to 30.74	-700	1037 to 1041
30.74 to 30.85	-800	1041 to 1045
30.85 to 30.96	-900	1045 to 1048
30.96 to 31.07	-1000	1048 to 1052

EXAMPLE: ELEVATION = 2500 FT
QNH = 29.48 IN.HG
CORRECTION = 400 FT.
PRESS ALT = 2900 FT

FIGURE 82.—Altimeter Setting to Pressure Altitude.

TAKEOFF EPR, SPEEDS AND STAB TRIM SETTING

MAX TAKEOFF EPR

0 - 60 KNOTS

ENG 1 & 3 AIRBLEED ON
ENG 2 NO AIRBLEED

PRESS ALT FT	OAT °F / °C	-67 TO -9 / -55 TO -23	-4 / -20	5 / -15	14 / -10	23 / -5	32 / 0	41 / 5	50 / 10	59 / 15	68 / 20	77 / 25	86 / 30	95 / 35	104 / 40	113 / 45	120 / 49
-1000	1 & 3	2.04	2.04	2.04	2.04	2.04	2.04	2.04	2.04	2.04	2.04	2.04	2.04	2.03	1.99	1.94	1.91
	2	2.06	2.06	2.06	2.06	2.06	2.06	2.06	2.06	2.06	2.06	2.06	2.06	2.05	2.00	1.96	1.92
S.L.	1 & 3	2.10	2.10	2.10	2.10	2.10	2.10	2.10	2.10	2.10	2.10	2.10	2.08	2.03	1.99	1.94	1.91
	2	2.11	2.11	2.11	2.11	2.11	2.11	2.11	2.11	2.11	2.11	2.11	2.10	2.05	2.00	1.96	1.92
1000	1 & 3	2.15	2.15	2.15	2.15	2.15	2.15	2.15	2.13	2.12	2.12	2.11	2.08	2.03	1.99	1.94	1.91
	2	2.16	2.16	2.16	2.16	2.16	2.16	2.16	2.15	2.13	2.13	2.12	2.10	2.05	2.00	1.96	1.92
2000	1 & 3	2.21	2.21	2.21	2.21	2.21	2.20	2.17	2.14	2.14	2.14	2.11	2.08	2.03	1.99	1.94	1.91
	2	2.22	2.22	2.22	2.22	2.22	2.21	2.18	2.16	2.16	2.15	2.12	2.10	2.05	2.00	1.96	1.92
3000	1 & 3	2.26	2.26	2.26	2.25	2.23	2.20	2.17	2.14	2.14	2.14	2.11	2.08	2.03	1.99	1.94	1.91
	2	2.28	2.28	2.28	2.27	2.24	2.21	2.18	2.16	2.16	2.15	2.12	2.10	2.05	2.00	1.96	1.92
3856 & ABOVE	1 & 3	2.31	2.29	2.27	2.25	2.23	2.20	2.17	2.14	2.14	2.14	2.11	2.08	2.03	1.99	1.94	1.91
	2	2.32	2.31	2.29	2.27	2.24	2.21	2.18	2.16	2.16	2.15	2.12	2.10	2.05	2.00	1.96	1.92

EPR BLEED CORRECTIONS	ENG 1 & 3	ENG 2
AIR CONDITIONING	OFF +.04	-
ENGINE ANTI-ICE ON	-	-.03

REDUCE ENG 2 EPR BY .05 WITH 6TH STAGE BLEED ON (IF INSTALLED) FOR 10 °C (50 °F) OAT & WARMER

V_1, V_R, V_2
ANTI-SKID OPERATIVE

PRESSURE ALT - 1000 FT	OAT			
9 TO 11	°F / °C	(ABOVE CERTIFIED ALTITUDE)	-65 / -54 TO 25 / -4	26 / -3 TO 87 / 31
7 TO 9	°F / °C		-65 / -54 TO 9 / -13	10 / -12 TO 75 / 24	76 / 25 TO 104 / 40
5 TO 7	°F / °C	-65 / -54 TO -10 / -23	-8 / -22 TO 42 / 5	43 / 6 TO 97 / 36	98 / 37 TO 111 / 44
3 TO 5	°F / °C	-65 / -54 TO 32 / 0	33 / 1 TO 90 / 32	91 / 33 TO 113 / 45	114 / 46 TO 120 / 49
1 TO 3	°F / °C	-65 / -54 TO 83 / 28	84 / 29 TO 106 / 41	107 / 42 TO 120 / 49	
-1 TO 1	°F / °C	-65 / -54 TO 99 / 37	100 / 38 TO 120 / 49		

FLAPS	GROSS WEIGHT 1000 LB	$V_1 = V_R$	V_2	$V_1 = V_R$	V_2	$V_1 = V_R$	V_2	$V_1 = V_R$	V_2
5	210	165	175	166	175				
	200	160	171	162	171				
	190	155	167	157	167	158	167		
	180	150	163	152	163	154	163		
	170	144	159	147	159	149	159	150	158
	160	140	154	141	153	143	153	145	153
	150	135	149	136	149	138	149	140	148
	140	129	145	130	145	132	144	134	144
	130	124	140	125	139	126	138	128	138
	120	119	135	120	134	120	134	121	133
15	210	156	166	157	166				
	200	151	162	153	162				
	190	146	158	148	158	149	158		
	180	141	154	143	154	145	154		
	170	136	150	138	150	140	150	141	149
	160	132	146	133	145	135	145	137	145
	150	127	141	128	141	130	141	132	140
	140	122	137	123	137	124	136	126	136
	130	117	133	118	132	118	131	120	131
	120	112	128	113	127	113	127	115	126
20	210	151	161	152	161				
	200	146	157	148	157				
	190	141	153	143	153	144	153		
	180	136	150	138	150	140	149		
	170	132	146	133	146	135	145	136	145
	160	128	142	129	141	131	141	133	141
	150	123	137	124	137	126	136	128	136
	140	118	133	119	133	120	132	122	132
	130	113	129	114	128	114	127	116	127
	120	109	124	109	123	109	123	111	122
25	210	146	157	147	157				
	200	141	153	143	153				
	190	137	149	138	149	139	149		
	180	132	145	134	145	136	145		
	170	127	141	129	141	131	141	132	140
	160	123	137	124	137	126	137	128	136
	150	119	133	120	133	122	133	124	132
	140	114	129	115	129	116	128	118	128
	130	109	125	110	124	110	124	112	123
	120	105	120	106	120	106	119	108	118

STAB TRIM SETTING

CG	FLAPS 5	FLAPS 15 / 20	FLAPS 25
	UNITS AIRPLANE NOSE UP		
10	6 3/4	7 1/2	8 1/4
12	6 1/2	7 1/4	8
14	6 1/4	7	7 3/4
16	6	6 3/4	7 1/2
18	5 3/4	6 1/2	7
20	5 1/2	6	6 1/2
22	5	5 3/4	6 1/4
24	4 3/4	5 1/4	5 3/4
26	4 1/2	4 3/4	5 1/4
28	4	4 1/2	4 3/4
30	3 3/4	4	4 1/4
32	3 1/2	3 3/4	4
34	3 1/4	3 1/4	3 1/2
36	2 3/4	3	3
38	2 1/2	2 1/2	2 1/2
40	2 1/2	2 1/2	2 1/2
42	2 1/2	2 1/2	2 1/2

FLAP RETRACTION/ MANEUVERING SPEEDS

GROSS WEIGHT LB	FLAP POSITION 15	5	2	0
154500 & BELOW	150	160	190	200
154501 TO 176000	160	170	200	210
176001 TO 191000	170	180	210	220
ABOVE 191000	180	190	225	235

FOR MANEUVERS IMMEDIATELY AFTER TAKEOFF EXCEEDING 15° BANK MAINTAIN AT LEAST V_2 +10 AT TAKEOFF FLAPS

FIGURE 83.—Takeoff Performance.

OPERATING CONDITIONS	H-1	H-2	H-3	H-4	H-5
ALTITUDE	24,000	17,000	8,000	18,000	22,000
WEIGHT (X1000)	195	185	155	135	175
ENGINES OPERATING	3	3	3	3	3
HOLDING TIME (MIN)	15	30	45	25	35

FIGURE 84.—B-727 – Holding.

EPR IAS - KTS FF PER ENG - LB/HR	HOLDING B-727								
PRESSURE ALTITUDE FT	GROSS WEIGHT - 1000 LB								
	200	190	180	170	160	150	140	130	120
25000	1.85 268 3600	1.81 261 3400	1.77 253 3210	1.73 246 3030	1.69 238 2860	1.64 230 2680	1.60 222 2510	1.55 213 2340	1.51 205 2180
20000	1.69 265 3630	1.66 258 3450	1.62 251 3280	1.59 244 3110	1.55 236 2940	1.51 228 2770	1.48 220 2600	1.44 212 2440	1.40 204 2270
15000	1.56 263 3670	1.53 256 3500	1.50 249 3340	1.47 242 3170	1.44 235 3000	1.41 227 2850	1.38 219 2680	1.35 211 2520	1.32 203 2350
10000	1.45 262 3800	1.43 255 3640	1.40 248 3460	1.38 241 3310	1.35 234 3140	1.33 226 2970	1.30 218 2810	1.28 210 2640	1.25 202 2480
5000	1.36 260 3890	1.34 254 3720	1.32 247 3550	1.30 240 3380	1.28 233 3220	1.26 225 3060	1.24 218 2890	1.22 210 2730	1.20 201 2560

FIGURE 85.—B-727 – Holding Performance Chart.

OPERATING CONDITIONS	S–1	S–2	S–3	S–4	S–5
FLIGHT LEVEL	370	350	410	390	330
LANDING WEIGHT (X1000)	130	150	135	155	125
DESCENT TYPE	.80M/ 250	.80M/ 280/250	.80M/ 320/250	.80M/ 350/250	.80M/ 320/250

FIGURE 86.—Descent Performance.

.80M/250 KIAS

FLIGHT LEVEL	TIME MIN	FUEL LB	DISTANCE NAM AT LANDING WEIGHTS		
			120,000 LB	140,000 LB	160,000 LB
410	27	1610	133	137	138
390	27	1600	130	134	136
370	26	1570	123	128	129
350	25	1540	116	120	122
330	24	1510	110	113	115
310	23	1480	103	107	108
290	22	1450	97	100	101
270	21	1420	90	93	95
250	20	1390	84	87	88
230	19	1360	78	80	81
210	18	1320	72	74	75
190	17	1280	66	68	68
170	16	1240	60	62	62
150	14	1190	54	56	56
100	11	1050	39	40	40
050	8	870	24	24	24
015	5	700	12	12	12

.80M/280/250 KIAS

FLIGHT LEVEL	TIME MIN	FUEL LB	DISTANCE NAM AT LANDING WEIGHTS		
			120,000 LB	140,000 LB	160,000 LB
410	25	1550	123	129	132
390	24	1540	121	127	130
370	24	1520	115	121	125
350	23	1500	111	117	120
330	23	1480	106	111	115
310	22	1450	100	105	108
290	21	1430	94	99	102
270	20	1400	88	93	95
250	19	1370	83	87	89
230	18	1350	77	81	83
210	17	1310	72	75	76
190	16	1280	66	69	70
170	15	1240	61	63	64
150	14	1200	55	57	58
100	12	1080	42	42	42
050	8	870	24	24	24
015	5	700	12	12	12

.80M/320/250 KIAS

FLIGHT LEVEL	TIME MIN	FUEL LB	DISTANCE NAM AT LANDING WEIGHTS		
			120,000 LB	140,000 LB	160,000 LB
410	22	1490	113	120	123
390	22	1480	111	117	121
370	21	1460	105	112	116
350	21	1440	101	107	111
330	20	1420	96	103	107
310	20	1400	92	98	102
290	19	1390	89	94	98
270	19	1370	85	90	94
250	18	1350	80	85	88
230	17	1330	75	79	82
210	17	1300	71	74	77
190	16	1270	66	69	71
170	15	1240	61	64	65
150	14	1210	56	59	60
100	12	1110	45	46	46
050	8	870	24	24	24
015	5	700	12	12	12

.80M/350/250 KIAS

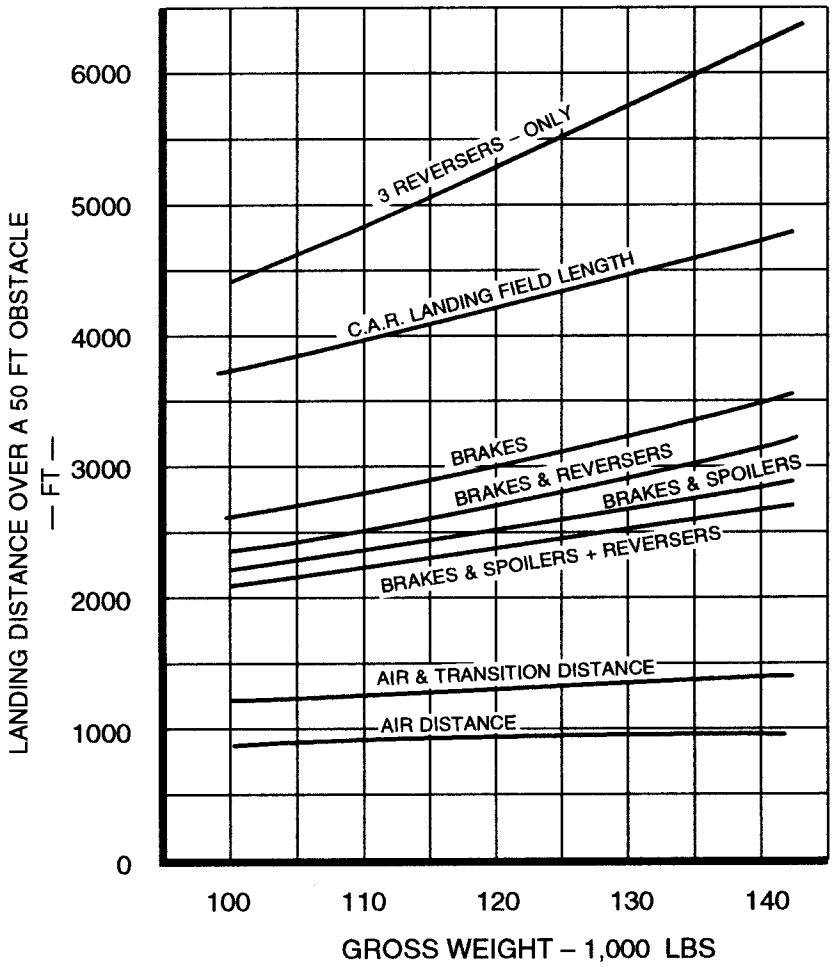
FLIGHT LEVEL	TIME MIN	FUEL LB	DISTANCE NAM AT LANDING WEIGHTS		
			120,000 LB	140,000 LB	160,000 LB
410	21	1440	106	112	116
390	21	1430	103	110	114
370	20	1420	99	106	110
350	20	1400	95	101	106
330	19	1390	91	98	102
310	19	1380	88	94	98
290	18	1360	85	90	95
270	18	1350	82	87	91
250	17	1330	78	83	87
230	17	1310	74	78	81
210	16	1290	70	74	76
190	16	1270	65	69	71
170	15	1240	61	64	66
150	14	1210	57	60	61
100	13	1130	47	48	49
050	8	870	24	24	24
015	5	700	12	12	12

NOTE: FUEL FOR A STRAIGHT-IN APPROACH IS INCLUDED

FIGURE 87.—Descent Performance Chart.

LANDING DISTANCE
COMPARISON
DRY RUNWAY

SEA LEVEL 59 °F
40° FLAPS
ANTI–SKID OPERATIVE.
BRAKES & SPOILERS APPLIED
2 SECONDS AFTER TOUCHDOWN.
REVERSERS INITIATED
3 SECONDS AFTER TOUCHDOWN.
ENGINE SPIN–UP TIME FOR
REVERSE THRUST IS 6.3 SECONDS.
CERTIFIED LANDING PARAMETERS USED,
EXCEPT REVERSE THRUST WHICH IS
FLIGHT TEST DATA.



TRAINING INFORMATION ONLY REPRESENTATIVE

NORMAL LANDING

FIGURE 88.—B-727 – Normal Landing – Dry Runway.

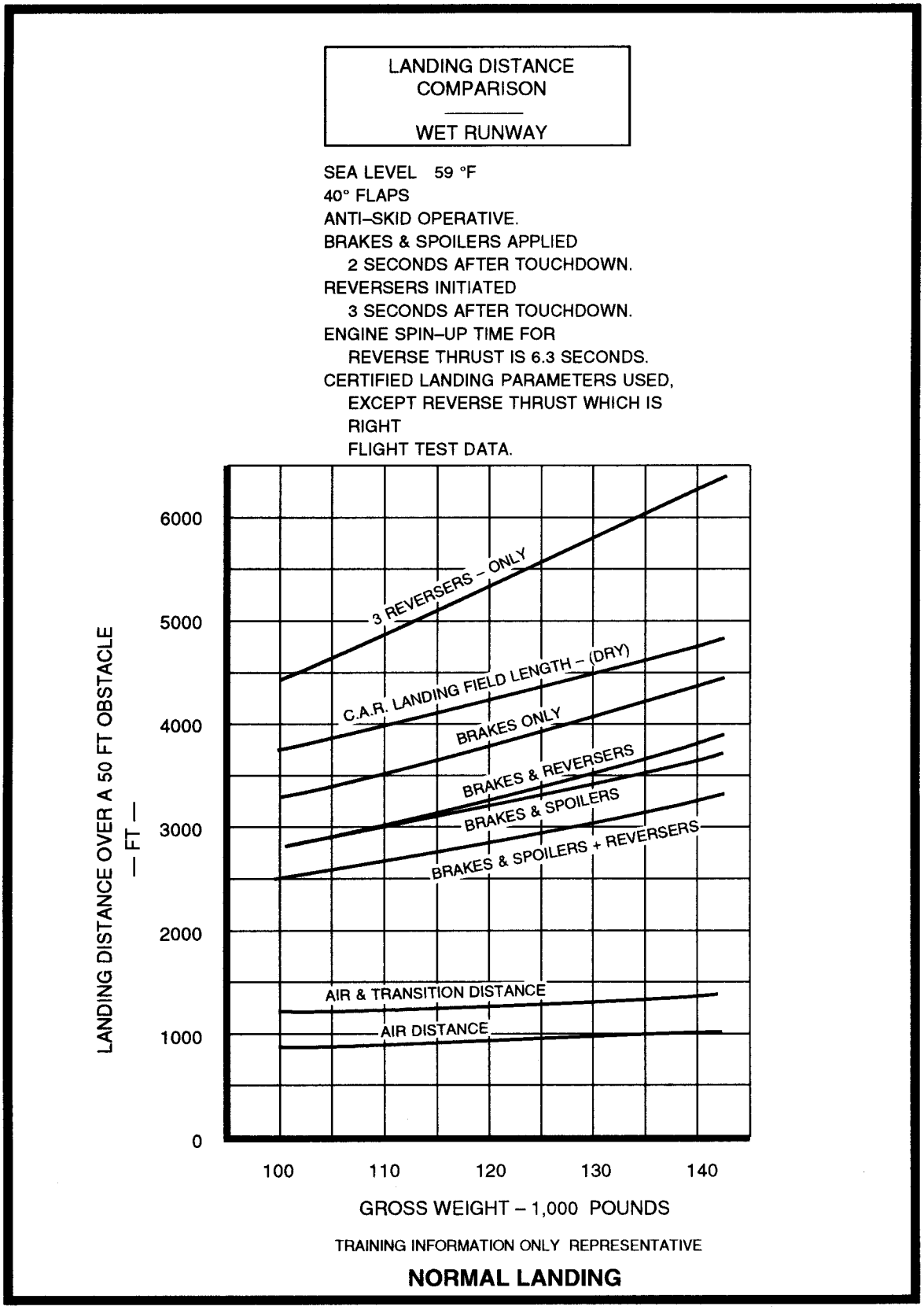
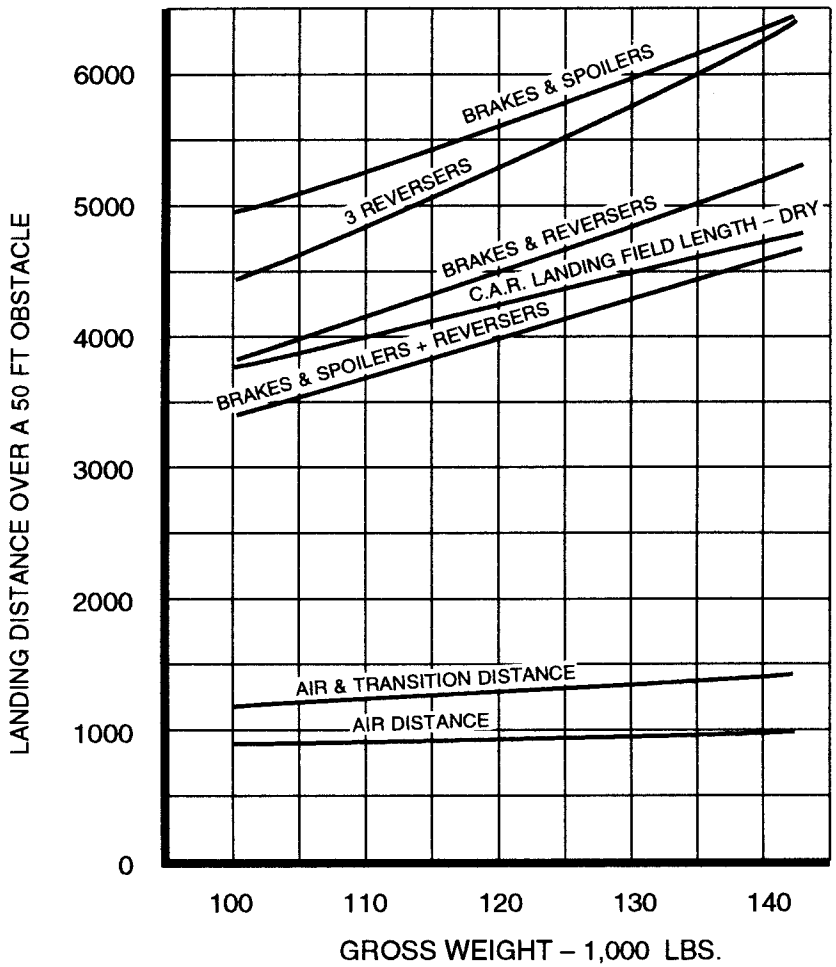


FIGURE 89.—B-727 – Normal Landing – Wet Runway.

LANDING DISTANCE
COMPARISON
ICY RUNWAY

SEA LEVEL 59 °F
40° FLAPS
ANTI-SKID OPERATIVE.
BRAKES & SPOILERS APPLIED
2 SECONDS AFTER TOUCHDOWN.
REVERSERS INITIATED
3 SECONDS AFTER TOUCHDOWN.
ENGINE SPIN-UP TIME FOR
REVERSE THRUST IS 6.3 SECONDS.
CERTIFIED LANDING PARAMETERS USED,
EXCEPT REVERSE THRUST WHICH IS
BASED ON FLIGHT TEST DATA.



TRAINING INFORMATION ONLY REPRESENTATIVE

NORMAL LANDING

FIGURE 90.—B-727 – Normal Landing – Icy Runway.

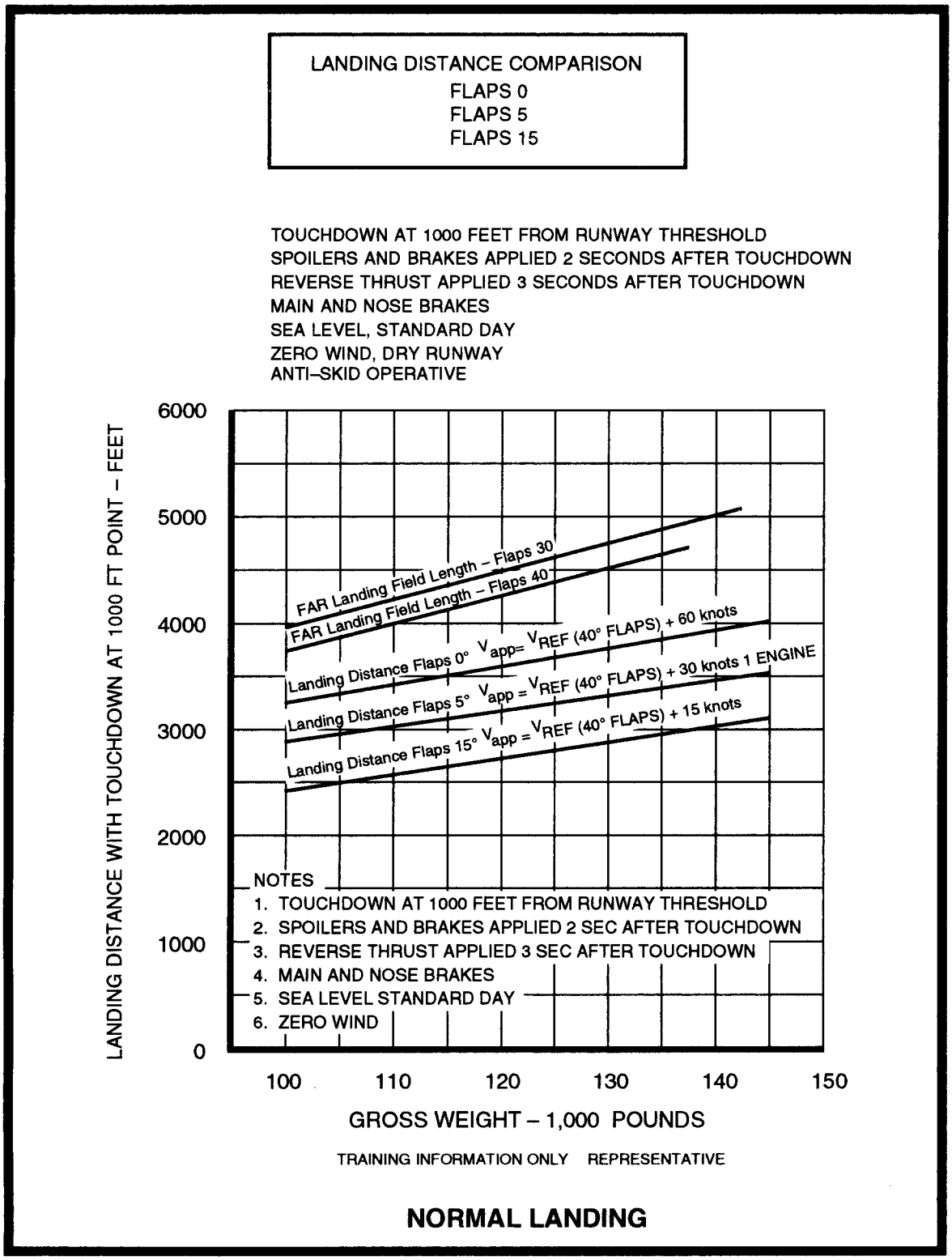


FIGURE 91.—B-727 – Normal Landing Distance Comparison.

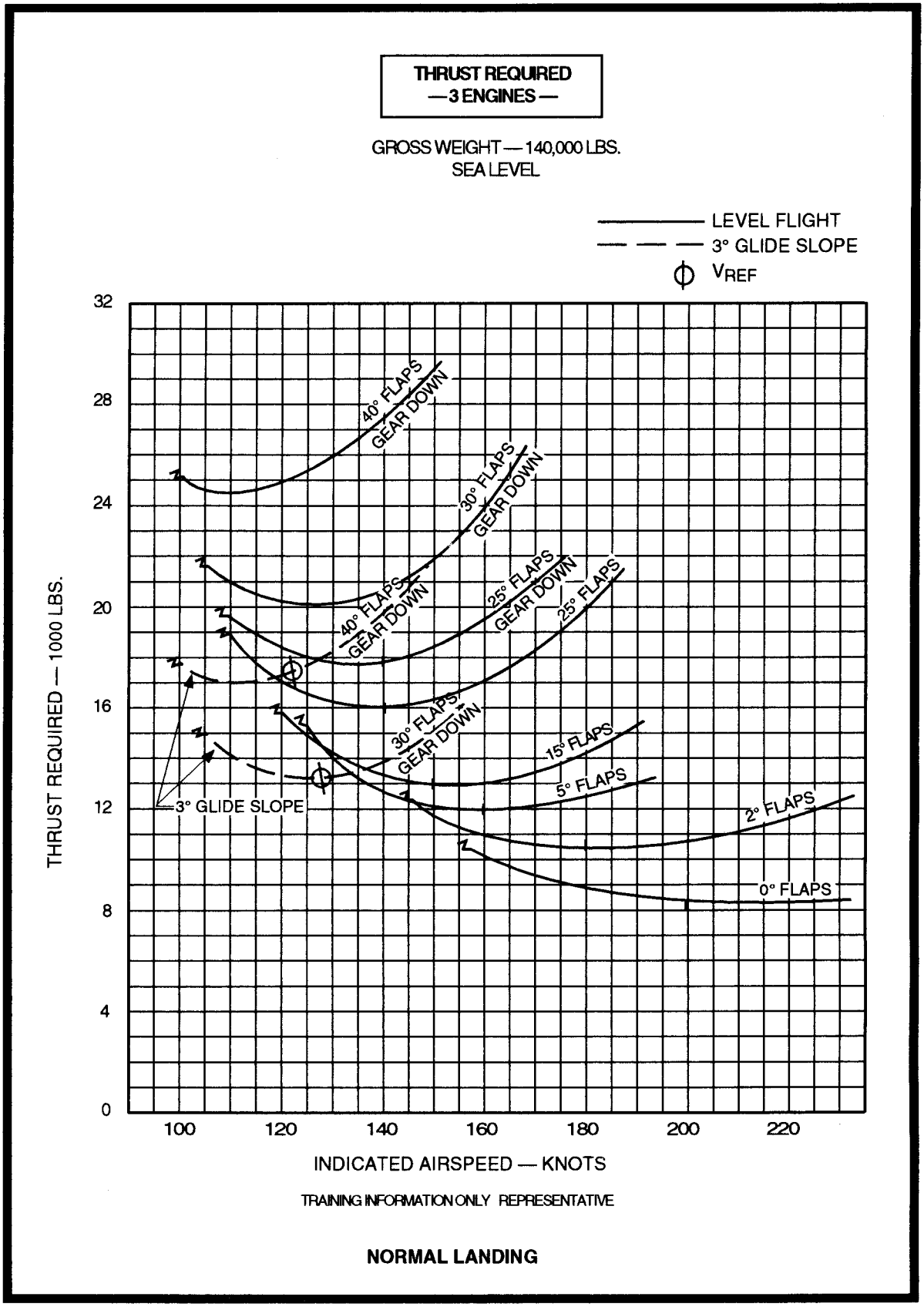


FIGURE 92.—B-727 – Landing Thrust – 140,000 Pounds.

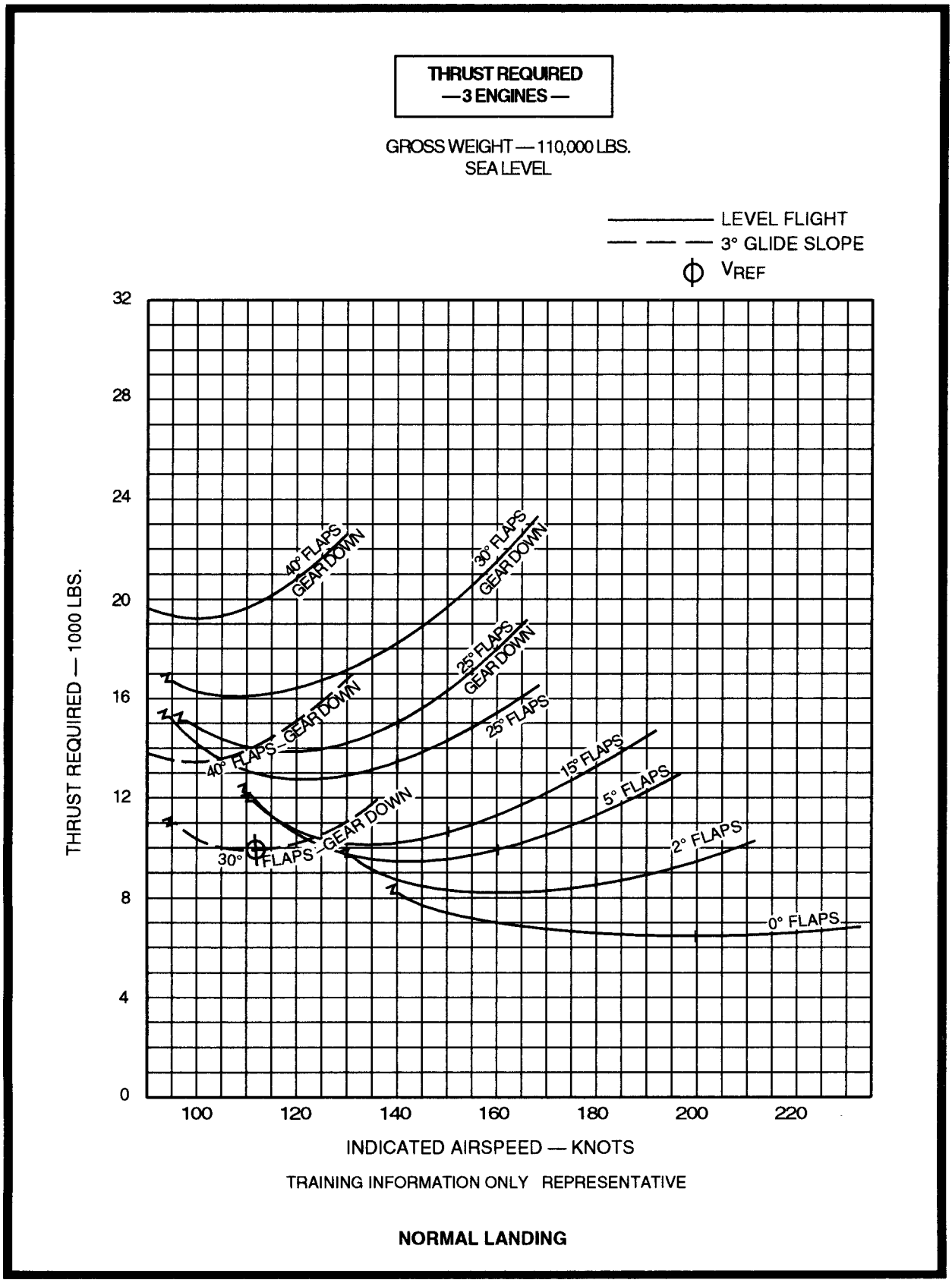


FIGURE 93.—B-727 – Landing Thrust – 110,000 Pounds.

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 PROPOSED (Z)	6. DEPARTURE TIME ACTUAL (Z)	7. CRUISING ALTITUDE
VFR / X IFR / DVFR	N60JB	C208/R	160 KTS	MDW Chicago Midway			FL190

8. ROUTE OF FLIGHT
Midway Four Dep. GIJ, J554 CRL, J586 YXU, J547 BUF

9. DESTINATION (Name of airport and city)	10. EST. TIME ENROUTE HOURS	MINUTES	11. REMARKS
BUF Greater Buffalo Int'l. Buffalo			L/O = Level off. PPH = Pounds Per Hour L/O R-270/19 GIJ Variation: GIJ 1W, CRL 3W, YXU 6W, BUF 8W.

12. FUEL ON BOARD HOURS	MINUTES	13. ALTERNATE AIRPORT(S)	14. PILOT'S NAME, ADDRESS & TELEPHONE NUMBER & AIRCRAFT HOME BASE	15. NUMBER ABOARD
3	20	ROC Rochester	17. DESTINATION CONTACT/TELEPHONE (OPTIONAL)	2

16. COLOR OF AIRCRAFT
Brown/Tan

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

FLIGHT LOG

CHECK POINTS FROM	TO	ROUTE ALTITUDE	COURSE	WIND TEMP	SPEED-KTS TAS	GS	DIST NM	TIME LEG	TOT	FUEL LEG	TOT
MDW	L/O GIJ R-270/19	MDW 4 Climb					49		:19:00		327*
R-270/19 GIJ	GIJ	Direct FL190		230/51 ISA							
GIJ	CRL	J554 FL190									
CRL	YXU	J586 FL190		240/59 ISA							
YXU	BUF R-282/30	J547 FL190		250/62 ISA							
BUF R-282/30	BUF	Descent & Approach					30	:14:00		121.5	
BUF	ROC	V2 7000			150		44	:20:00			

OTHER DATA: * Includes Taxi Fuel
NOTE: Use 610 PPH Total Fuel Flow From L/O To Start Of Descent.
Use 710 PPH Total Fuel Flow For Reserve And Alternate Requirements.
A Missed Approach Requires 81# of Fuel.

TIME and FUEL: As required by FARs.

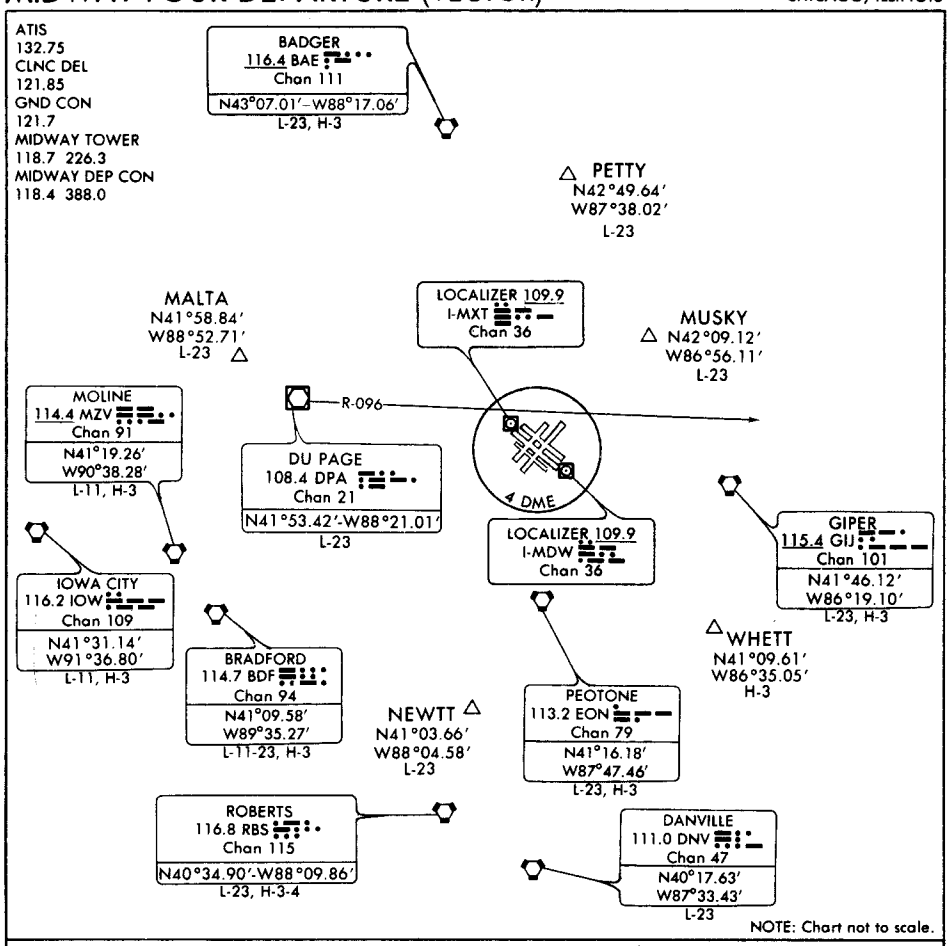
TIME	FUEL (LB)	
		EN ROUTE
		RESERVE
		ALTERNATE
		TOTAL

FIGURE 94.—Flight Plan/Flight Log.

94342 SL-81 (FAA)

MIDWAY FOUR DEPARTURE (VECTOR)

CHICAGO MIDWAY (MDW)
CHICAGO, ILLINOIS



DEPARTURE ROUTE DESCRIPTION

All aircraft expect radar vectors to first enroute fix. Expect clearance to requested altitude/flight level ten minutes after departure.

TAKE-OFF RUNWAYS 22L/R, 31C/R, 13L/C: Climb runway heading to 1300' before turning on course.

TAKE-OFF RUNWAYS 4L/R: Northbound departures assigned headings 360° (CW) thru 080°, turn right climb on heading 100° until leaving 2400. Thence via vector to assigned route.

DME-EQUIPPED AIRCRAFT: Complete initially assigned turn within 4 DME of Midway. Maintain 3000' or assigned lower altitude. Expect clearance to requested altitude 10 minutes after departure.

NON-DME EQUIPPED AIRCRAFT: Complete initially assigned turn south of DPA R-096, maintain 3000' or assigned lower altitude. Expect clearance to requested altitude 10 minutes after departure.

MIDWAY FOUR DEPARTURE (VECTOR)
94342

CHICAGO, ILLINOIS
CHICAGO MIDWAY (MDW)

FIGURE 95.—Midway Four Departure (Vector).

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16 ILLINOIS

CHAMPAIGN (URBANA)

UNIVERSITY OF ILLINOIS-WILLARD (CMI) 5 SW UTC-6(-5DT) CHICAGO
N40°02.36' W88°16.68' H-4H, L-23A
754 B S4 **FUEL** 100LL, JET A1 + OX 1 ARFF Index A IAP
RWY 14R-32L: H8100X150 (CONC-GRVD) S-100, D-180, DT-260 HIRL
RWY 14R: VASI(V4L)—GA 3.0° TCH 31'. **RWY 32L:** MALSR. VASI(V4L)—GA 3.0° TCH 54'.
RWY 04L-22R: H6500X150 (CONC-GRVD) S-100, D-180, DT-260 MIRL
RWY 04L: VASI(V4L)—GA 3.0° TCH 45'. **RWY 22R:** VASI(V4L)—GA 3.0° TCH 41'. Tree.
RWY 18-36: H5299X150 (CONC) S-40, D-50, DT-90 MIRL
RWY 36: VASI(V4L)—GA 3.0° TCH 40'. Tree.
AIRPORT REMARKS: Attended continuously. Rwy 18-36 CLOSED 0600-1200Z‡ indefinitely. PPR for unscheduled air carrier operations with more than 30 passenger seats between 0400-1200Z‡, call arpt manager 217-244-8604. Rwy 04R-22L and Rwy 14L-32R VFR day only, restricted to authorized Flight Schools only. When twr clsd HIRL Rwy 14R-32L preset low ints, to increase ints and ACTIVATE MIRL Rwys 04L-22R MALSR Rwy 32L—CTAF. Itinerant parking on southeast ramp only. Taxiway D not available for air carrier ops with more than 30 passenger seats. NOTE: See Land and Hold Short Operations Section.
COMMUNICATIONS: CTAF 120.4 **ATIS** 124.85 **UNICOM** 122.95
ST LOUIS FSS (STL) TF 1-800-WX-BRIEF. NOTAM FILE CMI.
CHAMPAIGN RCO 122.1R 110.0T (KANKAKEE FSS)
CHAMPAIGN (URBANA) RCO 122.45 (ST LOUIS FSS)
® **CHAMPAIGN APP/DEP CON** 132.85 (134°-312°) 121.35 (313°-133°) 118.25 (1200-0600Z‡)
CHICAGO CENTER APP/DEP CON 121.35 (0600-1200Z‡)
CHAMPAIGN TOWER 120.4 (1200-0600Z‡) **GND CON** 121.8 **CLNC DEL** 128.75
AIRSPACE: CLASS C svc 1200-0600Z‡ ctc **APP CON** other times CLASS G.
RADIO AIDS TO NAVIGATION: NOTAM FILE CMI.
CHAMPAIGN (L) VORTAC 110.0 CMI Chan 37 N40°02.07' W88°16.56' at fld. 750/3E.
VEALS NDB (LOM) 407 CM N39°57.97' W88°10.95' 315°6.2 NM to fld.
ILS 109.1 I-CMI Rwy 32L. LOM VEALS NDB. ILS unmonitored when twr clsd.
ASR

CHICAGO

CHICAGO MIDWAY (MDW) 9SW UTC-6(-5DT) N41°47.16' W87°45.15' CHICAGO
620 B S4 **FUEL** 100LL, JET A1 + OX 2, 4 AOE ARFF Index C COPTER
RWY 13C-31C: H6522X150 (CONC-GRVD) S-95, D-165, DT-250 HIRL H-3H, L-23A, A
RWY 13C: ALSF1. PAPI (P4L)—GA 3.0° TCH 47'. Thld dsplcd 462'. Pole. IAP
RWY 31C: LDIN. REIL. VASI(V4L)—GA 3.0° TCH 52'. Thld dsplcd 696'. Tree.
RWY 04R-22L: H6446X150 (CONC-ASPH-GRVD) S-95, D-165, DT-250 HIRL
RWY 04R: REIL. VASI(V4R)—GA 3.4° TCH 64. Thld dsplcd 518'. Building.
RWY 22L: REIL. VASI(V4R)—GA 3.0° TCH 53'. Thld dsplcd 634'. Pole.
RWY 04L-22R: H5509X150 (ASPH) S-30, D-40 MIRL
RWY 04L: VASI(V4R). Thld dsplcd 758'. Tree. **RWY 22R:** VASI(V4L). Building.
RWY 13L-31R: H5412X150 (ASPH) S-30, D-40 MIRL
RWY 13L: Thld dsplcd 753'. Tree. **RWY 31R:** Pole.
Rwy 13R-31L: H3859X60 (CONC) S-12.5 MIRL
RWY 13R: Pole. **RWY 31L:** Tree.
AIRPORT REMARKS: Attended continuously. Landing fee. Arpt CLOSED to solo student training. Birds on and in vicinity of arpt. Noise abatement procedures: All departures are requested to expedite climb through 1500 ft MSL 0400-1200Z‡. Rwys 13L-31R and 04R-22R not avbl for air carrier ops with more than 30 passenger seats. Rwy 13C PAPI and RVR out of svc indefinitely. Flight Notification Service (ADCUS) available.
WEATHER DATA SOURCES: LAWRS.
COMMUNICATIONS: ATIS 132.75 **UNICOM** 122.95
KANKAKEE FSS (IKK) TF 1-800-WX-BRIEF. NOTAM FILE MDW.
® **APP/DEP CON** 118.4 126.05
MIDWAY TOWER 118.7 135.2 (helicopter ops) **GND CON** 121.7 **CLNC DEL** 121.85 **PRE TAXI CLNC** 121.85
AIRSPACE: CLASS C svc continuous ctc **MIDWAY RADAR** 119.45
RADIO AIDS TO NAVIGATION: NOTAM FILE IKK.
CHICAGO HEIGHTS (L) VORTAC 114.2 CGT Chan 89 N41°30.60' W87°34.29' 332° 18.5 NM to fld. 630/2E.
ERMIN NDB (MHW/LOM) 332 HK N41°43.14' W87°50.19' 044° 5.5 NM to fld. NOTAM FILE MDW.
KEDZI NDB (MHW/LOM) 248 MX N41°44.49' W87°41.38' 315° 3.9 NM to fld. NOTAM FILE MDW.
ILS/DME 109.9 I-MDW Chan 36 Rwy 13C.
ILS 111.5 I-HKH Rwy 04R. LOM ERMIN NDB.
ILS/DME 109.9 I-MXT Chan 36 Rwy 31C. LOM KEDZI NDB.
MLS Chan 660 Rwy 22L. MLS unusable 246°-262° byd 10NM blo 3500'; unusable clockwise byd 262°; elevation unusable clockwise beyond 226° blo 2.0°; elevation unusable counterclockwise byd 222° blo 2.0°. Disregard guidance signals found clockwise byd 314°. Disregard guidance signals found counterclockwise byd 184°.

FIGURE 95A.—Excerpt (MDW).

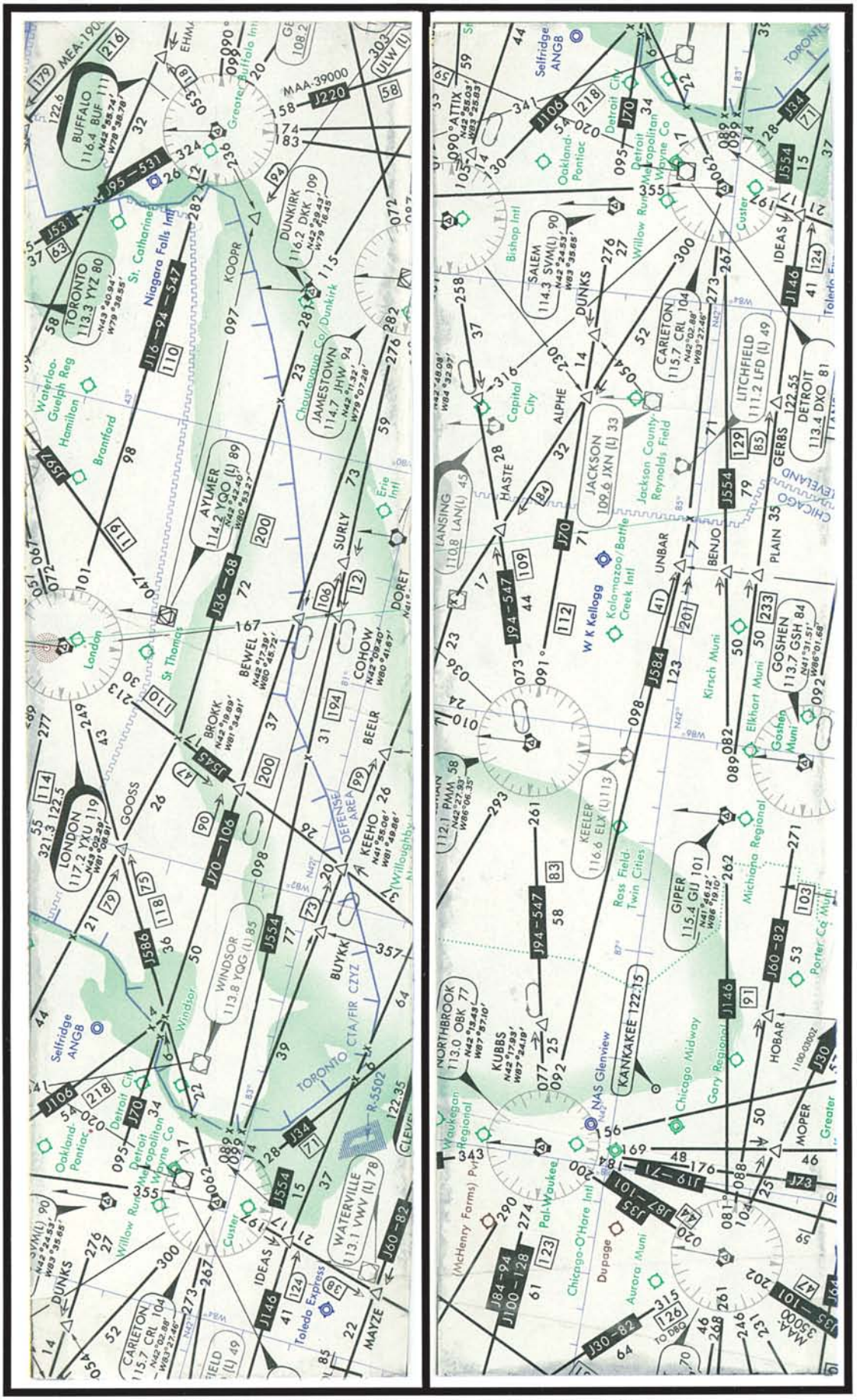
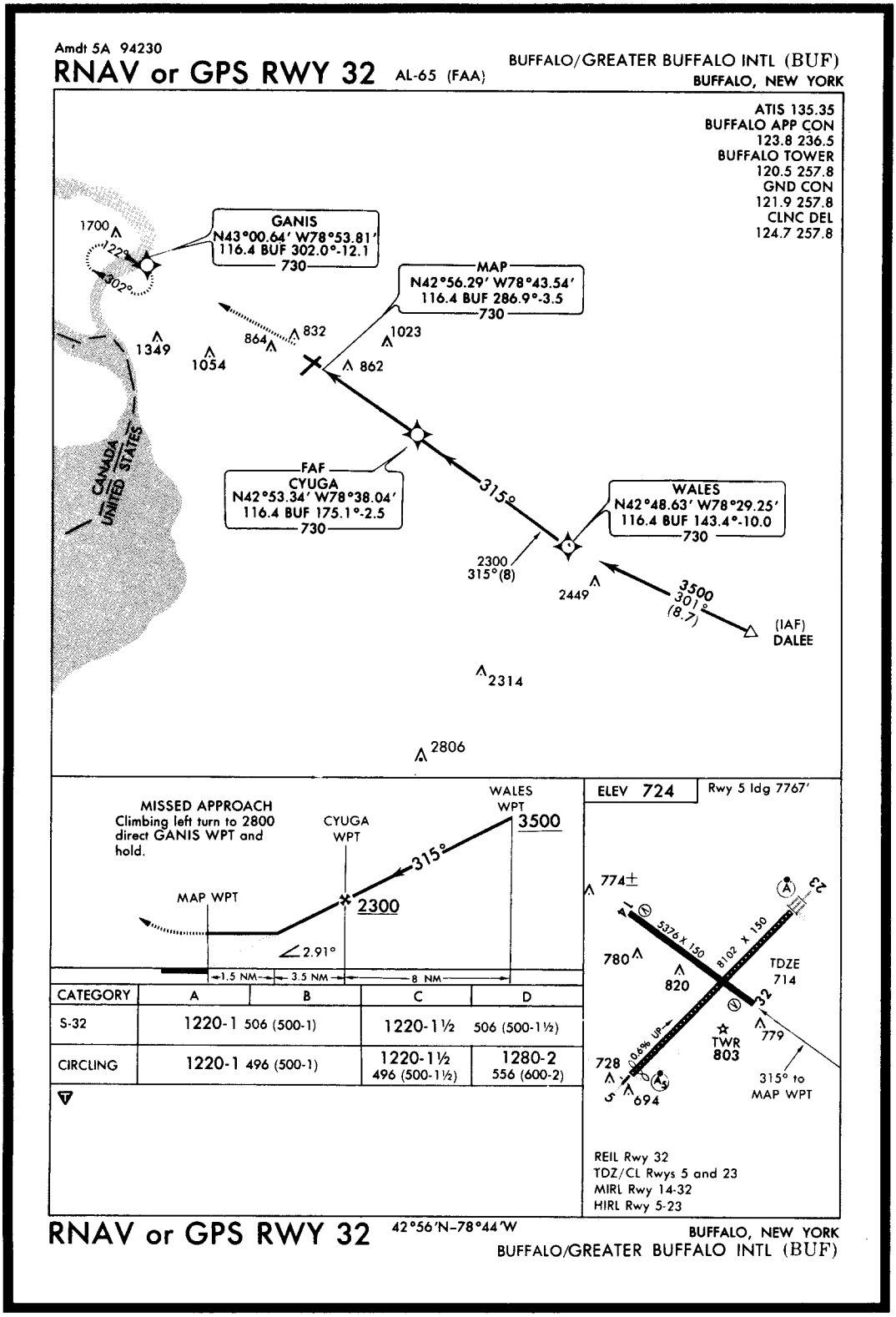


FIGURE 96.—IFR En Route High Altitude Chart Segment.



CATEGORY	A	B	C	D
S-32	1220-1 506 (500-1)		1220-1½ 506 (500-1½)	
CIRCLING	1220-1 496 (500-1)		1220-1½ 496 (500-1½)	1280-2 556 (600-2)

FIGURE 97.—RNAV or GPS RWY 32 (BUF).

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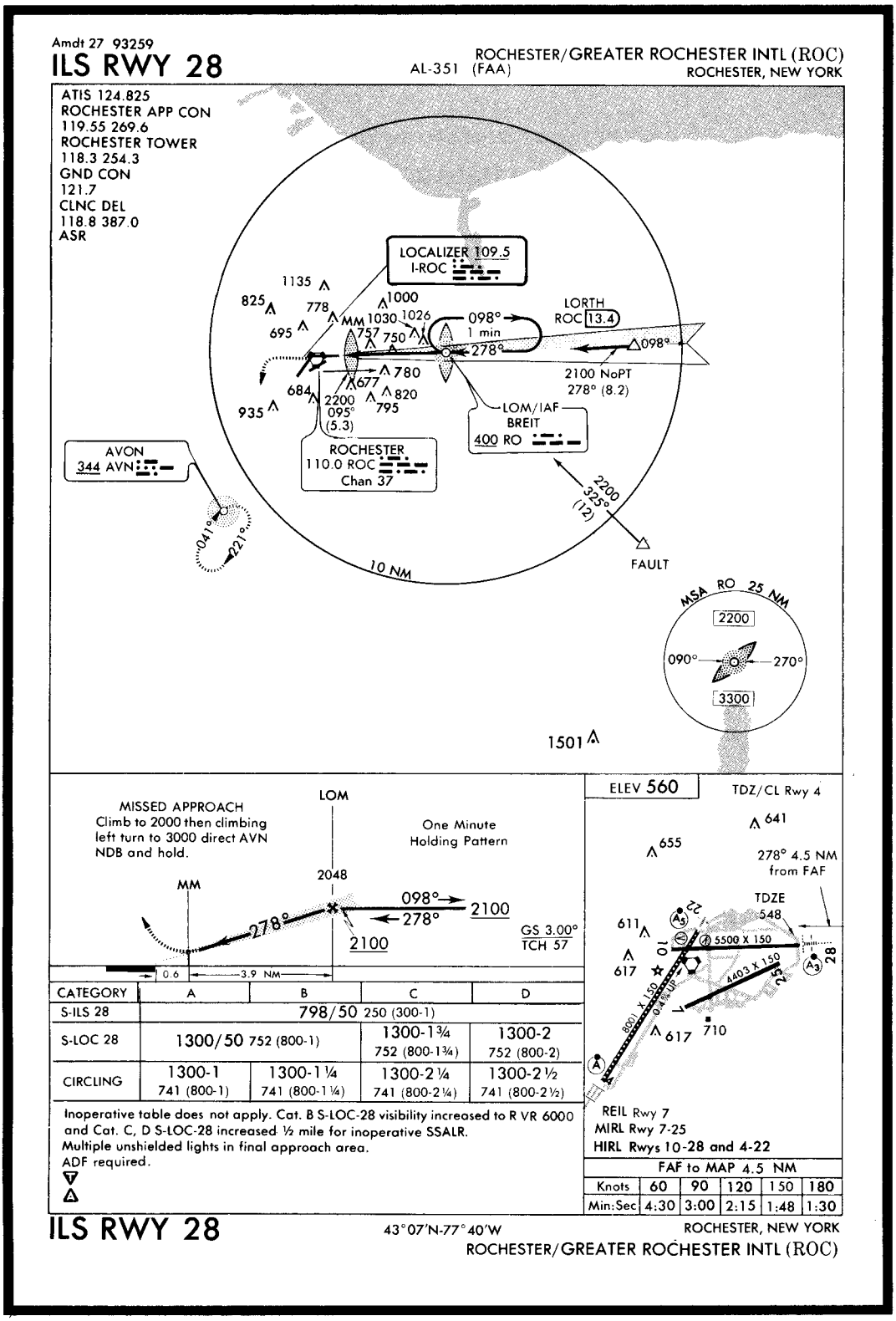

FIGURE 97A.—ILS RWY 28 (ROC).

A 94342 ALTERNATE MINS A

INSTRUMENT APPROACH PROCEDURE CHARTS

A IFR ALTERNATE MINIMUMS

(NOT APPLICABLE TO USA/USN/USAF)

Standard alternate minimums for non precision approaches are 800-2 (NDB, VOR, LOC, TACAN, LDA, VORTAC, VOR/DME or ASR); for precision approaches 600-2 (ILS or PAR). Airports within this geographical area that require alternate minimums other than standard or alternate minimums with restrictions are listed below. NA - means alternate minimums are not authorized due to unmonitored facility or absence of weather reporting service. Civil pilots see FAR 91. USA/USN/USAF pilots refer to appropriate regulations.

NAME ALTERNATE MINIMUMS

ALBANY, NY

ALBANY COUNTY ..... **ILS Rwy 1[1]**
ILS Rwy 19[1]
VOR/DME or GPS Rwy 1[1]
VOR Rwy 1[2]
VOR or GPS Rwy 19[1]
VOR or GPS Rwy 28[1]

[1]Category D, 800-2½.
[2]Category C, 800-2¼; Category D, 800-2½.

ALLENTOWN, PA

LEHIGH VALLEY INTL ..... **ILS Rwy 13**
ILS, Categories A,B,C, 700-2; Category D, 700-2¼. LOC, Category D, 800-2¼.

ALTOONA, PA

ALTOONA-BLAIR COUNTY ..... **ILS Rwy 20[1]**
VOR or GPS-A[2]

[1]Categories A,B,C, 900-2½, Category D, 1100-3.
[2]Category D, 1100-3.

BRADFORD, PA

BRADFORD REGIONAL ..... **VOR/DME Rwy 14**
NA when BFD FSS closed.

CORTLAND, NY

CORTLAND COUNTY-
CHASE FIELD ..... **VOR or GPS-A**
Categories A,B, 1100-2,Categories C,D, 1100-3.

DUBOIS, PA

DUBOIS-JEFFERSON COUNTY ..... **ILS Rwy 25**
LOC, NA.

NAME ALTERNATE MINIMUMS

ELMIRA, NY

ELMIRA/CORNING REGIONAL ..... **ILS Rwy 6[1,2]**
ILS Rwy 24,1200-3
NDB or GPS Rwy 24,1200-3

[1]Categories A,B, 1200-2; Categories C,D, 1200-3.
[2]NA when control tower closed.

ERIE, PA

ERIE INTL ..... **ILS Rwy 6[1]**
ILS Rwy 24[1]
NDB Rwy 6
NDB Rwy 24
RADAR-1

NA when control tower closed.
[1]ILS, 700-2.

FARMINGDALE, NY

REPUBLIC ..... **ILS Rwy 14[1]**
NDB or GPS Rwy 1[2]

[1]NA when control tower closed.
[2]NA when control zone not effective.

HARRISBURG, PA

CAPITAL CITY ..... **ILS Rwy 8**
Categories A,B, 900-2; Categories C,D, 900-2¾.
NA when control tower closed.

HARRISBURG INTL ..... **ILS Rwy 13[1]**
ILS Rwy 31[1]
VOR or GPS Rwy 31[2]

[1]ILS, Categories C,D, 700-2. LOC, NA.
[2]Categories A,B, 900-2, Category C, 900-2¾, Category D, 900-3.

NE-2

A 94342 ALTERNATE MINS A

FIGURE 97B.—IFR Alternate Minimums.

ALTERNATE MINS

94342

NAME — ALTERNATE MINIMUMS

PHILADELPHIA, PA(CON'T)

PHILADELPHIA INTL ..... **ILS Rwy 9L[1]**
ILS Rwy 9R[2]
ILS Rwy 17[3]
ILS Rwy 27L[3]
ILS Rwy 27R[3]
NDB or GPS Rwy 27L#
RNAV or GPS Rwy 17*

[1]ILS, Category D, 700-2.
[2]ILS, 700-2.
[3]ILS, Categories A,B,C, 700-2; Category D, 700-2¼. LOC, Category D,800-2¼.
#Category C, 800-2¼; Category D, 800-2½.
*Category D, 800-2¼.

PHILIPSBURG, PA

MID-STATE ..... **ILS Rwy 16[1]**
NDB Rwy 16[2]
VOR Rwy 24[3]

[1]ILS, Category C, 700-2; Category D, 700-2¼. LOC, Category D, 800-2¼.
[2]Category D, 800-2¼.
[3]Categories A,B, 900-2; Category C, 900-2¼; Category D, 900-2½.

PITTSBURGH, PA

PITTSBURGH INTL ..... **ILS Rwy 10L[1]**
ILS Rwy 10R[1]
ILS Rwy 28L[1]
ILS Rwy 28R[1]
ILS Rwy 32[1]
VOR or TACAN Rwy 28L/C[2]

[1]ILS, Category E, 700-2¼. LOC, Category E, 800-2¼.
[2]Category E, 800-2¼.

POUGHKEEPSIE, NY

DUTCHESS COUNTY ..... **ILS Rwy 6**
ILS, Categories B,C,D, 700-2.

READING, PA

READING REGIONAL/CARL A. SPAATZ FIELD ..... **ILS Rwy 36[1]#**
NDB Rwy 36[2]#
RNAV or GPS Rwy 13[2]*
RNAV or GPS Rwy 18[3]*

[1]ILS, Categories A,B,C, 700-2; Category D, 800-2½. LOC, Category D, 800-2½.
[2]Category D, 800-2½.
[3]Category C, 800-2¼; Category D, 800-2½.
#NA when control tower closed.
*NA when control zone not in effect.

NAME — ALTERNATE MINIMUMS

REEDSVILLE, PA

MIFFLIN COUNTY ..... **LOC Rwy 6**
NA when airport unattended.
Category D, 1500-3.

ROCHESTER, NY

GREATER ROCHESTER INTL ..... **ILS Rwy 4[1]**
ILS Rwy 22[1]
ILS Rwy 28[2]
NDB or GPS Rwy 28[3]
RADAR-1#
VOR/DME or GPS Rwy 4#
VOR Rwy 4#

[1]ILS, Category D, 700-2¼. LOC, Category D, 800-2¼.
[2]Categories A,B, 800-2; Category C, 800-2¼; Category D, 800-2½.
[3]Category C, 800-2¼; Category D, 800-2½.
#Category D, 800-2¼.

SARANAC LAKE, NY

ADIRONDACK REGIONAL ..... **VOR/DME or GPS Rwy 5[1]**
VOR or GPS Rwy 9[2,3]

[1]NA except Categories A,B, 1200-2; Categories C,D, 1200-3, for operators with approved weather reporting service.
[2]Category A, 1000-2; Category B, 1100-2; Categories C,D, 1100-3.
[3]NA except for operators with approved weather reporting service.

STATE COLLEGE, PA

UNIVERSITY PARK ..... **ILS Rwy 24[1,2]**
VOR/DME RNAV or GPS Rwy 6[1]
VOR or GPS-B,1300-3

[1]Category D, 900-2¾.
[2]NA when airport unattended.

UTICA, NY

ONEIDA COUNTY ..... **NDB Rwy 33**
Category D, 800-2¼.

WATERTOWN, NY

WATERTOWN INTL ..... **ILS Rwy 7**
LOC, NA.

WESTHAMPTON BEACH, NY

THE FRANCIS S. GABRESKI ..... **ILS Rwy 24**
NDB Rwy 24
NA when control zone not in effect.

NE-2

ALTERNATE MINS

94342

FIGURE 97C.—IFR Alternate Minimums.

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 PROPOSED (Z)	6. DEPARTURE TIME ACTUAL (Z)	7. CRUISING ALTITUDE
VFR / X IFR / DVFR	N55JB	BE90/A	248 KTS	DFW Dallas Ft. Worth			15,000

8. ROUTE OF FLIGHT
DFW V369 BILEE, CUGAR 4 IAH

9. DESTINATION (Name of airport and city)	10. EST. TIME ENROUTE HOURS	MINUTES	11. REMARKS
IAH Houston Intercontinental Houston			L/O = Level off. PPH = Pounds Per Hour

12. FUEL ON BOARD HOURS	MINUTES	13. ALTERNATE AIRPORT(S)	14. PILOT'S NAME, ADDRESS & TELEPHONE NUMBER & AIRCRAFT HOME BASE	15. NUMBER ABOARD
		BPT Beaumont-Port Arthur Jefferson County	17. DESTINATION CONTACT/TELEPHONE (OPTIONAL)	4

16. COLOR OF AIRCRAFT
BLUE/YELLOW

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

FLIGHT LOG

CHECK POINTS FROM	TO	ROUTE ALTITUDE	COURSE	WIND TEMP	SPEED-KTS TAS	GS	DIST NM	TIME LEG	TOT	FUEL LEG	TOT
DFW	L/O	V369 Climb					27		:12:00		231*
L/O	Bilee	V369 15,000		230/42 ISA							
Bilee	Cugar	Cugar 4 15,000									
Cugar	Start Descent	Cugar 4 15,000		230/42 ISA							
Start Descent	IAH	Descent & Approach					25	:14:00		132	
IAH	BPT	Vectors 3000				194	68				

OTHER DATA: * Includes Taxi Fuel
NOTE: Use 850 PPH Total Fuel Flow From L/O To Start Of Descent.
Use 880 PPH Total Fuel Flow For Reserve And Alternate Requirements.
A Missed Approach Requires 82# of Fuel.

TIME and FUEL: As required by FARs.

TIME	FUEL (LB)	
		EN ROUTE
		RESERVE
		ALTERNATE
		TOTAL

FIGURE 98.—Flight Plan/Flight Log.

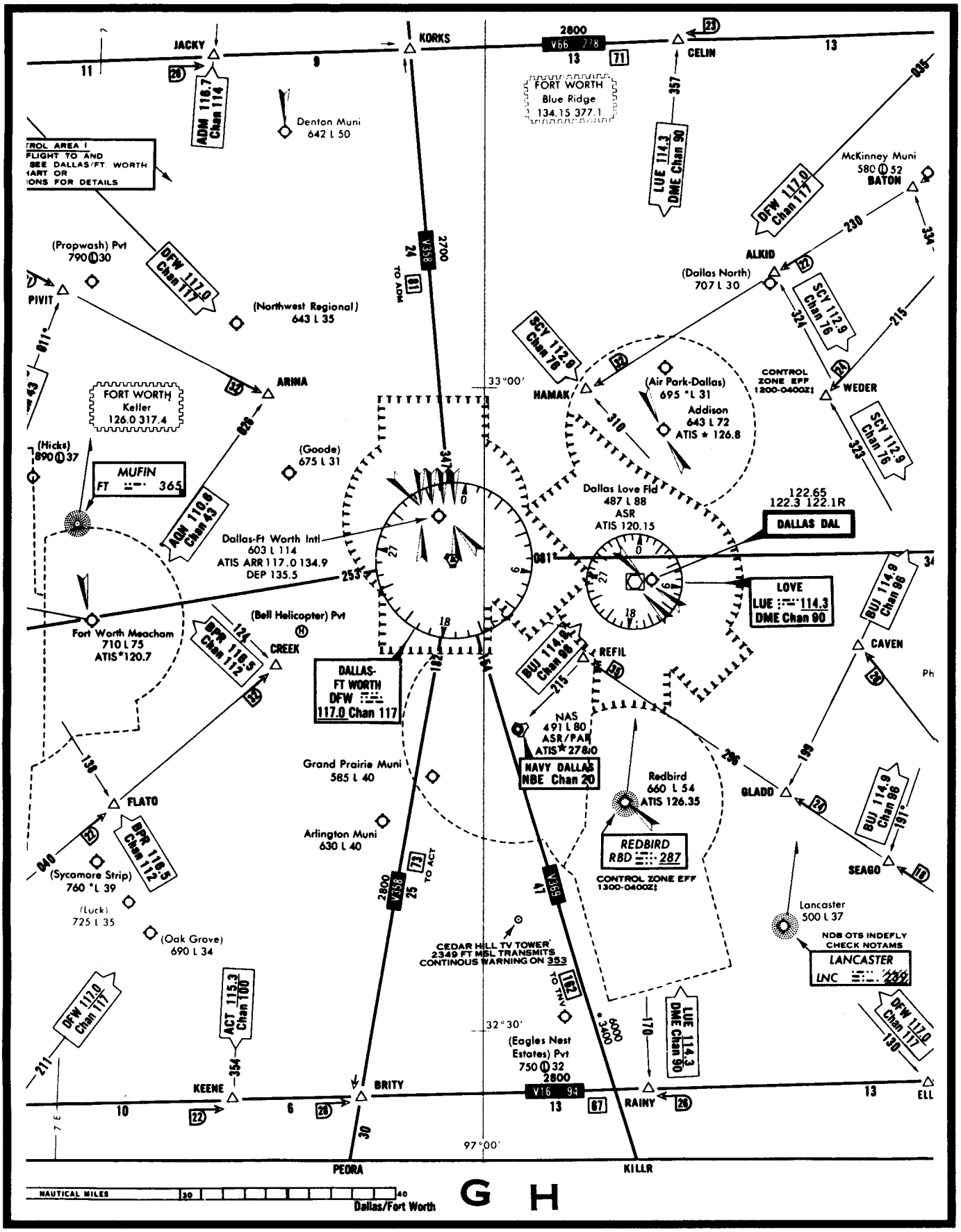

FIGURE 99.—IFR Area Chart Segment.

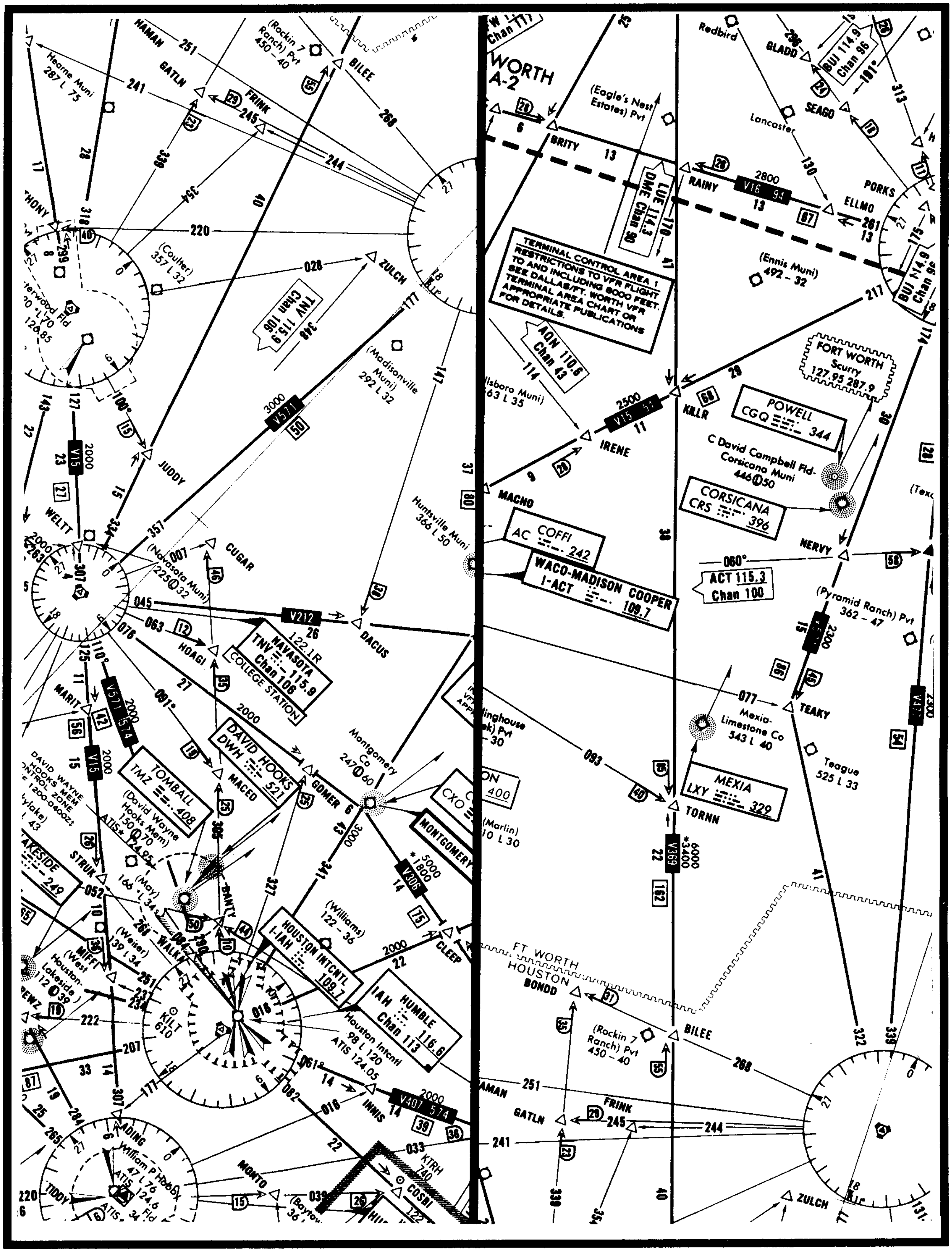

FIGURE 100.—IFR En Route Low Altitude Chart Segment.

TEXAS

§ **DALLAS-FORT WORTH INTL** (DFW) 12 NW UTC-6(-5DT) 32°53'47"N 97°02'28"W **DALLAS-FT. WORTH H-2K, 4F, 5B, L-13C, A IAP**

603 **BFUEL** 100LL, JET A OX 1,3 LRA CFR Index E

RWY 17L-35R: H11,388X150 (CONC-GRVD) S-120, D-200, DT-600, DDT-850 HIRL, CL
RWY 17L: ALSF2. TDZ. **RWY 35R:** MALSR. TDZ.

RWY 17R-35L: H11,388X200 (CONC-GRVD) S-120, D-200, DT-600, DDT-850 HIRL, CL
RWY 17R: SSALR TDZ. **RWY 35L:** TDZ. VASI(V6L).

RWY 18L-36R: H11,387X200 (CONC-GRVD) S-120, D-200, DT-600, DDT-850 HIRL, CL
RWY 18L: SSALR.TDZ. **RWY 36R:** 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 13L-31R: H9000X200 (CONC-GRVD) S-120, D-200, DT-600, DDT-850 HIRL, CL .5% up NW.
RWY 13L: TDZ. VASI(V6L)—Upper GA 3.25°TCH 93'. Lower GA 3.0°TCH 47'.
RWY 31 R: MALSR. TDZ.

RWY 13R-31L: H9300X150 (CONC-GRVD) S-120, D-220, DT-600, DDT-850 HIRL, CL
RWY 13 R: MALSR. TDZ. **RWY 31L:** TDZ.

RWY 18S-36S: H4000X100 (CONC)

AIRPORT REMARKS: Attended continuously. 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. 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: LWAS.

COMMUNICATIONS: ATIS 117.0 134.9 (ARR) 135.5 (DEP) **UNICOM** 122.95
FORT WORTH FSS (FTW) LC 624-8471, Toll free call, dial 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 Group I: See VFR Terminal Area chart.

RADIO AIDS TO NAVIGATION: NOTAM FILE DFW.
(H) **VORTACW** 117.0 DFW Chan 117 32°51'57"N97°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"N97°01'49"W 353° 5.1 NM to fld.
JIFFY NDB (LOM) 219 FL 32°59'45"N97°01'46"W 173° 5.1 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

---

§ **HOUSTON INTERCONTINENTAL** (IAH) 15N UTC-6(-5DT) 29°58'49"N 95°20'22"W **HOUSTON H-5B, L-17B IAP**

98 B S4 FUEL 100LL, JET A OX2 LRA CFR Index D

RWY 14L-32R: H1200X150 (CONC-GRVD) S-100, D-200, DT-400, DDT-778 HIRL, CL
RWY 14L: MALSR. VASI(V4L)—GA 3.0°TCH 54'. **RWY 32R:** MALSR.

RWY 09-27: H10000X150 (ASPH-GRVD) S-75, D-191, DT-400, DDT-850 HIRL,CL
RWY 09: MALSR. TDZ. PAPI(P4L)—GA 3.0°TCH 63'.
RWY 27: ALSF2. TDZ. PAPI(P4L)—GA 3.0°TCH 63'.

RWY 08-26: H9401X150 (CONC-GRVD) S-120, D-155, DT-265 HIRL, CL
RWY 08: MALSR. TDZ. **RWY 26:** ALSF2. TDZ. VASI(V4L)—GA 3.0°TCH 53'.

RWY 14R-32L: H6038X100 (ASPH-GRVD) S-30, D-60, DT-60 MIRL
RWY 14R: VASI(V4L)—GA 3.0°TCH 40'. Road. **RWY 32L:** VASI(V4L)—GA 3.0°TCH 45'.

AIRPORT REMARKS: Attended continuously. CAUTION: Birds on and in vicinity of arpt. CAUTION—Approach end of rwy 26 bright lgts approximately one mile from thld and 900' South of centerline. Caution—Deer on and in vicinity of arpt. Rwy 14R-32L CLOSED to acft over 140,000 lbs gross weight. Landing Fee. Flight Notification Service (ADCUS) available.

WEATHER DATA SOURCES: LWAS

COMMUNICATIONS: ATIS 124.05 **UNICOM** 122.95
MONTGOMERY COUNTY FSS (CXO) Toll free call, dial 1-800-WX-BRIEF. NOTAM FILE IAH.
® **APP CON** 124.35 (West) 127.25 (North and East)
TOWER 118.1 (135.15 copter control) **GND CON** 121.7 **CLNC DEL** 128.1 (135.15 copter control)
® **DEP CON** 123.8 (West) 119.7 (North and East)
TCA Group II: VFR Terminal Area chart.

RADIO AIDS TO NAVIGATION: NOTAM FILE IAH.
HUMBLE (H) VORTACW 116.6 IAH Chan 113 29°57'24"N95°20'44"W at fld. 90/08E. **HIWAS.**
MARBE NDB (LOM) 379 HS 30°04'29"N 95°24'45"W 146° 5.9 NM to fld.
NIXIN NDB (LOM) 326 JY 29°59'36"N 95°12'54"W 257° 6.5 NM to fld.
ILS/DME 109.7 I-JYV Chan 34 Rwy 26 LOM NIXIN NDB
ILS 111.9 I-HSQ Rwy 14L LOM MARBE NDB
ILS/DME 109.7 I-IAH Chan 34 Rwy 08
ILS/DME 110.9 I-UYO Chan 34 Rwy 09
ILS 111.9 I-CDG Rwy 32R

FIGURE 101.—Airport/Facility Directory Excerpts.

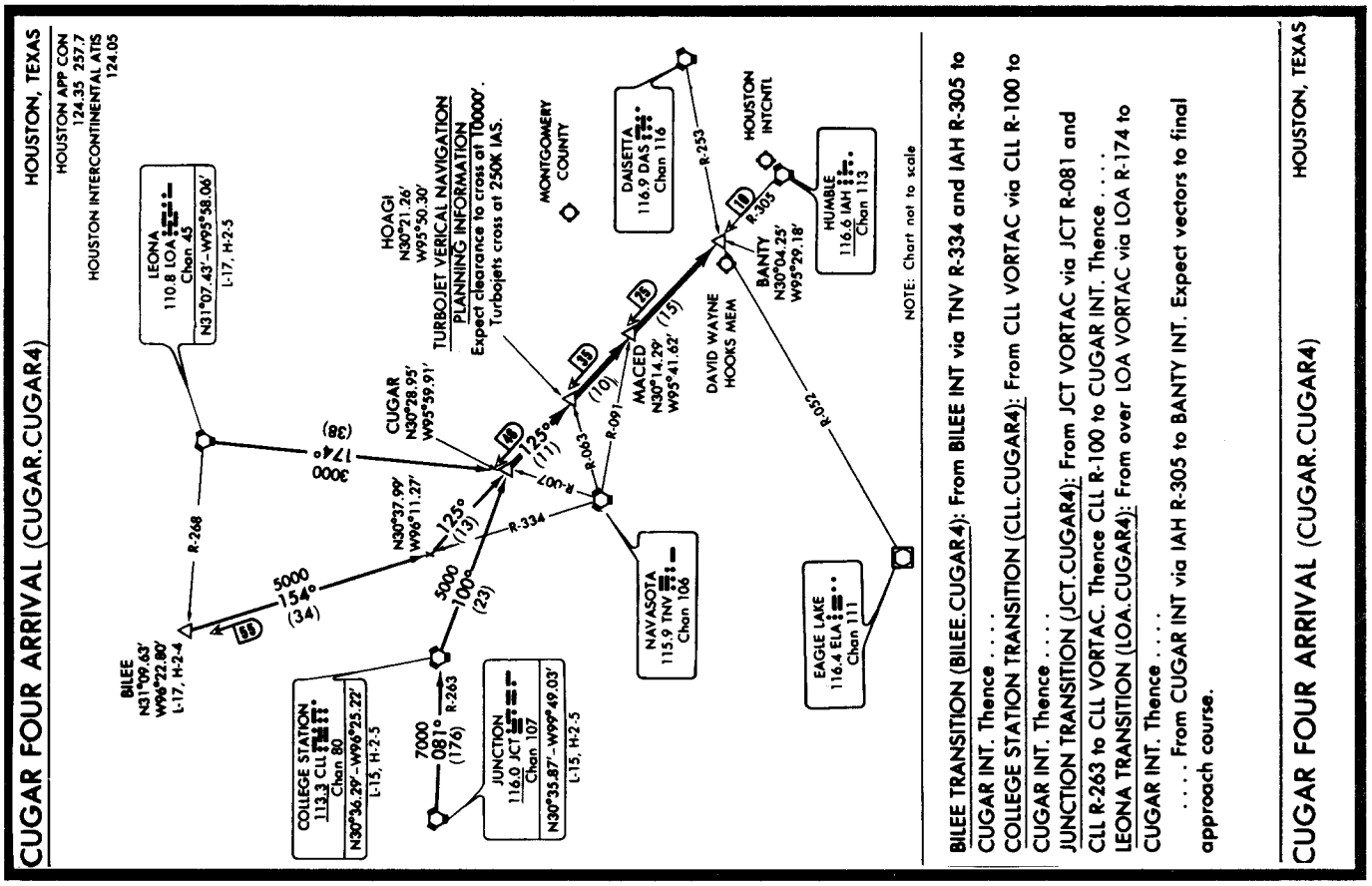

FIGURE 102.—VOR/DME RWY 32R (IAH)/Cugar Four Arrival (Cugar.Cugar4).

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 PROPOSED (Z)	6. DEPARTURE TIME ACTUAL (Z)	7. CRUISING ALTITUDE
VFR / X IFR / DVFR	N91JB	BE1900/A	233 KTS	TUS TUCSON			FL220

8. ROUTE OF FLIGHT
TUS TUS3.GBN, J104TNP, TNP.DOWNE 3 LAX

9. DESTINATION (Name of airport and city)	10. EST. TIME ENROUTE HOURS	MINUTES	11. REMARKS
LAX LOS ANGELES INT'L Los Angeles			L/O = Level Off PPH = Pounds Per Hour TEC = Tower Enroute Control This flight is operating under FAR 135.

12. FUEL ON BOARD HOURS	MINUTES	13. ALTERNATE AIRPORT(S)	14. PILOT'S NAME, ADDRESS & TELEPHONE NUMBER & AIRCRAFT HOME BASE	15. NUMBER ABOARD
		BUR Burbank-Glendale-Pasadena	17. DESTINATION CONTACT/TELEPHONE (OPTIONAL)	18

16. COLOR OF AIRCRAFT
Maroon/White

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

FLIGHT LOG

CHECK POINTS FROM	TO	ROUTE ALTITUDE	COURSE	WIND TEMP	SPEED-KTS TAS	GS	DIST NM	TIME LEG	TOT	FUEL LEG	TOT
TUS	L/O	TUS3.GBN Climb					73		:25:00		350*
L/O	GBN	TUS3.GBN FL220		280/46 ISA-3							
GBN	INT. J104	J104 FL220									
INT J104	PKE			280/46 ISA-3							
PKE	TNP										
TNP	Start Descent										
Start Descent	Downe 3 LAX	Descent & Approach					52	:18:00		170	
LAX	BUR	TEC 3000					31	:19:00			

OTHER DATA: * Includes Taxi Fuel
NOTE: Use 676 PPH Total Fuel Flow From L/O To Start Of Descent.
Use 726 PPH Total Fuel Flow For Reserve And Alternate Requirements.
A Missed Approach Requires 120# of Fuel.

TIME and FUEL: As required by FARs.

TIME	FUEL (LB)	
		EN ROUTE
		RESERVE
		ALTERNATE
		TOTAL

FIGURE 103.—Flight Plan/Flight Log.

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(PILOT NAV) (TUS3.TUS) 90347

TUCSON THREE DEPARTURE SL-430 (FAA)

TUCSON INTL
TUCSON, ARIZONA

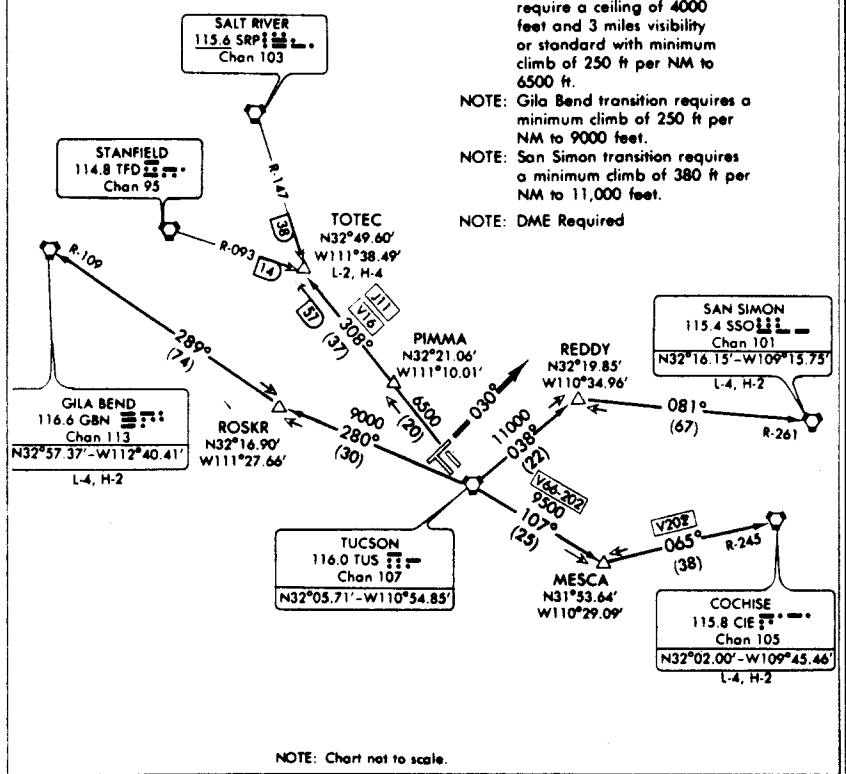
CLNC DEL
126.65 326.2
ATIS 123.8 320.1

NOTE: Rwys 3, 11L/R, 21, 29L/R require a ceiling of 4000 feet and 3 miles visibility or standard with minimum climb of 250 ft per NM to 6500 ft.

NOTE: Gila Bend transition requires a minimum climb of 250 ft per NM to 9000 feet.

NOTE: San Simon transition requires a minimum climb of 380 ft per NM to 11,000 feet.

NOTE: DME Required



NOTE: Chart not to scale.

DEPARTURE ROUTE DESCRIPTION

TAKE-OFF RUNWAY 3: Fly heading 030° for vector to appropriate transition. Maintain 17,000 feet or assigned lower altitude. Expect clearance to filed flight level 10 minutes after departure.

TAKE-OFF RUNWAYS 11L/R, 21, 29L/R: Fly assigned heading for vector to intercept appropriate transition. Maintain 17,000 feet, or assigned lower altitude. Expect clearance to filed flight level 10 minutes after departure.

COCHISE TRANSITION (TUS3.CIE): Via TUS R-107 and CIE R-245 to CIE VORTAC.

GILA BEND TRANSITION (TUS3.GBN): Via TUS R-280 and GBN R-109 to GBN VORTAC.

SAN SIMON TRANSITION (TUS3.SSO): Via TUS R-038 and SSO R-261 to SSO VORTAC.

TOTEC TRANSITION (TUS3.TOTEC): Via TUS R-308 to TOTEC INT.

TUCSON THREE DEPARTURE
(PILOT NAV) (TUS3.TUS)

TUCSON, ARIZONA
TUCSON INTL

FIGURE 104.—Tucson Three Departure (Pilot Nav) (TUS3.TUS).

ARIZONA

TUCSON INTL (TUS) 6 S UTC-7 32°06'58"N 110°56'26"W — PHOENIX H-2H, L-4F IAP
2641 B S4 FUEL 100, 100LL, JET A OX 1, 2, 3, 4 TPA—See Remarks
AOE ARFF Index D
RWY 11L-29R: H10994X150 (ASPH-PFC) S-160, D-200, DT-350, DDT-585 HIRL 0.6% up SE
RWY 11L: MALSR. REIL. PAPI (P4L)—GA 3.0° TCH 55'. Rgt tfc. Arresting device.
RWY 29R: REIL. VASI(V6L)—Upper GA 3.25°TCH 94'. Lower GA 3.0°TCH 50'. Arresting device.
RWY 11R-29L: H9129X75 (ASPH) S-120, D-140, DT-220 MIRL 0.6% up SE
RWY 11R: REIL. Thld dsplcd 2109'. Pole. Rgt tfc. RWY 29L: REIL. Pole.
RWY 03-21: H7000X150 (ASPH-PFC) S-105, D-137, DT-230, DDT-500 MIRL
RWY 03: Thld dsplcd 841'. Railroad.
RWY 21: REIL. VASI(V4L)—GA 3.0°TCH 50'.Tree. Rgt tfc. Arresting device.
AIRPORT REMARKS: Attended continuously. Commercial ldg fee and tiedown fee. Acft departing Rwy 11R reqd to attain at least 400'AGL prior to starting turn. Rwy 11L-29R has distance remaining markers on both sides. Rwy 03-21 has distance remaining markers on east side. Rwy 11R dsplcd thld not lgtd. No B-747 training except PPR; No flight training 0500-1300Z except PPR; call manager aviation svc 602-573-8152. Rwy 11L-29R gross weight limit DC-10-10 315,000 lbs, DC-10-30/40 400,000 lbs, L-1011-1 325,000 lbs, L-1011-100/200 340,000 lbs, Rwy 03-21 gross weight limit DC-10-10 300,000 lbs, DC-10-30/40 375,000 lbs, L-1011-01 310,000 lbs, L-1011-100/200 315,000 lbs. TPA-3441 (800) small acft, 4041 (1400) large/heavy turbojet acft. Portions of Taxiways C and 9 not visible from the twr due to vegetation; portions of Taxiway 2 not visible from the twr due to hangars. Note: See Special Notices—Glider Operations Northwest of Tucson, Arizona. Flight Notification Service (ADCUS) available.
WEATHER DATA SOURCES: LLWAS.
COMMUNICATIONS: ATIS 123.8 (602) 741-1177 UNICOM 122.95
TUCSON FSS (TUS) on arpt. 122.2 LC 889-9689. NOTAM FILE TUS.
MOUNT LEMMON RCO 122.4 (TUCSON FSS)
(R) APP/DEP CON 125.1 (Rwy 11 090°-285°) (Rwy 29 275°-065°) 118.5 (Rwy 11 286°-089°) (Rwy 29 066°-274°)128.5
TOWER 118.3 119.0 GND CON 124.4 CLNC DEL 126.65
RADIO AIDS TO NAVIGATION: NOTAM FILE TUS. VHF/DF ctc FSS.
(H) VORTAC 116.0 TUS Chan 107 32°05'42"N 110°54'51"W 301° 1.8 NM to fld. 2670/12E.
VORTAC unusable 050°-080°beyond 30 NM below 10,500' 350°-005°beyond 30 NM below 11,200'
ILS/DME 108.5 I-TUS Chan 22 Rwy 11L.

▼ TAKE-OFF MINS

TUCSON, AZ

RYAN FIELD
DEPARTURE PROCEDURE: **Rwy 8**, turn right; **Rwy 24**, turn left direct to Ryan NDB. Continue climb in holding pattern (W, right turn 090° inbound) to 5000 before proceeding on course.

TUCSON INTL
TAKE-OFF MINIMUMS: **Rwys 3, 11L/R, 21, 29L/R**, 4000-3 or std. with min. climb of 250' per NM to 6500.
DEPARTURE PROCEDURE: Comply with SID or radar vectors; or turn left or right as assigned by ATC direct TUS VORTAC, climb in holding pattern (NW, right turn, 128 inbound) to depart TUS VORTAC at or above MCA or MEA for assigned airway.

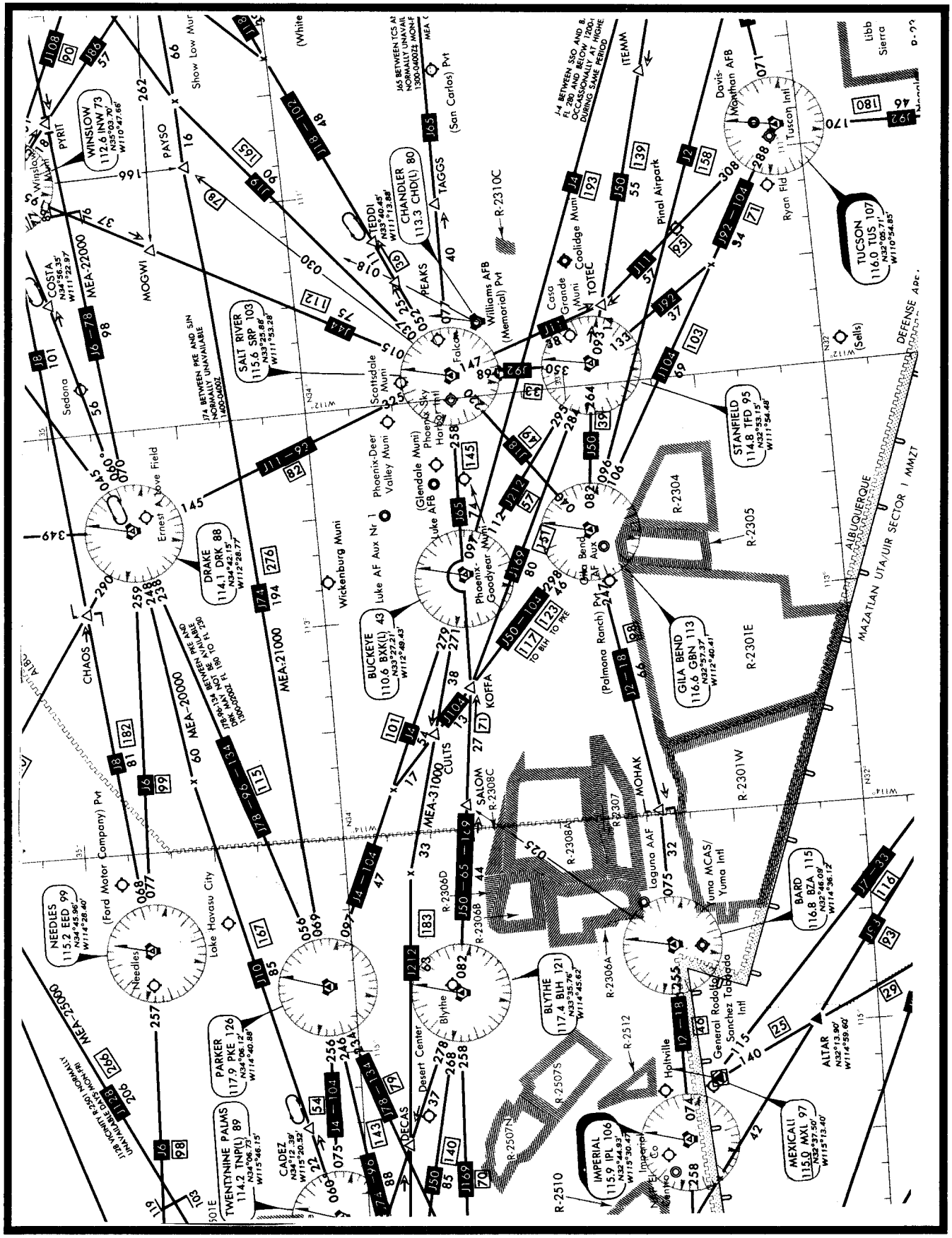
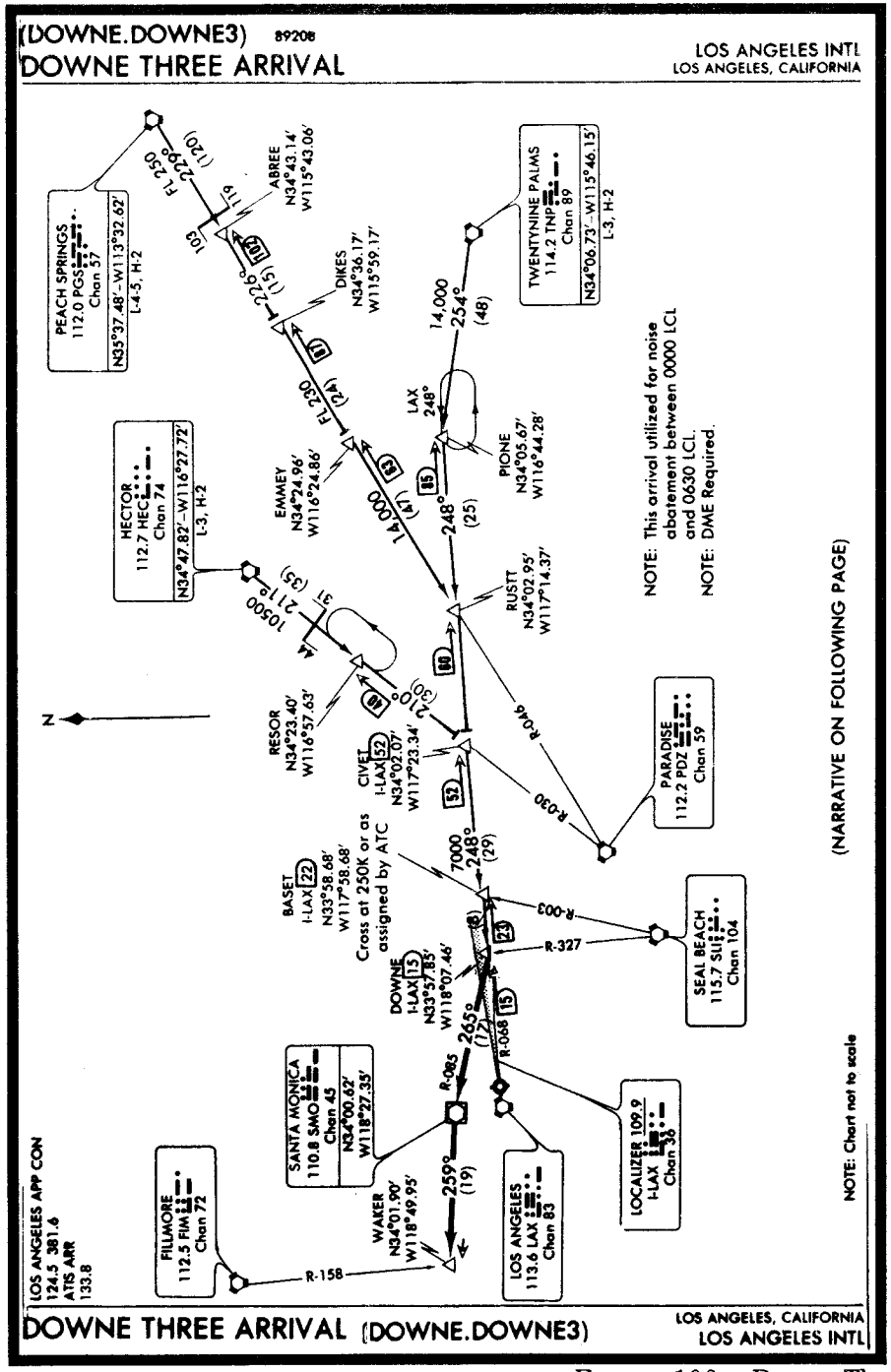


FIGURE 105.—IFR En Route High Altitude Chart Segment.



(DOWNE.DOWNE3) 89208

DOWNE THREE ARRIVAL

LOS ANGELES INTL
LOS ANGELES, CALIFORNIA

ARRIVAL DESCRIPTION

HECTOR TRANSITION (HEC.DOWNE3): From over HEC VORTAC via HEC R-211 and PDZ R-030 to CIVET INT, then LAX R-068 to DOWNE INT. Thence . . . .

PEACH SPRINGS TRANSITION (PGS.DOWNE3): From over PGS VORTAC via PGS R-229 and PDZ R-046 to RUSTT INT, then LAX R-068 to DOWNE INT. Thence . . . .

TWENTYNINE PALMS TRANSITION (TNP.DOWNE3): From over TNP VORTAC via TNP R-254 to PIONE DME, then LAX R-068 to DOWNE INT. Thence . . . .

. . . . From DOWNE INT via SMO R-085 to SMO VOR/DME, then via SMO R-259 to WAKER INT, expect vector to final approach course for runways 6 and 7.

FIGURE 106.—Downe Three Arrival (Downe.Downe3).

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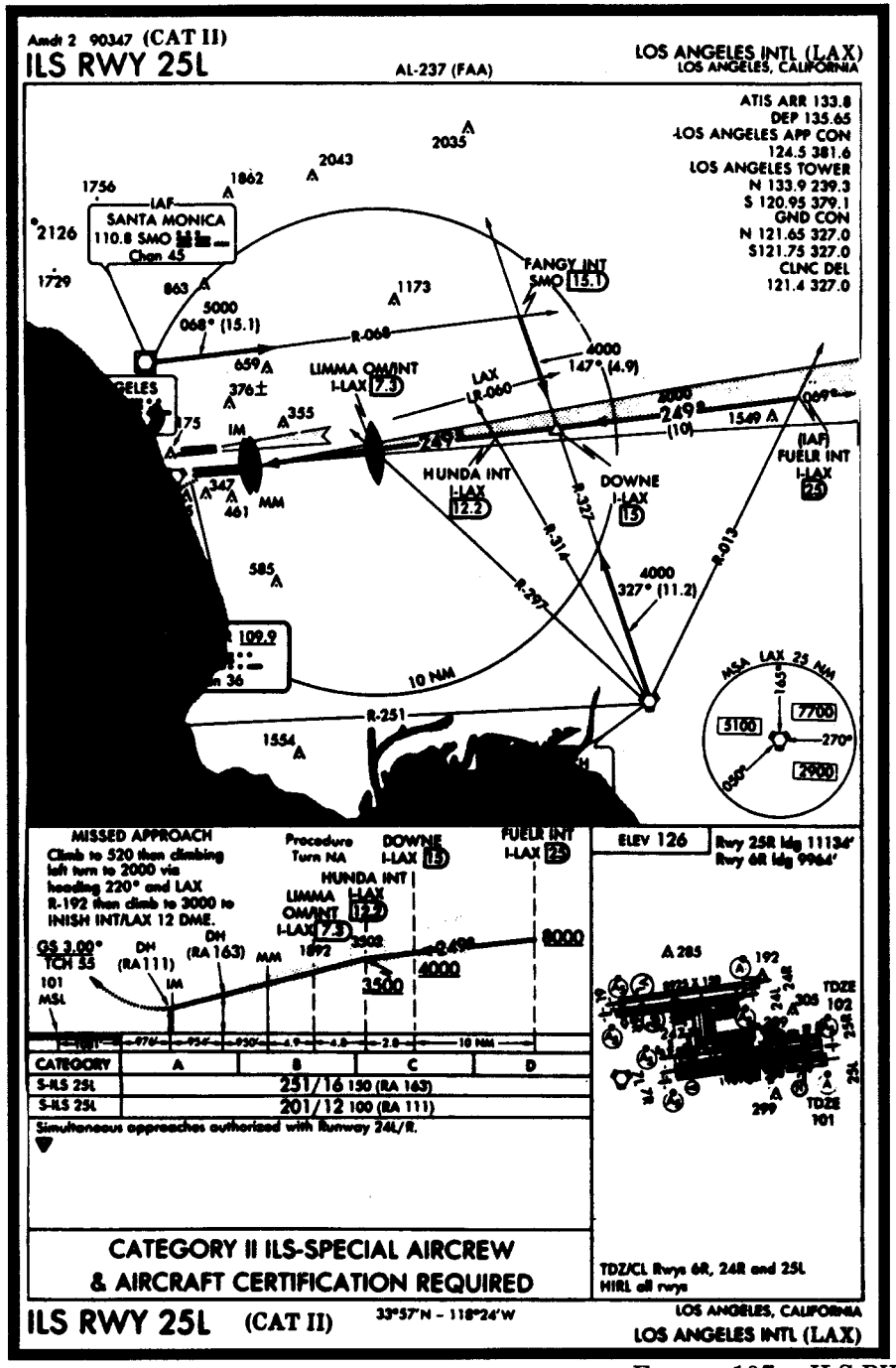

FIGURE 107.—ILS RWY 25L (CAT II) – LAX.

CALIFORNIA

LOS ANGELES

LOS ANGELES INTL (LAX) 9 SW UTC-8(-7DT) 33°56'33"N 118°24'26"W — LOS ANGELES

126 B S4 FUEL 100, 100LL, JET A OX 4 LRA ARFF Index E — COPTER

RWY 07L-25R: H12091X150 (CONC-GRVD) S-175, D-225, DT-400, DDT-900 HIRL CL — H-2G, L-3B, A

RWY 07L: MALSR. VASI(V4L)—GA 2.5° TCH 59'. Building. Rgt tfc. — IAP

RWY 25R: MALSR. Thld dsplcd 957'. Railroad.

RWY 07R-25L: H11096X200 (CONC-GRVD) S-175, D-225, DT-400, DDT-900 HIRL CL

RWY 07R: MALSR. VASI(V4L)—GA 3.0° TCH 56'. Pole. Rgt tfc. RWY 25L: ALSF2. TDZ. Railroad.

RWY 06R-24L: H10285X150 (CONC-GRVD) S-175, D-225, DT-400, DDT-900 HIRL CL

RWY 06R: MALSR. TDZ. VASI(V6L)—Upper GA 3.25° TCH 92'. Lower GA 3.0° TCH 60'. Thld dsplcd 321'. Pole.

RWY 24L: MALSR. Rgt tfc.

RWY 06L-24R: H8925X150 (CONC-GRVD) S-175, D-225, DT-400, DDT-900 HIRL CL

RWY 06L: MALSR. VASI(V6L)—Upper GA 3.25° TCH 94'. Lower GA 3.0°TCH 54'. Pole.

RWY 24R: ALSF2. TDZ. Sign. Rgt tfc.

AIRPORT REMARKS: Attended continuously. Turbulence may be deflected upward from the blast fence 180' E of Rwy 25R. CAUTION: Impaired wing clearance may exist on taxiway J between 30K and 19K when taxilane K occupied; 165' centerline to centerline Twr will advise. Rwy 07L-25R hold lines have been relocated N on Taxiways 28J, 30J, 32J, 36J and 42J. Practice instrument approaches and touch and go landings are prohibited. Taxiway Tango between taxilanes 32 and 35 north of terminal one is restricted to B-767 or smaller acft. Taxiways 2L, 8L, 11F, 20G, 30L, 32L, 36L, 42L, T33, and 32S will not accommodate A B747-200. Noise sensitive arpt. On westerly tkfs no turns before crossing shoreline. Over-ocean apchs utilized 0800-1430Z‡. Rwy 24R ALSF2 operates as SSALR till weather goes below VFR. Rwy 25L ALSF2 operates as SSALR until weather goes below VFR. Rwy 07L-25R FAA strength evaluation DC-10-10 540,000 lbs, DC-10-30 600,000 lbs, L-1011 600,000 lbs, B747-SP 630,000 lbs. Rwy 06L-24R FAA strength evaluation DC-10-10 430,000 lbs, DC-10-30 510,000 lbs, L-1011 510,000 lbs. Rwy 07R-25L FAA strength evaluation DC-10-10 400,000 lbs, DC-10-30 600,000 lbs, L-1011 600,000 lbs, B747-SP 710,000 lbs. Rwy 06R-24L FAA strength evaluation DC-10-10 340,000 lbs, DC-10-30 480,000 lbs, L-1011 480,000 lbs. Dual wheel acft up to 200,000 lbs, dual tandem wheel up to 350,000 lbs and double dual tanden wheel up to 834,000 lbs and DC10-10 to 430,000 lbs, DC10-30 to 578,000 lbs and L-1011 to 466,000 lbs and A-300 to 366,000 lbs regularly opr on all rwys. A 700'X500' clearway has been established at west end of Rwy 24L. Numerous birds on and in vicinity of airport. Rwy 25R MALSR out of service indefinitely. Flight Notification Service (ADCUS) available.

WEATHER DATA SOURCES: LLWAS.

COMMUNICATIONS: ATIS ARRIVAL 133.8 ATIS DEP 135.65 (213) 646-2297 UNICOM 122.95

HAWTHORNE FSS (HHR) TF 1-800-WX-BRIEF. NOTAM FILE LAX.

Ⓡ APP CON 128.5 (045°-089°), 124.9 (090°-224°), 124.5 (225°-044°)

TOWER 133.9 (N. complex), 120.95 (S. complex), 119.8 120.35 (helicopters).

GND CON 121.75 (S. complex), 121.65 (N. complex) CLNC DEL 121.4

Ⓡ DEP CON 125.2 (249°-044°) 124.3 (045°-248°)

TCA: See VFR Terminal Area chart.

RADIO AIDS TO NAVIGATION: NOTAM FILE LAX.

(H) VORTAC 113.6 LAX Chan 83 33°55'59"N 118°25'52"W 050° 1.3 NM to fld. 180/15E

VOR unusable 270-280° 17-35 NM below 8000' 280-300° 10-20 NM below 8000'

ROMEN NDB (LOM) 278 OS 33°57'54"N 118°16'37"W 244° 6.6 NM to fld.

ILS/DME 108.5 I-OSS Chan 22 Rwy 24R LOM ROMEN NDB

ILS/DME 108.5 I-HQB Chan 22 Rwy 24L LOM ROMEN NDB

ILS/DME 109.9 I-LAX Chan 36 Rwy 25L

ILS/DME 109.9 I-CFN Chan 36 Rwy 25R

ILS/DME 111.7 I-UWU Chan 54 Rwy 06L

ILS/DME 111.7 I-GPE Chan 54 Rwy 06R

ILS/DME 111.1 I-IAS Chan 48 Rwy 07L

ILS/DME 111.1 I-MKZ Chan 48 Rwy 07R

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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 PROPOSED (Z)	6. DEPARTURE TIME ACTUAL (Z)	7. CRUISING ALTITUDE
VFR / X IFR / DVFR	N131JB	BH206/A	115 KTS	DFW Dallas Ft. Worth			7,000

8. ROUTE OF FLIGHT
DFW V369 BILEE, CUGAR 4 IAH

9. DESTINATION (Name of airport and city)	10. EST. TIME ENROUTE HOURS	MINUTES	11. REMARKS
IAH Houston Intercontinental Houston			L/O = Level off. PPH = Pounds Per Hour

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

16. COLOR OF AIRCRAFT
BLUE/YELLOW

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

FLIGHT LOG

CHECK POINTS FROM	TO	ROUTE ALTITUDE	COURSE	WIND TEMP	SPEED-KTS TAS	GS	DIST NM	TIME LEG	TOT	FUEL LEG	TOT
DFW	L/O	V369 Climb					23		:14:00		123*
L/O	Bilee	V369 7,000		220/36 ISA							
Bilee	Cugar	Cugar 4 7,000									
Cugar	Start Descent	Cugar 4 7,000		220/36 ISA							
Start Descent	IAH	Descent & Approach					37	:16:00		140	
IAH	HOU	Direct 3000					22	:15:00			

OTHER DATA: * Includes Taxi Fuel
NOTE: Use 165 PPH Total Fuel Flow From L/O To Start Of Descent.
Use 172 PPH Total Fuel Flow For Reserve And Alternate Requirements.
A Missed Approach Requires 55# of Fuel.

TIME and FUEL: As required by FARs.

TIME	FUEL (LB)	
		EN ROUTE
		RESERVE
		ALTERNATE
		TOTAL

FIGURE 108.—Flight Plan/Flight Log.

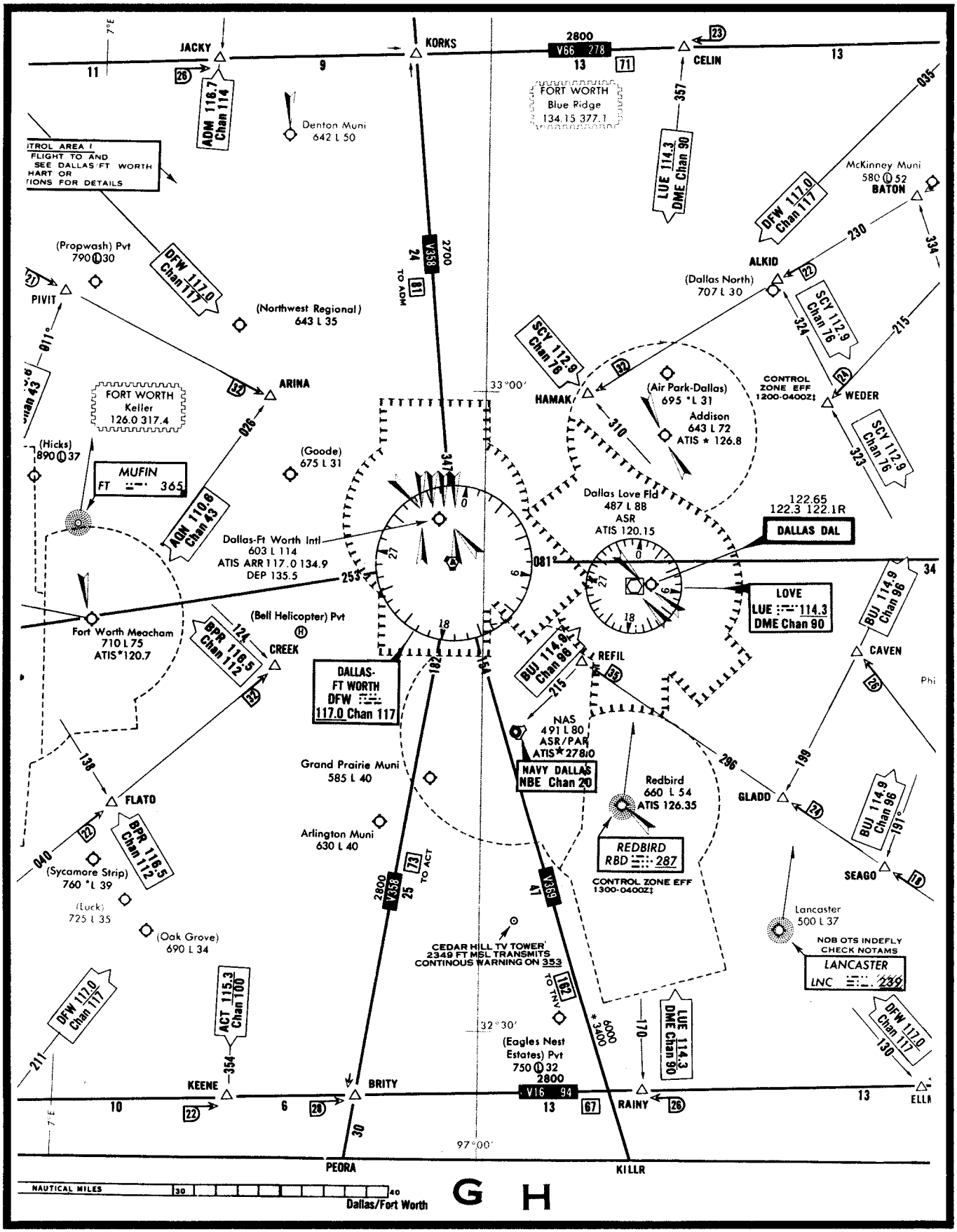


FIGURE 109.—IFR Area Chart Segment.

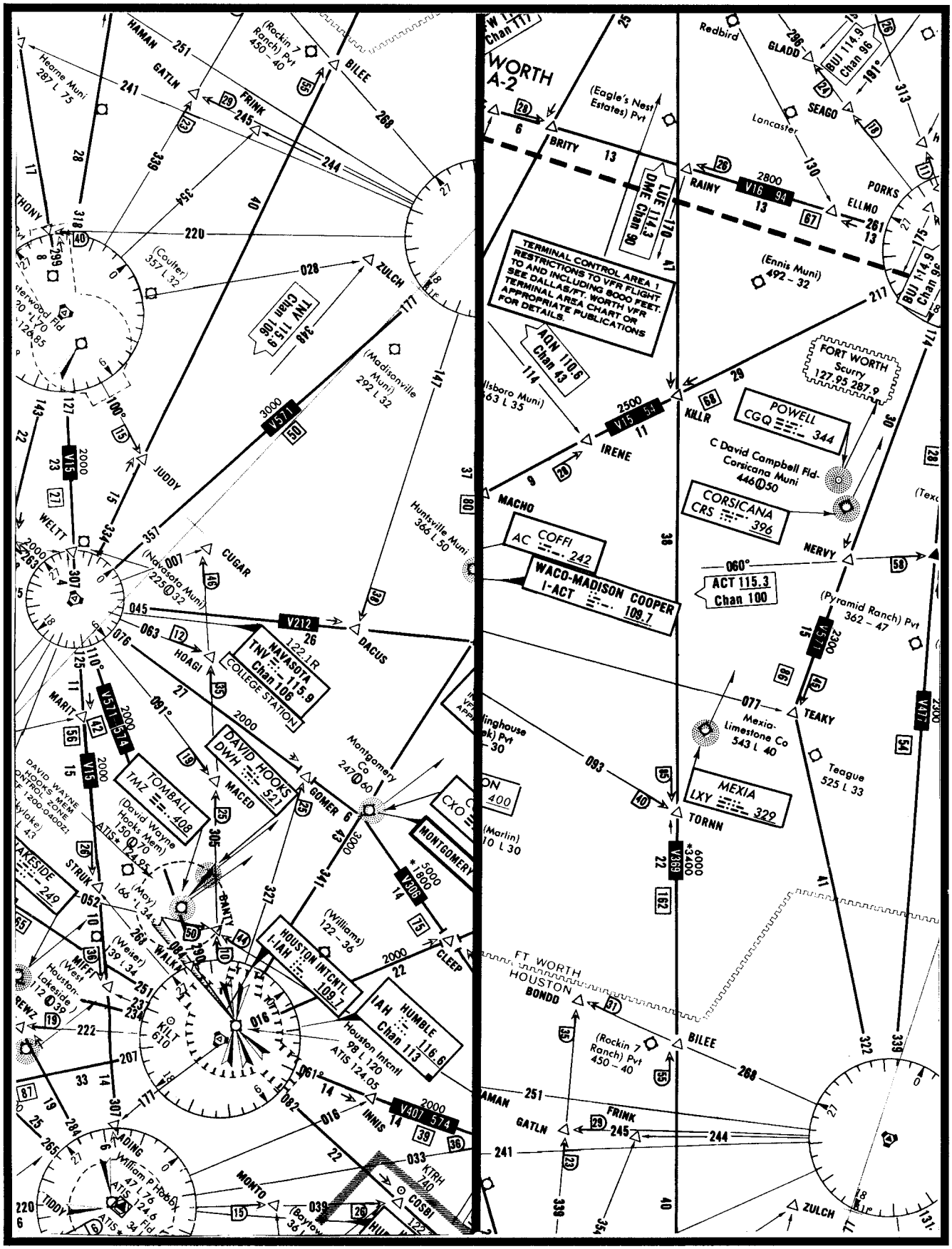


FIGURE 110.—IFR En Route Low Altitude Chart Segment.

TEXAS

§ DALLAS-FORT WORTH INTL (DFW) 12 NW UTC-6(-5DT) 32°53'47"N 97°02'28"W **DALLAS-FT. WORTH H-2K, 4F, 5B, L-13C, A IAP**

603 B **FUEL** 100LL, JET A OX 1,3 LRA CFR Index E

RWY 17L-35R: H11,388X150 (CONC-GRVD) S-120, D-200, DT-600, DDT-850 HIRL, CL
RWY 17L: ALSF2. TDZ. **RWY 35R:** MALSR. TDZ.

RWY 17R-35L: H11,388X200 (CONC-GRVD) S-120, D-200, DT-600, DDT-850 HIRL, CL
RWY 17R: SSALR TDZ. **RWY 35L:** TDZ. VASI(V6L).

RWY 18L-36R: H11,387X200 (CONC-GRVD) S-120, D-200, DT-600, DDT-850 HIRL, CL
RWY 18L: SSALR.TDZ. **RWY 36R:** 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 13L-31R: H9000X200 (CONC-GRVD) S-120, D-200, DT-600, DDT-850 HIRL, CL .5% up NW.
RWY 13L: TDZ. VASI(V6L)—Upper GA 3.25°TCH 93'. Lower GA 3.0°TCH 47'.
RWY 31 R: MALSR. TDZ.

RWY 13R-31L: H9300X150 (CONC-GRVD) S-120, D-220, DT-600, DDT-850 HIRL, CL
RWY 13 R: MALSR. TDZ. **RWY 31L:** TDZ.

RWY 18S-36S: H4000X100 (CONC)

AIRPORT REMARKS: Attended continuously. 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. 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 624-8471, Toll free call, dial 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 Group I: See VFR Terminal Area chart.

RADIO AIDS TO NAVIGATION: NOTAM FILE DFW.
(H) **VORTACW** 117.0 DFW Chan 117 32°51'57"N97°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"N97°01'49"W 353° 5.1 NM to fld.
JIFFY NDB (LOM) 219 FL 32°59'45"N97°01'46"W 173° 5.1 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

---

§ HOUSTON INTERCONTINENTAL (IAH) 15N UTC-6(-5DT) 29°58'49"N 95°20'22"W **HOUSTON H-5B, L-17B IAP**

98 B S4 FUEL 100LL, JET A OX2 LRA CFR Index D

RWY 14L-32R: H1200X150 (CONC-GRVD) S-100, D-200, DT-400, DDT-778 HIRL, CL
RWY 14L: MALSR. VASI(V4L)—GA 3.0°TCH 54'. **RWY 32R:** MALSR.

RWY 09-27: H10000X150 (ASPH-GRVD) S-75, D-191, DT-400, DDT-850 HIRL,CL
RWY 09: MALSR. TDZ. PAPI(P4L)—GA 3.0°TCH 63'.
RWY 27: ALSF2. TDZ. PAPI(P4L)—GA 3.0°TCH 63'.

RWY 08-26: H9401X150 (CONC-GRVD) S-120, D-155, DT-265 HIRL, CL
RWY 08: MALSR. TDZ. **RWY 26:** ALSF2. TDZ. VASI(V4L)—GA 3.0°TCH 53'.

RWY 14R-32L: H6038X100 (ASPH-GRVD) S-30, D-60, DT-60 MIRL
RWY 14R: VASI(V4L)—GA 3.0°TCH 40'. Road. **RWY 32L:** VASI(V4L)—GA 3.0°TCH 45'.

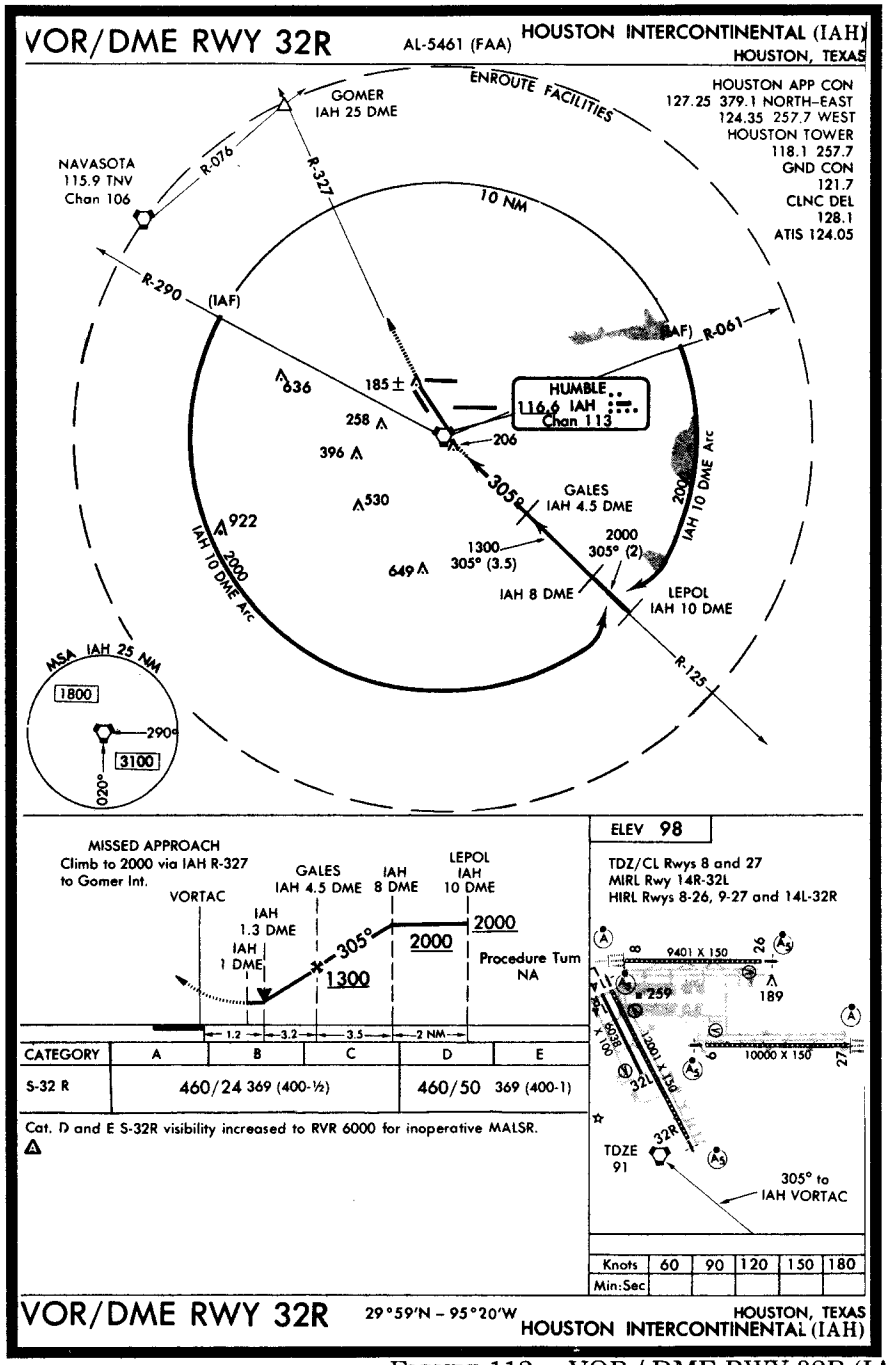
AIRPORT REMARKS: Attended continuously. CAUTION: Birds on and in vicinity of arpt. CAUTION—Approach end of rwy 26 bright lgts approximately one mile from thld and 900' South of centerline. Caution—Deer on and in vicinity of arpt. Rwy 14R-32L CLOSED to acft over 140,000 lbs gross weight. Landing Fee. Flight Notification Service (ADCUS) available.

WEATHER DATA SOURCES: LLWAS

COMMUNICATIONS: ATIS 124.05 **UNICOM** 122.95
MONTGOMERY COUNTY FSS (CXO) Toll free call, dial 1-800-WX-BRIEF. NOTAM FILE IAH.
® **APP CON** 124.35 (West) 127.25 (North and East)
TOWER 118.1 (135.15 copter control) **GND CON** 121.7 **CLNC DEL** 128.1 (135.15 copter control)
® **DEP CON** 123.8 (West) 119.7 (North and East)
TCA Group II: VFR Terminal Area chart.

RADIO AIDS TO NAVIGATION: NOTAM FILE IAH.
HUMBLE (H) VORTACW 116.6 IAH Chan 113 29°57'24"N95°20'44"W at fld. 90/08E. **HIWAS.**
MARBE NDB (LOM) 379 HS 30°04'29"N 95°24'45"W 146° 5.9 NM to fld.
NIXIN NDB (LOM) 326 JY 29°59'36"N 95°12'54"W 257° 6.5 NM to fld.
ILS/DME 109.7 I-JYV Chan 34 Rwy 26 LOM NIXIN NDB
ILS 111.9 I-HSQ Rwy 14L LOM MARBE NDB
ILS/DME 109.7 I-IAH Chan 34 Rwy 08
ILS/DME 110.9 I-UYO Chan 34 Rwy 09
ILS 111.9 I-CDG Rwy 32R

FIGURE 111.—Airport/Facility Directory Excerpts.



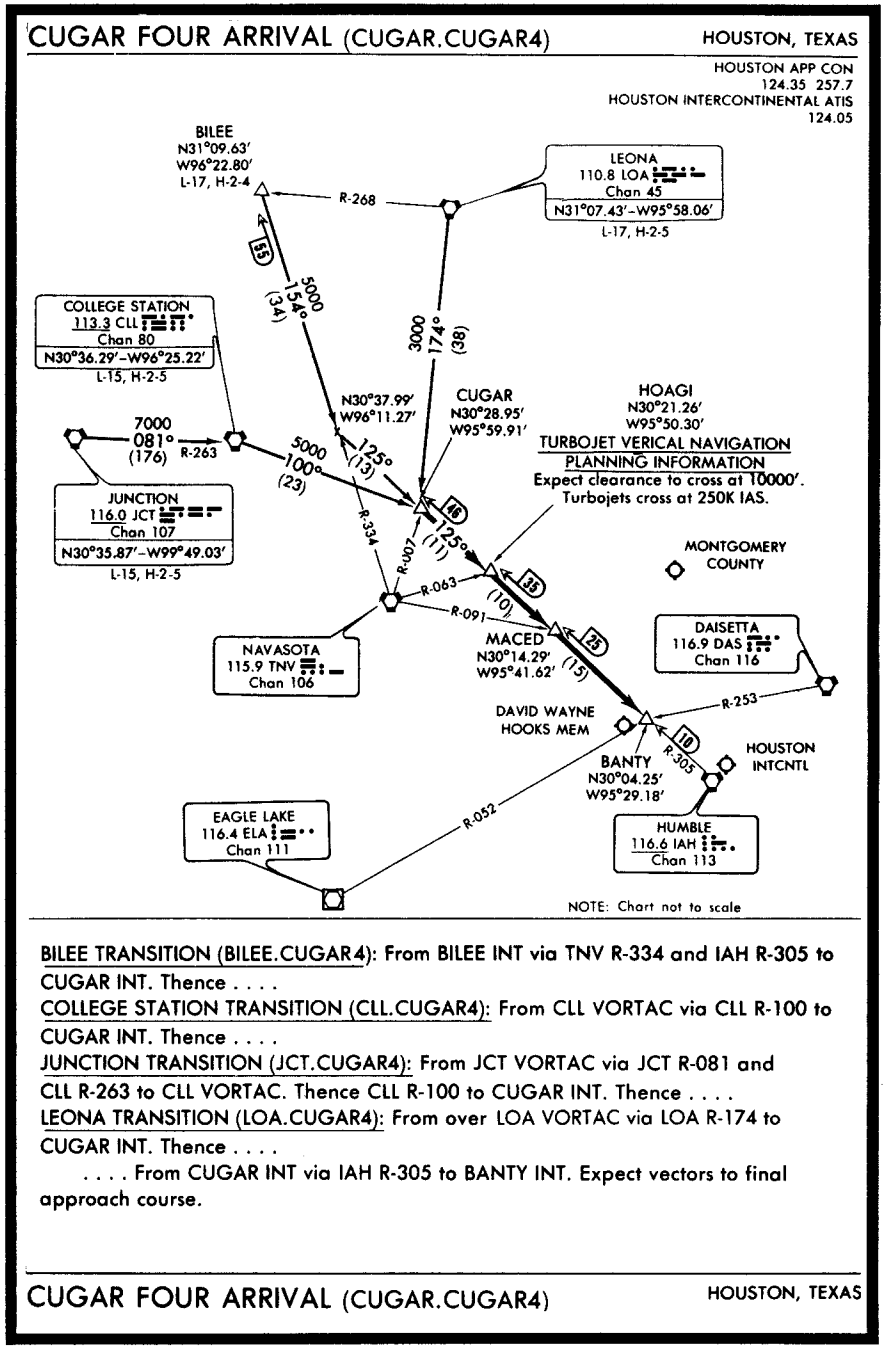


FIGURE 112.—VOR / DME RWY 32R (IAH) / Cugar Four Arrival (Cugar.Cugar4).

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 PROPOSED (Z)	6. DEPARTURE TIME ACTUAL (Z)	7. CRUISING ALTITUDE
VFR / X IFR / DVFR	N60BJ	BH214/A	110 KTS	ØO2 Baker			12,000

8. ROUTE OF FLIGHT
Hdg 270 degrees to V394, V394 POM, V210 LAX

9. DESTINATION (Name of airport and city)	10. EST. TIME ENROUTE HOURS	MINUTES	11. REMARKS
LAX Los Angeles Int'l Los Angeles			L/O = Level Off PPH = Pounds Per Hour TBC = Tower to Tower

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

16. COLOR OF AIRCRAFT: Brown/White

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

FLIGHT LOG

CHECK POINTS FROM	TO	ROUTE ALTITUDE	COURSE	WIND TEMP	SPEED-KTS TAS	GS	DIST NM	TIME LEG	TOT	FUEL LEG	TOT
ØO2	V394	HDG 270 Climb					8		:10:00		250*
Join V394	DAG	V394 12000		290/36 ISA-2			15				
DAG	POM										
POM	PIRRO Int.	V210 12000									
PIRRO Int.	LAX	Descent & Approach					29	:17:00		348	
LAX	LGB	TFC 3000			110	120	22	:11:00			

OTHER DATA: * Includes Taxi Fuel
NOTE: Use 1045 PPH Total Fuel Flow From L/O To Start Of Descent. Use 1095 PPH Total Fuel Flow For Reserve / Alternate Requirements
A missed approach requires 89# of fuel.

TIME and FUEL: As required by FARs.

TIME	FUEL (LB)	
		EN ROUTE
		RESERVE
		ALTERNATE
		TOTAL

FIGURE 113.—Flight Plan/Flight Log.

LONG BEACH (DAUGHERTY FLD) (LGB) 3 NE UTC-8(-7DT) N33°49.06' W118°09.10' **LOS ANGELES**
57 B S4 **FUEL** 100LL, JET A OX 1, 2, 3, 4 LRA ARFF Index C **COPTER**
RWY 12-30: H10000X200 (ASPH-GRVD) S-30 +, D-200, DT-300 HIRL 0.4% up NW **H-2B, L-3B, A**
RWY 12: VASI(V4L)—GA 3.0° TCH 47'. Thld dsplcd 1340'. Railroad. **IAP**
RWY 30: MALSR. PAPI(P4L) —GA 3.0° TCH 70'. Thld dsplcd 1990'. Tree.
RWY 07L-25R: H6192X150 (ASPH-PFC) S-30, D-70, DT-110 MIRL 0.3% up W
RWY 07L: Thld dsplcd 1305'. Railroad.
RWY 25R: REIL. VASI(V4L)—GA 4.0° TCH 57'. Thld dsplcd 531'. Road. Rgt tfc.
RWY 07R-25L: H5420X150 (ASPH) S-30, D-75 HIRL 0.4% up W
RWY 07R: Tower. Rgt tfc. **RWY 25L:** REIL. VASI(V4L)—GA 4.0° TCH 58'. Trees.
RWY 16R-34L: H4470X75 (ASPH) S-12.5
RWY 16R: VASI(V4L)—GA 4.0° TCH 36'. Thld dsplcd 310'. Fence. Rgt tfc. **RWY 34L:** Road.
RWY 16L-34R: H4267X75 (ASPH) S-12.5
RWY 16L: Thld dsplcd 415'. Fence. **RWY 34R:** Thld dsplcd 292'. Road. Rgt tfc.
AIRPORT REMARKS: Attended continuously. All rwys CLOSED 0600-1500Z‡ except Rwy 12-30. Flocks of seagulls on and in vicinity of arpt especially during rain. Unlighted twr 152' AGL 2500' W and 500' S of Rwy 07 thld. 255' AGL obstruction 1200' S of Rwy 07 thld. Broken pavement on NE Police helipad between perimeter road and Twy F. Prior notification requested 24 hours in advance for all acft over 75,000 pounds certificated maximum gross weight and civilian Non-Stage III jets and all military jets, ctc Noise Abatement 310-429-6647 Mon-Fri 1500-0100Z‡. Noise abatement information on 122.85. Noise limits (single event noise exposure level), Rwy 25 tkf 92.0 DB-ldg 88.0 DB; Rwy 07 tkf 88.0 DB-ldg 92.0 DB; Rwys 12 and 30 tkf 102.5 DB-ldg 101.5 DB except 0600-1500Z‡ tkf 79.0-ldg 79.0 DB. Touch and go, stop and go, low apch only permitted 1500-0300Z‡ weekdays and 1600-2300Z‡ weekends and holidays only on Rwy 07L-25R and Rwy 07R-25L unless weather conditions require twr to direct such operations to Rwy 16R-34L and Rwy 16L-34R. Rwy 12-30 arpt manager limits gross weight to 300,000 lbs dual tandom wheel except DC-10 series 30/40 and MD11 limited to 378,000 lbs. No twy access to Rwy 07L W of Twy D, 4897' remaining on Rwy 07L from Twy D, Twy A clsd W of compass rose. Taxiway K east of Taxiway C clsd to acft with a wingspan greater than 117'. Engine run-ups other than preflight are limited to hours of 1500-0500Z‡ weekdays and 1700-0500Z‡ weekends and holidays. Rwy 07R-25L limited to acft with a maximum wing span of 90'. ACTIVATE MALSR Rwy 30 when tower clsd—CTAF. Rwy 12-30 HIRL lighted during hours tower clsd. NOTE: See SPECIAL NOTICE—Land and Hold Short Operations.
COMMUNICATIONS: CTAF 119.4 **ATIS** 127.75 (310) 595-8564 **UNICOM** 122.95
HAWTHORNE FSS (HHR) TF 1-800-WX-BRIEF. NOTAM FILE LGB.
® **SOCAL APP CON** 124.65
® **SOCAL DEP CON** 127.2
LONG BEACH TOWER 119.4 (Rwy 30 apch, Rwy 12 dep) 120.5 (Rwy 12 apch, Rwy 30 dep) (1415-0745Z‡)
GND CON 133.0 **CLNC DEL** 118.15
AIRSPACE: CLASS D svc effective 1415-0745Z‡ other times CLASS G.
RADIO AIDS TO NAVIGATION: NOTAM FILE HHR.
SEAL BEACH (L) VORTACW 115.7 SLI Chan 104 N33°47.00' W118°03.29' 278° 5.3 NM to fld. 20/15E. **HIWAS.**
BECCA NDB (LOM) 233 LG N33°45.40' W118°04.64' 301° 5.2 NM to fld.
ILS 110.3 I-LGB Rwy 30. LOM BECCA NDB. Unmonitored when twr clsd. MM unmonitored.

• •

HELIPAD H1: H20X20 (ASPH-CONC)
HELIPAD H2: H20X20 (ASPH-CONC)
HELIPAD H3: H20X20 (ASPH-CONC)
HELIPORT REMARKS: Training helipads H1, H2 and H3 located N of Rwy 12-30 midfield between Taxiways G and K.

LONNIE POOL FLD/WEAVERVILLE (See WEAVERVILLE)

LOS ALAMITOS AAF (ARMED FORCES RESERVE CENTER): **LOS ANGELES**
AIRSPACE: CLASS D svc effective Sat-Mon 1600-0000Z‡, Tue-Fri 1500-0600Z‡ other times CLASS G. **L-3B, A**

FIGURE 113A.—Data from Southwest U.S. Airport/Facility Directory.

38 CALIFORNIA

AVENAL N35°38.82′ W119°58.72′ NOTAM FILE HHR. LOS ANGELES
(H) VORTAC 117.1 AVE Chan 118 080° 14.4 NM to Lost Hills-Kern Co. 710/16E. H-2A, L-2E, 3A
RCO 122.1R 117.1T (BAKERSFIELD FSS)

BAKER (0O2) 2 NW UTC-8(-7DT) N35°17.13′ W116°04.95′ LOS ANGELES
922 B TPA—1922(1000) L-3C, 5B
RWY 15-33: H3157X50 (ASPH) MIRL
RWY 33: P-line. Rgt tfc.
AIRPORT REMARKS: Unattended. Mountain ½ mile W of arpt. Unlit towers and unmarked powerlines across apch path Rwy 33.
COMMUNICATIONS: CTAF 122.9
RIVERSIDE FSS (RAL) TF 1-800-WX-BRIEF. NOTAM FILE RAL.
RADIO AIDS TO NAVIGATION: NOTAM FILE DAG.
DAGGETT (L) VORTAC 113.2 DAG Chan 79 N34°57.75′ W116°34.69′ 036° 31.1 NM to fld. 1760/15E.
HIWAS.

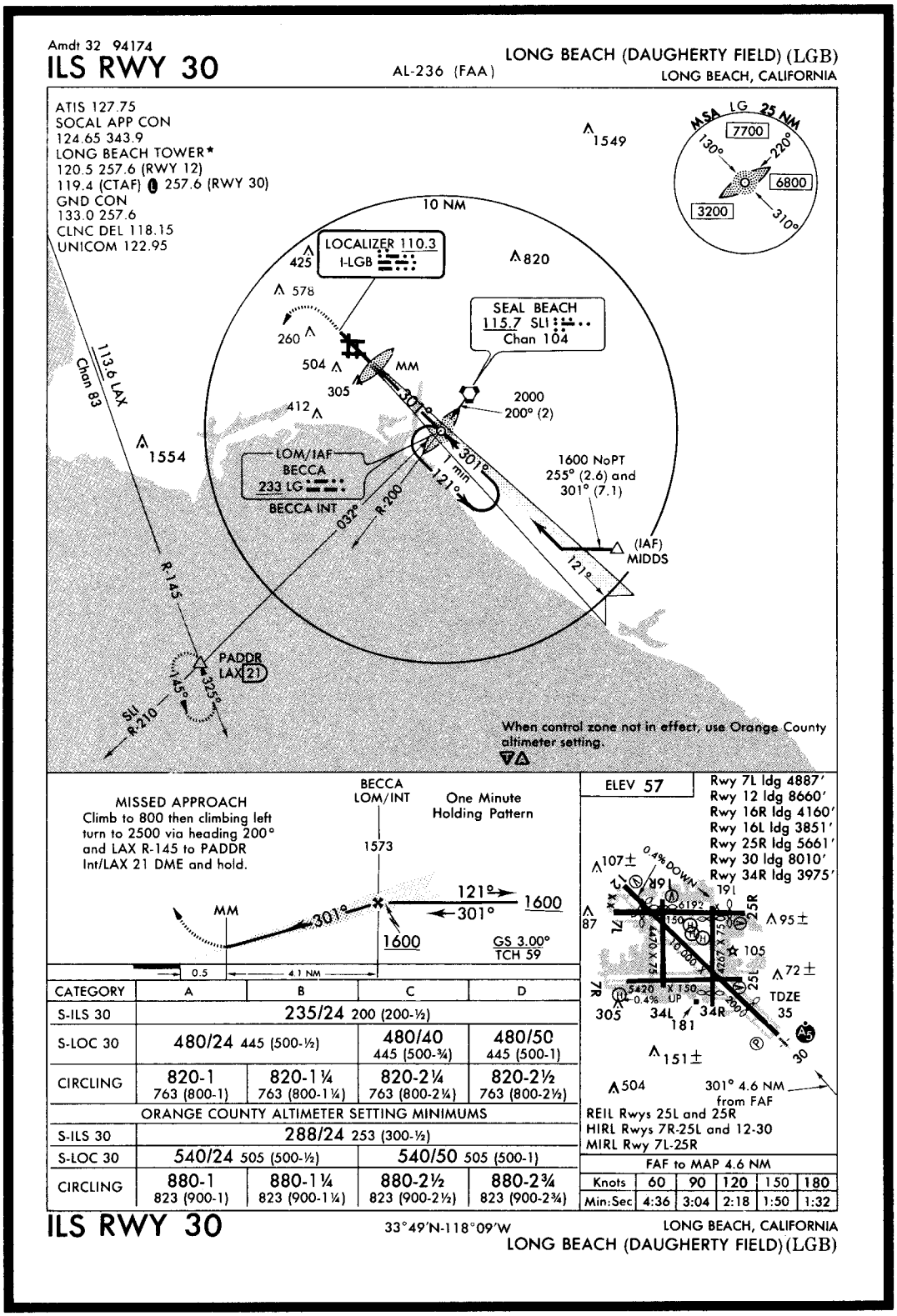
BAKERSFIELD N35°26.02′ W119°03.41′ LOS ANGELES
FSS (BFL) at Meadows Fld. 123.65 122.45 122.2. LD 805-399-1787. L-3B, 5A

BAKERSFIELD

BAKERSFIELD MUNI (L45) 3 S UTC-8(-7DT) N35°19.49′ W118°59.75′ LOS ANGELES
376 B S4 FUEL 80, 100LL TPA—1176(800) L-3B, 5A
RWY 16-34: H4000X75 (ASPH) S-20 MIRL IAP
RWY 16: Road. Rgt tfc. RWY 34: PAPI(P2L)—GA 4.0° TCH 54′. P-line.
AIRPORT REMARKS: Attended 1500-0100Z‡. 100′ pole line ½ mile south of arpt.
COMMUNICATIONS: CTAF/UNICOM 122.8
BAKERSFIELD FSS (BFL) LC 399-1787 NOTAM FILE BFL.
Ⓡ BAKERSFIELD APP/DEP CON 126.45 (1400-0700Z‡)
Ⓡ L.A. CENTER APP/DEP CON 127.1 (0700-1400Z‡)
RADIO AIDS TO NAVIGATION: NOTAM FILE BFL.
SHAFTER (H) VORTACW 115.4 EHF Chan 101 N35°29.07′ W119°05.84′ 138° 10.8 NM to fld. 550/14E.
HIWAS.

MEADOWS FLD (BFL) 3 NW UTC-8(-7DT) N35°26.02′ W119°03.41′ LOS ANGELES
507 B S4 FUEL 80, 100, 100LL, JET A ARFF Index B H-2B, L-2E, 3B, 5A
RWY 12L-30R: H10857X150 (ASPH-GRVD) S-110, D-200, DT-500, DDT-850 HIRL 0.3% up NW IAP
RWY 12L: VASI(V4L)—GA 3.0° TCH 52′.
RWY 30R: MALSR. PAPI(P4L)—GA 3.0° TCH 64′. Thld dsplcd 3428′. P-line. Rgt tfc.
RWY 12R-30L: H3700X75 (ASPH) S-18 MIRL
RWY 12R: Rgt tfc. RWY 30L: VASI(NSTD)—GA 3.0°. Tree.
AIRPORT REMARKS: Attended 1330-0700Z‡, fee for call out service other hours. Rwy 12L 16′ pump 525′ from thld 550′ left. Distance remaining at the 2000′ mark on Rwy 30R is actually 2850′. Noise sensitive areas S and E of arpt recommended turbojet training hours weekdays 1600-0600Z‡, weekends 2000-0600Z‡ no more than ten practice approaches per hour. Rwy 30L NSTD VASI single light source visibility 1 mile, red blo glide path. When twr clsd ACTIVATE PAPI Rwy 30R—CTAF. For MIRL Rwy 12R-30L and taxiway lgts when tower clsd ctc FSS—CTAF.
COMMUNICATIONS: CTAF 118.1 ATIS 118.6 (805) 399-9425 UNICOM 122.95
BAKERSFIELD FSS (BFL) on arpt. 123.65 122.45 122.2. LC 399-1787. NOTAM FILE BFL.
BAKERSFIELD APP CON 118.9 (N) 118.8 (S) (1400-0700Z‡)
BAKERSFIELD DEP CON 126.45 (N,S) (1400-0700Z‡)
Ⓡ L.A. CENTER APP/DEP CON 127.1 (0700-1400Z‡)
BAKERSFIELD TOWER 118.1 (1400-0700Z‡) GND CON 121.7
AIRSPACE: CLASS D svc effective 1400-0700Z‡ other times CLASS E.
RADIO AIDS TO NAVIGATION: NOTAM FILE BFL.
SHAFTER (H) VORTACW 115.4 EHF Chan 101 N35°29.07′ W119°05.84′ 133° 3.6 NM to fld. 550/14E.
HIWAS.
NILEY NDB (LOM) 385 BF N35°21.65′ W118°58.12′ 301° 6.1 NM to fld.
ILS/DME 111.9 I-BFL Chan 56 Rwy 30R. LOM NILEY NDB. ILS unmonitored when twr clsd.

FIGURE 113B.—Data from Southwest U.S. Airport/Facility Directory.



CATEGORY	A	B	C	D
S-ILS 30	235/24 200 (200-½)			
S-LOC 30	480/24 445 (500-½)		480/40 445 (500-¾)	480/50 445 (500-1)
CIRCLING	820-1 763 (800-1)	820-1¼ 763 (800-1¼)	820-2¼ 763 (800-2¼)	820-2½ 763 (800-2½)
ORANGE COUNTY ALTIMETER SETTING MINIMUMS				
S-ILS 30	288/24 253 (300-½)			
S-LOC 30	540/24 505 (500-½)		540/50 505 (500-1)	
CIRCLING	880-1 823 (900-1)	880-1¼ 823 (900-1¼)	880-2½ 823 (900-2½)	880-2¾ 823 (900-2¾)

FAF to MAP 4.6 NM					
Knots	60	90	120	150	180
Min:Sec	4:36	3:04	2:18	1:50	1:32

FIGURE 113C.—ILS RWY 30 (LGB).

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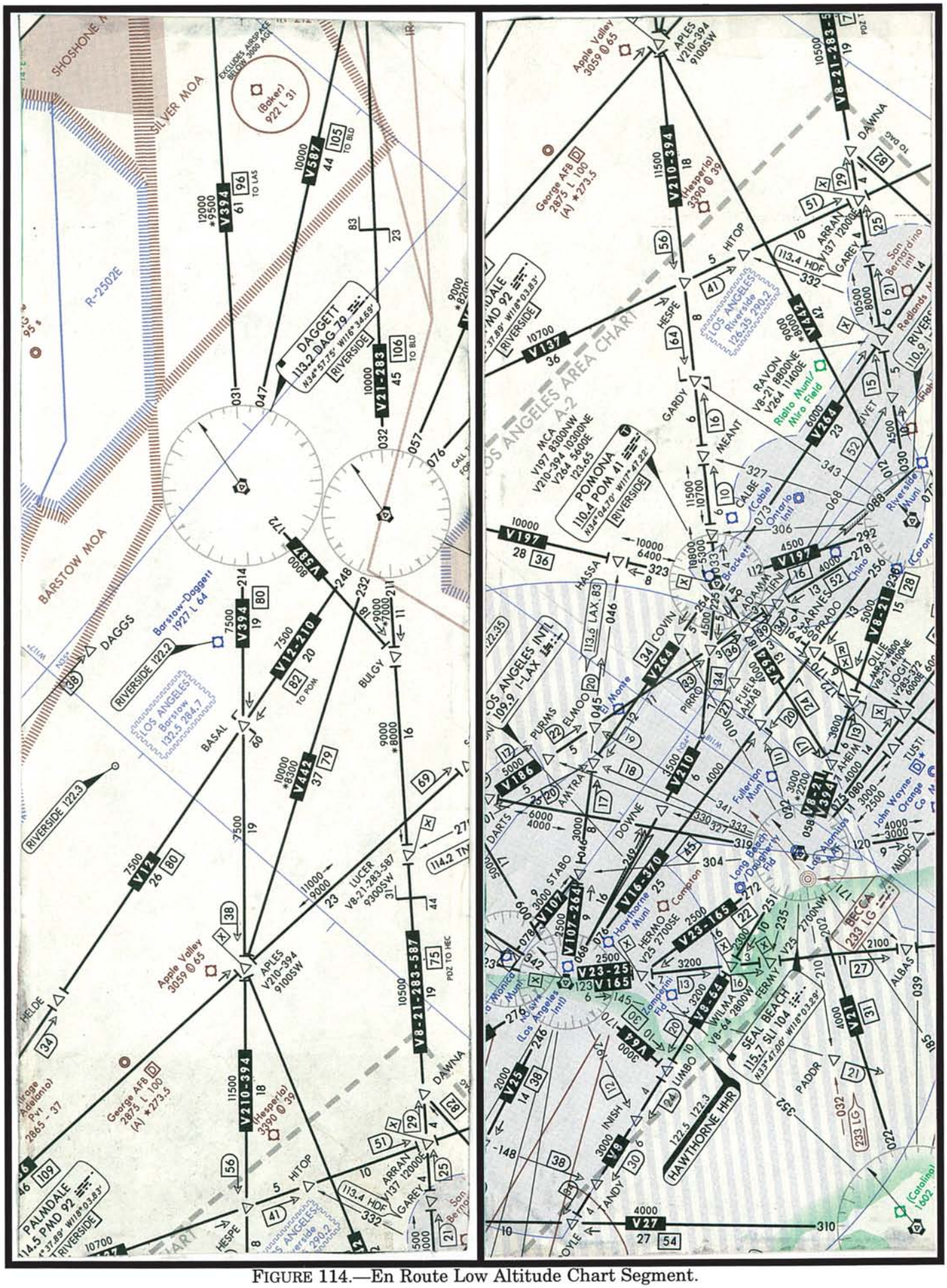

FIGURE 114.—En Route Low Altitude Chart Segment.

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 PROPOSED (Z)	6. DEPARTURE TIME ACTUAL (Z)	7. CRUISING ALTITUDE
VFR / X IFR / DVFR	PTL 130	B727/R	*** KTS	LAX			FL270

8. ROUTE OF FLIGHT
LAX INP3.IPL, J2 MOHAK, ARLIN 9 PHX

9. DESTINATION (Name of airport and city)	10. EST. TIME ENROUTE HOURS	MINUTES	11. REMARKS
PHX PHOENIX SKY HARBOR PHOENIX			L/O = Level Off PPH = Pounds Per Hour ** L/O at OCN R-270/50 *** MACH .78

12. FUEL ON BOARD HOURS	MINUTES	13. ALTERNATE AIRPORT(S)	14. PILOT'S NAME, ADDRESS & TELEPHONE NUMBER & AIRCRAFT HOME BASE	15. NUMBER ABOARD
		TUS TUCSON INT'L	17. DESTINATION CONTACT/TELEPHONE (OPTIONAL)	83

16. COLOR OF AIRCRAFT
RED/BLACK

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

FLIGHT LOG

CHECK POINTS FROM	TO	ROUTE ALTITUDE	COURSE	WIND TEMP	SPEED-KTS TAS	GS	DIST NM	TIME LEG	TOT	FUEL LEG	TOT
LAX	L/O**	IPL3.IPL Climb					43		:19:00		4510*
L/O	IPL	IPL3.IPL FL270		300/43 ISA-2							
IPL	BZA	J2 FL270									
BZA	Mohak Int	J2 FL270		300/43 ISA-2							
Mohak	Arlin Int	Arlin 9 FL270									
Arlin	PHX	Radar Vec DES/APP						:12:00		1140	
PHX	TUS	Radar V FL190					97	:26:00			

OTHER DATA: * Includes Taxi Fuel
NOTE: Use 9600 PPH Total Fuel Flow From L/O To Start Of Descent.
Use 9250 PPH Total Fuel Flow For Reserve And Alternate Requirements.
A Missed Approach Requires 416# of Fuel.

TIME and FUEL: As required by FARs.

TIME	FUEL (LB)	
		EN ROUTE
		RESERVE
		ALTERNATE
		TOTAL

FIGURE 115.—Flight Plan/Flight Log.

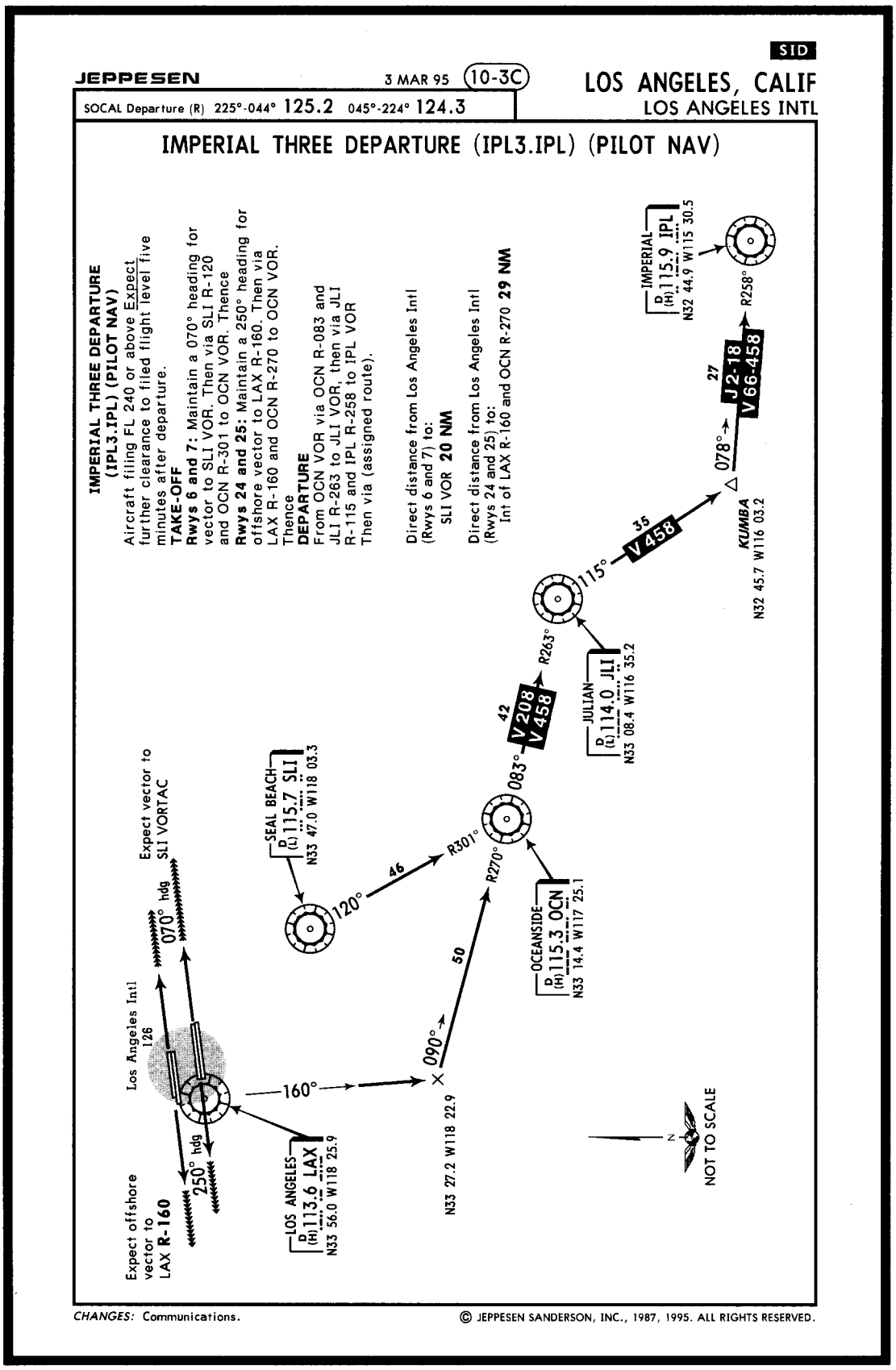

FIGURE 116.—Imperial Three Departure (IPL3.IPL) (PILOT NAV).

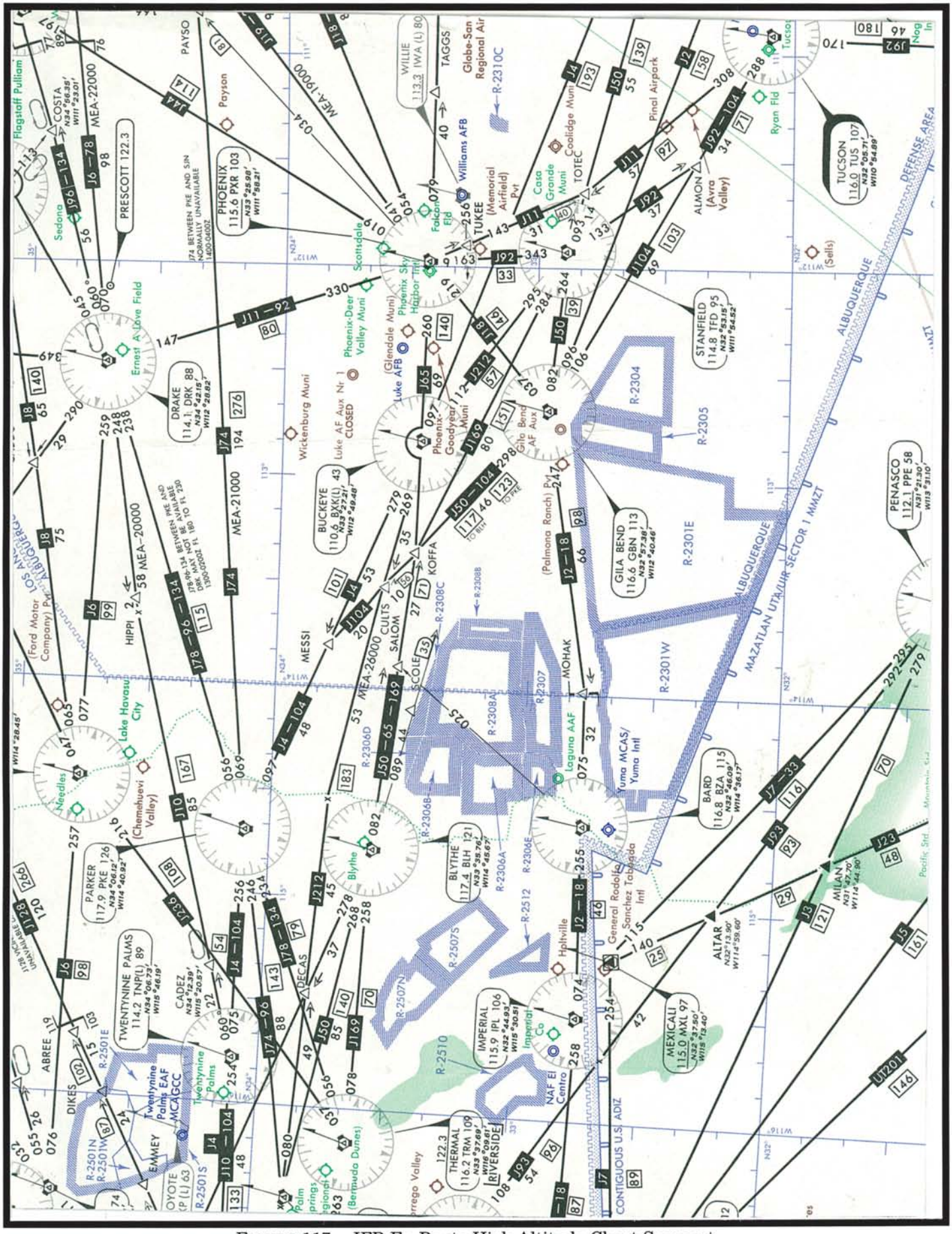

FIGURE 117.—IFR En Route High Altitude Chart Segment.

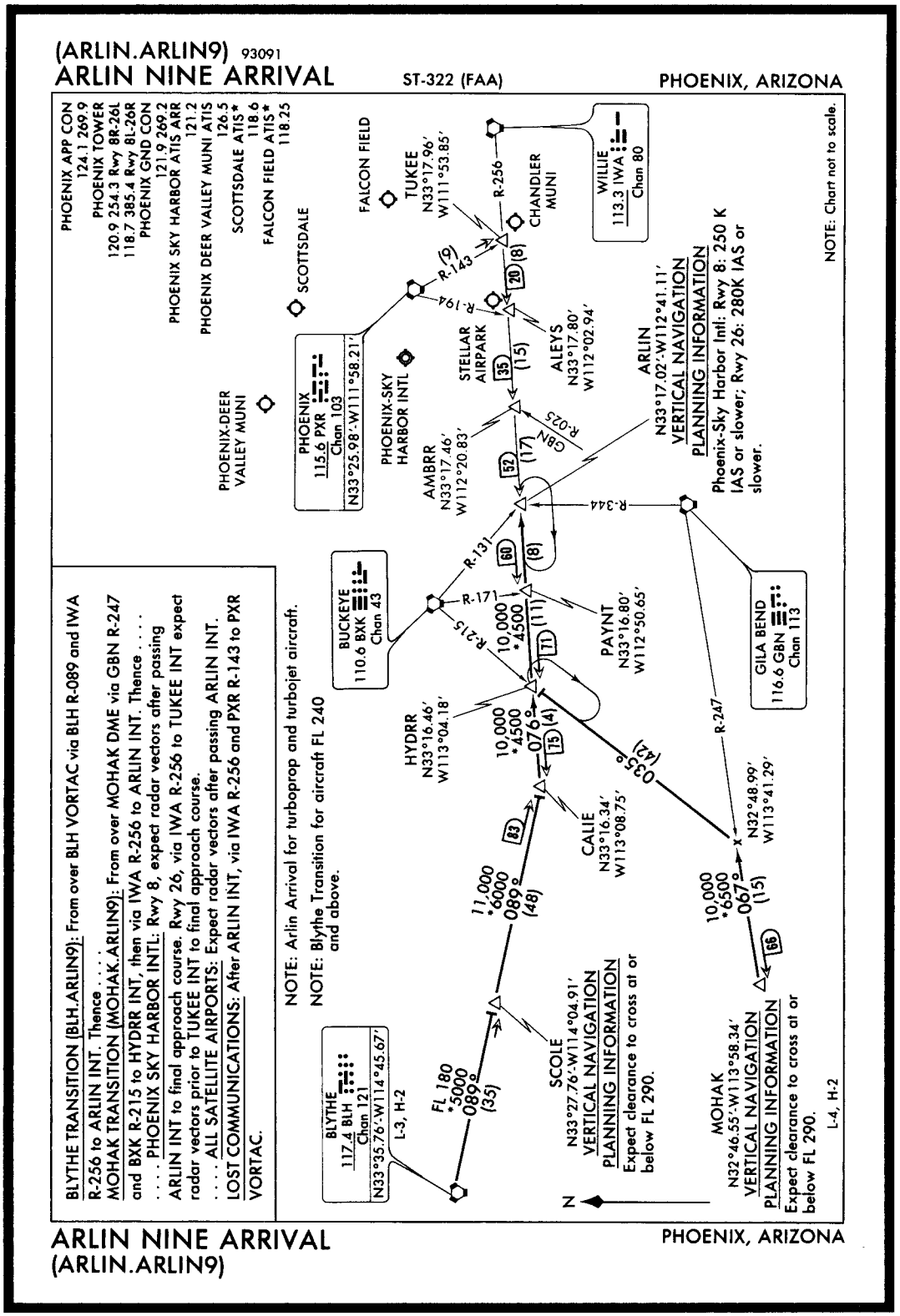

FIGURE 118.—ARLIN NINE ARRIVAL (ARLIN.ARLIN9).

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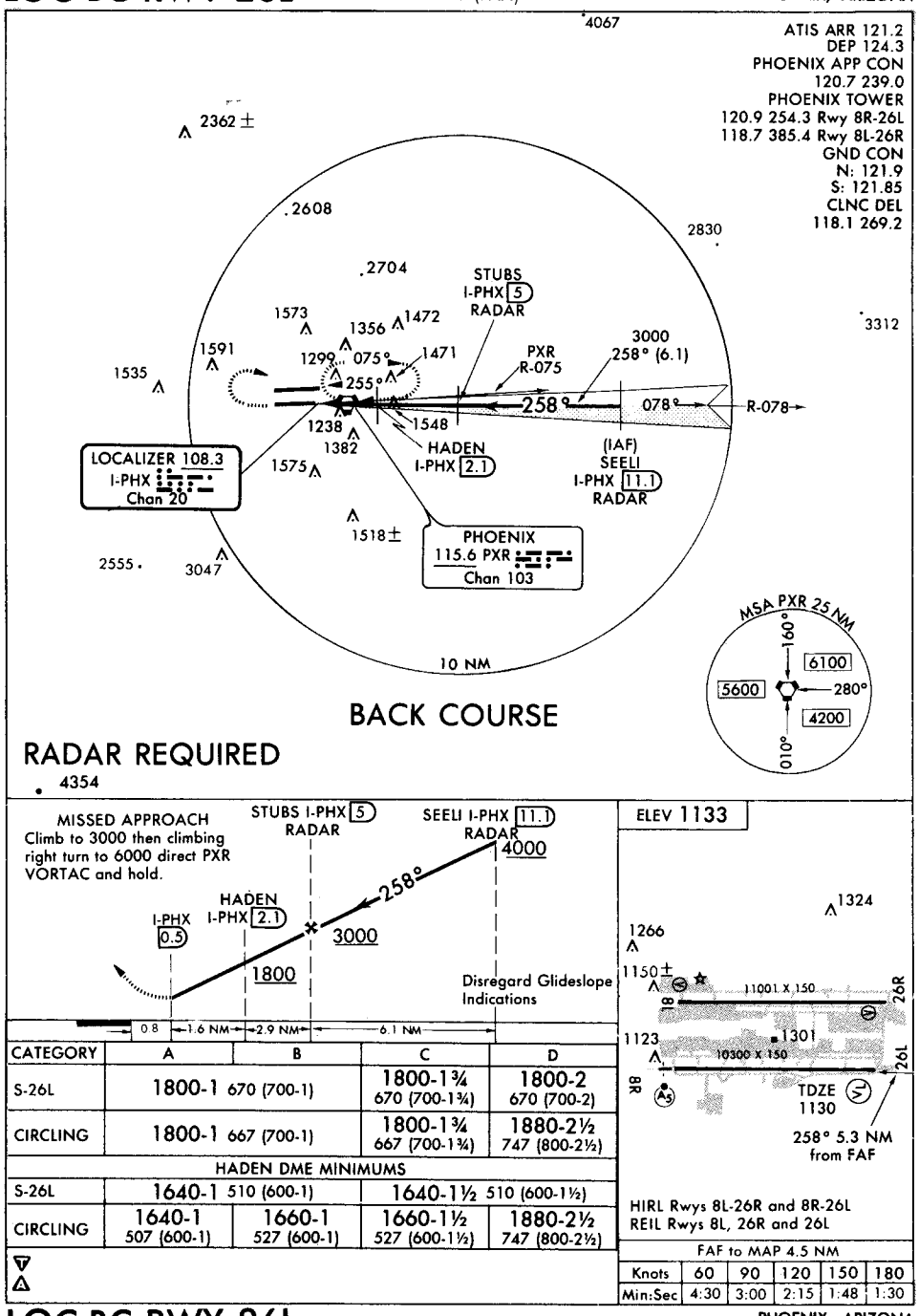
Amdt 8 94062

LOC BC RWY 26L

AL-322 (FAA)

PHOENIX SKY HARBOR INTL (PHX)
PHOENIX, ARIZONA



MISSED APPROACH
Climb to 3000 then climbing right turn to 6000 direct PXR VORTAC and hold.

ELEV 1133

HIRL Rwys 8L-26R and 8R-26L
REIL Rwys 8L, 26R and 26L

CATEGORY	A	B	C	D
S-26L	1800-1 670 (700-1)		1800-1¾ 670 (700-1¾)	1800-2 670 (700-2)
CIRCLING	1800-1 667 (700-1)		1800-1¾ 667 (700-1¾)	1880-2½ 747 (800-2½)
HADEN DME MINIMUMS				
S-26L	1640-1 510 (600-1)		1640-1½ 510 (600-1½)	
CIRCLING	1640-1 507 (600-1)	1660-1 527 (600-1)	1660-1½ 527 (600-1½)	1880-2½ 747 (800-2½)

FAF to MAP 4.5 NM

Knots	60	90	120	150	180
Min:Sec	4:30	3:00	2:15	1:48	1:30

LOC BC RWY 26L

33°26'N – 112°01'W

PHOENIX, ARIZONA
PHOENIX SKY HARBOR INTL (PHX)

FIGURE 118A.—LOC BC RWY 26L (PHX).

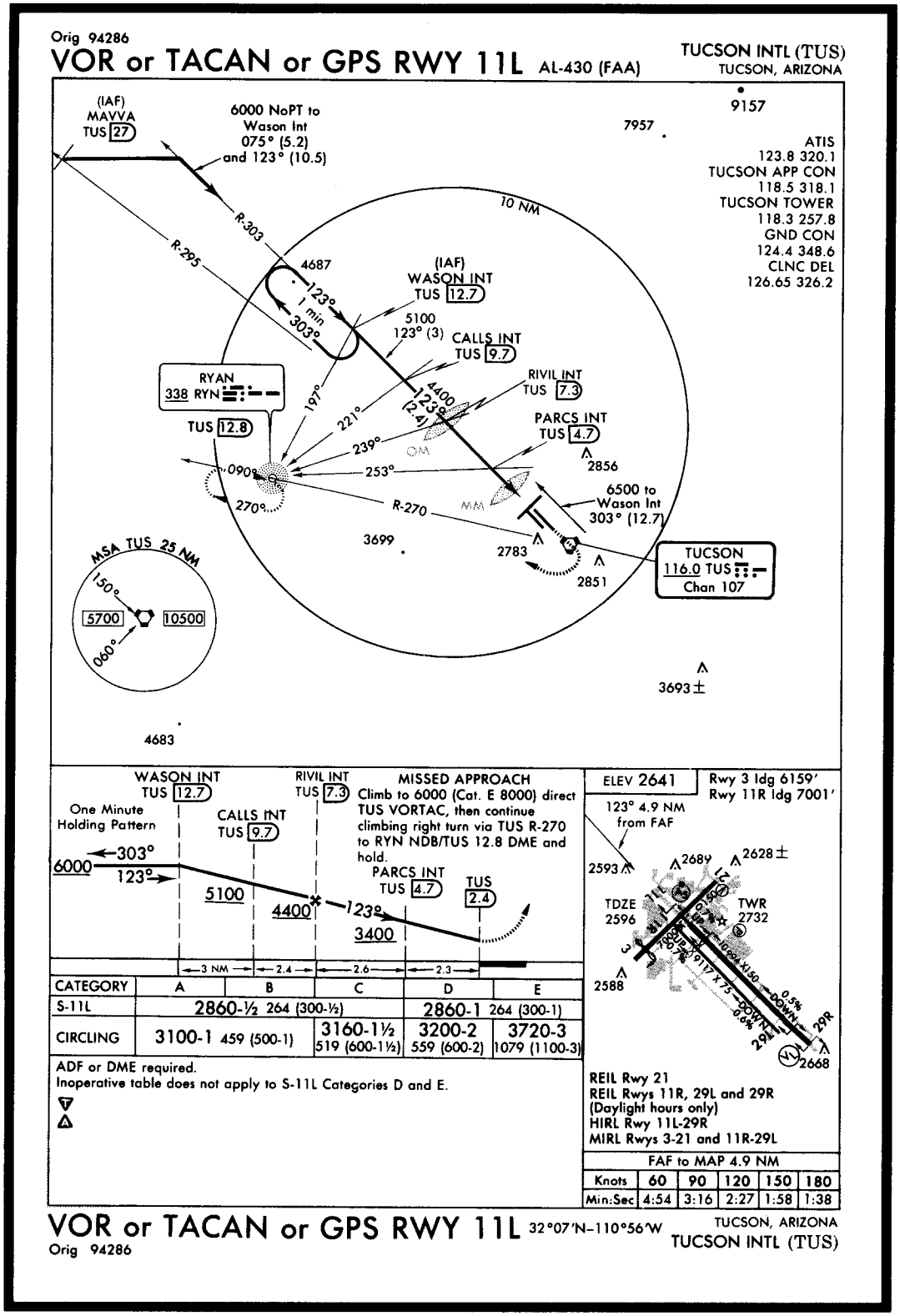


FIGURE 118B.—VOR or TACAN or GPS RWY 11L (TUS).

PHOENIX

PHOENIX-DEER VALLEY MUNI (DVT) 15 N UTC-7 N33°41.30′ W112°04.93′ **PHOENIX**
1476 B S4 **FUEL** 80, 100LL, JET A OX 1, 3 TPA—See Remarks **H-2C, L-4E**
RWY 07R-25L: H8200X100 (ASPH) S-40, D-50, DT-80 MIRL **IAP**
RWY 07R: REIL. VASI(V2L)—GA 3.0° Thld dsplcd 900′. Rgt tfc.
RWY 25L: REIL. VASI(V2L)—GA 3.0° Thld dsplcd 920′.
RWY 07L-25R: H4500X75 (ASPH) S-20 MIRL
RWY 07L: REIL. PVASI(PSIL)—GA 3.0° TCH 40′. **RWY 25R:** REIL. PVASI(PSIL)—GA 3.5° TCH 47′. Hill. Rgt tfc.
AIRPORT REMARKS: Attended 1300-0400Z. Fuel avbl only during hours 1400-0300Z 7 days. Lgtd hills NE, E, SE and W. Hot air balloon ops fall, winter, and spring months and ultralight opr South and West of arpt. Rwy 07L-25R is designated training rwy. Aerobatic practice area approximately 8½ miles northwest of the Deer Valley Arpt from the surface to 6000′ MSL. Parallel taxiway north and close proximity to Rwy 07L-25R. Rwy 07R VASI and REIL, Rwy 25L VASI and REIL, Rwy 07L PVASI and Rwy 25R PVASI on when twr clsd. Fee for all charters; travel clubs and certain revenue producing acft. TPA-2501(1025) single engine and 3001(1525) multi engine.
COMMUNICATIONS: CTAF 118.4 **ATIS** 126.5 **UNICOM** 122.95
PRESCOTT FSS (PRC) TF 1-800-992-7433. NOTAM FILE DVT.
PHOENIX RCO 122.6 122.2 (PRESCOTT FSS)
Ⓡ **PHOENIX APP/DEP CON** 120.7
DEER VALLEY TOWER 118.4 (Rwy 07R-25L) 120.2 (Rwy 07L-25R) (1300-0400Z) **GND CON** 121.8
CLNC DEL 119.5
AIRSPACE: CLASS D svc effective 1300-0400Z other times CLASS G.
RADIO AIDS TO NAVIGATION: NOTAM FILE PRC.
PHOENIX (H) VORTACW 115.6 PXR Chan 103 N33°25.98′ W111°58.21′ 328° 16.3 NM to fld. 1180/12E. **HIWAS.**
SCOTTSDALE NDB (MHW) 224 SDL N33°37.75′ W111°54.47′ 279° 9.4 NM to fld. NOTAM FILE SDL. Unmonitored when twr closed.
COMM/NAVAID REMARKS: Emerg frequency 121.5 not available at twr.

PHOENIX SKY HARBOR INTL (PHX) 3 E UTC-7 N33°26.17′ W112°00.57′ **PHOENIX**
1133 B S4 **FUEL** 100LL, JET A OX 1, 2, 3, 4 TPA—See Remarks **H-2C, L-4E**
LRA ARFF Index D **IAP**
RWY 08L-26R: H11001X150 (ASPH-GRVD) S-30, D-170, DT-280, DDT-620 HIRL
RWY 08L: REIL. VASI(V4L)—GA 3.0° TCH 55′. Building.
RWY 26R: REIL. VASI(V4L)—GA 3.0° TCH 60′. Road. Rgt tfc.
RWY 08R-26L: H10300X150 (ASPH-GRVD) S-30, D-200, DT-400, DDT-620 HIRL
RWY 08R: MALSR. Pole. Rgt tfc.
RWY 26L: REIL. VASI(V6L)—Upper GA 3.25° TCH 90′. Lower GA 3.0° TCH 53′. Antenna.
AIRPORT REMARKS: Attended continuously. Training by civil turbojet acft prohibited except PPR. TPA—2133(1000) lgt acft and non-turbo jets; 2633(1500) heavy acft and turbojets. Unless advised by ATC all turbine acft and acft 12,500 lbs and over remain at or above 3000′ MSL until established on final. Fly base leg at least 5 mile from arpt. Overnight parking fee. Fee for all charters; travel clubs and certain revenue producing aircraft. Taxiway A-6 limited to 68,000 GWT. Rwy 08L-26R FAA strength evaluation DC-10-10 505,000 pounds, DC-10-30/40 500,000 pounds, L-1011-1 450,000 pounds, aircraft up to DDTW 620,000 pounds, DC-10-10 505,000 pounds, DC-10-30/40 540,000 pounds, L-1011-1 450,000 pounds regularly operate on rwy. Rwy 08R-26L gross weight limit DC-10-10 430,000 pounds, DC-10-30/40 540,000 pounds, L-1011-1 430,000 pounds. Flight Notification Service (ADCUS) available.
WEATHER DATA SOURCES: ASOS (602) 231-8557. LLWAS.
COMMUNICATIONS: ATIS ARR 121.2 DEP 124.3 (602) 244-0963 **UNICOM** 122.95
PRESCOTT FSS (PRC) TF 1-800-992-7433. NOTAM FILE PHX.
RCO 122.6 122.2 (PRESCOTT FSS)
Ⓡ **APP/DEP CON** 126.8 (259°-309°) 124.9 (053°-146°) 124.1(147°-258° above 5500′) 123.7 (147°-258° 5500′ and below) 120.7 120.4 (Rwy 08L 275°-290° blo 6000′, Rwy 26R 030°-080°) (310°-052° 5500′ and below) 119.2 (310°-052° above 5500′)
TOWER 118.7 (Rwy 08L-26R) 120.9 (Rwy 08R-26L) **GND CON** 121.9 (North) 121.85 (South) **CLNC DEL** 118.1
AIRSPACE: CLASS B See VFR Terminal Area Chart.
RADIO AIDS TO NAVIGATION: NOTAM FILE PRC.
PHOENIX (H) VORTACW 115.6 PXR Chan 103 N33°25.98′ W111°58.21′ 263° 2.0 NM to fld. 1180/12E. **HIWAS.**
ILS 111.75 I-PZZ Rwy 26R (LOC only).
ILS/DME 108.3 I-PHX Chan 20 Rwy 08R. GS unusable below 1280′. LOC back course unusable beyond 20° south of course.

FIGURE 118C.—Excerpt from Airport/Facilities Directory.

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 PROPOSED (Z)	6. DEPARTURE TIME ACTUAL (Z)	7. CRUISING ALTITUDE
VFR / X IFR / DVFR	N130JB	B727/A	** KTS	BUF Greater Buffalo Int'l			FL310

8. ROUTE OF FLIGHT
Buffalo One Dep. J547 FNT, FNT.PMM 2 ORD

9. DESTINATION (Name of airport and city)	10. EST. TIME ENROUTE HOURS	MINUTES	11. REMARKS
ORD Chicago-Ohare Int'l Chicago			L/O = Level Off PPH = Pounds Per Hour ** MACH .78 Variation: BUF 8W, FNT 3W, ORD 2E ATC cleared N130JB to maintain FL310 until PMM R-073/15 cross PMM at FL200, cross Pivot at 10,000 feet.

12. FUEL ON BOARD HOURS	MINUTES	13. ALTERNATE AIRPORT(S)	14. PILOT'S NAME, ADDRESS & TELEPHONE NUMBER & AIRCRAFT HOME BASE	15. NUMBER ABOARD
		RFD Greater Rockford Rockford, Ill	17. DESTINATION CONTACT/TELEPHONE (OPTIONAL)	101

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

FLIGHT LOG

CHECK POINTS FROM	TO	ROUTE ALTITUDE	COURSE	WIND TEMP	SPEED-KTS TAS	GS	DIST NM	TIME LEG	TOT	FUEL LEG	TOT
BUF	L/O	Buffalo 1 Climb					70		:16:00		4960*
L/O	YXU	J547 FL310		330/39 ISA-6							
YXU	FNT										
FNT	R-073/15 PMM	FNT.PMM2		330/39 ISA-6							
R-073/15 PMM	PMM	FNT.PMM2 Descent	253				15	:02:00		216.7	
PMM	ORD	FNT.PMM2 Descent & Approach	261/216				89	:13:00		1408.3	
ORD	RFD	~~Radar V~~ 10,000					97	:17:00			

OTHER DATA: * Includes Taxi Fuel
NOTE: Use 9300 PPH Total Fuel Flow From L/O To Start Of Descent.
Use 9550 PPH Total Fuel Flow For Reserve And Alternate Requirements.
A Missed Approach Requires 450# of Fuel.

TIME and FUEL: As required by FARs.

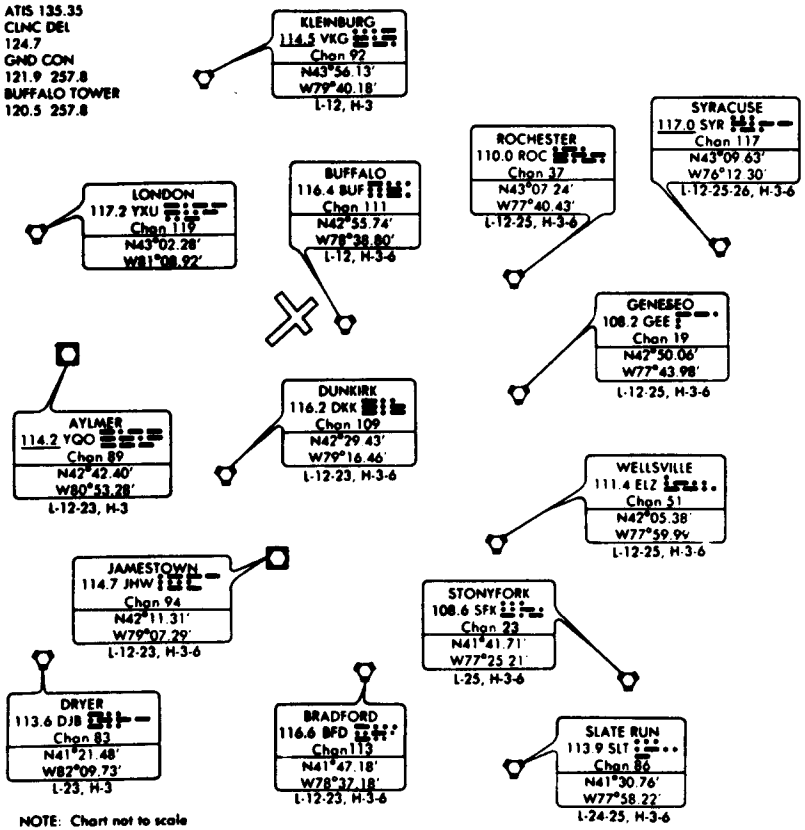
TIME	FUEL (LB)	
		EN ROUTE
		RESERVE
		ALTERNATE
		TOTAL

FIGURE 119.—Flight Plan/Flight Log.

90347 SL-65 (FAA)

BUFFALO ONE DEPARTURE (VECTOR)

BUFFALO/GREATER BUFFALO INTL
BUFFALO, NEW YORK



DEPARTURE ROUTE DESCRIPTION

All aircraft cleared as filed. Expect vectors to filed route or depicted fix. Maintain 10,000′ or assigned lower altitude. Expect further clearance to requested altitude/flight level ten minutes after departure.

All Runways: Maintain runway heading for vectors.

BUFFALO ONE DEPARTURE (VECTOR)

BUFFALO, NEW YORK
BUFFALO/GREATER BUFFALO INTL

NEW YORK

BUFFALO

§ **BUFFALO AIRFIELD** (9G0) 6.1 SE UTC-5(-4DT) 42°51′40″N 78°43′00″W — DETROIT L-12H IAP

670 B S2 FUEL 80, 100LL

RWY 06-24: H2665X60 (ASPH) S-8 MIRL

RWY 06: Trees. RWY 24: Tree.

AIRPORT REMARKS: Attended daylight hours. CAUTION: Ultralight activity on arpt. Airport lgts opr dusk-0700Z‡. For runway lights after 0700Z‡ phone 716-668-4900.

COMMUNICATIONS: CTAF/UNICOM 122.8

BUFFALO FSS (BUF) LC 631-9830. NOTAM FILE BUF.

Ⓡ BUFFALO APP DEP/CON 123.8

RADIO AIDS TO NAVIGATION: NOTAM FILE BUF.

BUFFALO (H) VORTAC 116.4 BUF Chan 111 42°55′44″N 78°38′48″W 225° 4.9 NM to fld. 730/08W.

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§ **GREATER BUFFALO INTL** (BUF) 5.2 E UTC-5(-4DT) 42°56′26″N 78°43′57″W — DETROIT H-3C, 6I, L-12H IAP

724 B S4 FUEL 100LL, JET A OX 1, 2, 3, 4 LRA CFR Index D

RWY 05-23: H8102X150 (ASPH-GRVD) S-75, D-195, DT-450 HIRL CL 0.6% up NE

RWY 05: SSALR. TDZ. Thld dsplcd 335′. Pole. RWY 23: SSALR. TDZ.

RWY 14-32: H5376X150 (ASPH) S-75, D-100, DT-160 MIRL 0.3% up SE.

RWY 14: VASI(V4L)—GA 3.0°TCH 55′. Tree. RWY 32: REIL. VASI(V4L)—GA 3.0°TCH 55′. Fence.

AIRPORT REMARKS: Attended continuously. Landing fee. CAUTION-Jet engine test stand located approximately 3600′ from approach end Rwy 32 1400′ south center line . Jet exhaust may reach altitude 100′ AGL. Ops conducted occasionally 1300-2300Z‡. CAUTION: Numerous types of birds may be encountered in holding pattern over Grand Island up to 5000′. Heavy concentration of Gulls, Blackbirds, and Starlings up to 5000′ on and in vicinity of arpt. Deer on and in vicinity of arpt. Flight Notification Service (ADCUS) available.

WEATHER DATA SOURCES: LLWAS.

COMMUNICATIONS: ATIS 135.35 UNICOM 122.95

BUFFALO FSS (BUF) on arpt. 122.6 122.2 122.1R 116.4T DL NOTAM FILE BUF.

Ⓡ BUFFALO APP DEP/CON 123.8 (055°-194°) 126.5 (195°-279°) 126.15 (280°-054°)

BUFFALO TOWER 120.5 GND CON 121.9

CLNC DEL 124.7 PRE-TAXI CLNC 124.7

ARSA ctc APP CON

RADIO AIDS TO NAVIGATION: NOTAM FILE BUF.

BUFFALO (H) VORTAC 116.4 BUF Chan 111 42°55′44″N 78°38′48″W 288° 3.5 NM to fld. 730/08W.

KLUMP NDB (LOM) 231 BU 43°00′01″N 78°39′04″W 233° 4.4 NM to fld.

PLAZZ NDB (LOM) 204 GB 42°52′26″N 78°49′00″W 053° 4.8 NM to fld.

ILS 111.3 I-BUF Rwy 23 LOM KLUMP NDB. Inner marker out of svc indefinitely. Back course unusable beyond 15 NM.

ILS 108.5 I-GBI Rwy 05 LOM PLAZZ NDB.

ASR

FIGURE 120.—Buffalo One Departure (Vector).

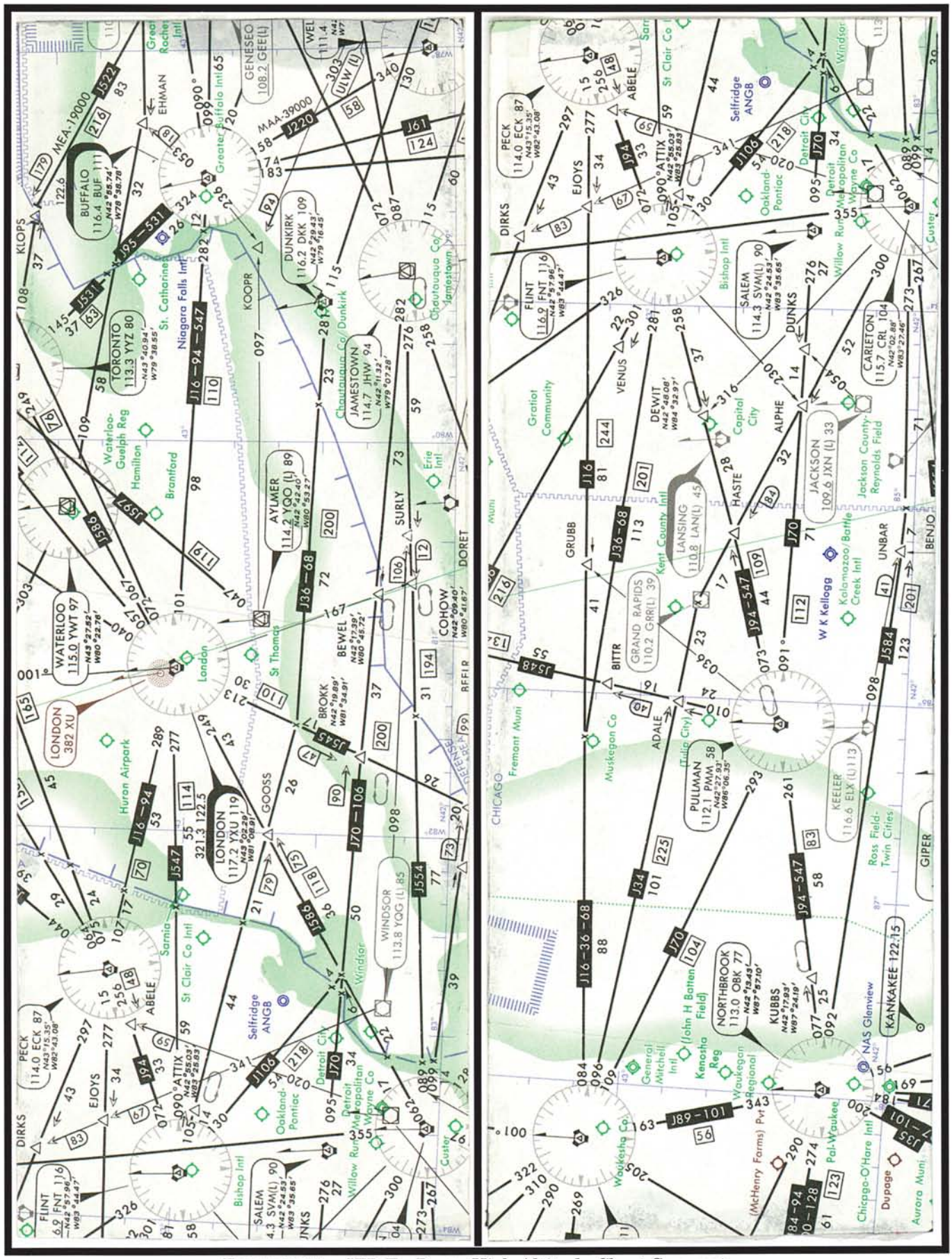


FIGURE 121.—IFR En Route High Altitude Chart Segment.

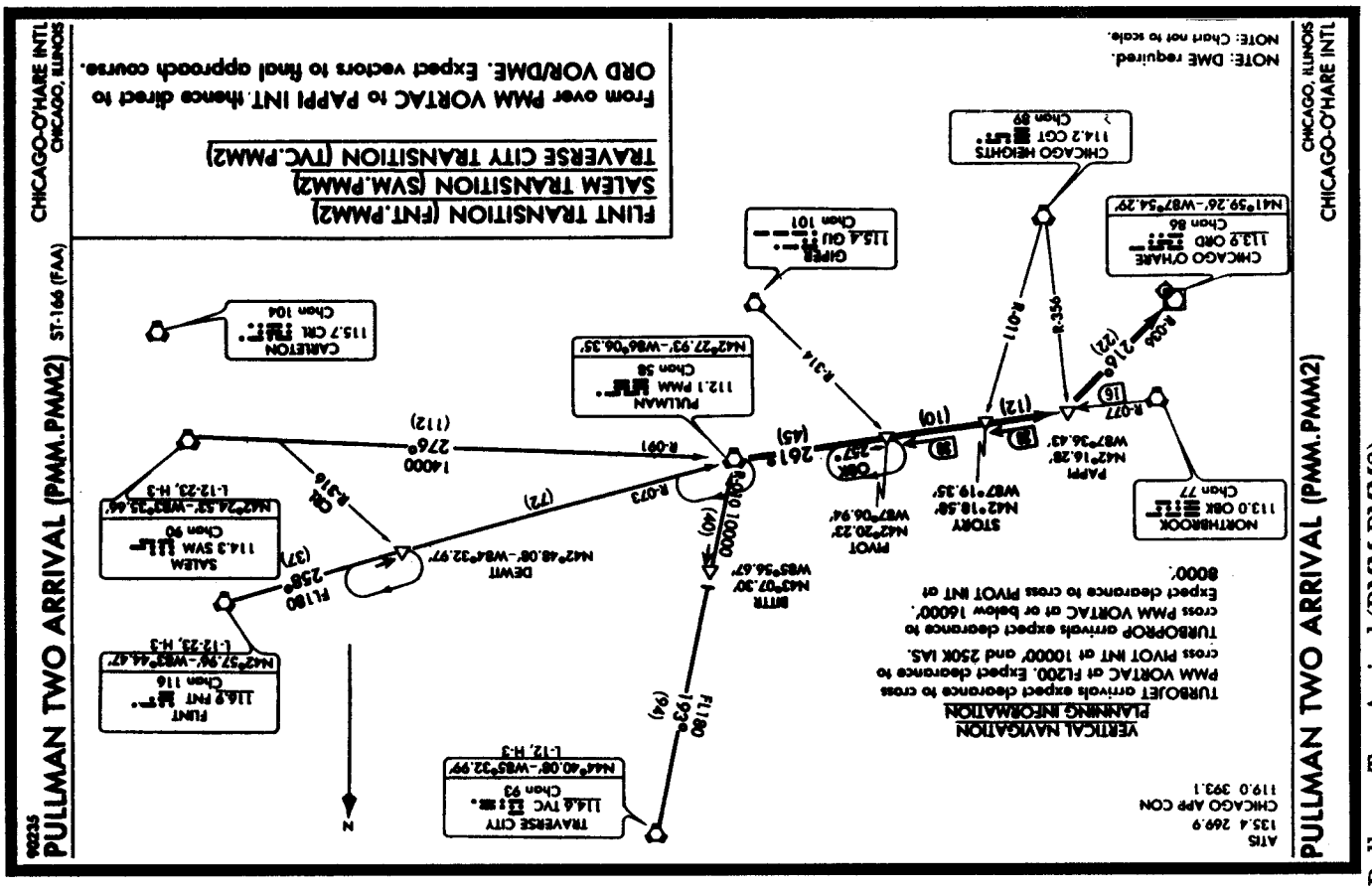


FIGURE 122.—ILS RWY 32L (ORD) / Pullman Two Arrival (PMM.PMM2).

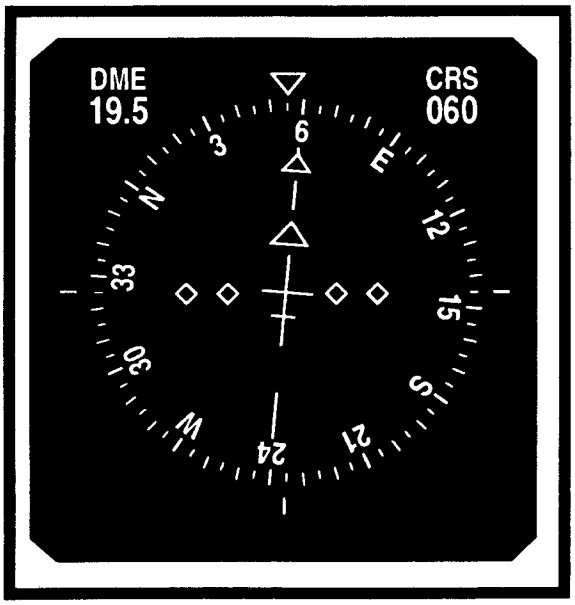


FIGURE 123.—Aircraft Course and DME Indicator.

FIGURE 124.—Aircraft Course and DME Indicator.

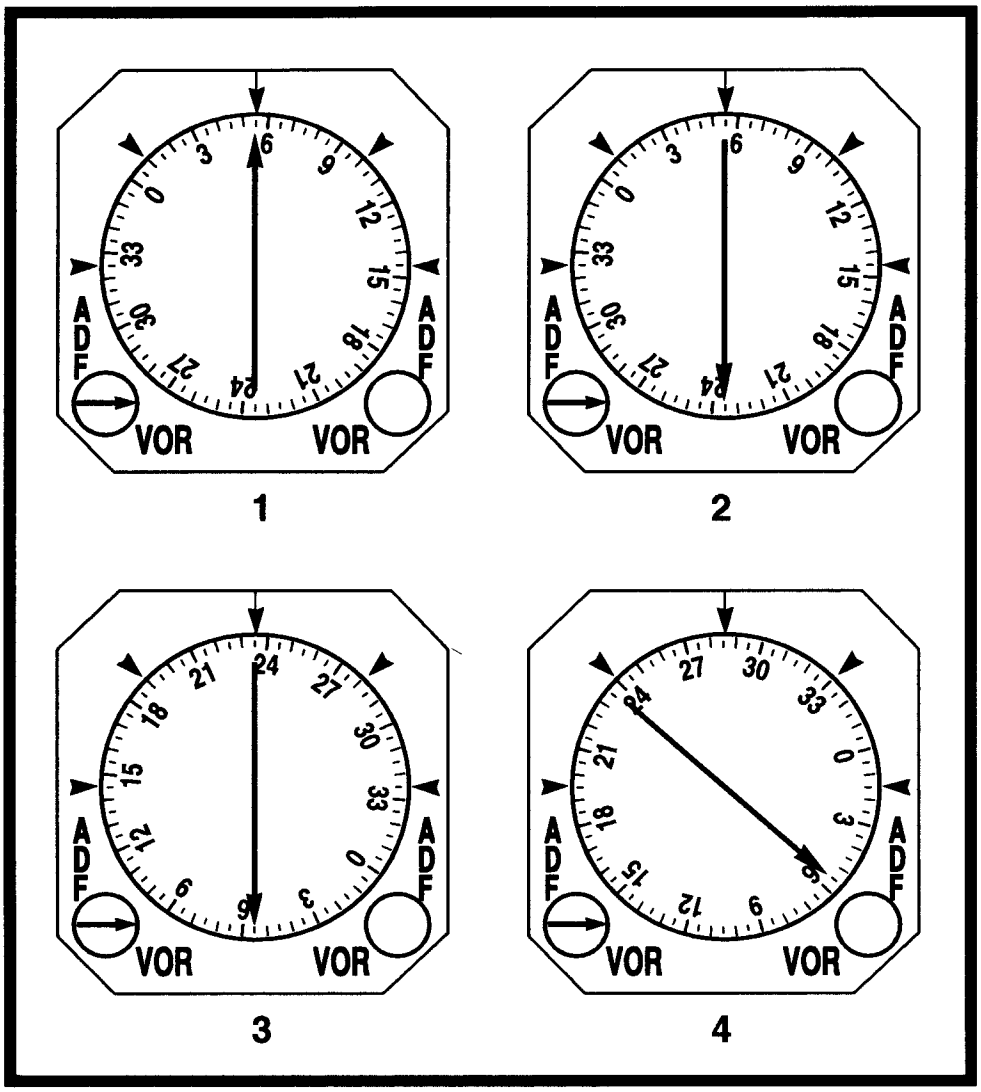
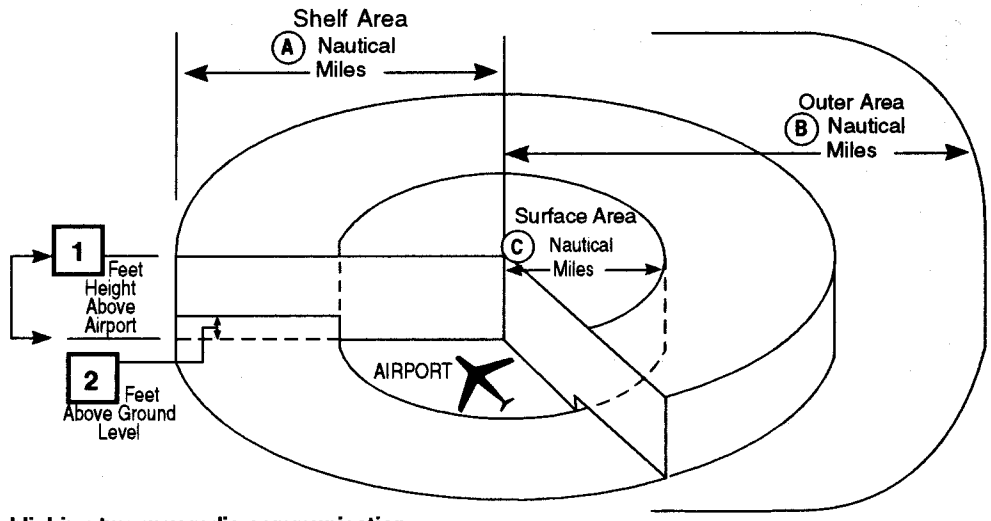


FIGURE 125.—RMI Illustrations.

Class C Airspace



Services upon establishing two-way radio communication and radar contact:
Sequencing Arrivals
IFR/VFR Standard Separation
IFR/VFR Traffic Advisories and Conflict Resolution
VFR/VFR Traffic Advisories

IFR: Instrument Flight Rules
VFR: Visual Flight Rules

FIGURE 126.—Class C Airspace.

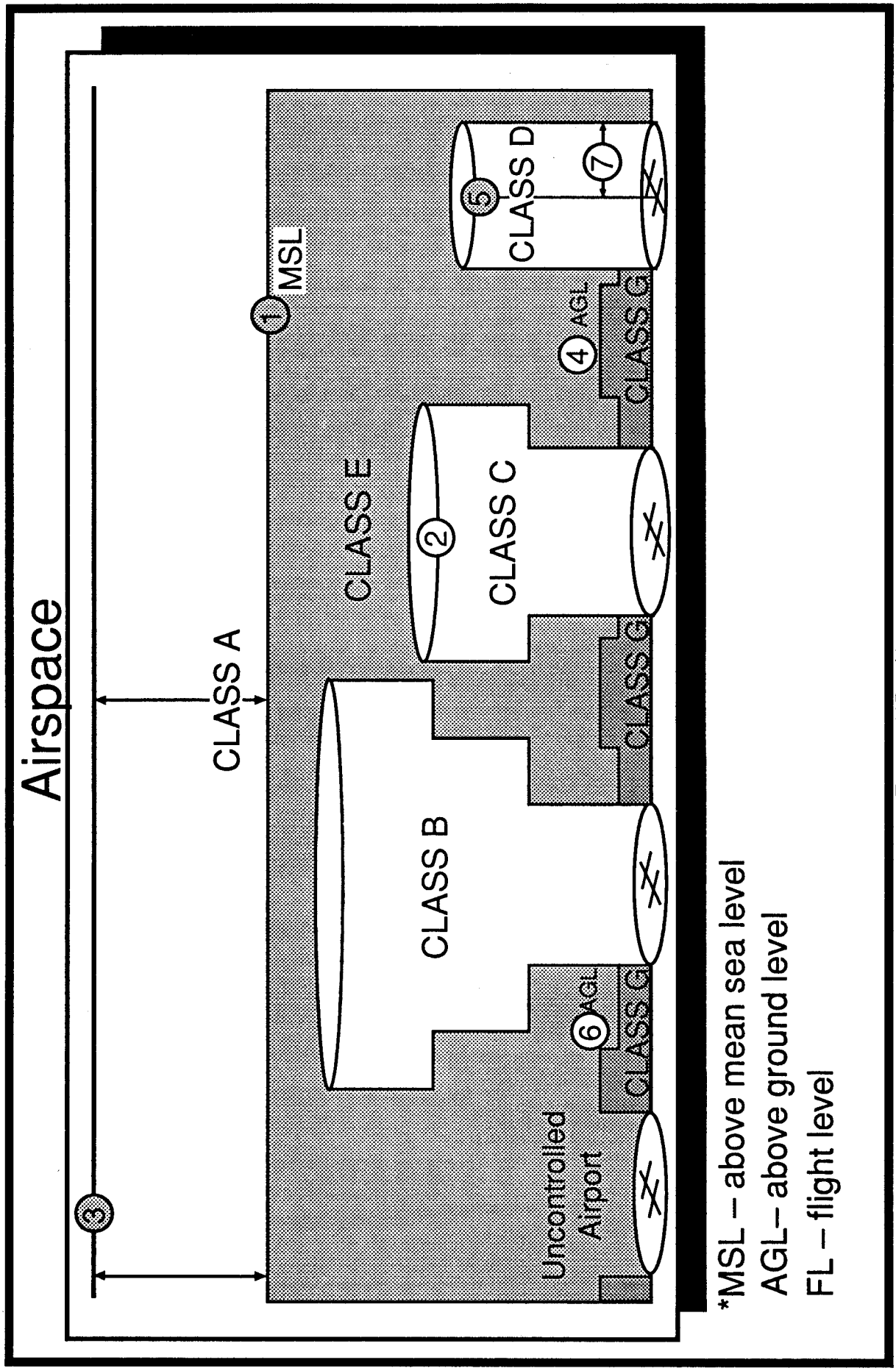


FIGURE 127.—Airspace.

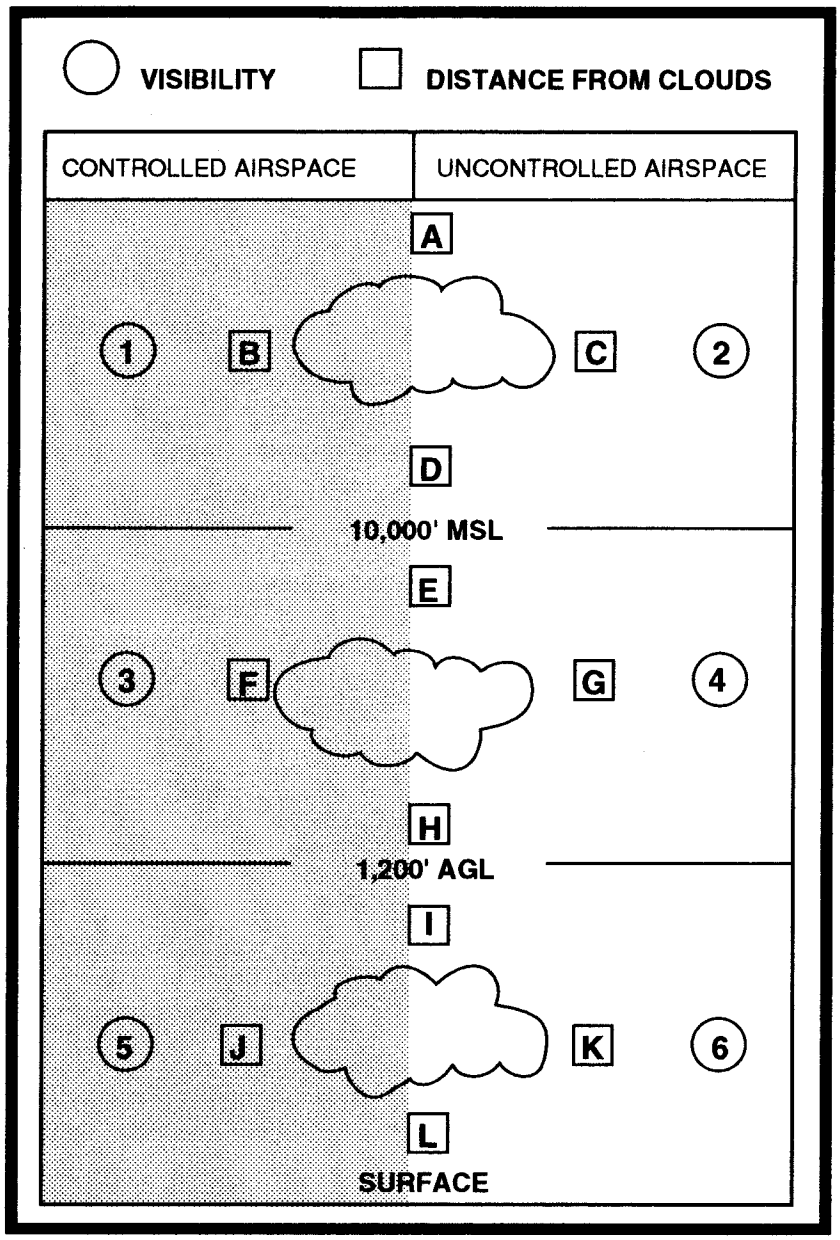


FIGURE 128.—Minimum In-Flight Visibility and Distance From Clouds.

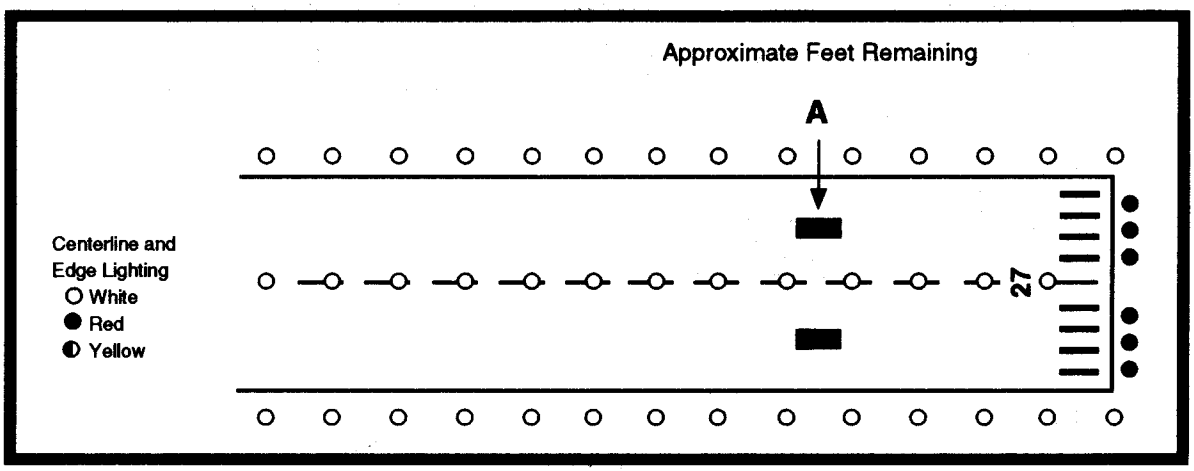


FIGURE 129.—FAA Nonprecision Approach Runway Markings and Lighting.

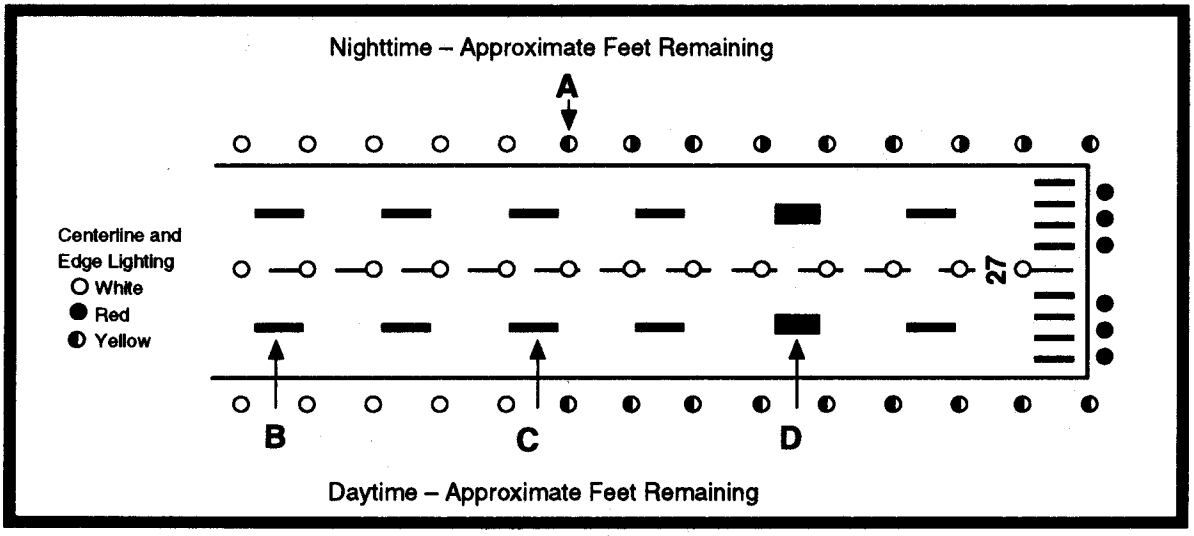


FIGURE 130.—ICAO Nonprecision Approach Runway Markings and Lighting.

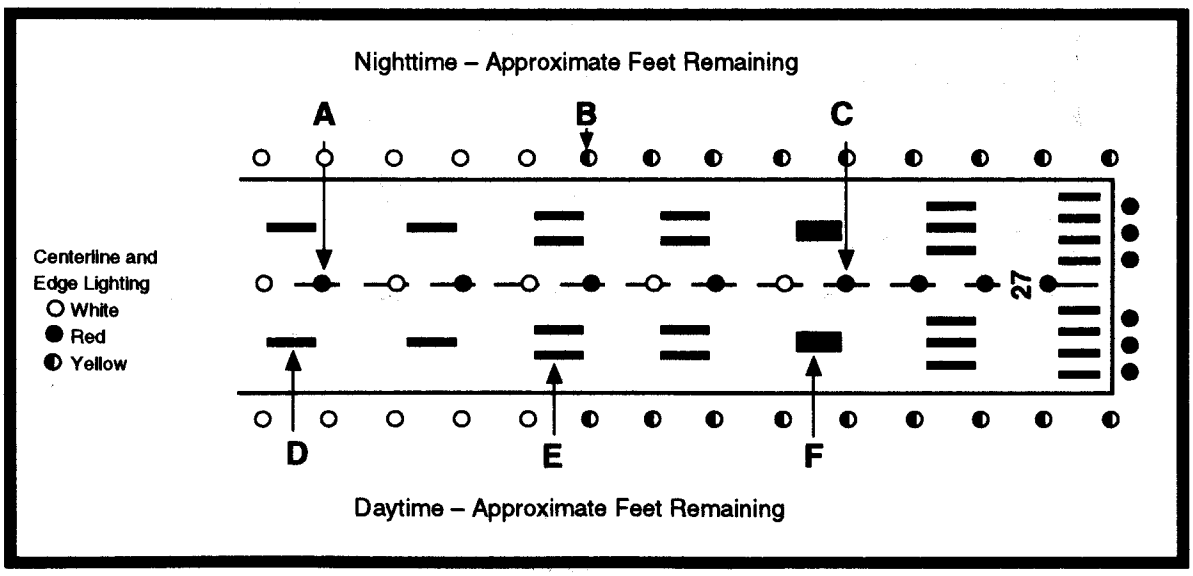
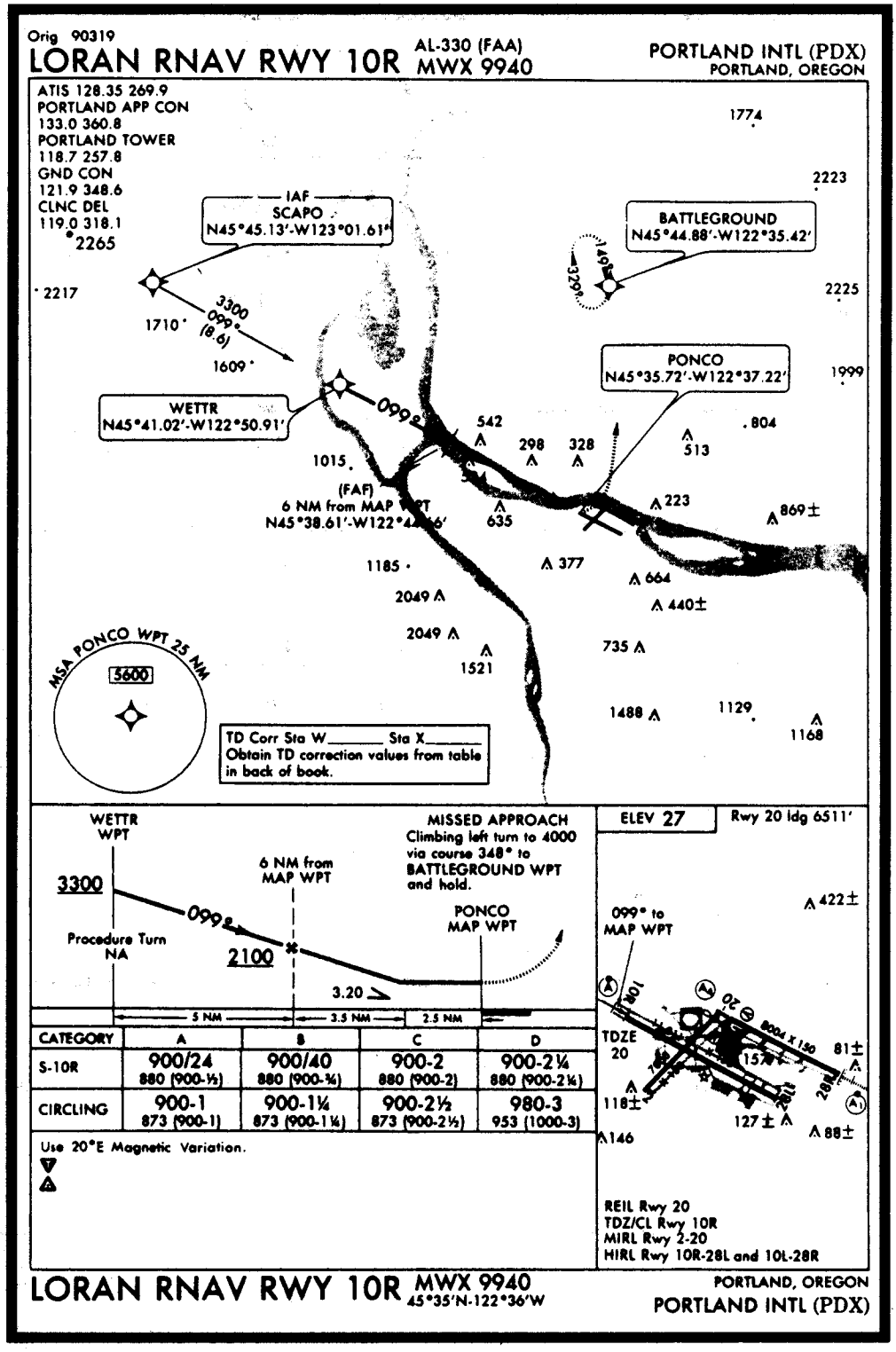


FIGURE 131.—FAA ICAO Precision Approach Runway Markings and Lighting.



CATEGORY	A	B	C	D
S-10R	900/24 880 (900-½)	900/40 880 (900-¾)	900-2 880 (900-2)	900-2¼ 880 (900-2¼)
CIRCLING	900-1 873 (900-1)	900-1¼ 873 (900-1¼)	900-2½ 873 (900-2½)	980-3 953 (1000-3)

Use 20°E Magnetic Variation.

FIGURE 132.—LORAN RNAV RWY 10R – MWX 9940 – (PDX).

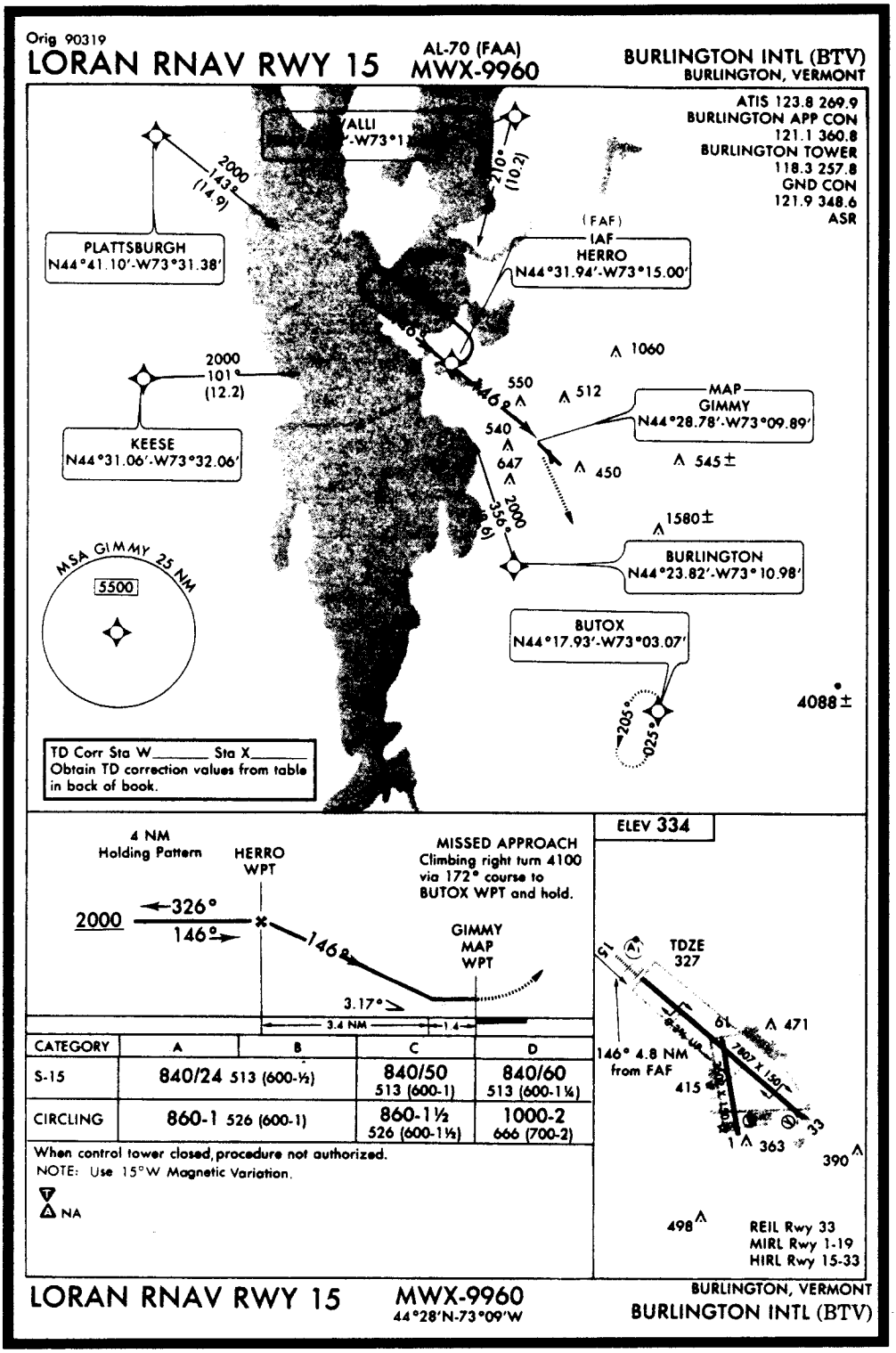


FIGURE 133.—LORAN RNAV RWY 15 – MWX-9960 – (BTV).

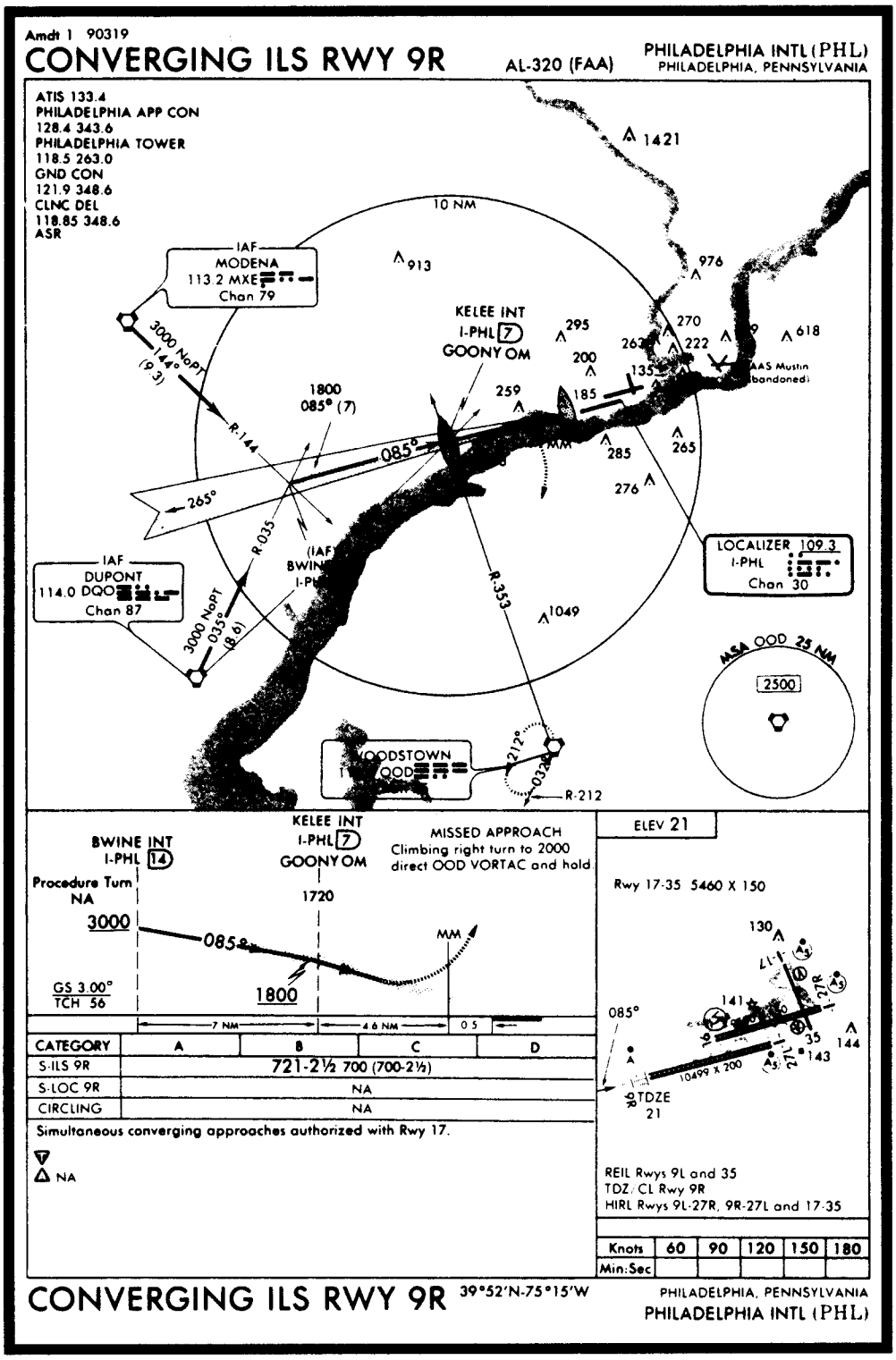


FIGURE 134.—Converging ILS RWY 9R (PHL).

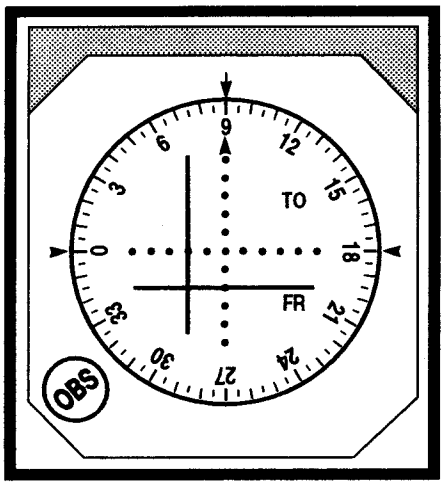


FIGURE 135.—OBS, ILS, and GS Displacement.

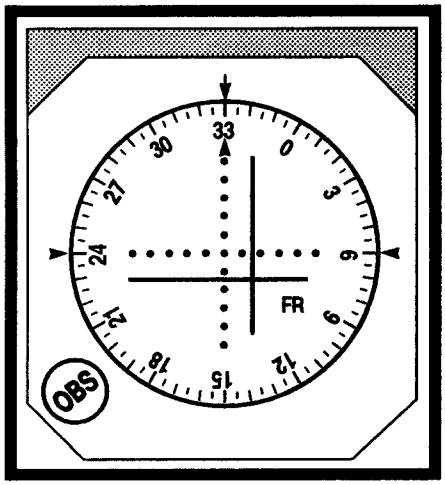


FIGURE 136.—OBS, ILS, and GS Displacement.

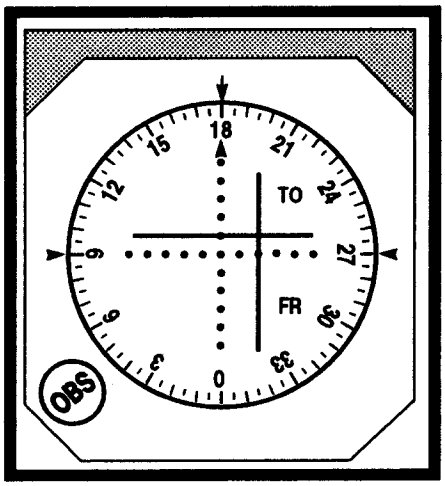


FIGURE 137.—OBS, ILS, and GS Displacement.

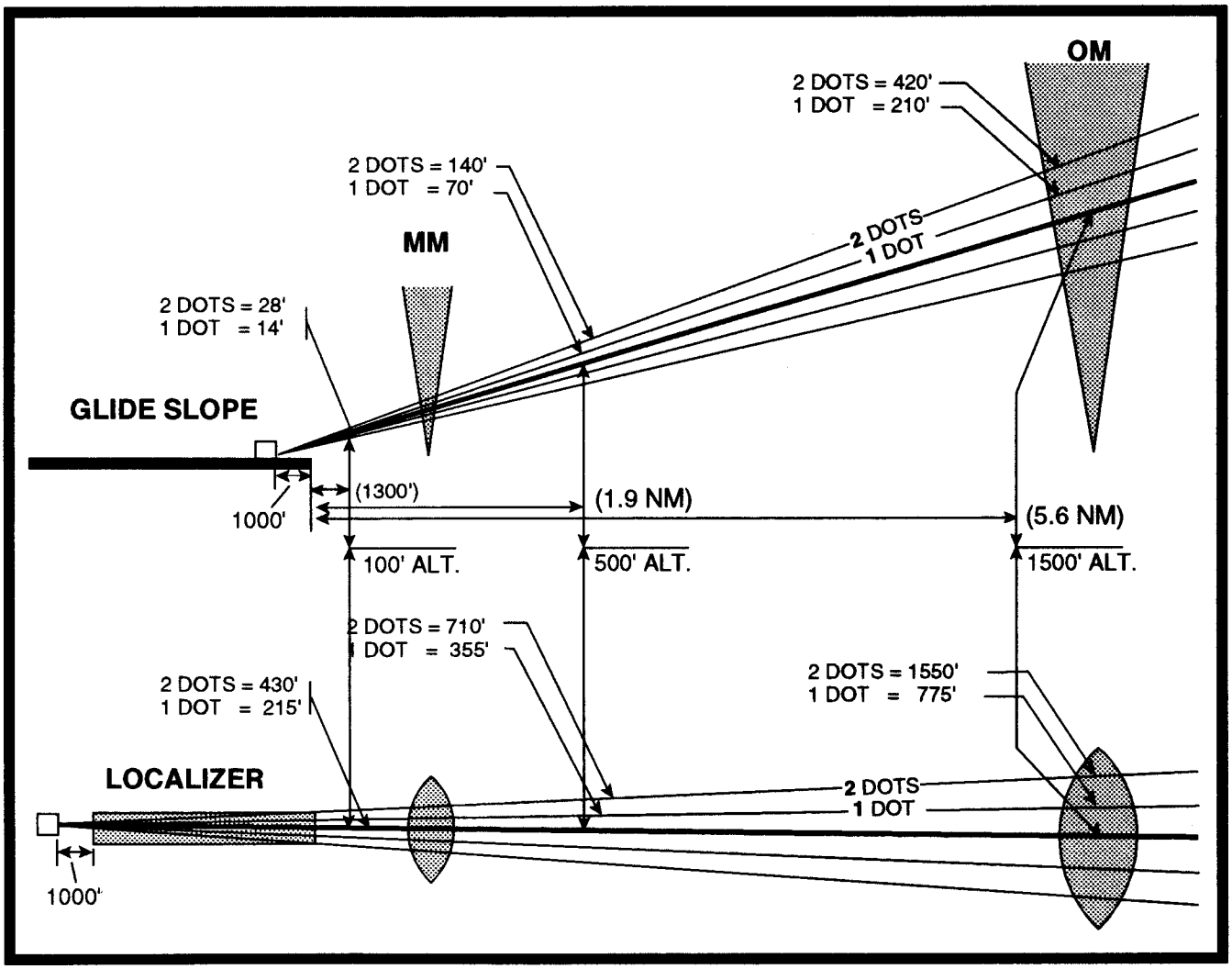


FIGURE 138.—Glide Slope and Localizer Illustration.

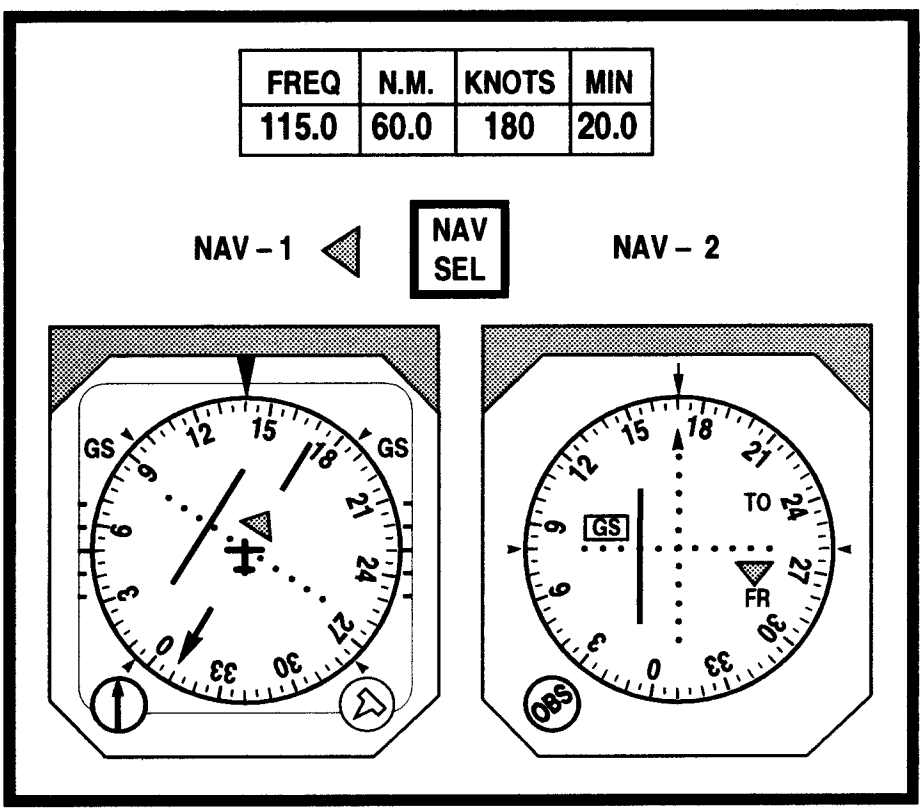


FIGURE 139.—No. 1 and No. 2 NAV Presentation.

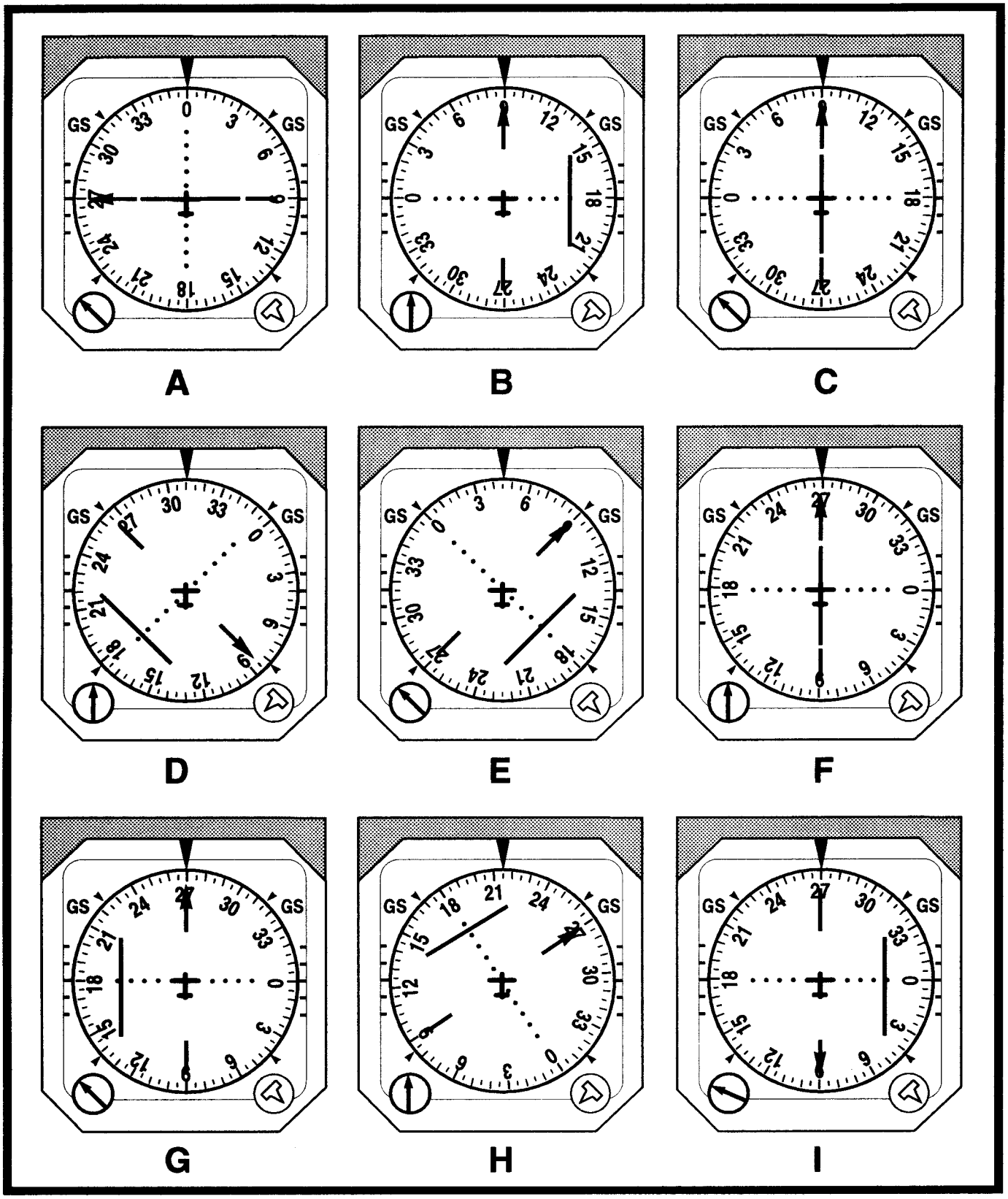


FIGURE 140.—HSI Presentation.

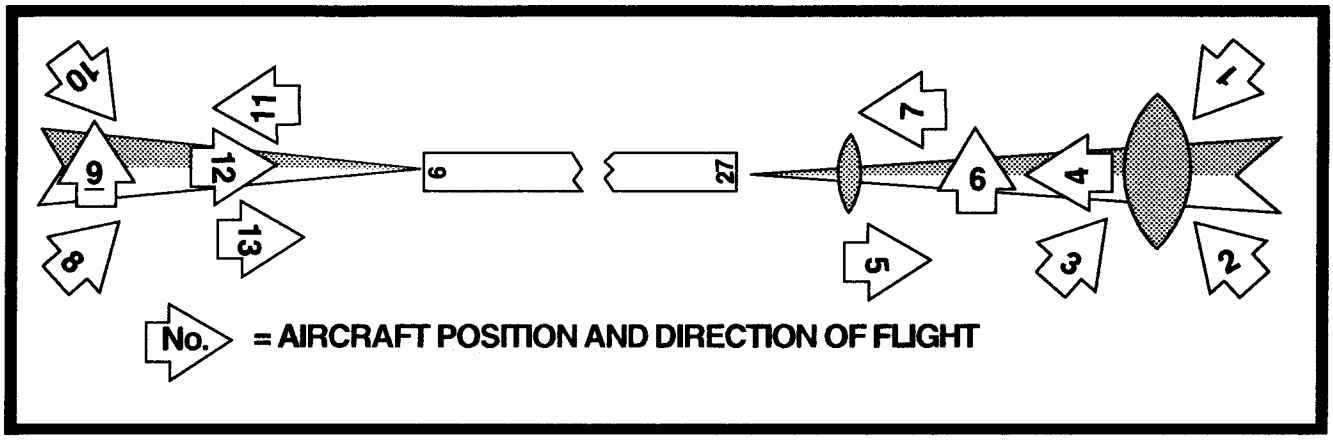


FIGURE 141.—Aircraft Position and Direction of Flight.

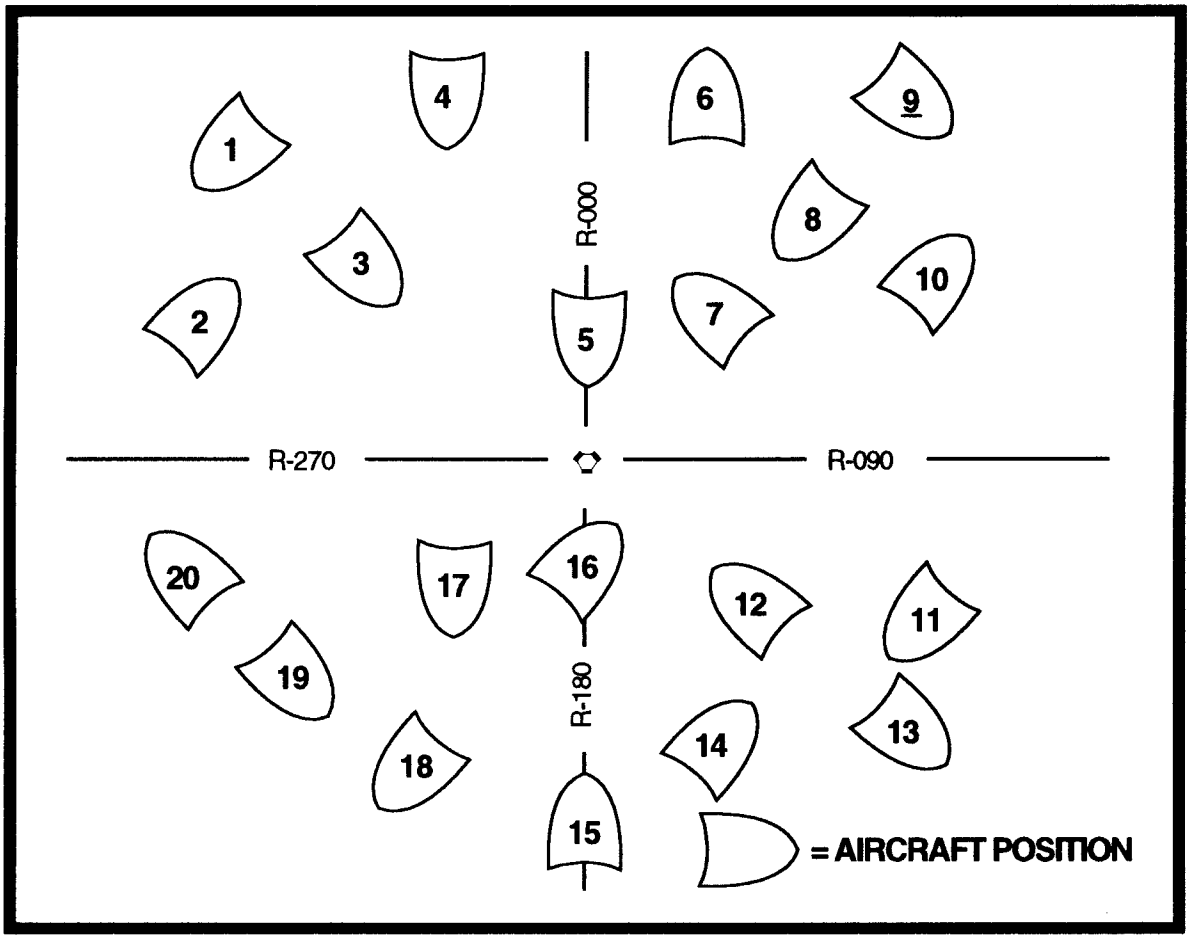


FIGURE 142.—Aircraft Position.

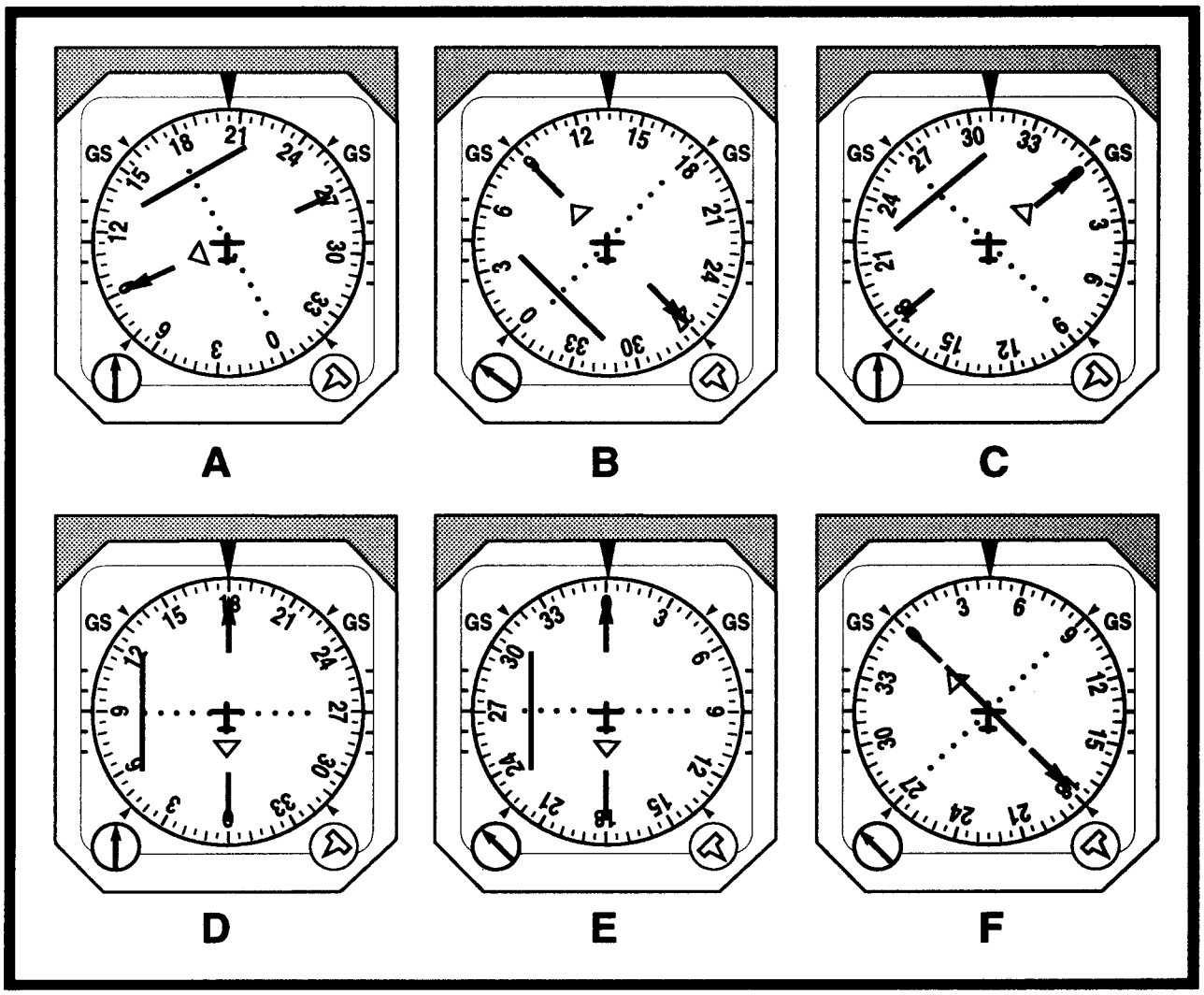


FIGURE 143.—HSI Presentation.

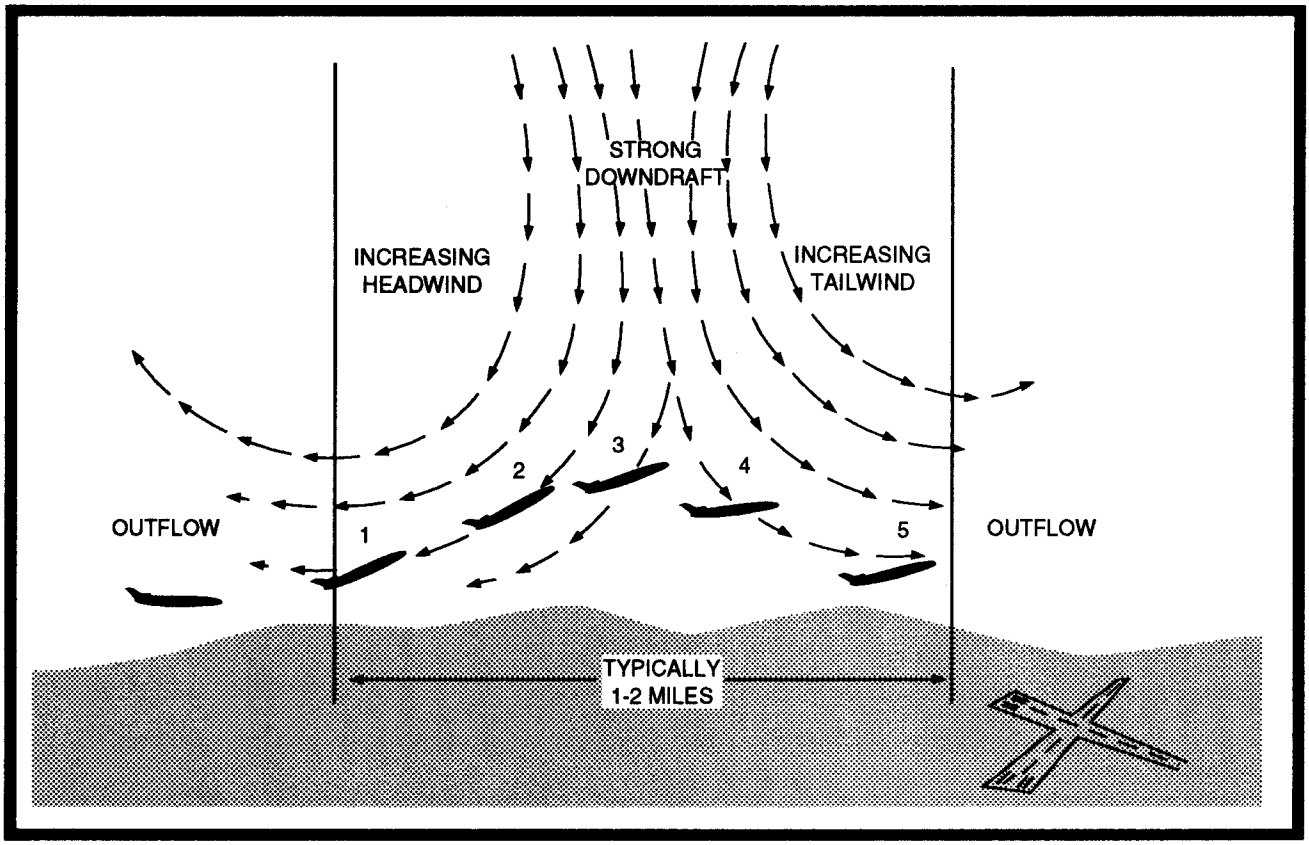


FIGURE 144.—Microburst Section Chart.

AVIATION ROUTINE WEATHER REPORTS (METAR)

TX

METAR KAMA 131755Z 33025G35KT 3/4SM IC OVC003 M02/M01 A2952 RMK PK WND 32039/43 WSHFT 1735 PRESFR P0003.

METAR KAUS 131753Z 19011G17KT 8SM SCT040 BKN250 31/21 A3006 RMK SLPNO.

METAR KBPT 131755Z 17004KT 7SM FEW001 SCT030 BKN250 34/23 A2979 RMK VIS E 2.

METAR KBRO 131755Z 14015KT 6SM HZ SCT034 OVC250 34/30 A2985 RMK PRESRR.

METAR KCDS 131758Z 11013KT 7SM -SHRA OVC180 23/21 A3012 RMK RAB42 VIRGA SW.

METAR KCLL 131749Z 21011KT 7SM SCT003 BKN025 OVC100 34/21 A3008 RMK BKN025 V OVC.

METAR KCOT 131749Z 13010KT 10SM SCT040 SCT200 31/21 A3002 RMK RAE24.

METAR KCRP 131753Z 16016KT 10SM SCT028 BKN250 32/24 A3003.

METAR KDAL 131755Z 16005KT 7SM SCT023 OVC100 30/22 A3007.

METAR KDFW 131800Z 17007KT 10SM SCT035 OVC120 29/20 A3008.

METAR KDHT 131756Z 04014KT 15SM BKN025 22/15 A3026.

METAR KDRT 131756Z 12012KT 10SM FEW006 SCT020 BKN100 OVC250 29/22 A3000 RMK CONS LTG DSTN ESE TS SE MOVG NW VIRGA W.

METAR KELP 131755Z 09007KT 60SM VCBLDU FEW070 SCT170 BKN210 29/13 A3015.

METAR KFTW 131750Z 18007KT 7SM SCT025 OVC100 29/20 A3008.

FTW 131815Z UA /OV DFW/TM 1803/FL095/TP PA30/SK 036 OVC 060/075 OVC/RM TOPS UNKN.

METAR KGGG 131745Z 15008KT 15SM SKC 32/21 A3011.

METAR KGLS 131750Z VRB04KT 6SM VCSH SCT041 BKN093 26/22 A2995.

SPECI KGLS 131802Z 10012G21KT 060V140 2SM +SHRA SCT005 BKN035 OVC050CB 24/23 A2980 RMK RAB57 WSHFT 58 FROPA

METAR KHOU 131752Z 15008KT 7SM SCT030 OVC250 31/27 A3008.

METAR KHRL 131753Z 14015KT 8SM SKC 30/25 A3010.

METAR KIAH 131755Z VRB03KT 1/4SM R33L/1200FT BCFG VV007 27/26 A3005.

METAR KINK 131755Z 04027G36KT 2SM BLSA PO OVC015TCU 24/13 A2985.

METAR KLBB 131750Z 06029G43KT 1SM BLSNDU SQ VV010 03/M01 A2949.

LBB 131808Z UUA /OV LBB /TM 1800 /FL UNKN /TP B737 /TB MDT /RM LLWS -17 KT SFC-010 DURC RWY 36 LBB.

SPECI KLBB 131818Z 35031G40KT 1/2SM FZDZ VV030 M01/M01 A2946 RMK WSHFT 12 FROPA.

LBB 131821Z UUA /OV LBB/TM1817/FL011/TP B727/SK UNKN OVC/TA -06 /TB MOD/IC MDT CLR.

METAR KLFK 131756Z 24007KT 7SM BKN100 33/19 A3008.

METAR KMAF 131756Z 02020KT 12SM BKN025 OVC250 27/18 A3009 RMK RAE44.

METAR KMFE 131756Z 13015KT 7SM BKN125 33/19 A2998.

METAR KMRF 131752Z 09012G20KT 60SM SKC 28/14 A3000.

MRF 131801Z UUA/OV MRF/TM1758/FL450/TP B767/TB MDT CAT.

FIGURE 145.—Aviation Routine Weather Reports (METAR).

AVIATION ROUTINE WEATHER REPORTS (METAR)

TX

METAR KABI 131755Z AUTO 21016G24KT 180V240 1SM R11/P6000FT -RA BR BKN015 OVC025 19/15 A2990 RMK AO2 PK WND 20035/25 WSHFT 1715 VIS 3/4V1 1/2 VIS 3/4 RWY11 RAB07 CIG 013V 017 CIG 014 RWY11 PRESFR SLP125 P0003 60009 T01940154 10196 20172 58033 TSNO $.

METAR KMWL 131756Z 13011KT 10SM BKN011 OVC050 25/23 A3006.

METAR KPSX 131755Z 20010KT 7SM SCT018 OVC200 31/24 A3007.

METAR KPVW 131750Z 05006KT 10SM SCT012 OVC030 30/20 A3011 RMK RAE47.

METAR KSAT 131756Z 15016KT 7SM SCT028 OVC250 30/20 A3005.

SAT 131756Z UA /OV SAT/TM 1739Z/ FL UNKN/TP UNKN/SK OVC 040.

METAR KSJT 131755Z 22012KT 7SM BKN018 OVC070 25/23 A3002.

METAR KSPS 131757Z 09014KT 6SM -RA SCT025 OVC090 24/22 A3005.

SPECI KSPS 131820Z 01025KT 2SM +RA OVC015TCU 22/21 A3000 RMK DSNT TORNADO B15 N MOV E.

SPS 131820Z UA/OV SPS/TM 1818/FL090/TP C402/SK OVC 075.

METAR KTPL 131751Z 17015KT 15SM SCT015 SCT100 OVC250 31/20 A3007.

METAR KTYR 131753Z AUTO 26029G41KT 2SM +TSRA BKN008 OVC020 31/24 A3001 RMK A02 TSB44 RAB46.

METAR KVCT 131755Z 17013KT 7SM SCT030 OVC250 30/24 A3005.

AR

METAR KARG 131753Z AUTO 22015G25KT 3/4SM R28/2400FT +RA OVC010 29/28 A2985 RMK AO2.

METAR KELD 131755Z 06005G10KT 3SM FU BKN050 OVC100 30/21 A3010.

METAR KFSM 131756Z 00000KT 5SM SKC 30/20 A2982.

FSM 131830Z UA/OV HRO-FSM/TM 1825/FL290/TP B737/SK SCT 290.

METAR KFYV 131755Z 170018G32KT 2SM +TSRA SQ SCT030 BKN060OVC100CB 28/21 A2978 RMK RAB47.

FYV 131801Z UA/OV 1 E DAK/TM 1755Z/FL 001/TP CV440/RM WS LND RWY16 FYV.

METAR KHOT 131751Z 34006KT 18SM SCT040 OVC150 32/18 A3010.

METAR KHRO 131753Z 09007KT 7SM FEW020 BKN040CB 30/27 A3001.

SPECI KHRO 131815Z 13017G26KT 2SM +TSRA SCT020 BKN045TCU 29/24A2983 RMK RAB12 FRQ LTGICCG VC PRESFR.

HRO 131830Z UUA/OV 6 S HRO/TM 1825Z/FL 001/TP DC6/RM WS TKO RWY 18.

METAR KLIT 131754Z 07004KT 10SM SCT030 BKN250 34/29 A3007.

METAR KPBF 131753Z 29007KT 5SM SCT040 BKN100 35/19 A3008.

METAR KTXK 131753Z 25003KT 7SM SCT100 BKN200 33/19 A3010.

FIGURE 146.—Aviation Routine Weather Reports (METAR).

INTERNATIONAL TERMINAL AERODROME FORECASTS (TAF)

TX

TAF
KALI 031745Z 031818 14015KT 6SM HZ BKN012
FM2000 15015G25KT P6SM BKN030 WS009/02045KT
FM2200 16011G21KT 4SM SCT040 BKN250 TEMPO 2301 3SM TSGS BKN020
FM0100 13015KT 5SM SCT015
FM0700 12008KT 5SM BKN008 BECMG 0912 3SM BKN015

TAF
KAMA 031745Z 031818 05012KT 5SM RA BR BKN010 BKN080 TEMPO1803 03015KT 2SM +TSRA OVC010
FM0400 03015KT 3SM BKN020 OVC080 TEMPO 0410 2SM +TSRA OVC010
FM1100 03012KT 5SM RA BR OVC010 BECMG 1618 1/2SM RA FG OVC008

TAF
KAUS 031745Z COR 031818 17010KT P6SM BKN025 OVC100
FM2100 15008KT 4SM BKN030 OVC100 TEMPO 2223 1SM TSPE OVC010
FM0100 16005KT 5SM BKN014 TEMPO 0809 1SM +TSRA BKN014 BECMG 1214 3SM TSRA BKN020
FM1500 17008KT 5SM SCT050

TAF
KCRP 031745Z 031818 15015G20KT P6SM SCT020 BKN250
FM2300 16015G25KT 4SM SCT030 BKN250 TEMPO 0001 TSRA
FM0100 16015KT 2SM BKN015 BECMG 0911 5SM SCT030

TAF
KDAL 031745Z 031818 00000KT P6SM SCT030 BKN100
FM2200 17007KT 5SM BR BKN030 OVC100 PROB40 0002 2SM TSRA OVC010
FM0200 09005KT 4SM -RA BKN020 PROB30 0407 3SM TSRA
FM0700 07004KT 1/2SM FG OVC002 BECMG 0912 3SM TSRA SCT040

TAF AMD
KDRT 031745Z 031818 14010KT P6SM OVC014
FM1900 VBR05KT 5SM BKN020 OVC100 TEMPO 2021 2SM +TSRA
FM2300 14012KT 5SM HZ BKN030 BKN100 PROB40 0205 3SM TSRA BKN020
FM0500 27006KT 6SM BR SCT035 BKN080 TEMPO 0709 2SM FU BR BKN020
FM1000 00000KT 4SM OVC030 BECMG 1416 3SM TSRA OVC020

TAF
KELP 031745Z 031818 08012KT P6SM SCT070 SCT100
FM2000 13010KT 6SM SCT070 BKN120 TEMPO 2223 15026G35KT 3SM BLSA BKN050
FM0600 07012KT 5SM BKN070 PROB40 0709 2SM -TSRA BKN025
FM1200 07020G34KT 1SM +TSRA BKN020CB WS008/25040KT

TAF
KHOU 031745Z 031818 18010KT 6SM HZ SCT020
FM2100 18015KT 4SM HZ SCT035 SCT250
FM0100 19010KT 3SM HZ SCT 250
FM0700 20005KT 1SM BR FU BKN005 OVC025
FM1300 13007KT 4SM HZ BKN040

TAF
KIAH 031745Z 031818 18010KT 5SM HZ SCT020
FM2000 16008KT 4SM HZ SCT015 SCT250
FM0500 17012KT 1SM BR FU BKN008 OVC020
FM1000 00000KT 1/4SM -RA FG BKN010 OVC031
FM1400 14005KT 5SM BKN004 OVC080 BECMG 1618 NSW

TAF
KINK 031745Z 031818 10010KT P6SM SCT020 SCT100
FM2100 08013KT 3SM DZ BKN025 BKN080 PROB40 0002 06026G35KT1SM +TSRAGR
FM0400 05019KT 2SM DU BKN020 OVC050 PROB40 0709 1SM +TSRA FEW002 OVC010
FM0900 02004KT 1/2SM RA FG SCT025 BKN045 OVC100CB
FM1400 34035G45KT 2SM SS SKC

FIGURE 147.—International Terminal Aerodrome Forecasts (TAF).

INTERNATIONAL TERMINAL AERODROME FORECASTS (TAF), CONTINUED

```
TAF
KLBB 031745Z 031818 06012KT 3SM -TSRA SCT010 OVC020
     FM2100 04015KT 5SM BR BKN020 OVC060 PROB40 0103 06025G35KT 1/8SM +SHRASNPE OVC003
     FM0400 05018KT 3SM -RA BR OVC010 PROB30 0608 07020KT 1SM +TSRA
     FM0900 00000KT 1/4SM -RA FG VV002
     FM1300 01005G12KT 1SM FZRA
     FM1600 VBR04KT 1/8SM FG VV001

TAF
KSAT 031745Z 031818 17010KT 6SM HZ BKN016 OVC030
     FM2000 17015KT P6SM BKN025
     FM2200 19012KT 4SM FU BKN030 OVC250 PROB40 0104 07020G30KT 3SM TSRA BKN020
     FM0500 12015KT 3SM SG BKN010 BKN035  PROB40 0709 05015G23KT 1SM +TSRA OVC010
     FM1000 35008G16KT 4SM BLSN OVC020

TAF
KSJT 031745Z 031818 12012KT 6SM HZ BKN016
     FM2000 17018KT 4SM BR BKN025
     FM2200 14020G28KT 3SM GS BKN030 OVC250 PROB40 0103 16025G32KT 1SM +TSRA OVC008CB
     FM0900 17020G34KT 2SM RA BR OVC010CB

TAF
KSPS 031745Z 031818 07012KT 4SM -RA FG SCT030 BKN080 TEMPO 0203 09022G30KT 1SM FZDZ OVC020
     FM0900 05015KT 2SM BR SCT001 BKN005 OVC010 SNRA WS090/09035KT
```

FIGURE 147.—International Terminal Aerodrome Forecasts (TAF), Continued.

CONVECTIVE SIGMET

```
MKCC WST Ø31755
CONVECTIVE SIGMET 42C
VALID UNTIL 1955Z
TX OK
FROM 5W MLC–PEQ–SJT–5W MLC
AREA SCT EMBDD TSTMS MOVG LTL. TOPS 3ØØ.

CONVECTIVE SIGMET 43C
VALID UNTIL 1955Z
CO KS OK
FROM AKO–OSW–3ØWNW OKC–AKO
AREA SCT TSTMS OCNLY EMBDD MOVG FROM 322Ø. TOPS 38Ø.

CONVECTIVE SIGMET 44C
VALID UNTIL 1955Z
5ØNE MEM
ISOLD INSTD LVL5 TSTM DIAM 1Ø MOVG FROM 2625. TOP ABV 45Ø.

OUTLOOK VALID UNTIL 2355Z
TSTMS OVR TX AND SE OK WL MOV SEWD 15 KTS.
TSTMS OVER CO, KS, AND N OK WL CONT MOVG SEWD 2Ø KTS.
TSTM OVR TN WL CONT MOVG EWD 25 KTS.
```

FIGURE 148.—Convective Sigmet.

WINDS AND TEMPERATURES ALOFT FORECASTS

DATA BASED ON Ø312ØØZ
VALID Ø4ØØØØZ FOR USE 18ØØ–Ø3ØØZ. TEMPS NEG ABV 24ØØØ

FT	3ØØØ	6ØØØ	9ØØØ	12ØØØ	18ØØØ	24ØØØ	3ØØØØ	34ØØØ	39ØØØ
ABI		13Ø6+16	16Ø7+11	18Ø7+Ø6	21Ø8-Ø7	22Ø8-18	24Ø833	25Ø942	3ØØ753
ABO			Ø81Ø+14	Ø511+Ø8	3415-Ø6	322Ø-18	312333	312543	3Ø2554
AMA		Ø614	Ø814+1Ø	Ø7Ø9+Ø5	321Ø-Ø7	2914-19	281934	282243	292554
ATL	Ø9Ø6	99ØØ+17	99ØØ+12	Ø2Ø5+Ø7	35Ø7-Ø7	33Ø5-19	29Ø534	28Ø543	99ØØ54
BNA	99ØØ	99ØØ+17	32Ø5+12	31Ø9+Ø7	3Ø18-Ø7	2918-19	272134	262444	262855
BRO	151Ø	1614+2Ø	1611+14	17Ø8+Ø8	99ØØ-Ø7	99ØØ-19	99ØØ34	99ØØ43	99ØØ55
DAL	Ø91Ø	17Ø6+17	2ØØ9+11	2Ø11+Ø6	2Ø15-Ø8	2214-19	231333	241342	271153
DEN			99ØØ+Ø9	99ØØ+Ø4	3Ø2Ø-1Ø	3Ø29-21	3Ø3636	3Ø4145	294756
DSM	3615	3315+Ø7	3118+Ø4	3Ø22+ØØ	2835-12	2748-24	276438	277348	277957
ELP		Ø61Ø	Ø614+13	Ø615+Ø8	Ø113-Ø5	3614-17	361433	361442	251354
GCK		Ø611+11	Ø8Ø9+Ø8	99ØØ+Ø3	2817-Ø9	2823-2Ø	273135	273644	284155
HLC		Ø4Ø9+Ø9	Ø4Ø5+Ø7	31Ø6+Ø2	2822-1Ø	273Ø-21	273936	274545	275256
HOU	Ø9Ø9	16Ø7+19	16Ø6+13	16Ø6+Ø7	16Ø5-Ø8	99ØØ-2Ø	99ØØ34	99ØØ43	99ØØ54
ICT	Ø516	Ø613+12	Ø6Ø7+Ø8	99ØØ+Ø4	2718-Ø9	2626-2Ø	263635	264144	274655
IND	3611	32Ø7+12	2912+Ø8	2818+Ø3	2733-Ø9	2643-21	265635	265944	256255
INK		Ø6Ø9+16	Ø7Ø9+12	Ø6Ø8+Ø7	Ø1Ø7-Ø6	36Ø7-18	35Ø833	34Ø842	35Ø855
JAN	3612	3613+18	3611+13	36Ø9+Ø7	Ø1Ø5-Ø8	99ØØ-19	99ØØ34	99ØØ43	23Ø854
LIT	Ø31Ø	36Ø8+16	32Ø6+11	28Ø8+Ø6	2517-Ø8	2518-19	252Ø34	252243	262454
LOU	Ø1Ø5	99ØØ+15	29Ø8+1Ø	2913+Ø5	2825-Ø8	2731-2Ø	263834	264143	254454
MEM	Ø1Ø9	Ø1Ø8+17	34Ø8+12	311Ø+Ø6	2916-Ø7	2717-19	261934	262144	262555
MKC	Ø316	Ø211+11	34Ø9+Ø7	3Ø13+Ø3	2728-1Ø	2638-21	265Ø36	265645	276356
MSY	Ø315	Ø216+19	Ø315+13	Ø414+Ø7	Ø51Ø-Ø8	Ø6Ø5-2Ø	99ØØ34	99ØØ43	21Ø854
OKC	Ø715	Ø81Ø+14	11Ø6+1Ø	99ØØ+Ø5	2414-Ø8	2419-19	252534	252743	272754
SAT	11Ø7	1713+18	1813+13	1911+Ø7	2ØØ6-Ø7	19Ø6-19	18Ø734	17Ø743	99ØØ54
SGF	Ø414	Ø41Ø+14	36Ø5+Ø9	29Ø8+Ø4	2624-Ø9	2632-2Ø	254135	264444	264655
SHV	Ø5Ø9	99ØØ+18	99ØØ+12	21Ø6+Ø6	2Ø12-Ø8	21Ø9-19	22Ø734	24Ø743	26Ø754
STL	Ø314	Ø11Ø+12	321Ø+Ø8	2915+Ø3	273Ø-Ø9	2741-21	265435	265744	266Ø55
TUS		Ø8Ø7+23	Ø814+16	Ø814+1Ø	Ø81Ø-Ø5	Ø5Ø5-17	33Ø533	31Ø842	29Ø954

FIGURE 149.—Winds and Temperatures Aloft Forecast.

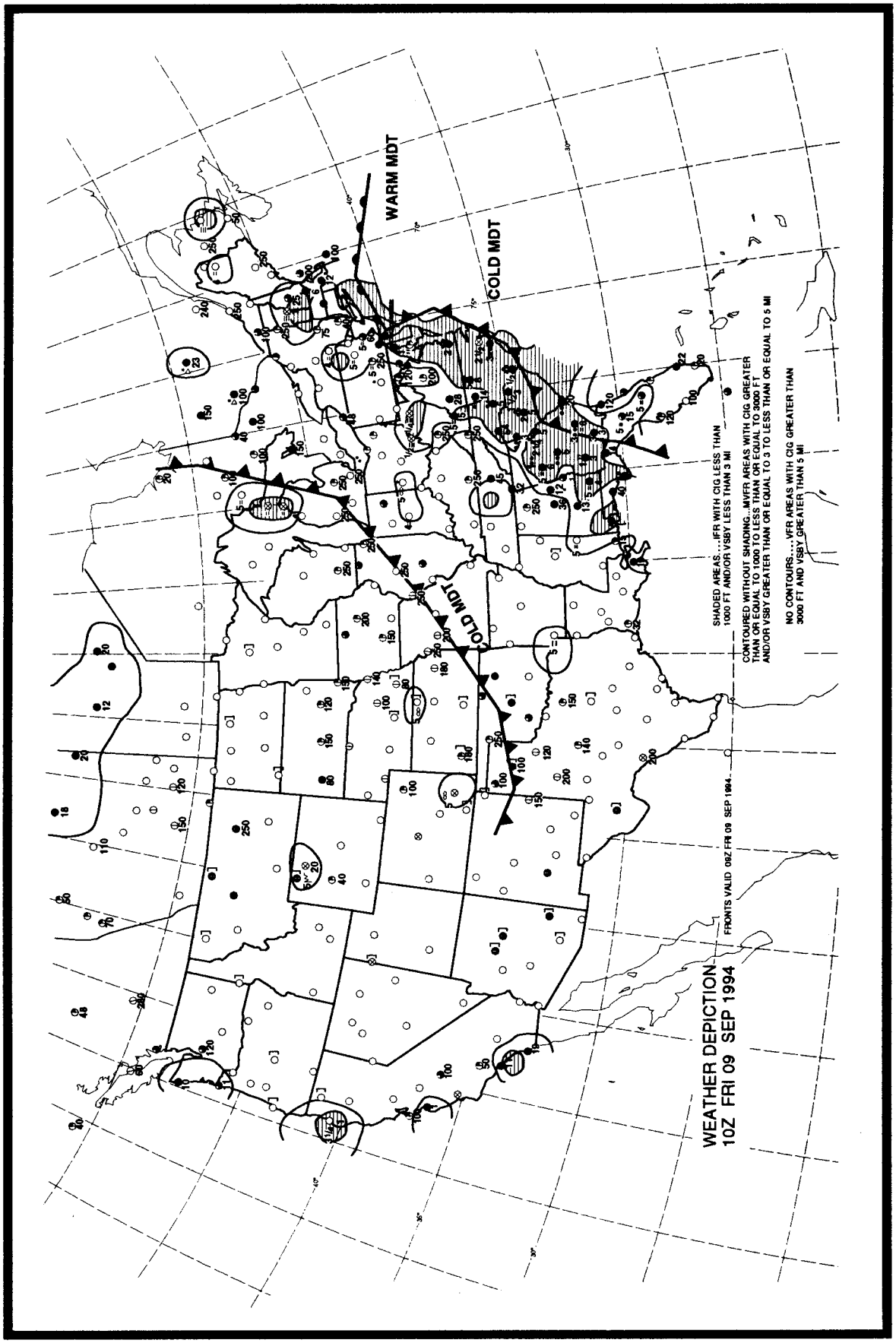


FIGURE 150.—Weather Depiction Chart.

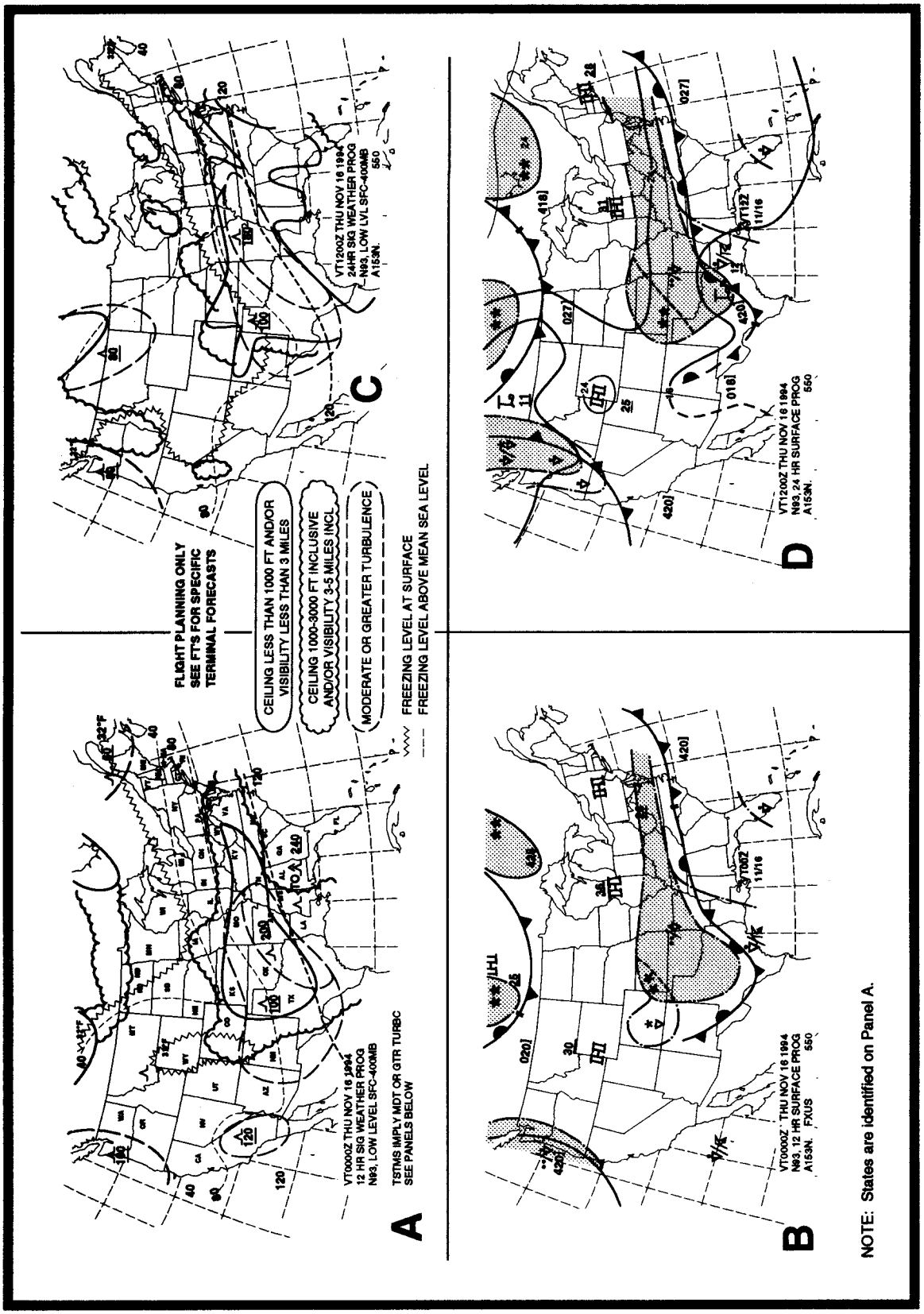


FIGURE 151.—U.S. Low-Level Significant Prog Chart.

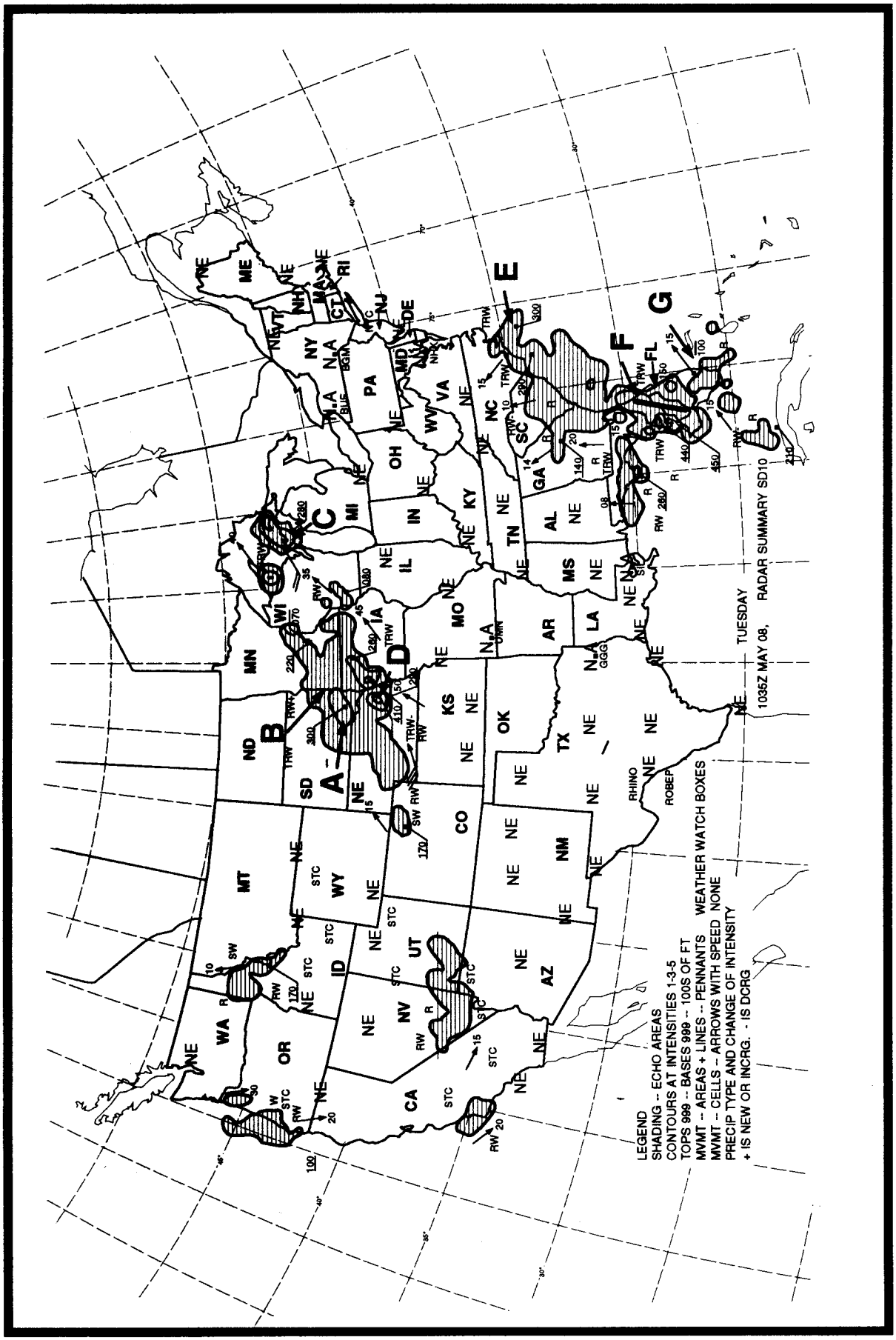


FIGURE 152.—Radar Summary Chart.

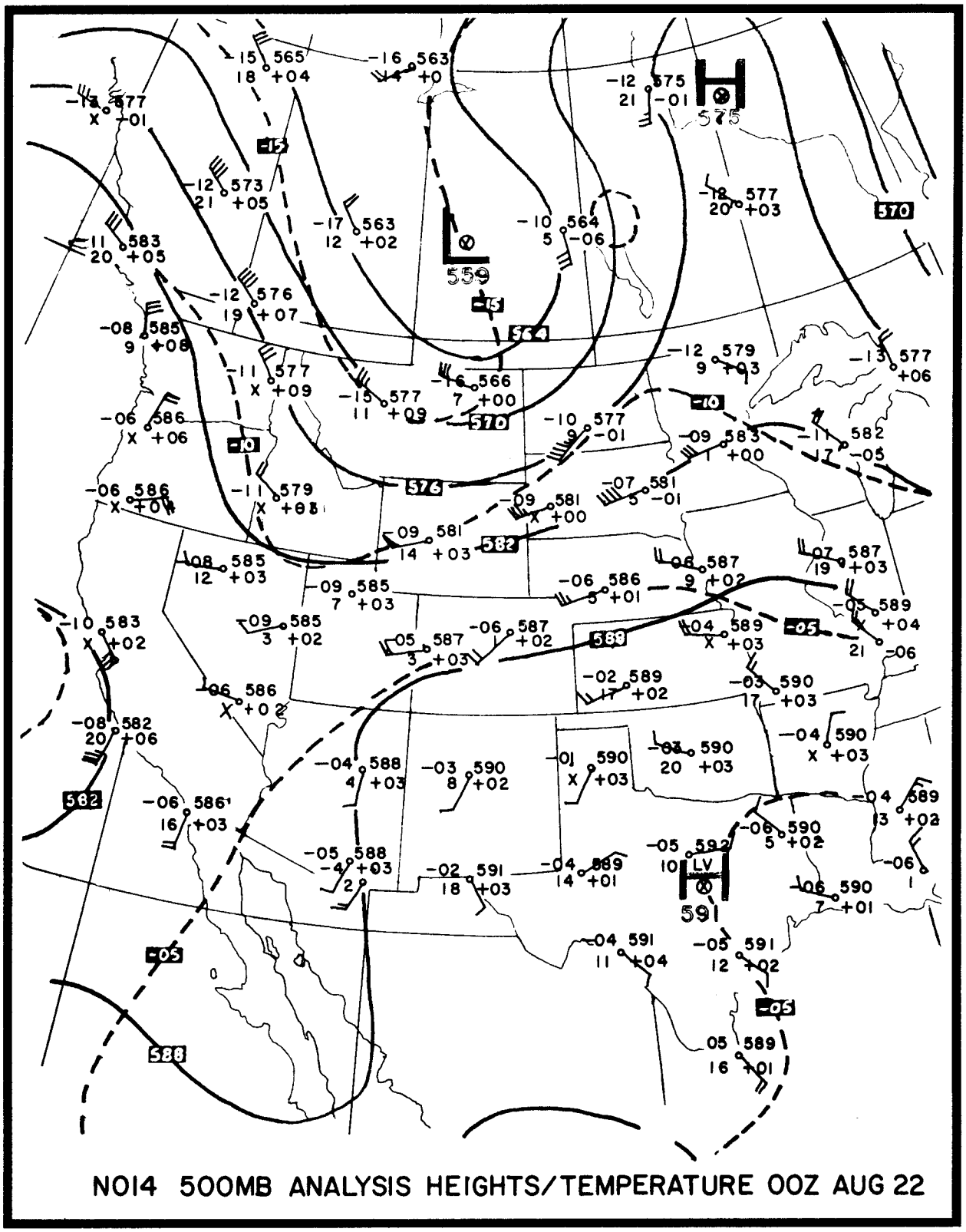


FIGURE 153.—500 MB Analysis Heights/Temperature Chart.

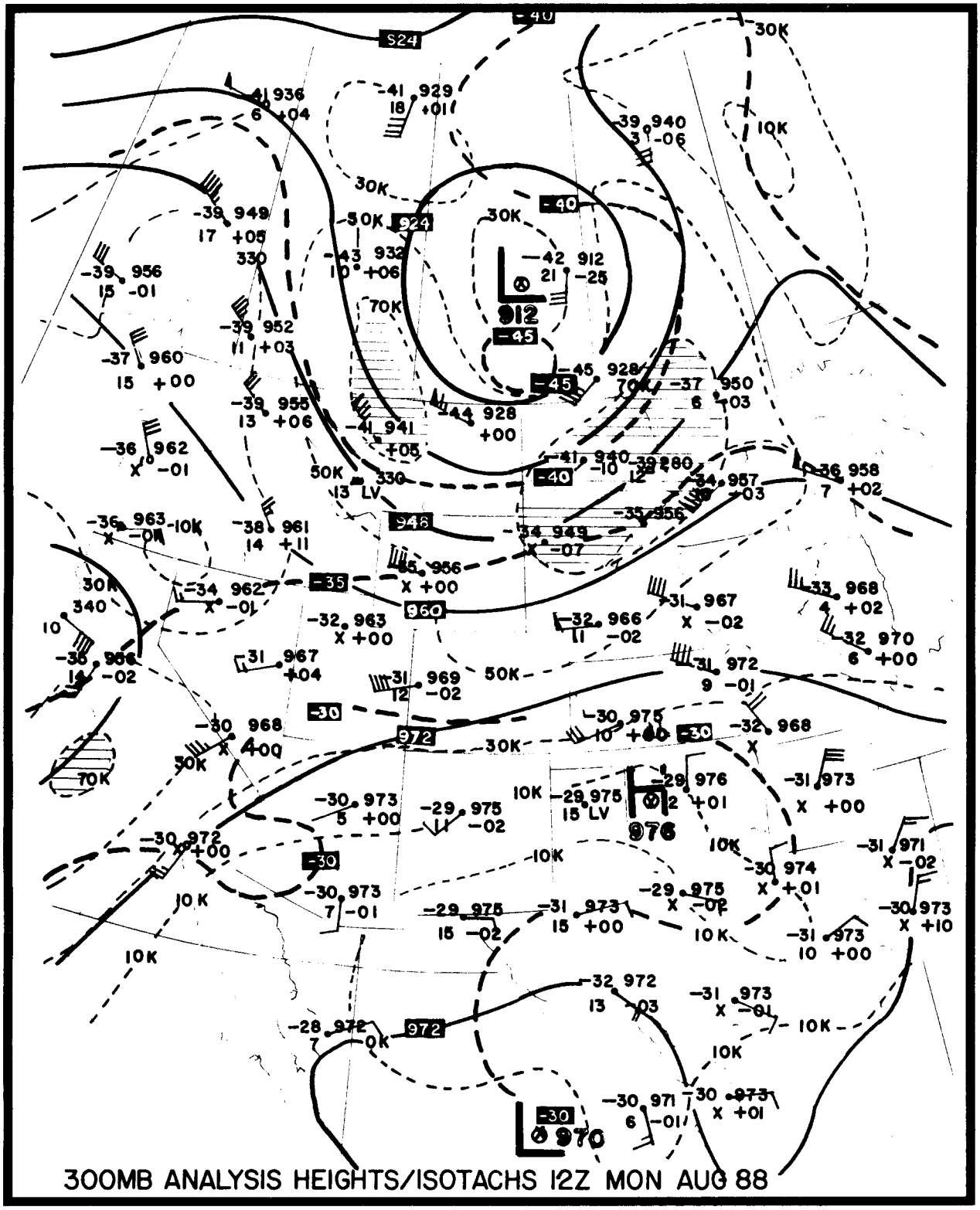


FIGURE 154.—300 MB Analysis Heights/Isotachs Chart.

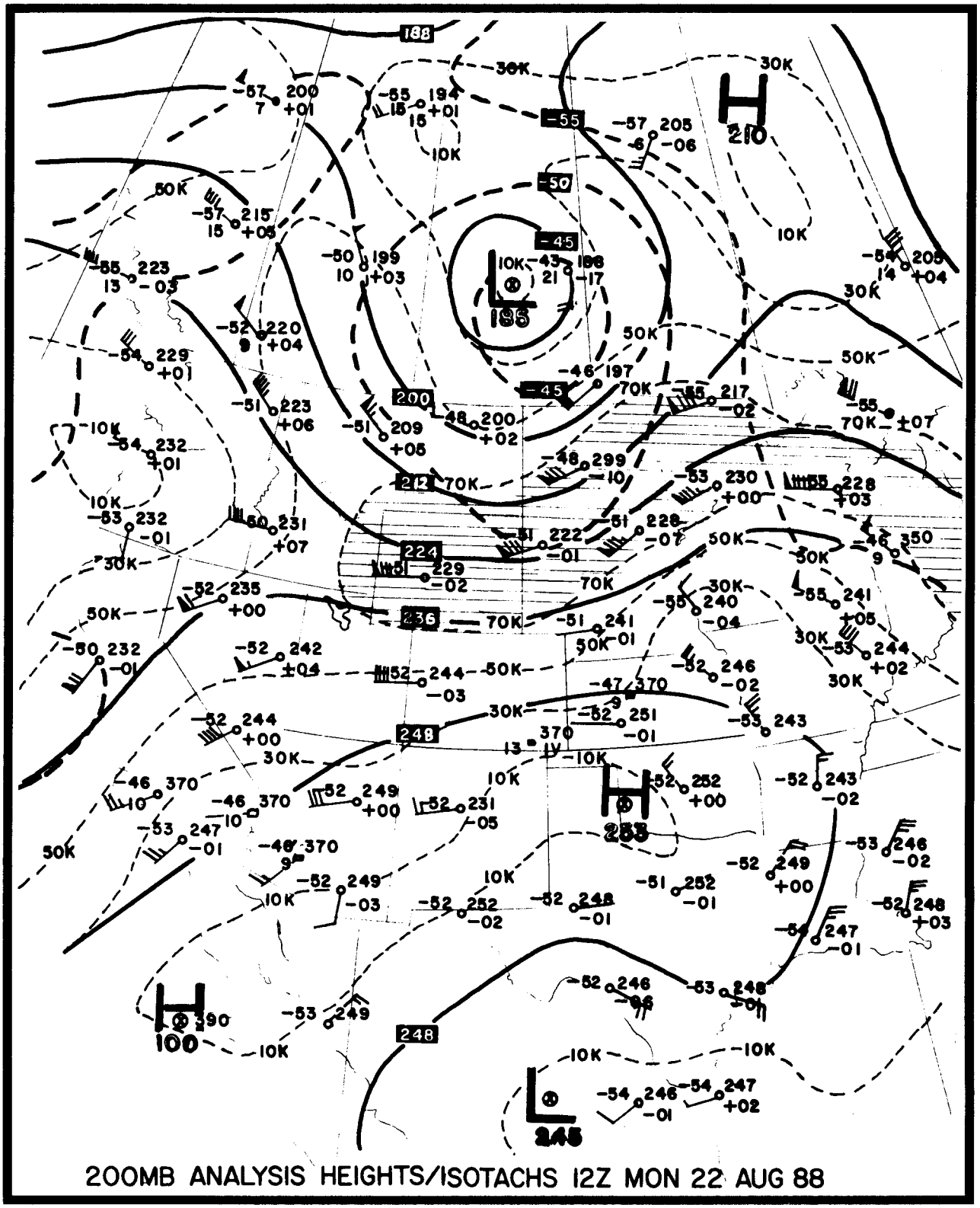


FIGURE 155.—200 MB Analysis Heights/Isotachs Chart.

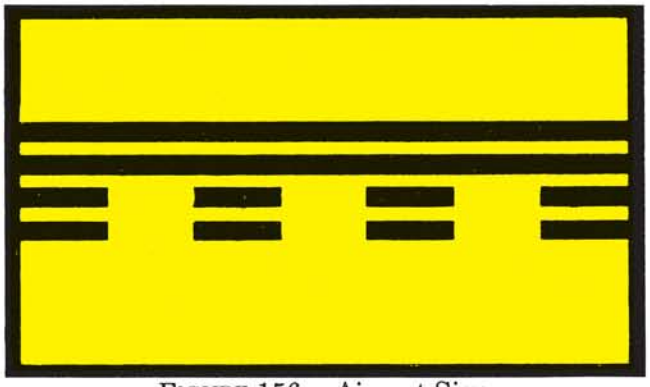


FIGURE 156.—Airport Sign.

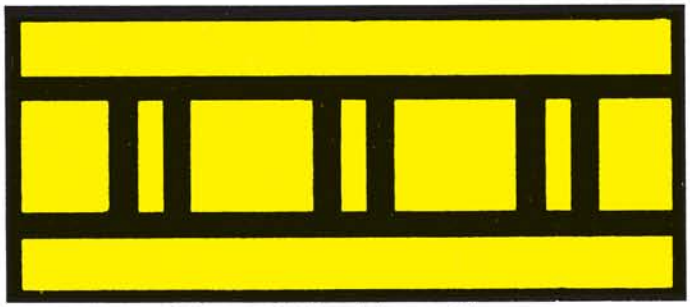


FIGURE 157.—Airport Sign.

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 PROPOSED (Z)	6. DEPARTURE TIME ACTUAL (Z)	7. CRUISING ALTITUDE
VFR / X IFR / DVFR	N711JB	G1159/A	506 KTS	STL ST LOUIS, MO			FL370

8. ROUTE OF FLIGHT
STL, GATWAY2.ROD, J29 DJB, J60 PSB, PSB.MIP8, LGA

9. DESTINATION (Name of airport and city) LGA
LA GAURDIA
NEW YORK, NY

10. EST. TIME ENROUTE: HOURS | MINUTES

11. REMARKS L/O = LEVEL OFF PPH = POUNDS PER HOUR
TEC = TOWER ENROUTE CONTROL
VARIATION: BIB IE, ROD IW, DJB 5W, PSB 8W, MIP 11W, SBJ 11W, LGA 12W

12. FUEL ON BOARD: HOURS 4 | MINUTES 00

13. ALTERNATE AIRPORT(S) JFK NEW YORK, NY

14. PILOT'S NAME, ADDRESS & TELEPHONE NUMBER & AIRCRAFT HOME BASE

15. NUMBER ABOARD 12

16. COLOR OF AIRCRAFT BLACK/RED

17. DESTINATION CONTACT/TELEPHONE (OPTIONAL)

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

FLIGHT LOG

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
STL	BIB	GATWAY 2.ROD / CLIMB					95		:16:00		987*
BIB	ROD	GATWAY2.ROD / FL370		350/96 / ISA-1							
ROD	DJB	J29 / FL370									
DJB	PSB	J60 / FL370									
PSB	MIP	PSB.MIP8 / FL370									
MIP	SBJ										
SBJ	LGA	DESCENT					52	:16:26		269	
LGA	JFK	TEC / 4000			260			:15:00			

OTHER DATA: NOTE: * Includes Taxi Fuel
Use 2389 PPH Total Fuel Flow From L/O To Start Of Descent.
Use 1898 PPH Total Fuel Flow For Reserve And Alternate Requirements.

A Missed Approach Requires 233# of Fuel.

TIME and FUEL: As required by FARs.

TIME	FUEL (LB)	
		EN ROUTE
		RESERVE
		ALTERNATE
		TOTAL

FIGURE 158.—Flight Plan/Flight Log.

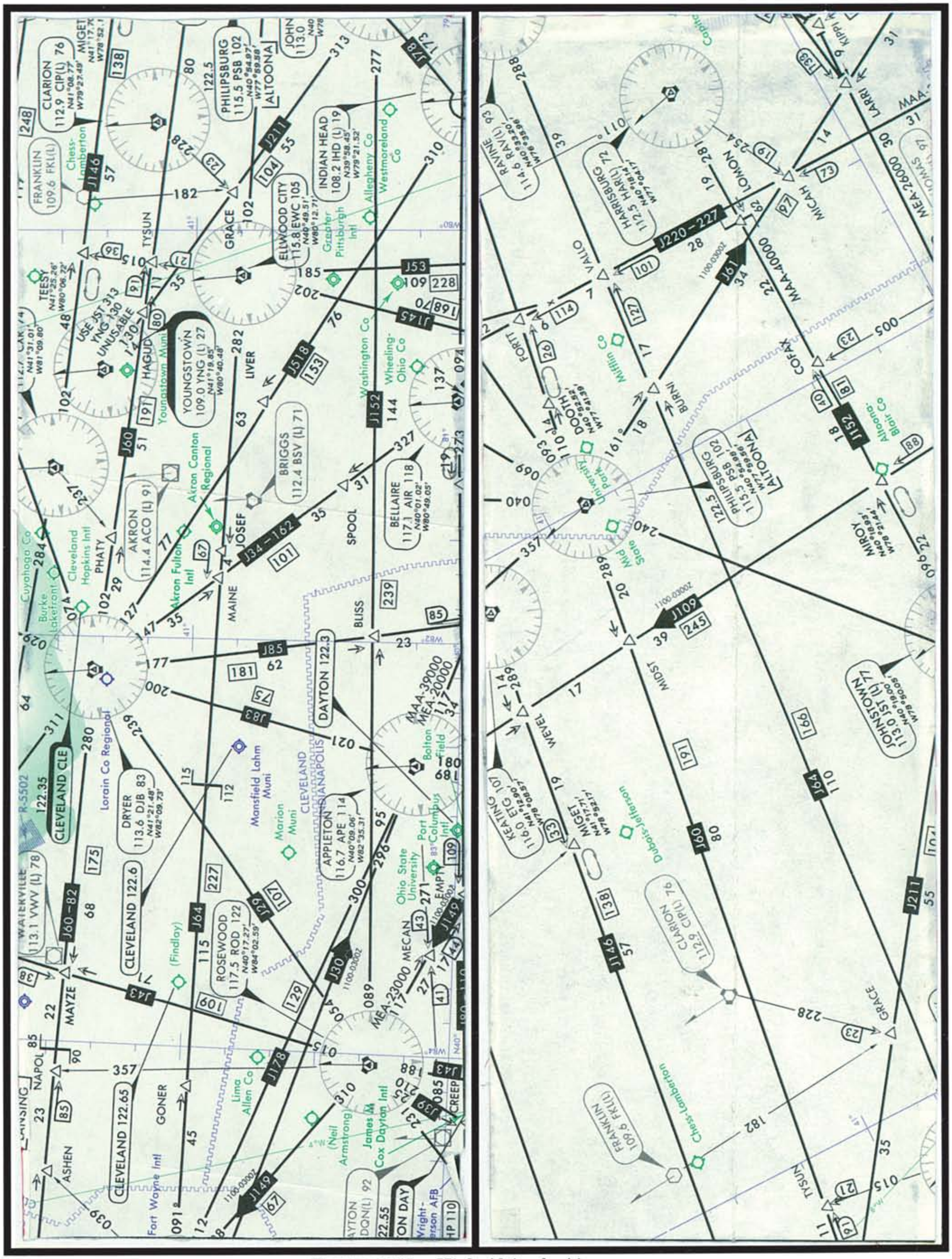


FIGURE 159.—High Altitude Airways.

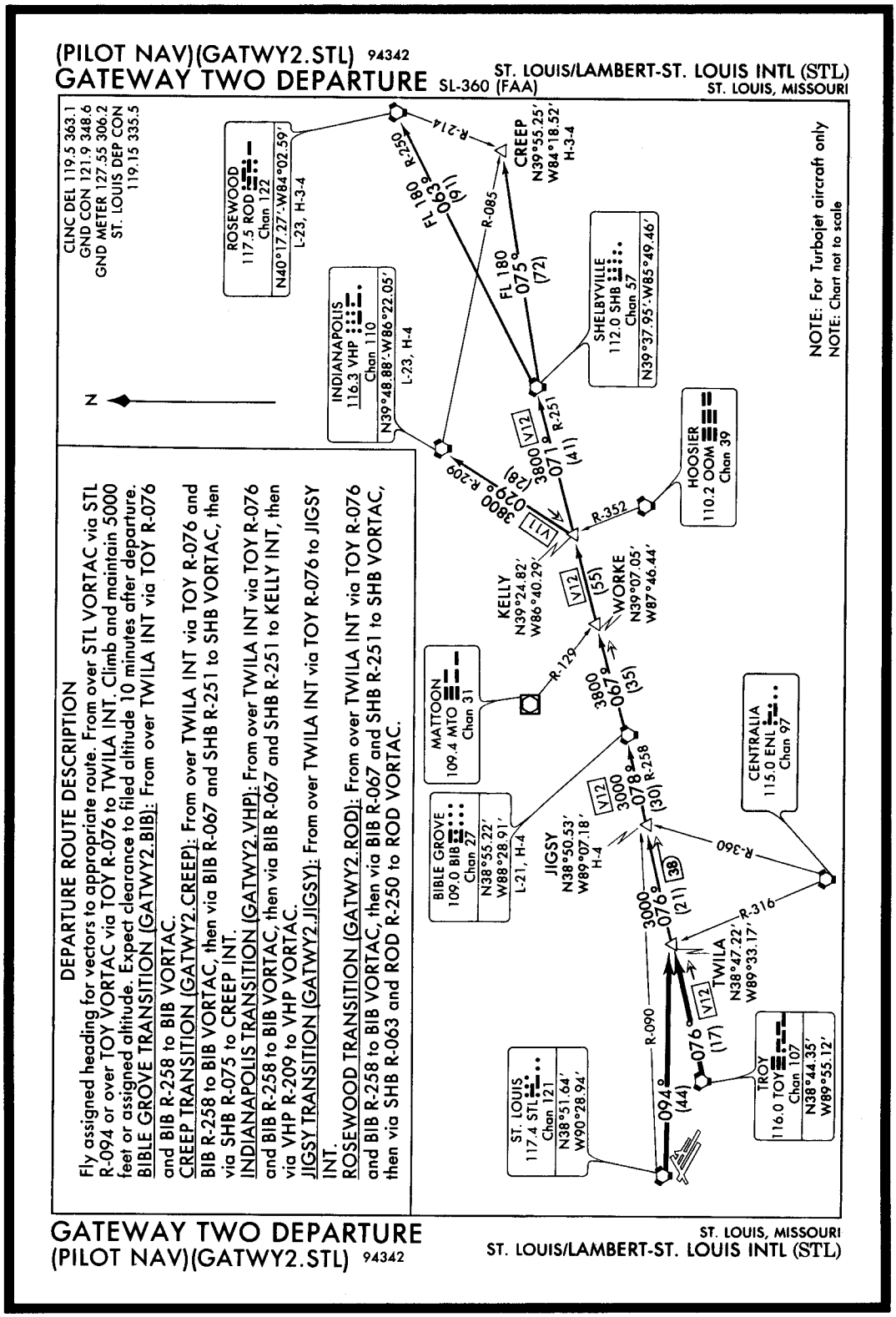


FIGURE 160.—GATEWAY TWO DEPARTURE (STL).

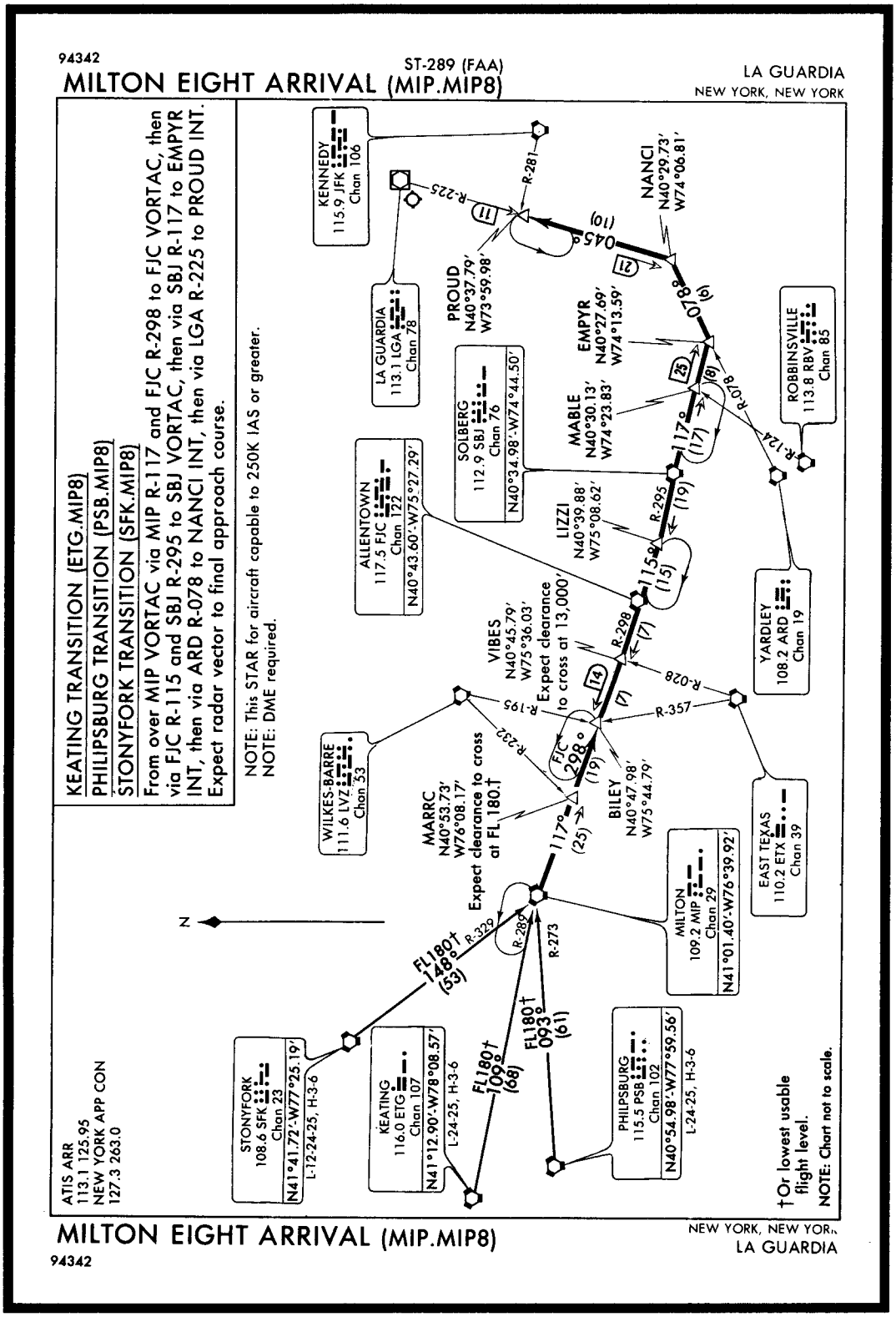


FIGURE 160A.—MILTON EIGHT ARRIVAL (MIP.MIP8).

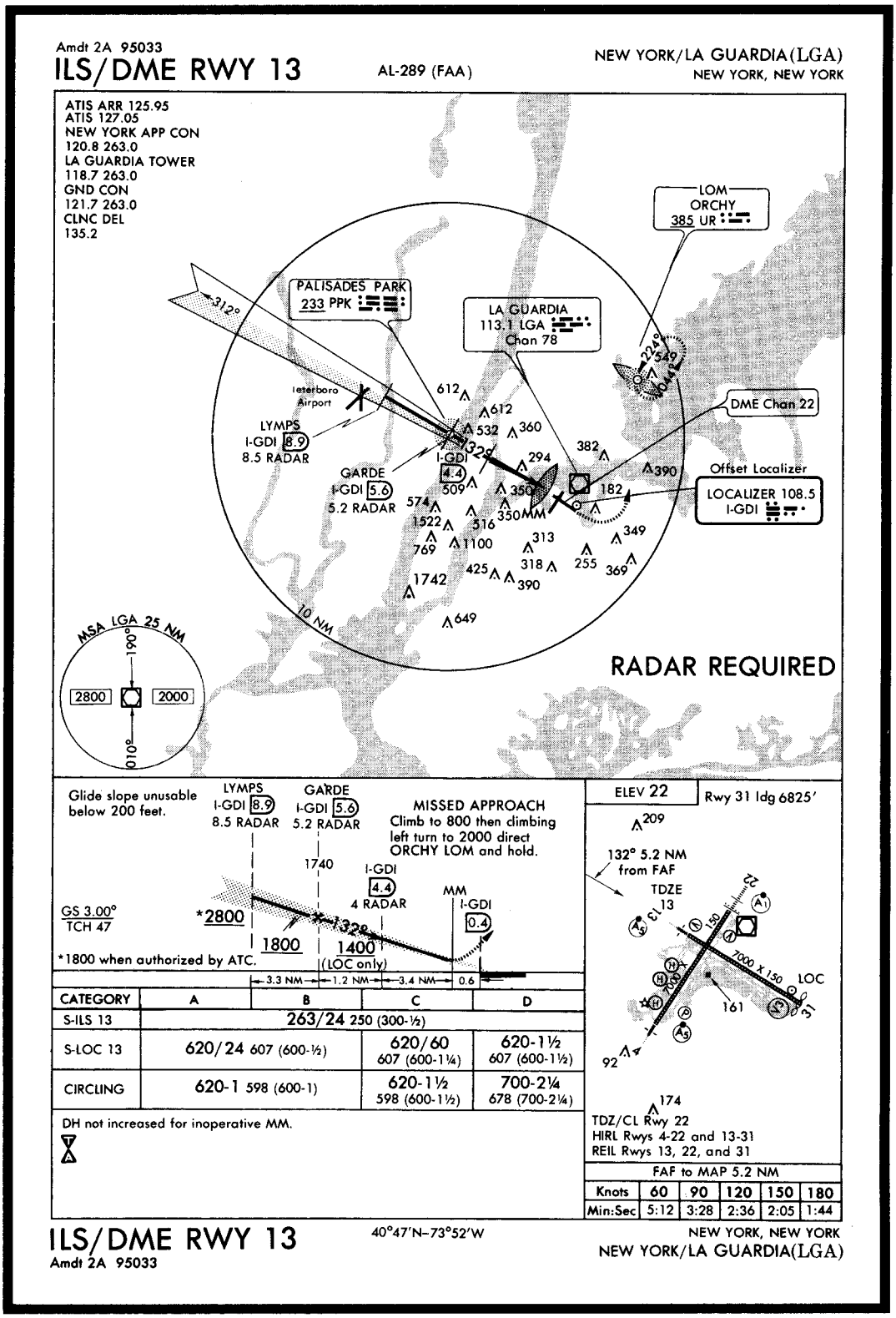
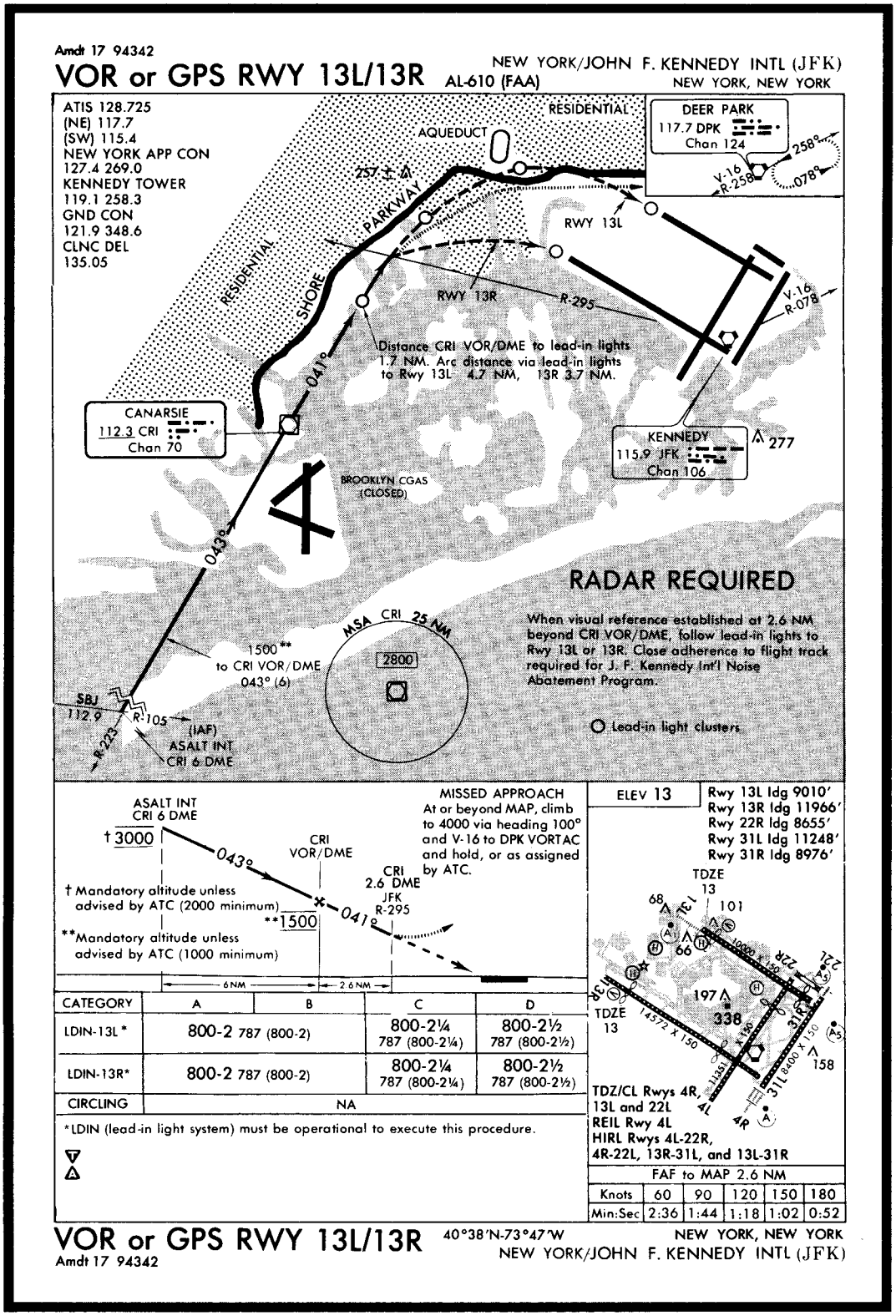


FIGURE 161.—ILS/DME RWY 13 (LGA).



CATEGORY	A	B	C	D
LDIN-13L*	800-2 787 (800-2)		800-2¼ 787 (800-2¼)	800-2½ 787 (800-2½)
LDIN-13R*	800-2 787 (800-2)		800-2¼ 787 (800-2¼)	800-2½ 787 (800-2½)
CIRCLING	NA			

*LDIN (lead-in light system) must be operational to execute this procedure.

FIGURE 161A.—VOR or GPS RWY 13L/13R (JFK).

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 PROPOSED (Z)	6. DEPARTURE TIME ACTUAL (Z)	7. CRUISING ALTITUDE
VFR / X IFR / DVFR	CHIEF 4	BH230/A	** KTS	RYN TUCSON/RYAN FIELD			11000

8. ROUTE OF FLIGHT
TUS, V202 SSO, V94 DMN, V110 TCS, V19ABQ, AEG.

9. DESTINATION (Name of airport and city)	10. EST. TIME ENROUTE HOURS	MINUTES	11. REMARKS
AEG ALBUQUERQUE/DOUBLE EAGLE II			L/O = LEVEL OFF PPH = POUNDS PER HOUR **CAS 125 ISA -6 TO +2

12. FUEL ON BOARD HOURS	MINUTES	13. ALTERNATE AIRPORT(S)	14. PILOT'S NAME, ADDRESS & TELEPHONE NUMBER & AIRCRAFT HOME BASE	15. NUMBER ABOARD
		ABQ ALBUQERQUE INT'L	17. DESTINATION CONTACT/TELEPHONE (OPTIONAL)	9

16. COLOR OF AIRCRAFT
ORANGE/BLACK

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

FLIGHT LOG

CHECK POINTS FROM	TO	ROUTE / ALTITUDE	COURSE	WIND / TEMP	SPEED-KTS TAS	GS	DIST NM	TIME LEG	TOT	FUEL LEG	TOT
RYN	MESCA						38		:17:00		180*
MESCA	CIE	V202 / 11000		240/31 / ISA-6							
CIE	SSO										
SSO	DMN	V94 / 11000		250/27 / ISA-1							
DMN	TCS	V110 / 11000									
TCS	ONM	V19 / 11000		220/33 / ISA+2							
ONM	ABQ										
ABQ	AEG	DIRECT / DESCENT					6	:06:00		49.0	
AEG	ABQ	TWR-TWR / 8000					11	:05:00			

OTHER DATA: * Includes Taxi Fuel
NOTE: Use 523 PPH Total Fuel Flow From L/O To Start Of Descent.
Use 497 PPH Total Fuel Flow For Reserve And Alternate Requirements.

A Missed Approach Requires 40# of Fuel.

TIME and FUEL: As required by FARs.

TIME	FUEL (LB)	
		EN ROUTE
		RESERVE
		ALTERNATE
		TOTAL

FIGURE 162.—Flight Plan/Flight Log.

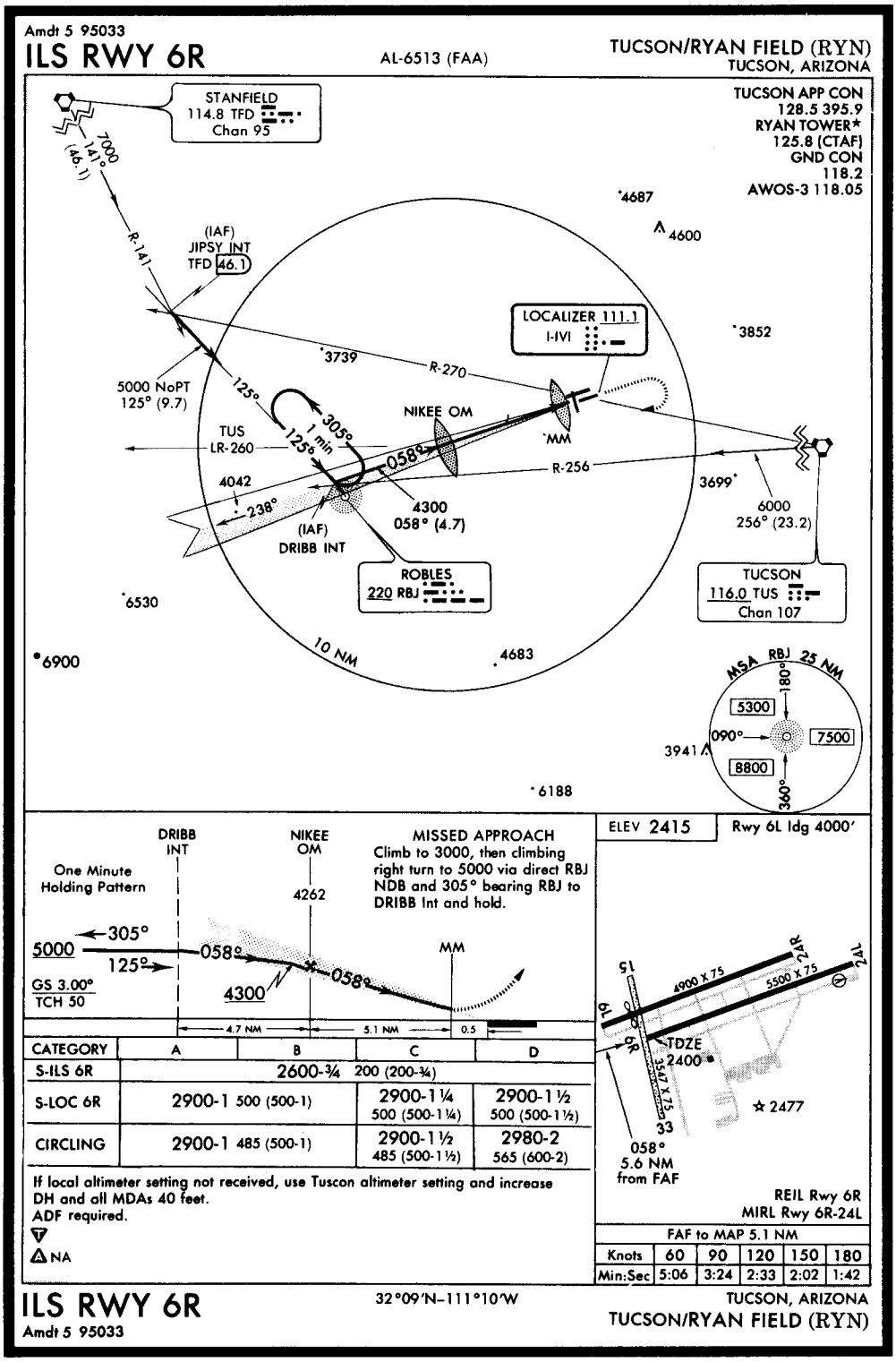


FIGURE 163.—ILS RWY 6R (RYN).

ARIZONA 31

TOYEI SCHOOL (See GANADO)

TUBA CITY (TØ3) 5W UTC−7 N36°05.57′ W111°22.96′ LAS VEGAS
4513 B H-2C, L-4E,5C
RWY 15-33: H6230X75 (ASPH) S-12.5 MIRL
RWY 15: PAPI(P2L)—GA 3.0° TCH 40′. RWY 33: PAPI(P2L)—GA 3.0° TCH 40′.
AIRPORT REMARKS: Unattended. Daylight operations only 1300-0100Z. Ngt operations not authorized. MIRL Rwy 15-33 out of svc indefinitely. Livestock on airport.
COMMUNICATIONS: CTAF 122.9
PRESCOTT FSS (PRC) TF 1-800-WX-BRIEF. NOTAM FILE PRC.
RCO 122.05R 113.5T (PRESCOTT FSS)
RADIO AIDS TO NAVIGATION: NOTAM FILE PRC.
(H) VORTAC 113.5 TBC Chan 82 N36°07.28′ W111°16.18′ 238° 5.8 NM to fld. 4960/15E.

TUCSON

AVRA VALLEY (E14) 13 NW UTC−7 N32°24.56′ W111°13.11′ PHOENIX
2031 B S3 FUEL 100LL, JET A H-2C, L-4F
RWY 12-30: H6901X100 (ASPH)
RWY 30: Road. Rgt tfc.
RWY 03-21: H4201X75 (ASPH) MIRL
RWY 03: VASI(V2L)-GA 3.0° TCH 43′. Thld dsplcd 295′. Road. Rgt tfc.
RWY 21: VASI(V2L)-GA 3.0° TCH 31′. Tree.
AIRPORT REMARKS: Attended 1400-0100Z. Parachute Jumping. Ditch apch end Rwy 21. Aerobatic activities 2-10 miles south of arpt, surface 5000′ MSL dalgt hours indefinitely. Extensive parachute training high and low levels all hours NW quadrant of arpt. ACTIVATE MIRL Rwy 03-21, VASI Rwy 03 and Rwy 21—CTAF. Note: See Special Notices—Glider Operations Northwest of Tucson, Arizona.
COMMUNICATIONS: CTAF/UNICOM 123.0
PRESCOTT FSS (PRC) TF 1-800-WX-BRIEF. NOTAM FILE PRC.
RADIO AIDS TO NAVIGATION: NOTAM FILE PRC.
TUCSON (H) VORTACW 116.0 TUS Chan 107 N32°05.71′ W110°54.89′ 309° 24.3 NM to fld. 2670/12E.
HIWAS.

CASCABEL AIR PARK (Ø5A) 35 N UTC−7 N32°18.01′ W110°21.91′ PHOENIX
3374
RWY 02-20: 2750X60 (DIRT)
RWY 20: Road.
AIRPORT REMARKS: Unattended. Rwy 20 10′ brush within primary surface. Rwy 02 25′ power lines 1/2 mile south of rwy. −15′ down slope beginning at end of Rwy 02.
COMMUNICATIONS: CTAF 122.9
PRESCOTT FSS (PRC) TF 1-800 WX-BRIEF. NOTAM FILE PRC.

RYAN FLD (RYN) 10 SW UTC−7 N32°08.53′ W111°10.46′ PHOENIX
2415 B S4 FUEL 80, 100LL TPA—See Remarks H-2C, L-4F
RWY 06R-24L: H5500X75 (ASPH) S-12.5, D-30 MIRL IAP
RWY 06R: REIL. Rgt tfc. RWY 24L: VASI(V4L)—GA 3.0° TCH 26′.
RWY 06L-24R: H4900X75 (ASPH) S-12.5, D-30
RWY 06L: Thld dsplcd 900′. Pole. RWY 24R: Tree. Rgt tfc.
RWY 15-33: 3547X75 (DIRT)
RWY 33: Tree.
AIRPORT REMARKS: Attended 1300-0100Z. Self svc fuel avbl 1300-0400Z. Rwy 06L-24R CLOSED 0100-1300Z. Rwy 06R preferential rwy up to 10 knot tailwind. Rwy 06L-24R paved shoulders 30′ wide both sides. TPA-3215(800), 3415(1000) when twr closed. Note: See Special Notices—Glider Operations Northwest of Tucson, Arizona.
WEATHER DATA SOURCES: AWOS-3 118.05 (602) 578-0269.
COMMUNICATIONS: CTAF 125.8
PRESCOTT FSS (PRC) TF 1-800-WX-BRIEF. NOTAM FILE PRC.
® TUCSON APP/DEP CON 128.5
TOWER 125.8 NFCT (Apr-Sep 1300-0300Z, Oct-Mar 1300-0100Z) GND CON 118.2
AIRSPACE: CLASS D svc Apr-Sep 1300-0300Z, Oct-Mar 1300-0100Z other times CLASS E.
RADIO AIDS TO NAVIGATION: NOTAM FILE PRC.
TUCSON (H) VORTACW 116.0 TUS Chan 107 N32°05.71′ W110°54.89′ 270° 13.5 NM to fld. 2670/12E.
HIWAS.
NDB (HW-SAB) 338 RYN N32°08.30′ W111°09.69′ at fld. TWEB avbl 1200-0500Z.
ILS 111.1 I-IVI Rwy 06R. Unmonitored.

FIGURE 163A.—Excerpt from Airport/Facilities Directory.

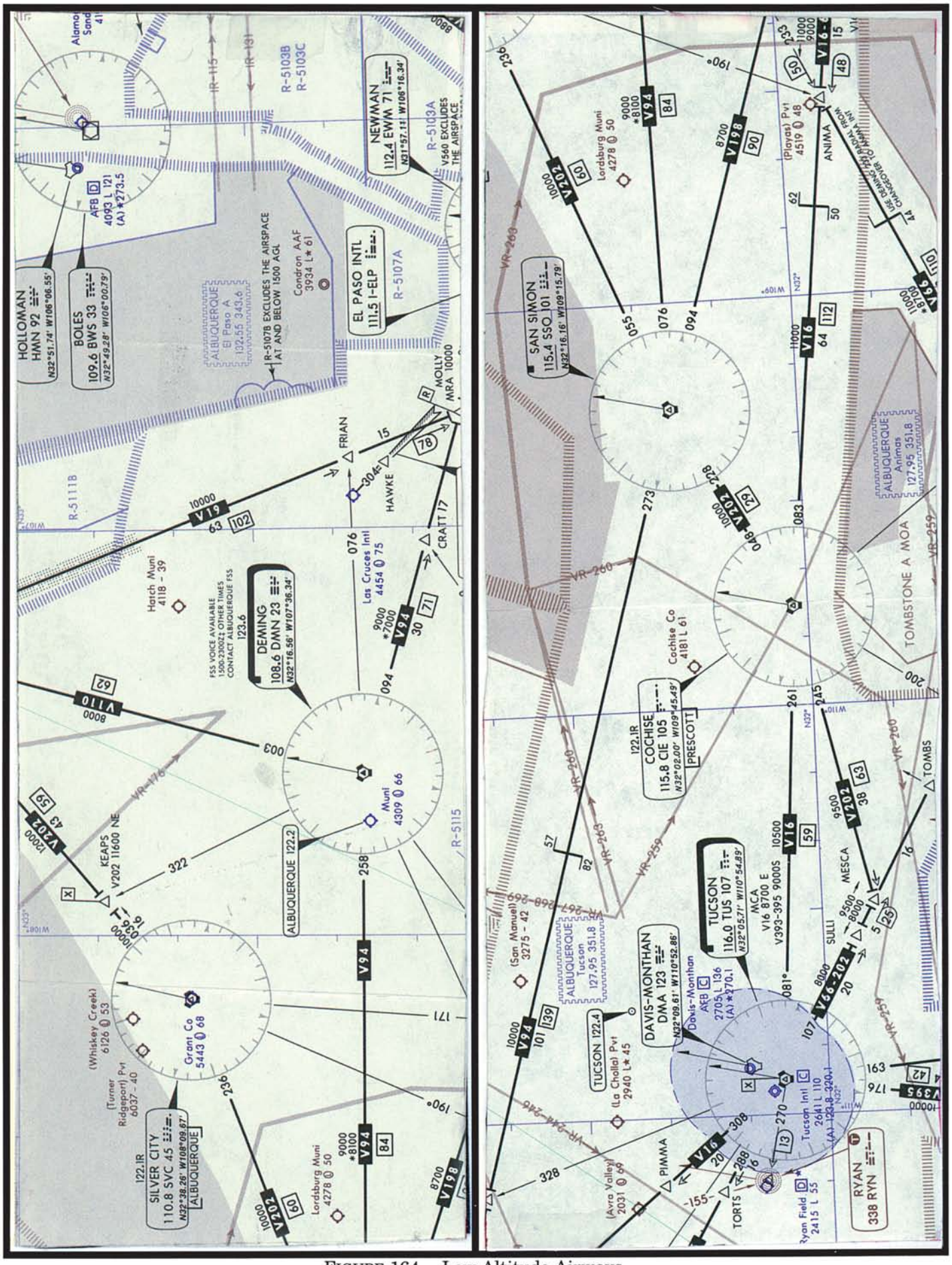


FIGURE 164.—Low Altitude Airways.

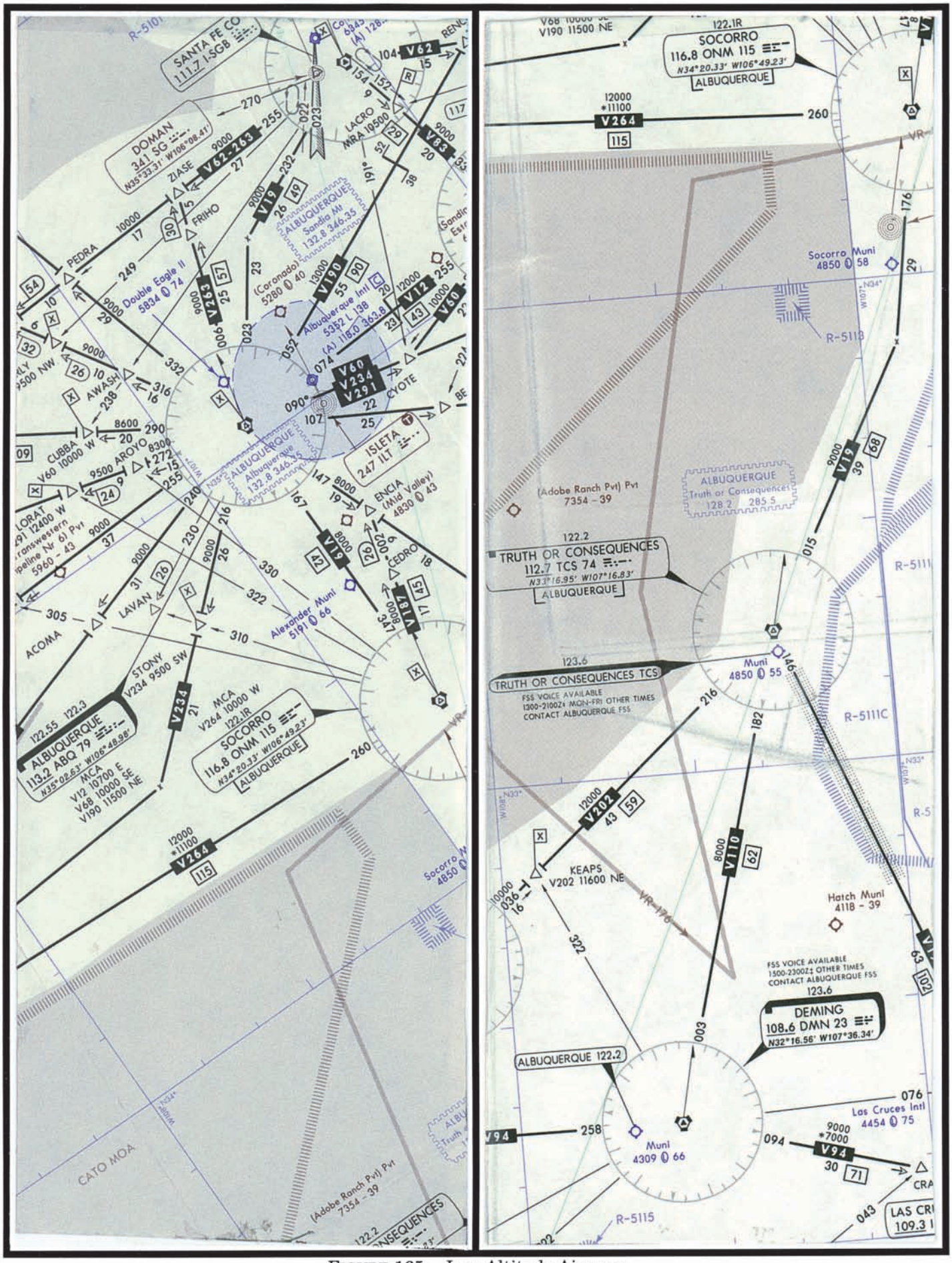
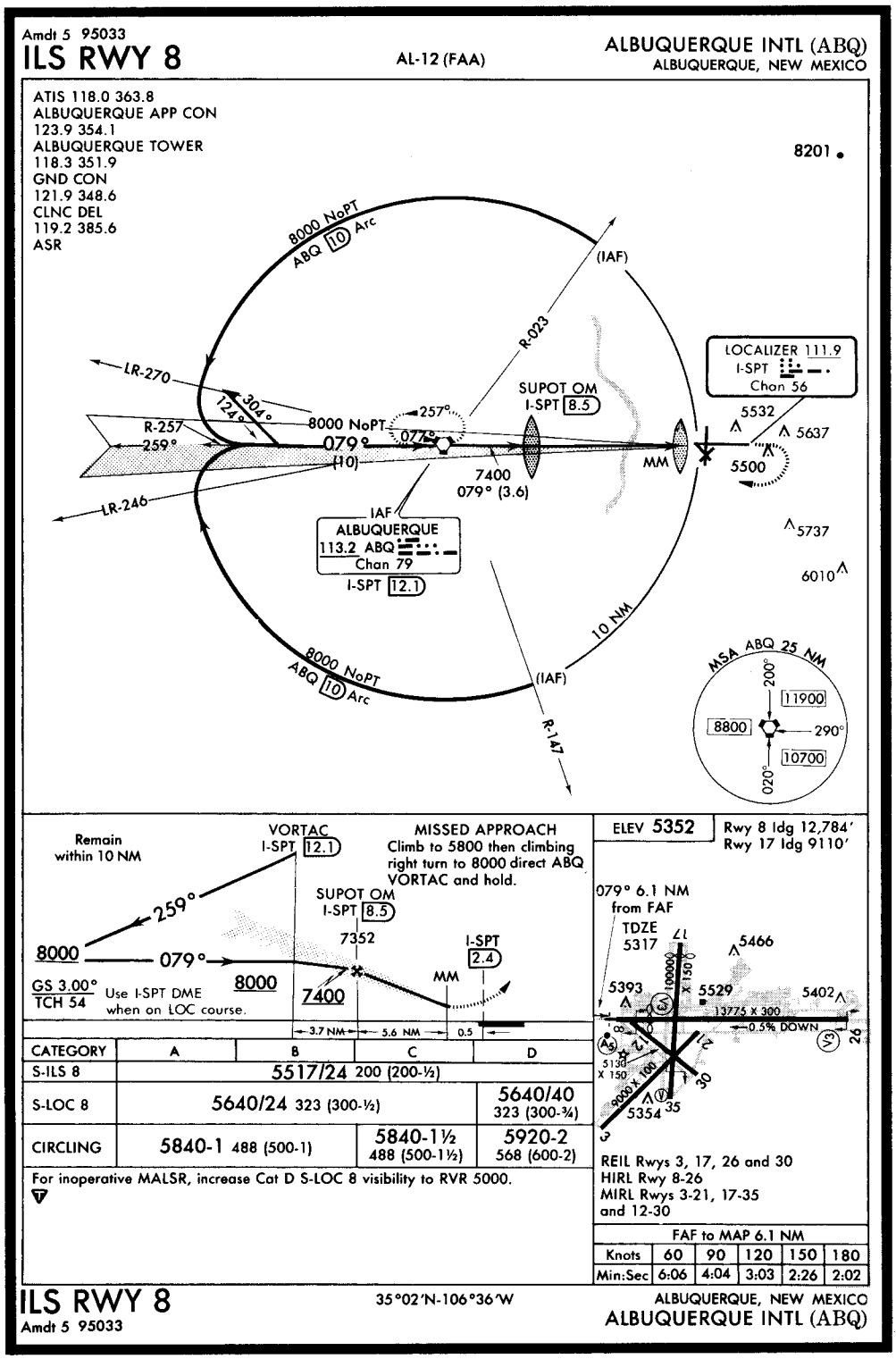


FIGURE 165.—Low Altitude Airways.



CATEGORY	A	B	C	D
S-ILS 8	5517/24 200 (200-½)			
S-LOC 8	5640/24 323 (300-½)			5640/40 323 (300-¾)
CIRCLING	5840-1 488 (500-1)		5840-1½ 488 (500-1½)	5920-2 568 (600-2)

For inoperative MALSR, increase Cat D S-LOC 8 visibility to RVR 5000.

FAF to MAP 6.1 NM					
Knots	60	90	120	150	180
Min:Sec	6:06	4:04	3:03	2:26	2:02

FIGURE 166.—ILS RWY 8 (ABQ).

68 NEW MEXICO

ALBUQUERQUE

ALBUQUERQUE INTL (ABQ) 3 SE UTC-7(-6DT) N35°02.45' W106°36.52' **ALBUQUERQUE**
5352 B S4 **FUEL** 100LL, JET A, A1, A1 + OX 1, 2, 3, 4 LRA ARFF Index C **H-2D, L-4G, 6E**
RWY 08-26: H13775X300 (ASPH-CONC-GRVD) S-100, D-210, DT-360 HIRL 0.3% up E **IAP**
RWY 08: MALSR. VASI(V6L)—GA 3.0° TCH 54'. Thld dsplcd 991'. Rgt tfc. Arresting device.
RWY 26: REIL. VASI(V6L)—Upper GA 3.25° TCH 77'. Lower GA 3.0° TCH 47'. Arresting device.
RWY 17-35: H10000X150 (ASPH-CONC-GRVD) S-100, D-210, DT-360 MIRL
RWY 17: REIL. VASI(V4L)—GA 3.0° TCH 53'. Thld dsplcd 890'. Road. Rgt tfc.
RWY 35: VASI(V4L)—GA 3.0° TCH 55'. Arresting device.
RWY 03-21: H9000X100 (ASPH) S-45, D-65 MIRL
RWY 03: REIL. Rgt tfc.
RWY 12-30: H5130X150 (ASPH) S-45, D-65 MIRL
RWY 12: Rgt tfc. **RWY 30:** REIL.
RUNWAY DECLARED DISTANCE INFORMATION

RWY 03:	TORA-9000	TODA-9000	ASDA-9000	LDA-9000
RWY 21:	TORA-9000	TODA-9000	ASDA-9000	LDA-9000
RWY 08:	TORA-13775	TODA-13775	ASDA-13775	LDA-12784
RWY 26:	TORA-13775	TODA-13775	ASDA-13775	LDA-13775
RWY 12:	TORA-5130	TODA-5130	ASDA-5130	LDA-5130
RWY 30:	TORA-5130	TODA-5130	ASDA-5130	LDA-5130
RWY 17:	TORA-10000	TODA-10000	ASDA-10000	LDA-9110
RWY 35:	TORA-10000	TODA-10000	ASDA-10000	LDA-10000

AIRPORT REMARKS: Attended continuously. Bird hazard Oct-Dec, and Mar-May. Heavy student copter traffic, control firing area S of arpt. Fighter acft depart S only, no military depart on Rwy 35. Rwy 03-21 SW 200' CLOSED to acft weighing over 12,500 pounds. Ramp W of Rwy 17-35 and N of Rwy 08-26 CLOSED to helicopters. Rwy 08-26 and Rwy 17-35 grooved 130' wide. Takeoff Rwy 03 prohibited except for emergency conditions on fld. Takeoff Rwy 35 requires prior coordination with twr. Twy H closed between Twy G and Rwy 17-35 indefinitely. Twy F S of freight ramp closed to acft over 65,000 pounds. Twy F between Twy F1 and Twy C restricted to maximum wing span 108' B727 or smaller acft. Portions of Twy D N of Twy D-3 not visible from twr. Arresting cables at Rwy 26 thld. Recessed arresting cables at Rwy 08 and Rwy 35 thld. Flight Notification Service (ADCUS) available. NOTE: See Land and Hold Short Operations Section.
WEATHER DATA SOURCES: LLWAS.
COMMUNICATIONS: ATIS 118.0 (505) 856-4928 **UNICOM** 122.95
ALBUQUERQUE FSS (ABQ) on arpt. 122.55 122.3 TF 1-800-WX-BRIEF. LC 505-243-7831. NOTAM FILE ABQ.
Ⓡ **APP CON** 124.4 (on or N of V12 and W of SANDIA MTNS) 134.8 (S of V12 and W of Manzano Mtns) 123.9 (S of V12 and E of Manzano Mtns) 127.4 (on or N of V12 and E of Sandia Mtns) 126.3
Ⓡ **DEP CON** 127.4 (on or N of V12 and E of Sandia Mtns) 124.4 (on or N of V12 and W of Sandia Mtns) 123.9 (S of V12 and E of Manzano Mtns) 134.8 (S of V12 and W of Manzano Mtns)
TOWER 118.3 120.3 **GND CON** 121.9 **CLNC DEL** 119.2
AIRSPACE: CLASS C svc ctc **APP CON**
RADIO AIDS TO NAVIGATION: NOTAM FILE ABQ.
(H) VORTACW 113.2 ABQ Chan 79 N35°02.63' W106°48.98' 078° 10.2 NM to fld. 5740/13E. **HIWAS.**
ISLETA NDB (HW) 247 ILT N34°59.22' W106°37.22' 359° 3.3 NM to fld.
ILS/DME 111.9 I-SPT Chan 56 Rwy 08.
ASR

CORONADO (4AC) 6 NE UTC-7(-6DT) N35°11.75' W106°34.40' **ALBUQUERQUE**
5280 B S4 **FUEL** 100LL OX 3 **L-4G, 6E**
RWY 17-35: H4010X60 (ASPH) S-22, D-28 LIRL (NSTD)
RWY 17: Thld dsplcd 200'. Hill. Rgt tfc. **RWY 35:** Thld dsplcd 200'. Trees.
RWY 03-21: H3500X40 (ASPH) S-22, D-28
RWY 03: Building.
AIRPORT REMARKS: Attended continuously. Rising terrain East of airport. Rwy 03 rgt tfc for ultralight operations below 300' and E of Rwy 17-35. Rwy 03-21 cracked and heavily weeded. ACTIVATE LIRL Rwy 17-35—CTAF.
COMMUNICATIONS: CTAF/UNICOM 122.8
ALBUQUERQUE FSS (ABQ) LC 243-7831 NOTAM FILE ABQ.
RADIO AIDS TO NAVIGATION: NOTAM FILE ABQ.
ALBUQUERQUE (H) VORTACW 113.2 ABQ Chan 79 N35°02.63' W106°48.98' 040° 15 NM to fld. 5740/13E. **HIWAS.**

FIGURE 166A.—Excerpt from Airport/Facilities Directory.

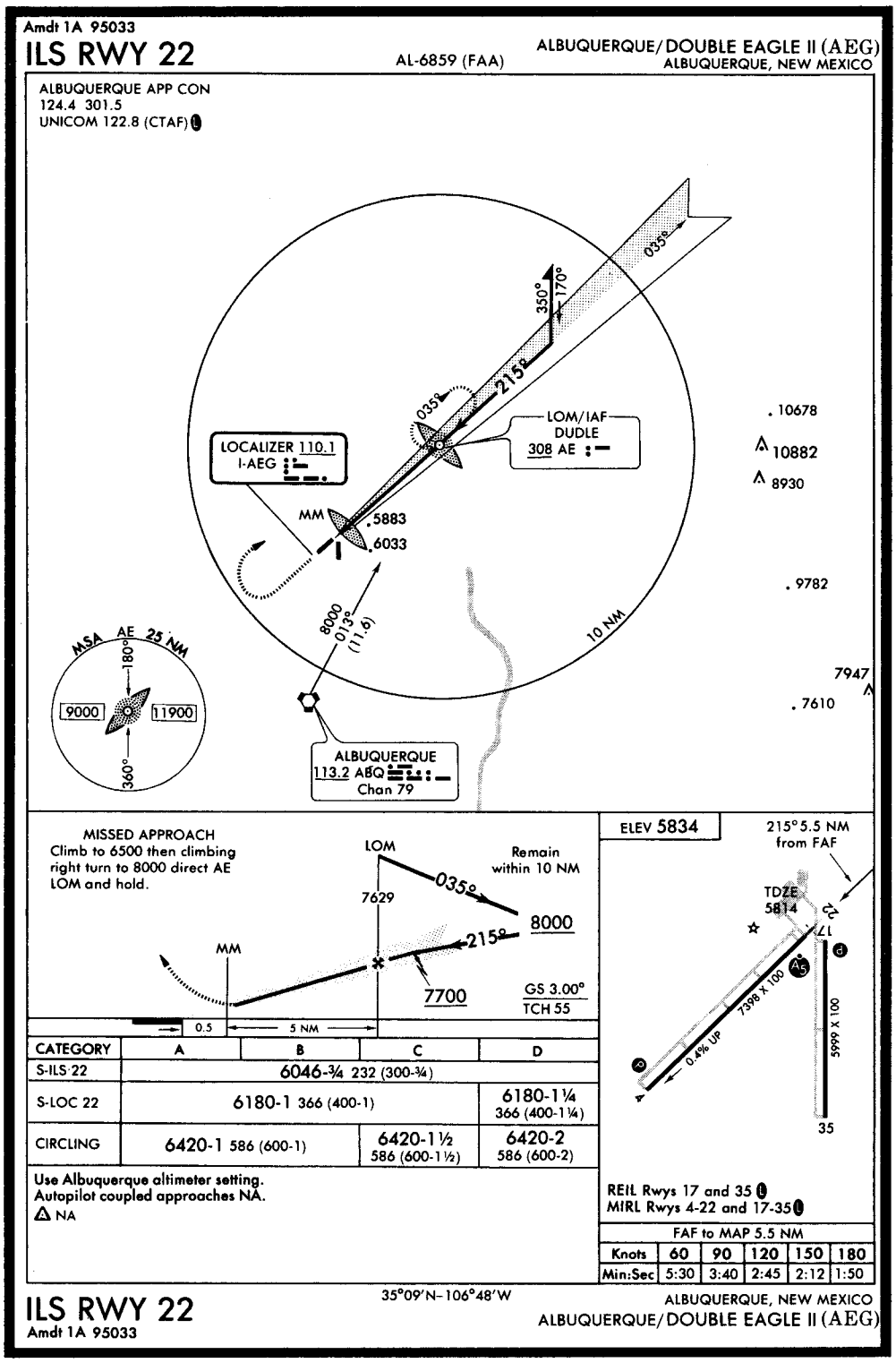


FIGURE 167.—ILS RWY 22 (AEG).

NEW MEXICO 69

DOUBLE EAGLE II (AEG) 7 NW UTC-7(-6DT) N35°08.71′ W106°47.71′ — ALBUQUERQUE H-2D, L-4G, 6E IAP
5834 B S4 FUEL 100LL, JET A OX 3
RWY 04-22: H7398X100 (ASPH) S-30 MIRL 0.4% up SW
RWY 04: PAPI(P4L). RWY 22: MALSR. Rgt tfc.
RWY 17-35: H5999X100 (ASPH) S-30 MIRL
RWY 17: REIL. PAPI(P4L). RWY 35: REIL. Rgt tfc.
AIRPORT REMARKS: Attended continuously. Fixed-base operator and arpt services 505-842-7007 or 505-836-7717. ACTIVATE MIRL Rwy 04-22 and Rwy 17-35, REIL Rwy 17 and Rwy 35 and MALSR Rwy 22 and PAPI Rwy 04 and Rwy 17—CTAF.
COMMUNICATIONS: CTAF/UNICOM 122.8
ALBUQUERQUE FSS (ABQ) LC 243-7831. NOTAM FILE ABQ
® ALBUQUERQUE APP/DEP CON 124.4
RADIO AIDS TO NAVIGATION: NOTAM FILE ABQ.
ALBUQUERQUE (H) VORTACW 113.2 ABQ Chan 79 N35°02.63′ W106°48.98′ 357° 6.2 NM to fld. 5740/13E. HIWAS.
DUDLE NDB (LOM) 308 AE N35°13.04′ W106°42.77′ 212° 5.9 NM to fld.
ILS 110.1 I-AEG Rwy 22 LOM DUDLE NDB. ILS unmonitored.

ALEXANDER MUNI (See BELEN)

ANTON CHICO N35°06.70′ W105°02.40′ NOTAM FILE ABQ. — ALBUQUERQUE H-2D, L-4G, 6E
(H) VORTAC 117.8 ACH Chan 125 105° 22.3 NM to Santa Rosa Muni. 5450/12E.
RCO 122.1R 117.8T (ALBUQUERQUE FSS)

ANGEL FIRE (AXX) 1 N UTC-7(-6DT) N36°25.24′ W105°17.40′ — DENVER H-2D, L-6E
8382 S4 FUEL 100LL, JET A
RWY 17-35: H8900X100 (ASPH) S-22 0.6% up S
RWY 17: Ground. RWY 35: Road.
AIRPORT REMARKS: Attended dalgt hours. Airport located in mountain valley, rising terrain in all directions. Aerobatics will be conducted adjacent to and east of arpt 14,500′ and below. Ramp asph surfaces deteriorated with numerous cracks and soft spots. Dirt berm located approximately 1700′ up NW from rwy end 17 250 ft E of E NW edge.
COMMUNICATIONS: CTAF/UNICOM 122.8
ALBUQUERQUE FSS (ABQ) TF 1-800-WX-BRIEF. NOTAM FILE ABQ.
RADIO AIDS TO NAVIGATION: NOTAM FILE ABQ.
TAOS (L) VORTAC 117.6 TAS Chan 123 N36°36.53′ W105°54.38′ 098° 31.9 NM to fld. 7860/13E.

APACHE CREEK
JEWETT MESA (Q13) 10 N UTC-7(-6DT) N34°00.20′ W108°40.69′ — ALBUQUERQUE
7681
RWY 06-24: 5200X40 (DIRT)
RWY 06: Pole. RWY 24: Fence.
AIRPORT REMARKS: Unattended. Arpt open May-Sep; other times CLOSED. Livestock on runway. Rwy 06-24 recommend visual inspection before using, infrequent maintenance. Rwy 06-24 heavily weeded with large rocks on rwy edges +2′ rocks 45′ from rwy centerline.
COMMUNICATIONS: CTAF 122.9
ALBUQUERQUE FSS (ABQ) TF 1-800-WX-BRIEF. NOTAM FILE ABQ.

ARTESIA MUNI (ATS) 3 W UTC-7(-6DT) N32°51.15′ W104°28.06′ — ALBUQUERQUE H-2D, 5A, L-4H IAP
3548 B S4 FUEL 100LL, JET A1
RWY 03-21: H6300X150 (ASPH-PFC) S-40, D-57 MIRL 0.4% up SW
RWY 03: P-line. RWY 21: PVASI(PSIL)—GA 3.0° TCH 25′. Road.
RWY 12-30: H5399X150 (ASPH-PFC) S-40, D-57 MIRL 0.5% up NW
RWY 12: Fence.
AIRPORT REMARKS: Attended 1400-0100Z‡. Fuel on call after hours 505-748-9053, 746-4196, 457-2399/2268, fee charged. MIRL Rwy 03-21 and Rwy 12-30 preset at low ints dusk-0800Z‡, ACTIVATE higher ints—CTAF. Rwys 03-21 and 12-30 PFC center 75′ width only.
WEATHER DATA SOURCES: AWOS-3 126.725 (505) 748-2103.
COMMUNICATIONS: CTAF/UNICOM 122.8
ALBUQUERQUE FSS (ABQ) TF 1-800-WX-BRIEF. NOTAM FILE ABQ.
ROSWELL APP/DEP CON 119.6 (1300-0400Z‡) ® ALBUQUERQUE CENTER APP/DEP CON 132.65 (0400-1300Z‡)
RADIO AIDS TO NAVIGATION: NOTAM FILE ROW.
CHISUM (H) VORTACW 116.1 CME Chan 108 N33°20.25′ W104°37.28′ 153° 30.1 NM to fld. 3770/12E. HIWAS.
NDB (MHW) 414 ATS N32°51.16′ W104°27.70′ at fld. NOTAM FILE ABQ.

FIGURE 167A.—Excerpt from Airport/Facilities Directory.

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 PROPOSED (Z)	6. DEPARTURE TIME ACTUAL (Z)	7. CRUISING ALTITUDE
VFR / X IFR / DVFR	PTZ 70	BE 1900/R	247 KTS	KPWK CHICAGO/ PAL-WAUKEE			FL190

8. ROUTE OF FLIGHT
PAL-WAUKEE TWO DEPARTURE, PMM J547 BUF

9. DESTINATION (Name of airport and city)	10. EST. TIME ENROUTE HOURS	MINUTES	11. REMARKS
BUF GREATER BUFFALO INT'L BUFFALO			L/O = LEVEL OFF PPH = POUNDS PER HOUR L/O PMM R-261/47 VARIATION: PWK 1W, FNT 3W, BUF 8W

12. FUEL ON BOARD HOURS	MINUTES	13. ALTERNATE AIRPORT(S)	14. PILOT'S NAME, ADDRESS & TELEPHONE NUMBER & AIRCRAFT HOME BASE	15. NUMBER ABOARD
3	35	SYR SYRACUSE HANCOCK INT'L	17. DESTINATION CONTACT/TELEPHONE (OPTIONAL)	13

16. COLOR OF AIRCRAFT
WHITE/BLACK

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

FLIGHT LOG

CHECK POINTS FROM	TO	ROUTE / ALTITUDE	COURSE	WIND TEMP	SPEED-KTS TAS	GS	DIST NM	TIME LEG	TIME TOT	FUEL LEG	FUEL TOT
PWK	L/O	VECTORS CLIMB					49		:24:00		410*
L/O	PMM	J547 FL190		020/61 ISA							
PMM	FNT										
FNT	YXU										
YXU	BUF R-282/40										
BUF R-282/40	BUF	J547 DESCENT					40	:19:00		163	
BUF	SYR	VECTORS 4000					112	:30:00			

OTHER DATA: * Includes Taxi Fuel
NOTE: Use 676 PPH Total Fuel Flow From L/O To Start Of Descent.
Use 726 PPH Total Fuel Flow for Reserve And Alternate Requirements.

A Missed Approach Requires 76# of Fuel.

TIME and FUEL: As required by FARs.

TIME	FUEL (LB)	
		EN ROUTE
		RESERVE
		ALTERNATE
		TOTAL

FIGURE 168.—Flight Plan/Flight Log.

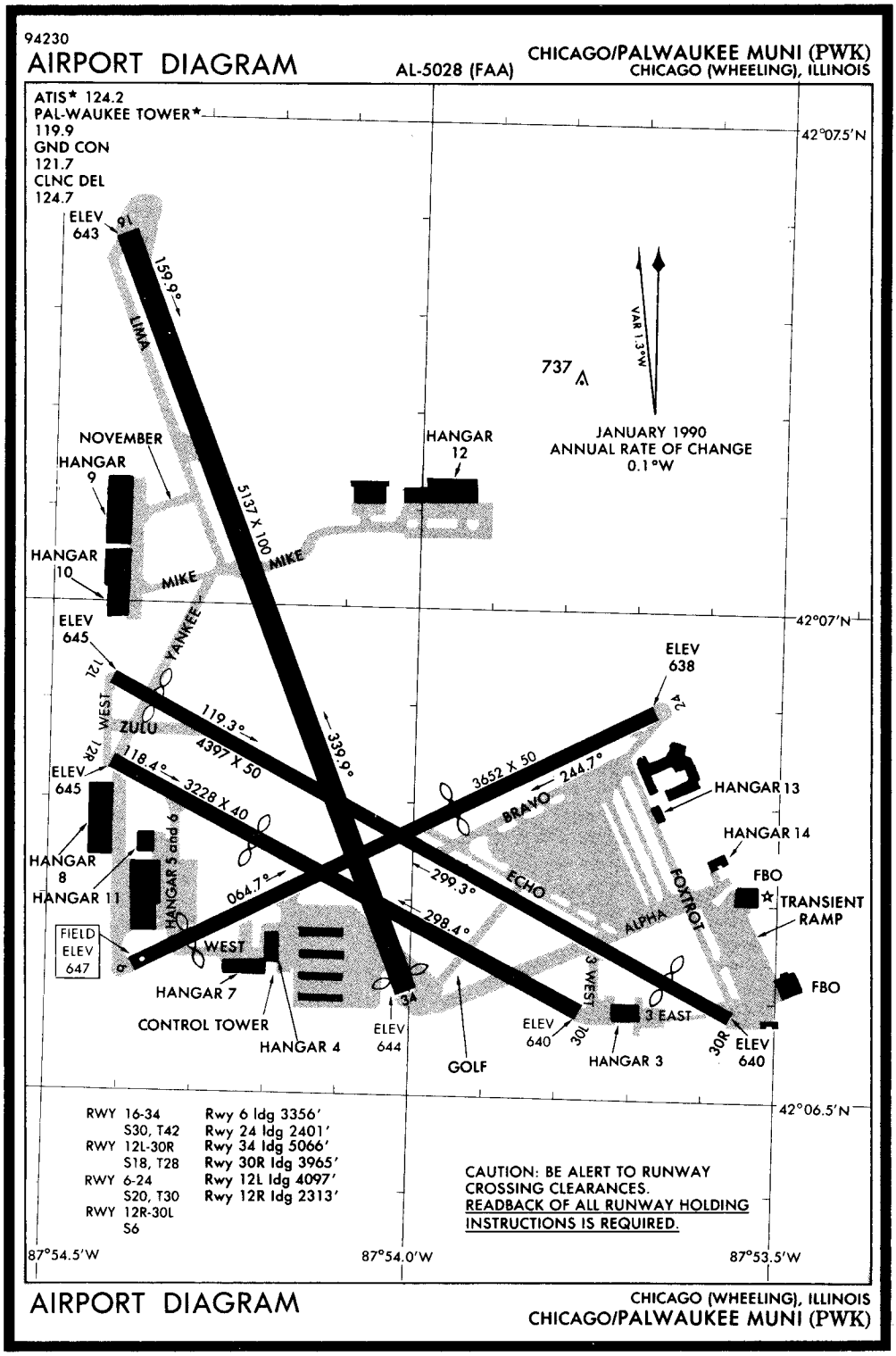


FIGURE 169.—AIRPORT DIAGRAM (PWK).

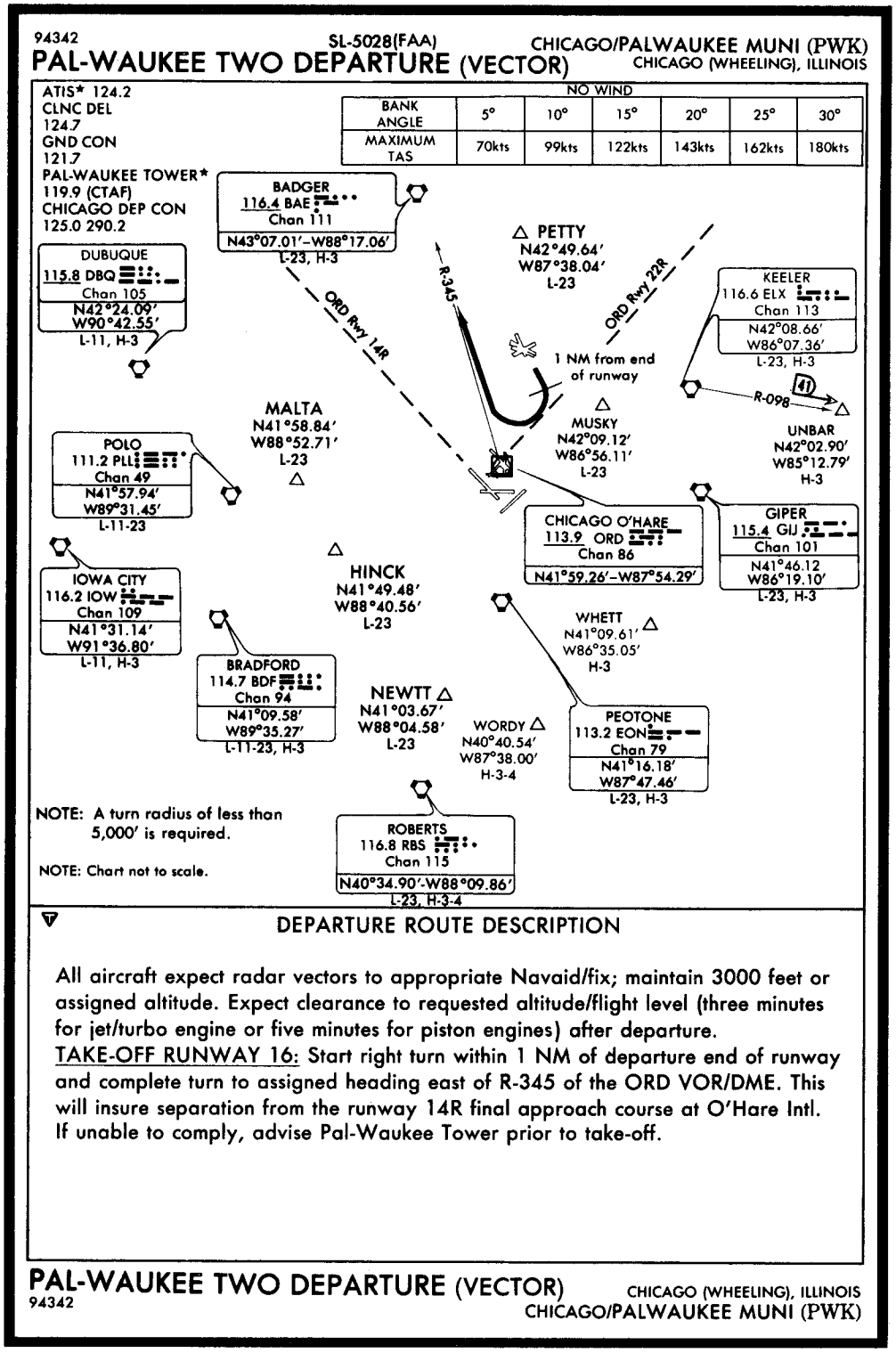


FIGURE 169A.—PAL-WAUKEE TWO DEPARTURE (VECTOR) (PWK).

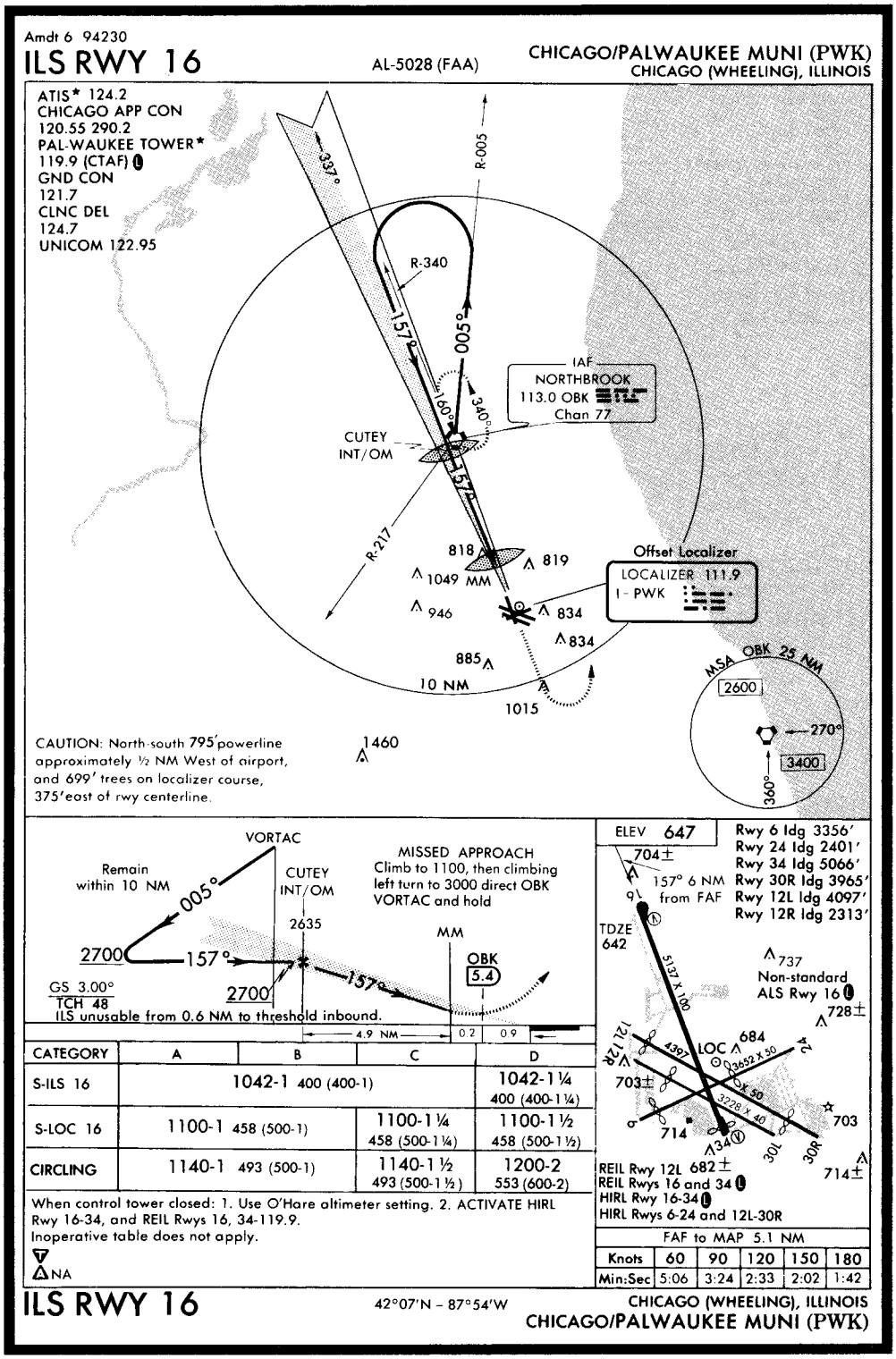


FIGURE 170.—ILS RWY 16 (PWK).

TAKE-OFF MINS

94286

CHICAGO, IL
CHICAGO MIDWAY
TAKE-OFF MINIMUMS: **Rwys 13R, 31L,** 300-1. **Rwy 13L,** 300-1 or std. with min. climb of 300' per NM to 900. **Rwy 31C,** 300-1 or std. with min. climb of 330' per NM to 900. **Rwy 31R,** 300-1 or std. with min. climb of 225' per NM to 900. **Rwy 22L,** 300-1 or std. with min. climb of 400' per NM to 900. **Rwy 22R,** 300-1 or std. with min. climb of 340' per NM to 900.
DEPARTURE PROCEDURE: **Rwys 4L, 4R,** Northbound Departures (360° CW 080°), climbing right turn to 2400 heading 100° before proceeding on course. **Rwys 22L, 22R, 31C, 31R, 31L, 13R, 13L, 13C,** climb runway heading to 1300' before turning.

CHICAGO-O'HARE INTL
TAKE-OFF MINIMUMS: **Rwy 22R,** 300-1. **Rwy 32L,** straight out or right turn, std.; left turn 1000-3 or std. with a min. climb of 240' per NM to 1800. **Rwy 18,** NA. **Rwy 36,** 500-1.

LANSING MUNI
DEPARTURE PROCEDURE: **Rwy 9,** 300-1. **Rwy 36,** 400-1.

CHICAGO/ROMEOVILLE, IL
LEWIS UNIVERSITY
DEPARTURE PROCEDURE: **Rwy 6,** climb on heading 065° to 1200 before proceeding on course.

CHICAGO/WAUKEGAN, IL
WAUKEGAN REGIONAL
TAKE-OFF MINIMUMS: **Rwy 14,** 300-1.

CHICAGO (WHEELING), IL
PALWAUKEE MUNI
TAKE-OFF MINIMUMS: **Rwys 6, 12L/R, 24, 30L/R, 34,** 300-1.

CLINTONVILLE, WI
CLINTONVILLE MUNI
DEPARTURE PROCEDURE: **Rwys 4, 9,** climb on runway heading to 2000 before turning on course.

DE KALB, IL
DE KALB TAYLOR MUNI
TAKE-OFF MINIMUMS: **Rwys 9, 27,** 300-1.

DECATUR, IL
DECATUR
DEPARTURE PROCEDURE: Northbound Departures; **Rwy 36,** left turn, climb to 3000 via DEC R-340 before proceeding North. **Rwy 30,** right turn, climb to 3000 via DEC R-340 before proceeding North. **Rwy 18,** climb runway heading to 1200 before turning North. **Rwys 6, 12, 24,** climb runway heading to 1600 before turning North.

DELAVAN, WI
LAKE LAWN
TAKE-OFF MINIMUMS: **Rwys 18, 36,** 300-1.

DIXON, IL
DIXON MUNI-CHARLES R. WALGREEN FIELD
TAKE-OFF MINIMUMS: **Rwys 26, 30,** 300-1.

EAU CLAIRE, WI
CHIPPEWA VALLEY REGIONAL
TAKE-OFF MINIMUMS: **Rwy 14,** 500-1.
DEPARTURE PROCEDURE: **Rwys 14, 22,** climb runway heading to 2500 before turning southbound.

EFFINGHAM, IL
EFFINGHAM COUNTY MEMORIAL
TAKE-OFF MINIMUMS: **Rwy 1,** 500-1.
DEPARTURE PROCEDURE: **Rwy 29,** climb runway heading to 2100 before turning right.

FAIRFIELD, IL
FAIRFIELD MUNI
TAKE-OFF MINIMUMS: **Rwy 9,** 400-1.
DEPARTURE PROCEDURE: **Rwy 36,** climb runway heading to 2100 before turning right. **Rwy 18,** climb runway heading to 2100 before turning left. **Rwy 27,** climb runway heading to 1500 before turning eastbound. **Rwy 9,** climb to 2100 on heading 120° before proceeding eastbound or northbound.

FLORA, IL
FLORA MUNI
DEPARTURE PROCEDURE: **Rwys 3, 33,** climb runway heading to 1100' before turning left. **Rwy 21,** climb runway heading to 1100 before turning right.

FOND DU LAC, WI
FOND DU LAC COUNTY
DEPARTURE PROCEDURE: **Rwy 9,** climb runway heading to 2000 before turning North. **Rwy 36,** climb runway heading to 2000 before turning East.

FRANKFORT, IL
FRANKFORT
TAKE-OFF MINIMUMS: **Rwy 27,** 300-1.
DEPARTURE PROCEDURE: **Rwy 9,** climb runway heading to 1200 before turning northbound.

GRANTSBURG, WI
GRANTSBURG MUNI
TAKE-OFF MINIMUMS: **Rwy 23,** 300-1.

GRAYSLAKE, IL
CAMPBELL
TAKE-OFF MINIMUMS: **Rwy 24,** 300-1.
DEPARTURE PROCEDURE: **Rwy 9,** climb runway heading to 1200 before turning.

4286 EC-3

TAKE-OFF MINS

FIGURE 170A.—TAKE-OFF MINS.

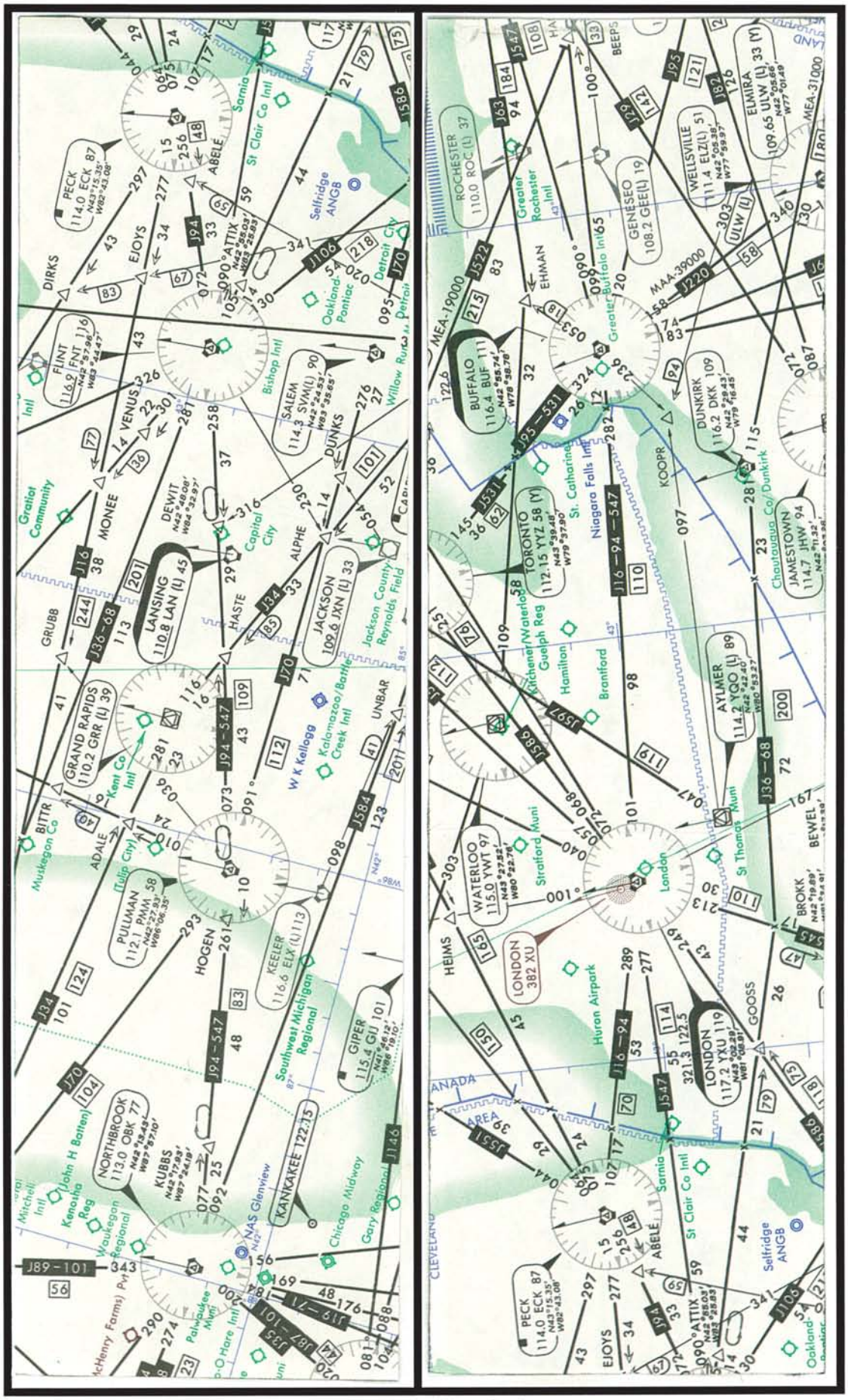
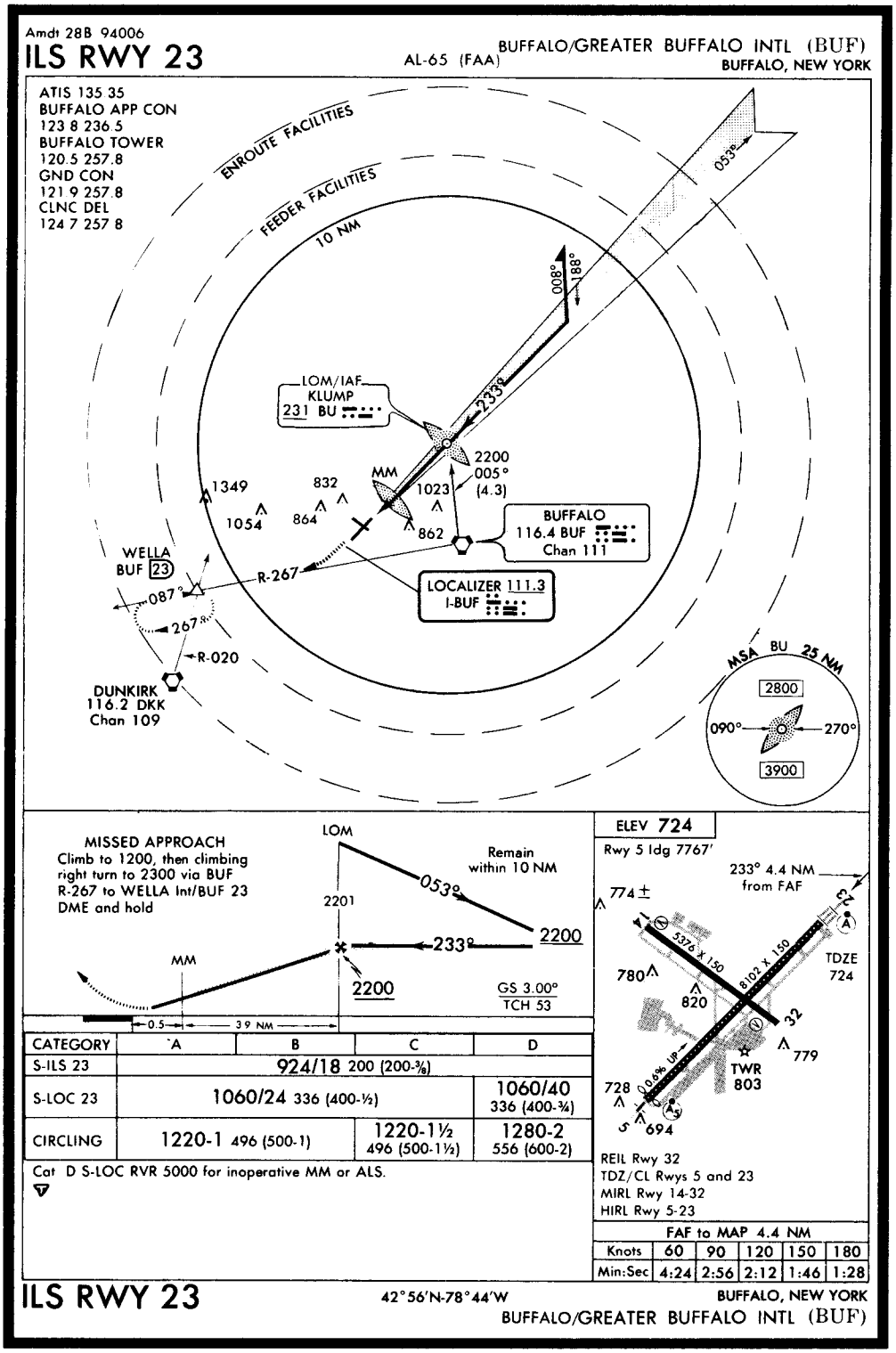


FIGURE 171.—High Altitude Airways.



CATEGORY	A	B	C	D
S-ILS 23	924/18 200 (200-⅜)			
S-LOC 23	1060/24 336 (400-½)			1060/40 336 (400-¾)
CIRCLING	1220-1 496 (500-1)		1220-1½ 496 (500-1½)	1280-2 556 (600-2)

Cat D S-LOC RVR 5000 for inoperative MM or ALS.

FAF to MAP 4.4 NM					
Knots	60	90	120	150	180
Min:Sec	4:24	2:56	2:12	1:46	1:28

FIGURE 172.—ILS RWY 23 (BUF).

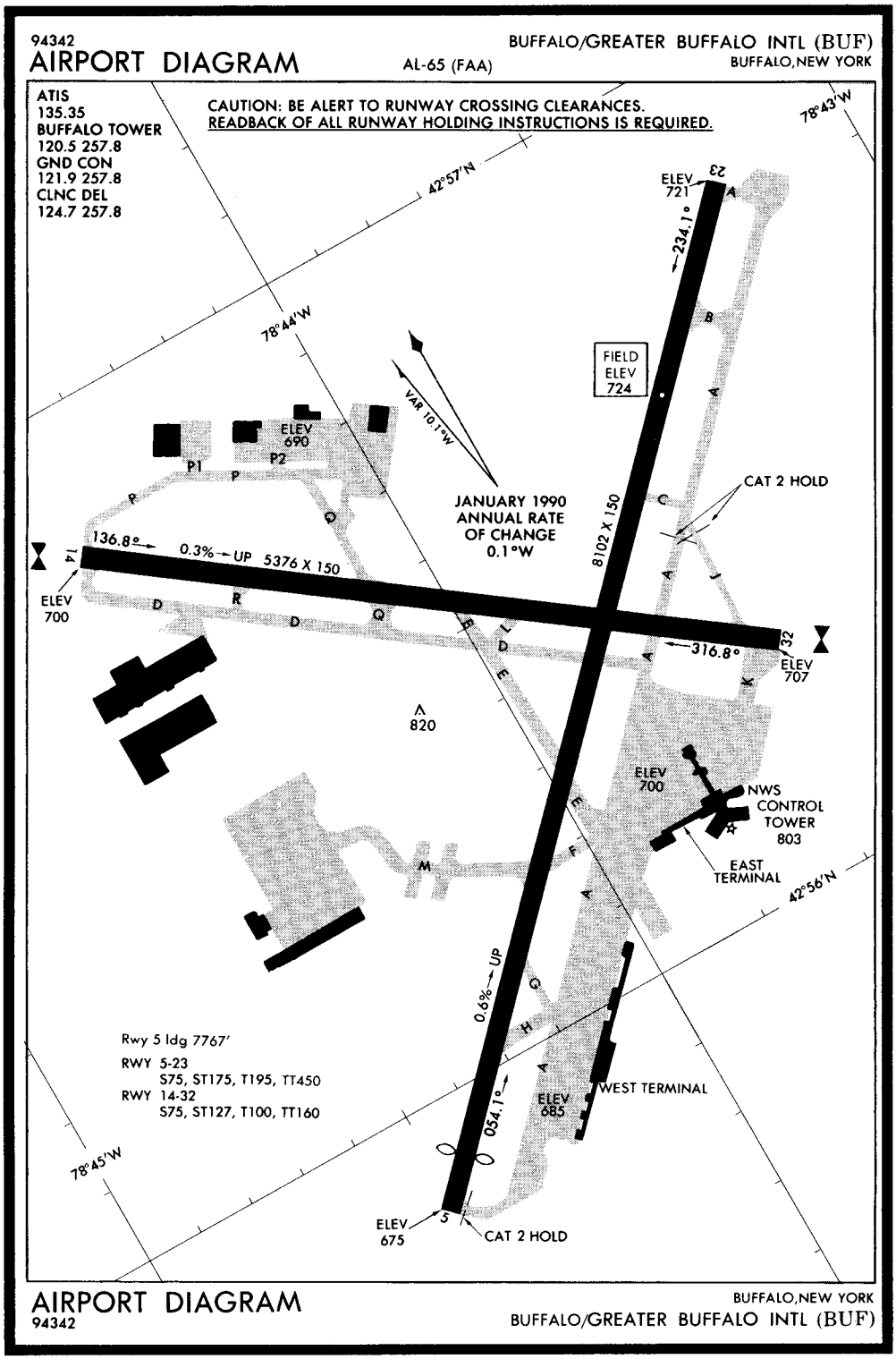


FIGURE 172A.—AIRPORT DIAGRAM (BUF).

A 95033 ALTERNATE MINS A

INSTRUMENT APPROACH PROCEDURE CHARTS

A IFR ALTERNATE MINIMUMS

(NOT APPLICABLE TO USA/USN/USAF)

Standard alternate minimums for non precision approaches are 800-2 (NDB, VOR, LOC, TACAN, LDA, VORTAC, VOR/DME or ASR); for precision approaches 600-2 (ILS or PAR). Airports within this geographical area that require alternate minimums other than standard or alternate minimums with restrictions are listed below. NA - means alternate minimums are not authorized due to unmonitored facility or absence of weather reporting service. Civil pilots see FAR 91. USA/USN/USAF pilots refer to appropriate regulations.

NAME — ALTERNATE MINIMUMS

ALBANY, NY
ALBANY COUNTY ..... ILS Rwy 1[1]
ILS Rwy 19[1]
VOR/DME or GPS Rwy 1[1]
VOR Rwy 1[2]
VOR or GPS Rwy 19[1]
VOR or GPS Rwy 28[1]
[1]Category D, 800-2½.
[2]Category C, 800-2¼; Category D, 800-2½.

ALLENTOWN, PA
LEHIGH VALLEY INTL ..... ILS Rwy 13
ILS, Categories A,B,C, 700-2; Category D, 700-2¼. LOC, Category D, 800-2¼.

ALTOONA, PA
ALTOONA-BLAIR COUNTY ..... ILS Rwy 20[1]
VOR or GPS-A[2]
[1]Categories A,B,C, 900-2½, Category D, 1100-3.
[2]Category D, 1100-3.

BRADFORD, PA
BRADFORD REGIONAL ..... VOR/DME or GPS Rwy 14
NA when BFD FSS closed.

CORTLAND, NY
CORTLAND COUNTY-CHASE FIELD ..... VOR or GPS-A
Categories A,B, 1100-2,Categories C,D, 1100-3.

DUBOIS, PA
DUBOIS-JEFFERSON COUNTY ..... ILS Rwy 25
LOC, NA.

NAME — ALTERNATE MINIMUMS

ELMIRA, NY
ELMIRA/CORNING REGIONAL ..... ILS Rwy 6[1,2]
ILS Rwy 24,1200-3
NDB or GPS Rwy 24,1200-3
[1]Categories A,B, 1200-2; Categories C,D, 1200-3.
[2]NA when control tower closed.

ERIE, PA
ERIE INTL ..... ILS Rwy 6[1]
ILS Rwy 24[1]
NDB Rwy 6
NDB Rwy 24
RADAR-1
NA when control tower closed.
[1]ILS, 700-2.

FARMINGDALE, NY
REPUBLIC ..... ILS Rwy 14[1]
NDB or GPS Rwy 1[2]
[1]NA when control tower closed.
[2]NA when control zone not effective.

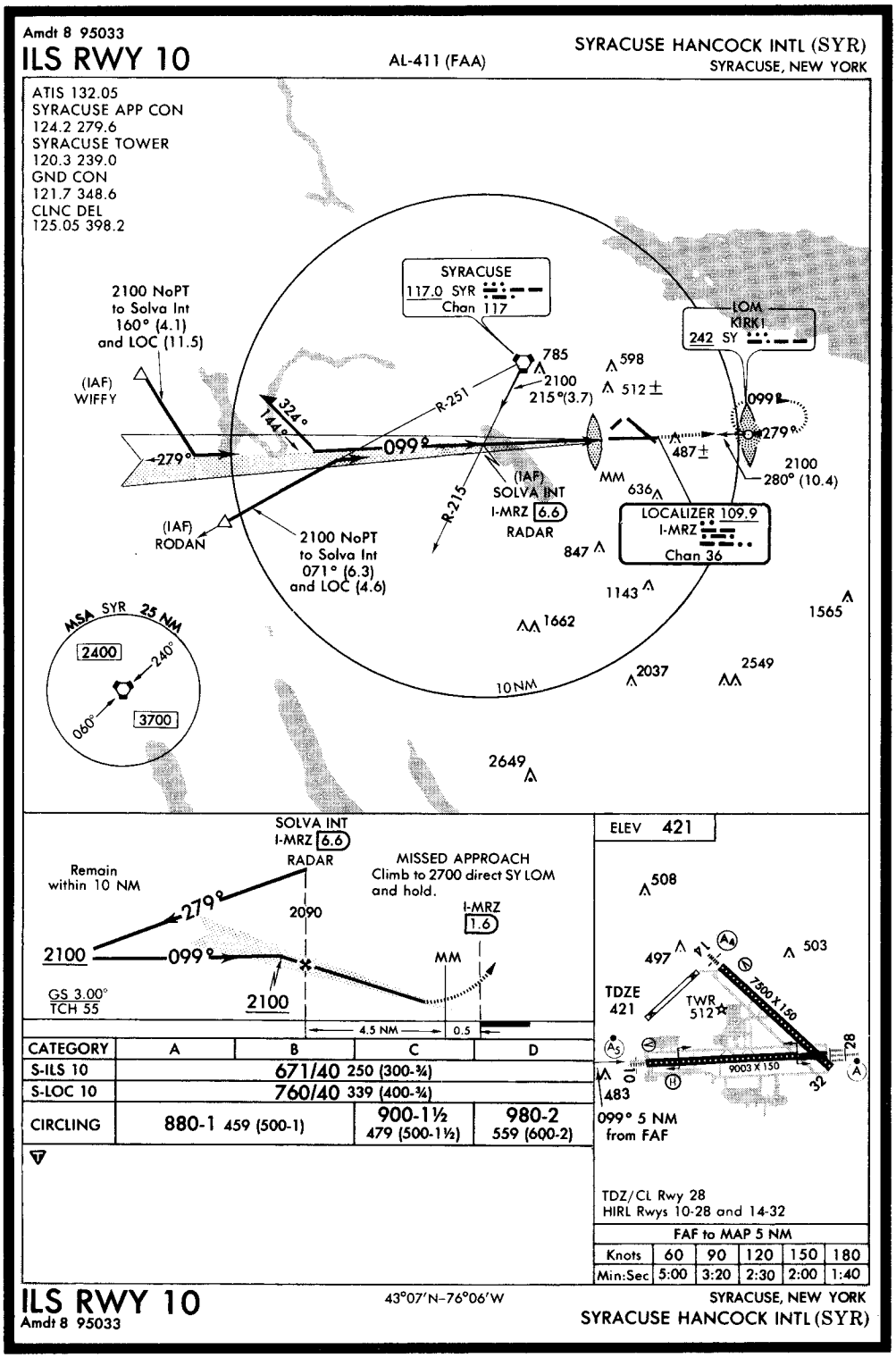
HARRISBURG, PA
CAPITAL CITY ..... ILS Rwy 8
Categories A,B, 900-2; Categories C,D, 900-2¾.
NA when control tower closed.

HARRISBURG INTL ..... ILS Rwy 13[1]
ILS Rwy 31[1]
VOR or GPS Rwy 31[2]
[1]ILS, Categories C,D, 700-2. LOC, NA.
[2]Categories A,B, 900-2, Category C, 900-2¾, Category D, 900-3.

NE-2

A 95033 ALTERNATE MINS A

FIGURE 173.—IFR ALTERNATE MINIMUMS.



CATEGORY	A	B	C	D
S-ILS 10	671/40 250 (300-¾)			
S-LOC 10	760/40 339 (400-¾)			
CIRCLING	880-1 459 (500-1)		900-1½ 479 (500-1½)	980-2 559 (600-2)

FAF to MAP 5 NM					
Knots	60	90	120	150	180
Min:Sec	5:00	3:20	2:30	2:00	1:40

FIGURE 173A.—ILS RWY 10 (SYR).

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 PROPOSED (Z)	6. DEPARTURE TIME ACTUAL (Z)	7. CRUISING ALTITUDE
VFR / X IFR / DVFR	SEA HAWK 1	BH230/R	** KTS	LWS LEWISTON-ZEZ PERCE CO.			*** 12000

8. ROUTE OF FLIGHT
POTOR2.CLOVA, V520PSC, V204YKM, V4 SEA, V27 ULESS, HQ, HQM

9. DESTINATION (Name of airport and city)	10. EST. TIME ENROUTE HOURS	MINUTES	11. REMARKS
HQM BOWERMAN HOQUIAM, WA			L/O = LEVEL OFF PPH = POUNDS PER HOUR **CAS 132 ISA - 8 TO ±0 *** AFTER SEA DESCEND TO 4000 FEET

12. FUEL ON BOARD HOURS	MINUTES	13. ALTERNATE AIRPORT(S)	14. PILOT'S NAME, ADDRESS & TELEPHONE NUMBER & AIRCRAFT HOME BASE	15. NUMBER ABOARD
		OLM OLYMPIA, WA	17. DESTINATION CONTACT/TELEPHONE (OPTIONAL)	8

16. COLOR OF AIRCRAFT
YELLOW/BLACK

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

FLIGHT LOG

CHECK POINTS FROM	TO	ROUTE ALTITUDE	COURSE	WIND TEMP	SPEED-KTS TAS	GS	DIST NM	TIME LEG	TOT	FUEL LEG	TOT
LWS	MQG	POTOR2.CLOVA CLIMB					15		:15:00		191*
MQG	ALW	V520 12000		340/40 ISA-8							
ALW	PSC	V520 12000		340/40 ISA-3							
PSC	YKM	V204 12000		320/35 ISA-3							
YKM	SEA	V4 12000		300/29 ISA+1							
SEA	ULESS	V27 4000		280/7 ISA							
ULESS	HQ	DIRECT DESCENT						:02:00		16.0	
HQ	HQM	DIRECT DESCENT						:04:00		32.0	
HQM	OLM	V204 5000		270/16 ISA		158	42				

OTHER DATA: * Includes Taxi Fuel
NOTE: Use 525 PPH Total Fuel Flow From L/O To Start Of Descent.
Use 499 PPH Total Fuel Flow For Reserve And Alternate Requirements.

A Missed Approach Requires 40# of Fuel.

TIME and FUEL: As required by FARs.

TIME	FUEL (LB)	
		EN ROUTE
		RESERVE
		ALTERNATE
		TOTAL

FIGURE 174.—Flight Plan/Flight Log.

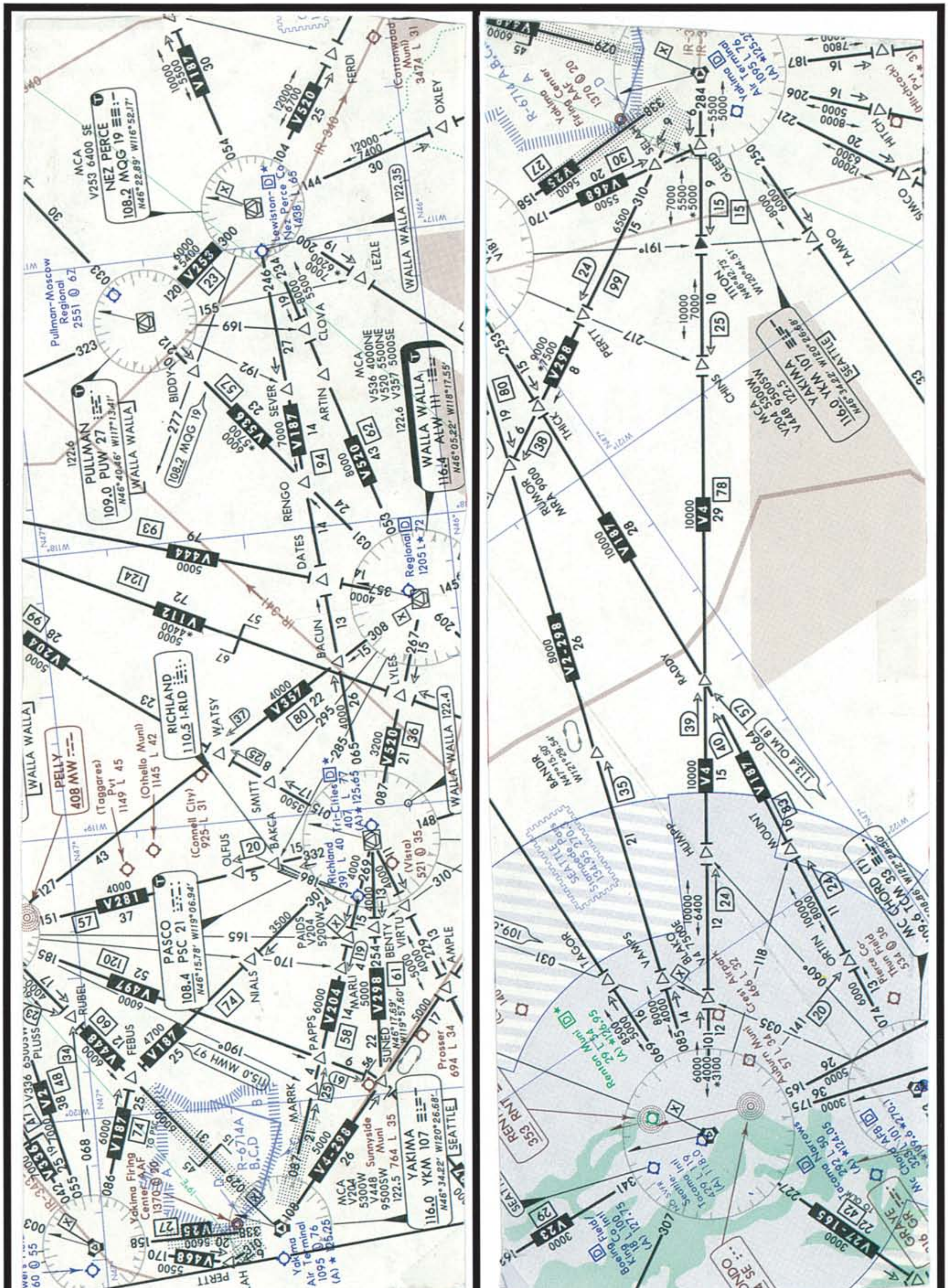


FIGURE 175.—Low Altitude Airways.

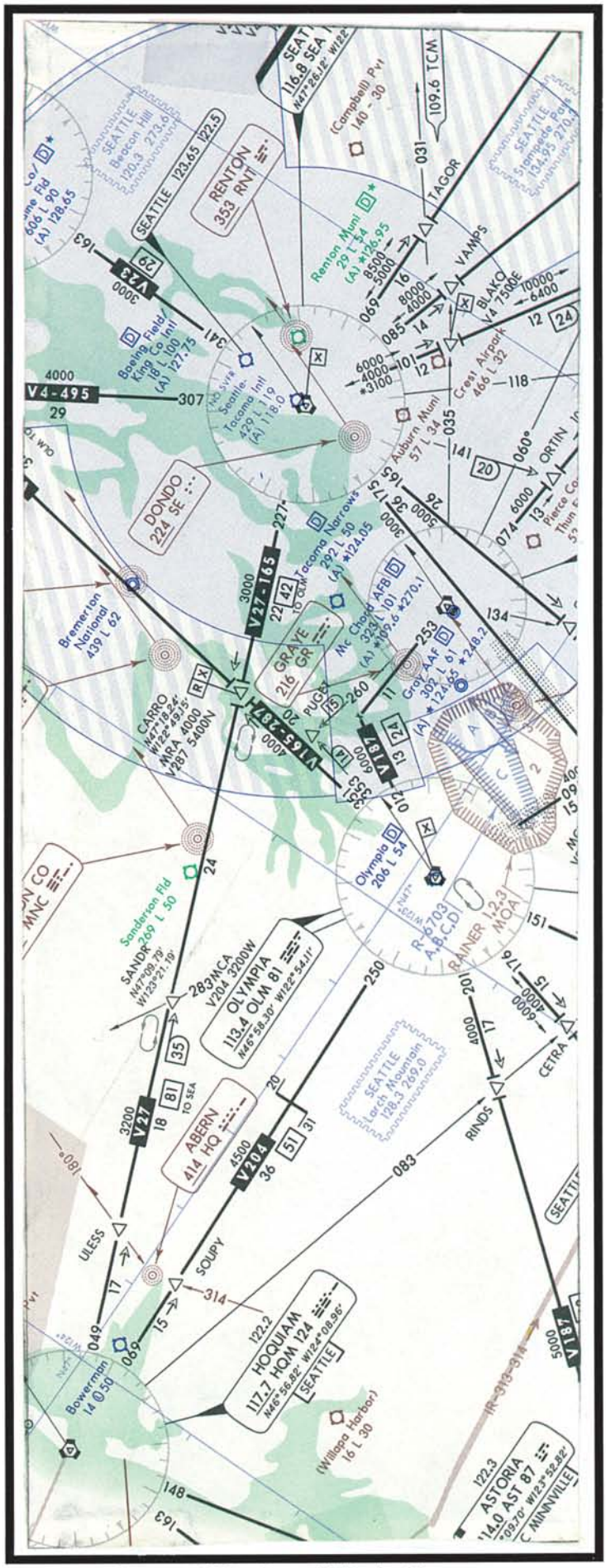


FIGURE 176.—Low Altitude Airways.

26 IDAHO

LEENY N47°44.57′ W116°57.66′. NOTAM FILE COE. GREAT FALLS
NDB (LOM) 347 CO 053° 6.0 NM to Coeur D'Alene Air Terminal.

LEE WILLIAMS MEM (See MIDVALE)

LEMHI CO (See SALMON)

LEWISTON
LEWISTON-NEZ PERCE CO (LWS) 2 S UTC-8(-7DT) N46°22.47′ W117°00.92′ SEATTLE
1438 B S4 FUEL 100, 100LL, JET A TPA—See Remarks ARFF Index A H-1B, L-9A
RWY 08-26: H6512X150 (ASPH-PFC) S-150, D-180, DT-400 HIRL IAP
RWY 08: REIL. VASI(V4R)—GA 3.0° TCH 45′. Antenna. Rgt tfc. RWY 26: MALSR. Tree.
RWY 11-29: H5001X100 (ASPH) S-70, D-94, DT-150 MIRL
RWY 11: REIL. Rgt tfc. RWY 29: VASI(V4R)—GA 3.0° TCH 47′.
AIRPORT REMARKS: Attended 1330-0500Z‡. CLOSED to unscheduled air carrier ops with more than 30 passenger seats 1500-0100Z‡ except PPR call arpt manager 208-746-7962 other times call station number 4 208-743-0172. TPA—turbine powered heavy acft 3000 (1562) all others 2500 (1062). When twr clsd ACTIVATE MALSR Rwy 26, REIL Rwy 08 and Rwy 11—CTAF.
WEATHER DATA SOURCES: LAWRS.
COMMUNICATIONS: CTAF 119.4 UNICOM 122.95
BOISE FSS (BOI) TF 1-800-WX-BRIEF. NOTAM FILE LWS.
RCO 122.35 (BOISE FSS)
SEATTLE CENTER APP/DEP CON 120.05
TOWER 119.4 (1400-0600Z‡) GND CON 121.9
AIRSPACE: CLASS D svc effective 1400-0600Z‡ other times CLASS G.
RADIO AIDS TO NAVIGATION: NOTAM FILE LWS.
NEZ PERCE (L) VORW/DME 108.2 MQG Chan 19 N46°22.89′ W116°52.17′ 246° 6.1 NM to fld. 1720/20E.
ILS 109.7 I-LWS Rwy 26. ILS unmonitored when tower closed.

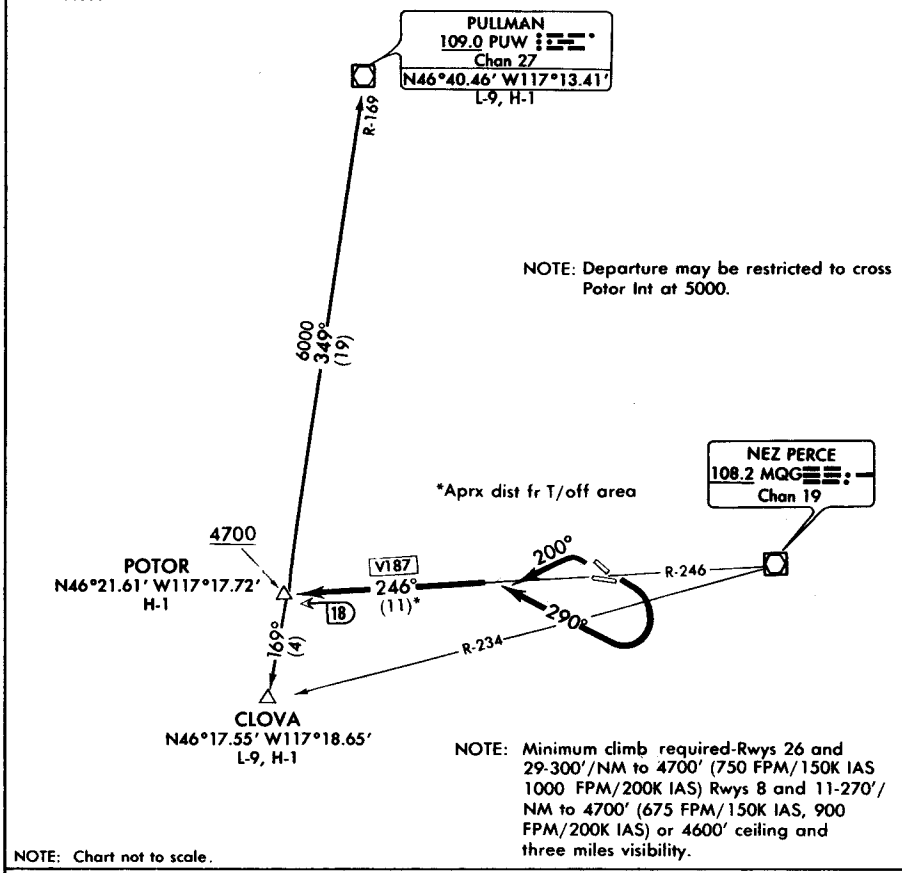
WASHINGTON 105

HOQUIAM
BOWERMAN (HQM) 2 W UTC-8(-7DT) N46°58.27′ W123°56.19′ SEATTLE
14 B S4 FUEL 80, 100LL, JET A1+ LRA L-1C
RWY 06-24: H4999X150 (ASPH) S-30, D-40, DT-80 HIRL IAP
RWY 06: MALSR. REIL. VASI(V4L)—GA 3.0° TCH 52′. Antenna. Rgt tfc.
RWY 24: VASI(V4L)—GA 3.0° TCH 50′. Sign.
AIRPORT REMARKS: Attended 1600-0200Z‡. Fuel avbl between 0100-1700Z‡, call 533-6655, call-out fee required. CAUTION—Flocks of waterfowl on and in vicinity of arpt. Service road south of rwy in primary surface. Ultralights prohibited without written permission from arpt manager. ACTIVATE HIRL Rwy 06-24 and REIL Rwy 06—CTAF.
COMMUNICATIONS: CTAF/UNICOM 122.7
SEATTLE FSS (SEA) TF 1-800-WX-BRIEF. NOTAM FILE HQM.
RCO 122.2 (SEATTLE FSS)
AIRSPACE: CLASS E svc effective 1400-0600Z‡ other times CLASS G.
RADIO AIDS TO NAVIGATION: NOTAM FILE HQM. VHF/DF ctc FSS.
HOQUIAM (H) VORTACW 117.7 HQM Chan 124 N46°56.82′ W124°08.96′ 062° 8.9 NM to fld. 10/19E. HIWAS.
ABERN NDB (LOM) 414 HQ N46°59.26′ W123°47.86′ 241° 5.8 NM to fld. Unmonitored 0600-1400Z‡. Out of service indefinitely.
ILS/DME 108.7 I-HQM Chan 24 Rwy 24 LOM ABERN NDB. LOM out of service indefinitely. LOC/LOM/DME unmonitored 0600-1400Z‡.

FIGURE 177.—Excerpt from Airport/Facilities Directory.

(PILOT NAV) (POTOR2.POTOR) 94342
POTOR TWO DEPARTURE SL-515 (FAA)
LEWISTON-NEZ PERCE COUNTY (LWS)
LEWISTON, IDAHO

GND CON
121.9
CTAF 119.4



DEPARTURE ROUTE DESCRIPTION

TAKE-OFF RUNWAYS 8, 11: Turn right heading 290°. Thence . . . .
TAKE-OFF RUNWAYS 26, 29: Turn left heading 200°. Thence . . . .
. . . . Intercept and proceed via MQG R-246 (V187) to POTOR INT. Thence via (assigned route) or (transition).
CLOVA TRANSITION (POTOR2.CLOVA): From over POTOR INT via PUW R-169 to CLOVA INT.
PULLMAN TRANSITION (POTOR2.PUW): From over POTOR INT via PUW R-169 to PUW VOR/DME.

POTOR TWO DEPARTURE
(PILOT NAV) (POTOR2.POTOR) 94342
LEWISTON, IDAHO
LEWISTON-NEZ PERCE COUNTY (LWS)

FIGURE 177A.—POTOR TWO DEPARTURE (LWS).

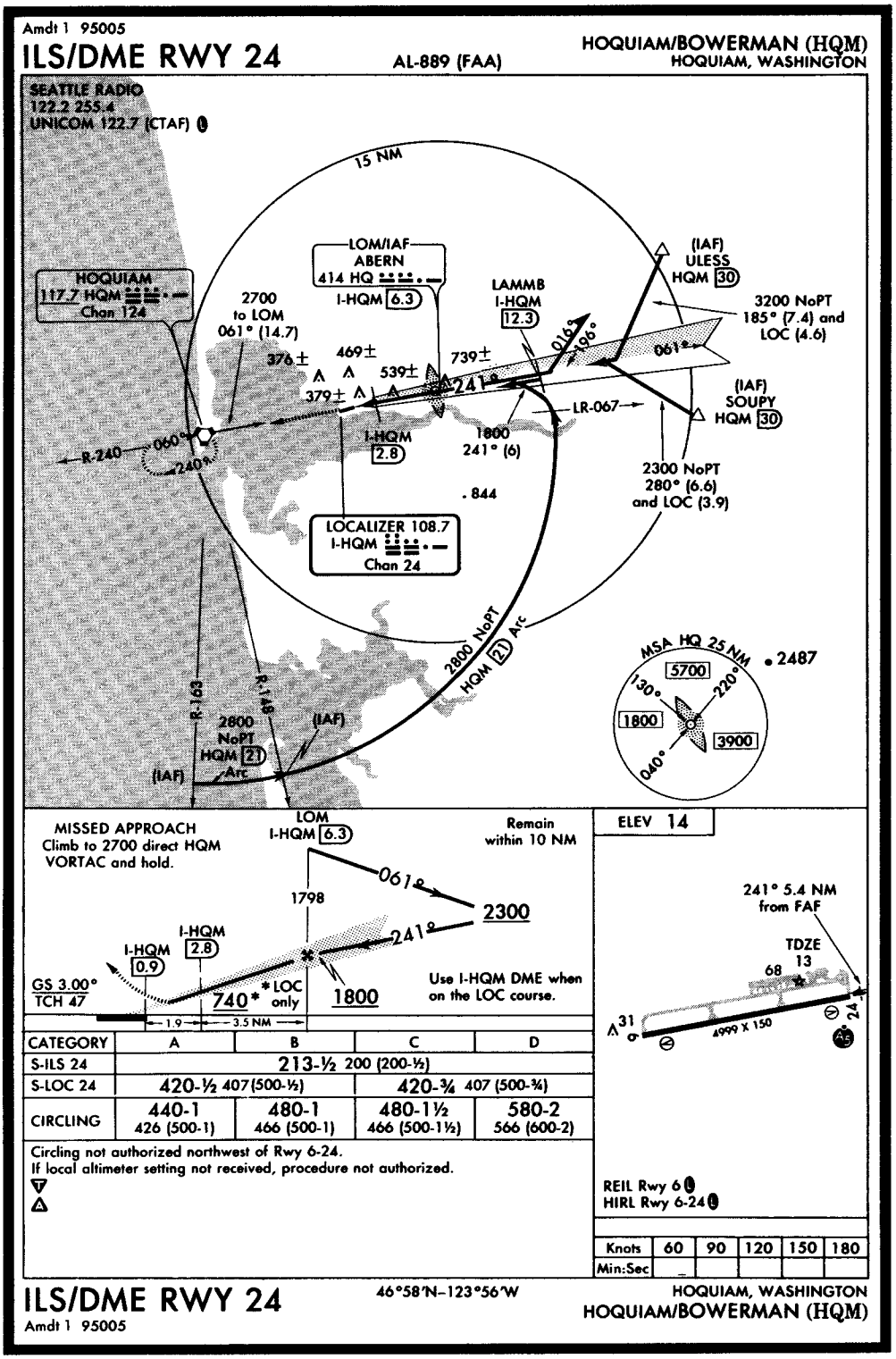
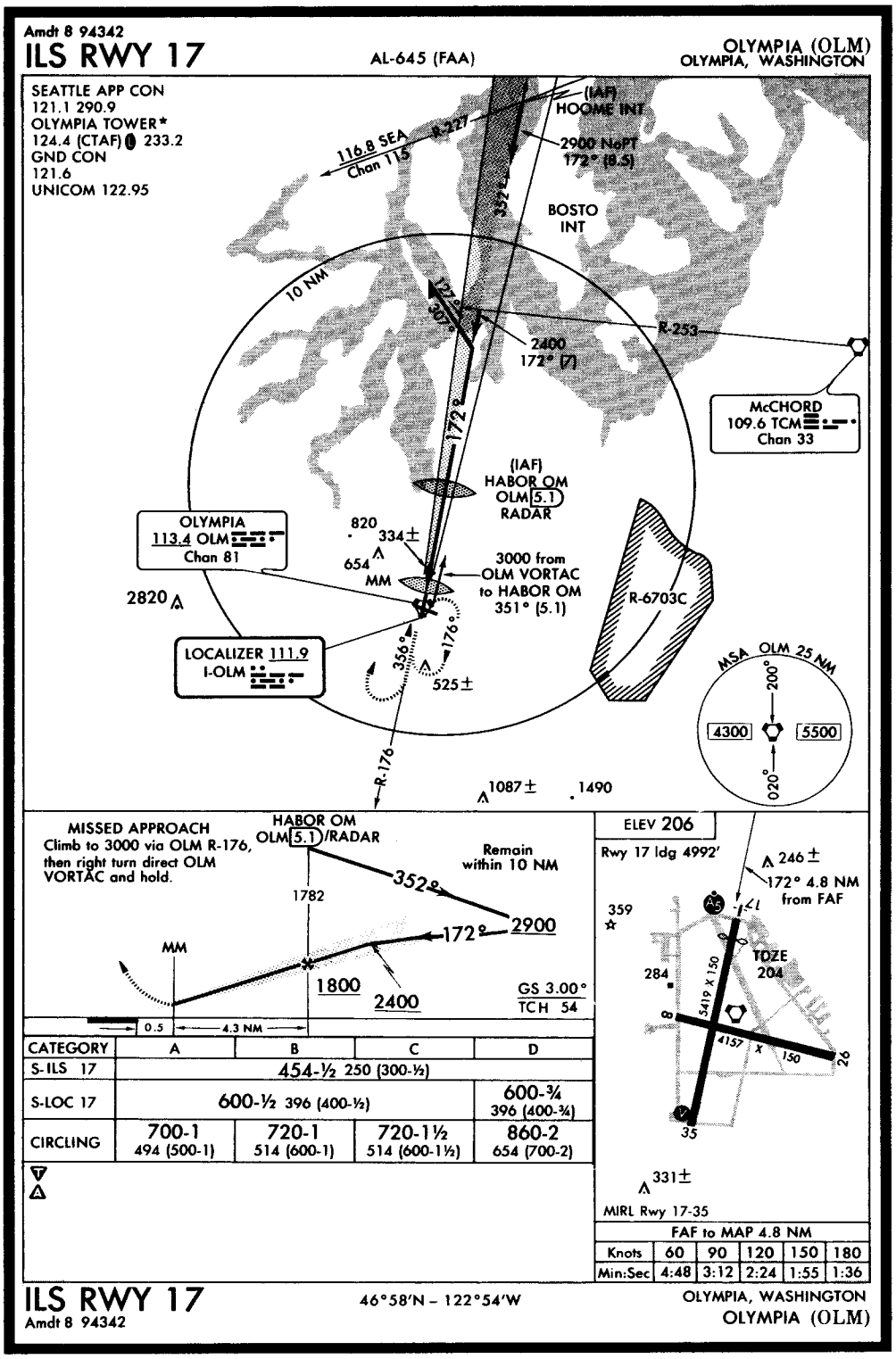


FIGURE 178.—ILS/DME RWY 24 (HQM).



CATEGORY	A	B	C	D
S-ILS 17	454-½ 250 (300-½)			
S-LOC 17	600-½ 396 (400-½)			600-¾ 396 (400-¾)
CIRCLING	700-1 494 (500-1)	720-1 514 (600-1)	720-1½ 514 (600-1½)	860-2 654 (700-2)

FAF to MAP 4.8 NM					
Knots	60	90	120	150	180
Min:Sec	4:48	3:12	2:24	1:55	1:36

FIGURE 178A.—ILS RWY 17 (OLM).

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 PROPOSED (Z)	6. DEPARTURE TIME ACTUAL (Z)	7. CRUISING ALTITUDE
VFR / X IFR / DVFR	EAB 90	BB1900/A	236 KTS	KPHF NEWPORT NEWS, VA			FL190

8. ROUTE OF FLIGHT
HENRY ONE ORF, J121 SIE, SIE. VCN5 PHL

9. DESTINATION (Name of airport and city)	10. EST. TIME ENROUTE HOURS	MINUTES	11. REMARKS
KPHL PHILADELPHIA INT'L PHILADELPHIA			VARIATION: PHF 7°W, PHL 10°W. TEC = TOWER ENROUTE CONTROL PPH = Pounds Per Hour

12. FUEL ON BOARD HOURS	MINUTES	13. ALTERNATE AIRPORT(S)	14. PILOT'S NAME, ADDRESS & TELEPHONE NUMBER & AIRCRAFT HOME BASE	15. NUMBER ABOARD
2	45	KACY ATLANTIC CITY INT'L	17. DESTINATION CONTACT/TELEPHONE (OPTIONAL)	13

16. COLOR OF AIRCRAFT
BLUE/RED

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

FLIGHT LOG

CHECK POINTS FROM	TO	ROUTE ALTITUDE	COURSE	WIND TEMP	SPEED-KTS TAS	GS	DIST NM	TIME LEG	TOT	FUEL LEG	TOT
PHF	ORF	VECTORS CLIMB					40		:19:00		312*
ORF	SAWED	J121 FL190		300/70 ISA+5							
SAWED	SWL										
SWL	SIE										
SIE	VCN										
VCN	OOD										
OOD	PHL	DESCENT & APPROACH					30	:16:00		177	
PHL	ACY	TEC 3000					46	:18:00			

OTHER DATA: * Includes Taxi Fuel
NOTE: Use 689 PPH Total Fuel Flow From L/O To Start Of Descent.
Use 739 PPH Total Fuel Flow For Reserve And Alternate Requirements.

A Missed Approach Requires 95# of Fuel.

TIME and FUEL: As required by FARs.

TIME	FUEL (LB)	
		EN ROUTE
		RESERVE
		ALTERNATE
		TOTAL

FIGURE 179.—Flight Plan/Flight Log.

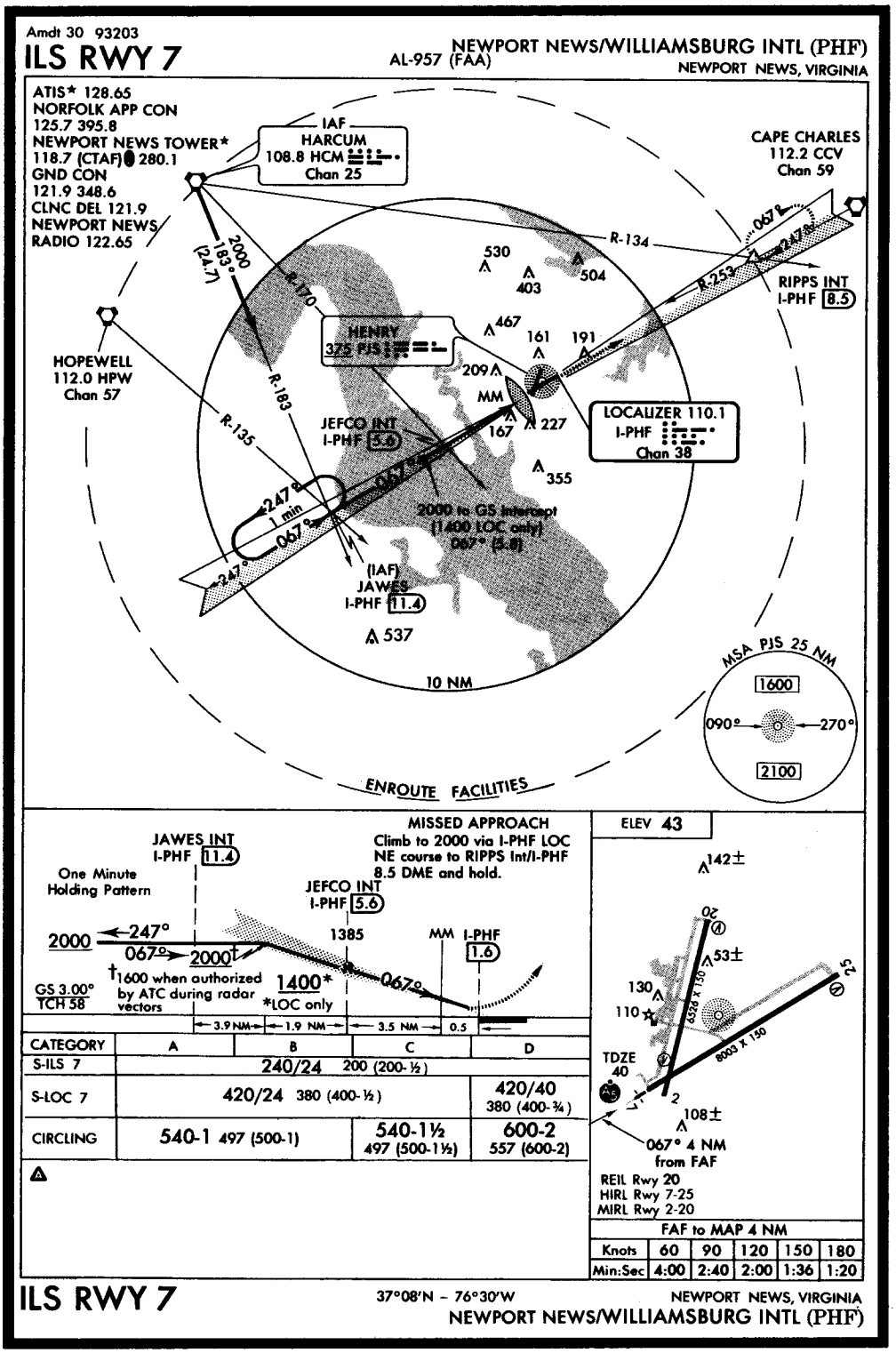


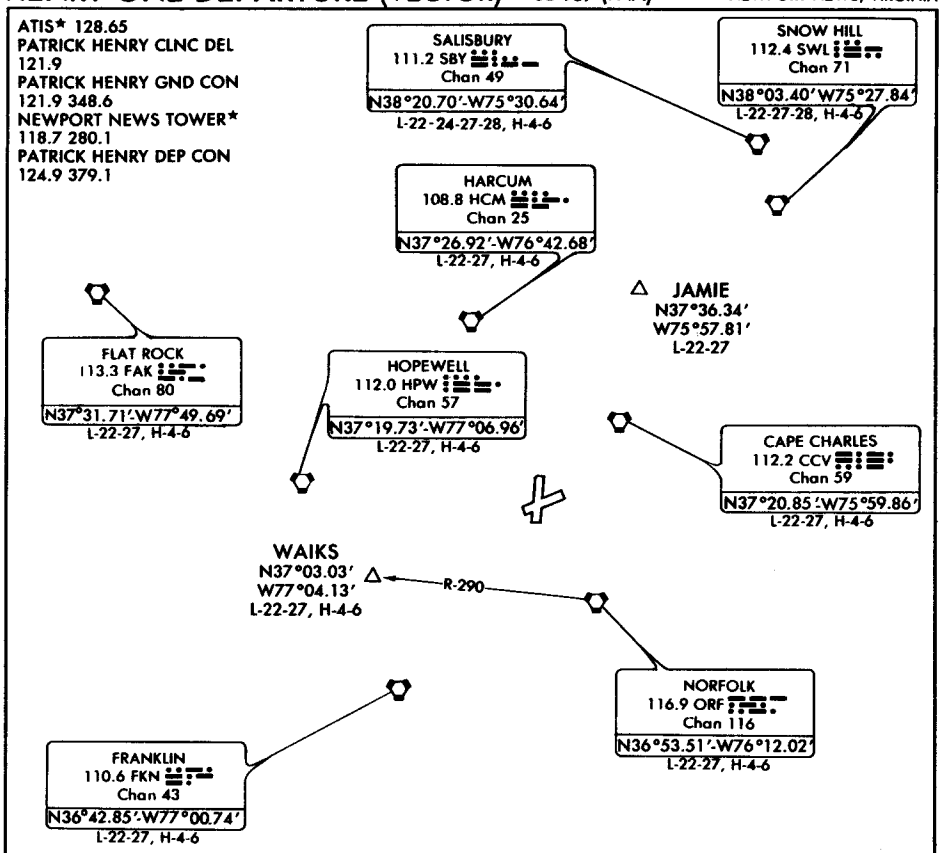
FIGURE 180.—ILS RWY 7 (PHF).

94342

NEWPORT NEWS/WILLIAMSBURG INTL (PHF)

HENRY ONE DEPARTURE (VECTOR) SL-957 (FAA)

NEWPORT NEWS, VIRGINIA



DEPARTURE ROUTE DESCRIPTION

TAKE-OFF RUNWAYS 2, 7 and 25: Fly runway heading for radar vectors to assigned departure route/fix. Maintain 2000 feet; expect clearance to requested altitude 10 minutes after departure.

TAKE-OFF RUNWAY 20: Turn right heading 250° for radar vectors to assigned departure route/fix. Maintain 2000 feet; expect clearance to requested altitude 10 minutes after departure.

HENRY ONE DEPARTURE (VECTOR)

NEWPORT NEWS, VIRGINIA

94342

NEWPORT NEWS/WILLIAMSBURG INTL (PHF)

FIGURE 180A.—HENRY ONE DEPARTURE (VECTOR) (PHF).

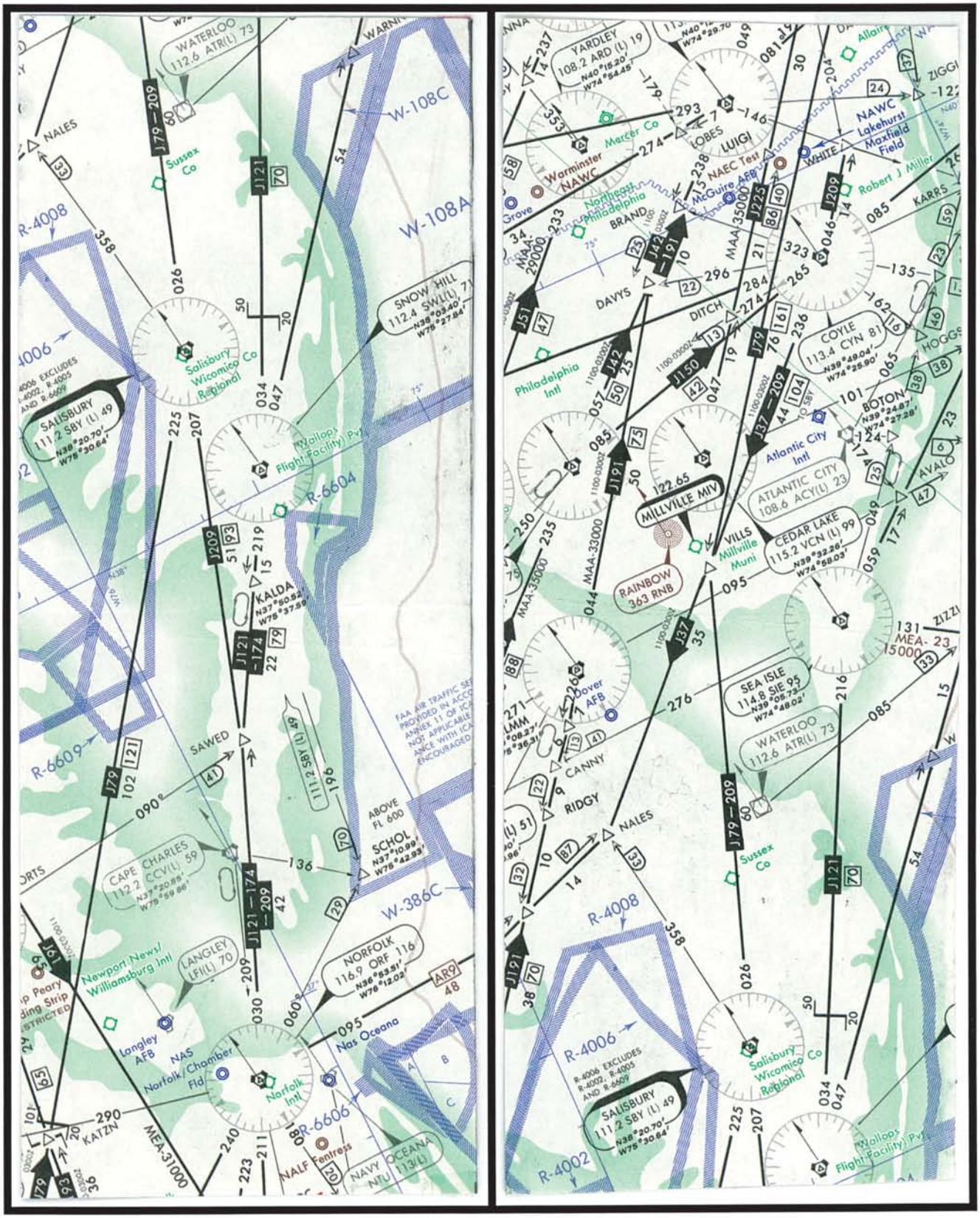


FIGURE 181.—High Altitude Airways.

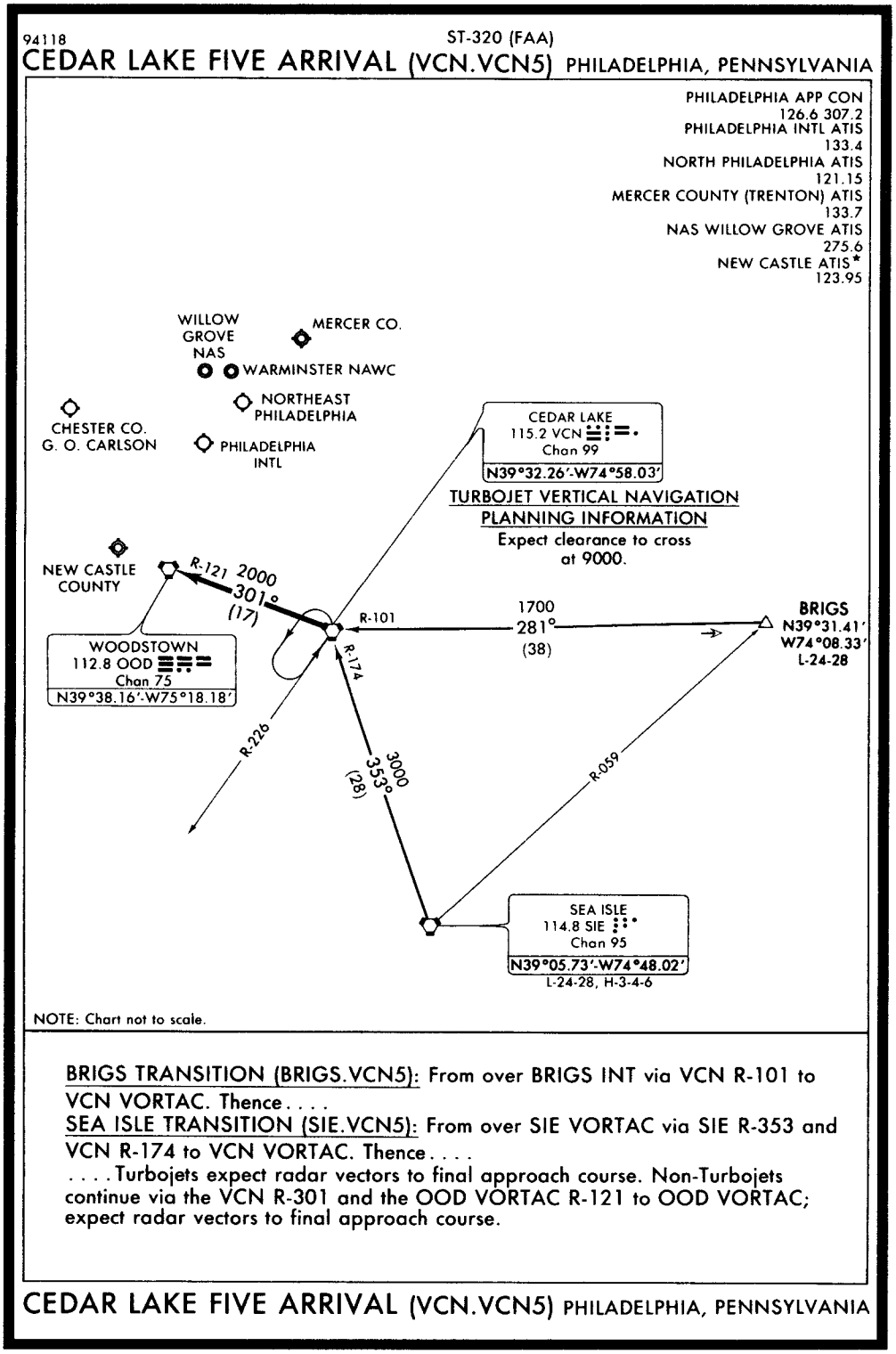
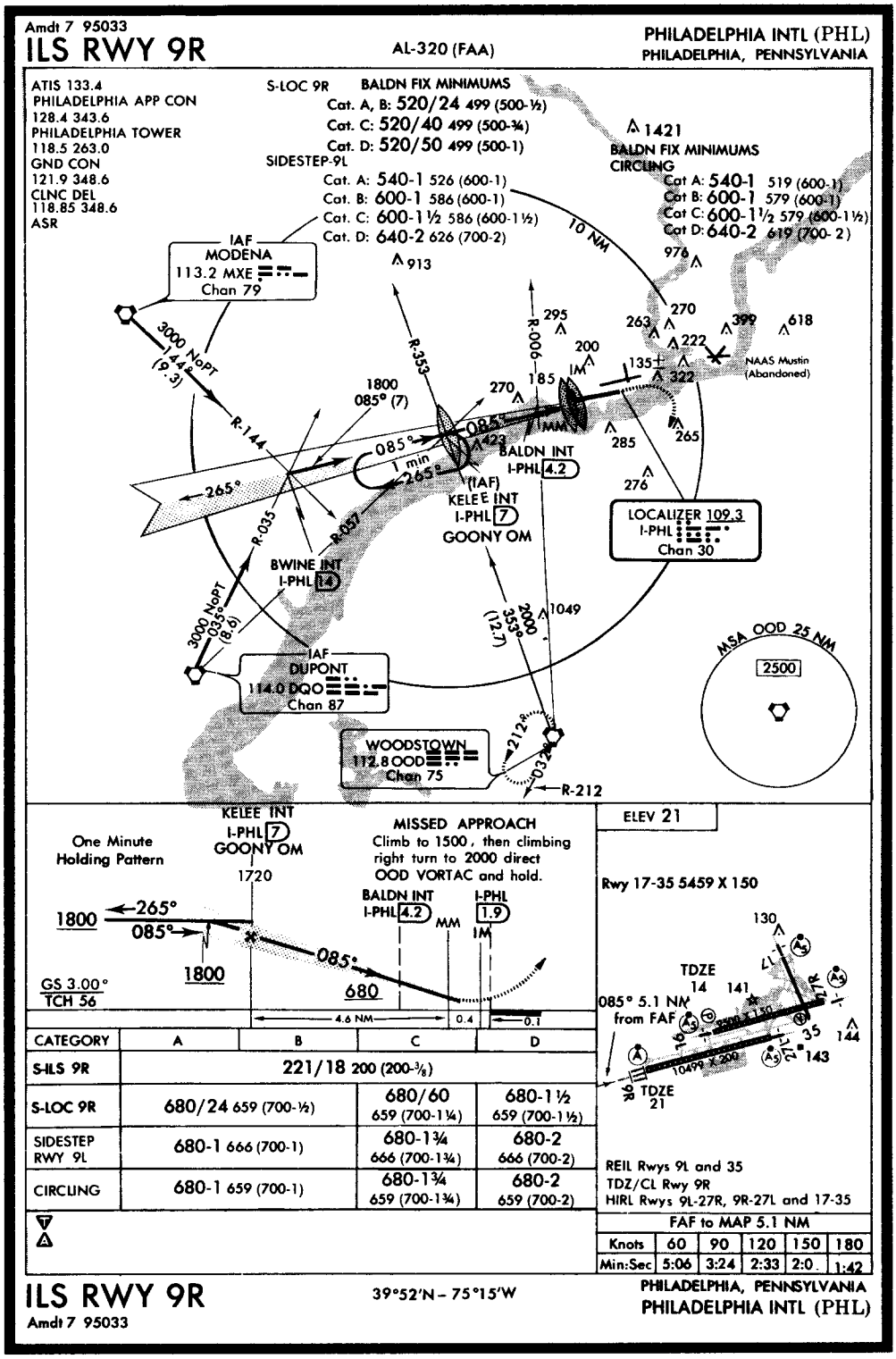


FIGURE 182.—CEDAR LAKE FIVE ARRIVAL (VCN.VCN5).



CATEGORY	A	B	C	D
S-ILS 9R	221/18 200 (200-⅜)			
S-LOC 9R	680/24 659 (700-½)		680/60 659 (700-1¼)	680-1½ 659 (700-1½)
SIDESTEP RWY 9L	680-1 666 (700-1)		680-1¾ 666 (700-1¾)	680-2 666 (700-2)
CIRCLING	680-1 659 (700-1)		680-1¾ 659 (700-1¾)	680-2 659 (700-2)

FIGURE 182A.—ILS RWY 9R (PHL).

A 94342 ALTERNATE MINS A

INSTRUMENT APPROACH PROCEDURE CHARTS

A IFR ALTERNATE MINIMUMS

(NOT APPLICABLE TO USA/USN/USAF)

Standard alternate minimums for non precision approaches are 800-2 (NDB, VOR, LOC, TACAN, LDA, VORTAC, VOR/DME or ASR); for precision approaches 600-2 (ILS or PAR). Airports within this geographical area that require alternate minimums other than standard or alternate minimums with restrictions are listed below. NA - means alternate minimums are not authorized due to unmonitored facility or absence of weather reporting service. Civil pilots see FAR 91. USA/USN/USAF pilots refer to appropriate regulations.

NAME — ALTERNATE MINIMUMS

ATLANTIC CITY, NJ

ATLANTIC CITY INTL ..... **ILS Rwy 13[1]**
RADAR-1[2]
VOR/DME or GPS Rwy 22[3]
VOR or GPS Rwy 4[3]
VOR or GPS Rwy 13[3]
VOR or GPS Rwy 31[3]

[1]ILS, Category D, 700-2; Category E, 700-2½. LOC, Category E, 800-2½.
[2]Category D, 700-2; Category E, 800-2½.
[3]Category E, 800-2½.

BALTIMORE, MD

BALTIMORE-WASHINGTON INTL ..... **VOR or GPS Rwy 10,1000-3**

MARTIN STATE ..... **ILS Rwy 33[1]**
VOR/DME or TACAN 1 Rwy 15[2]

[1]ILS, Category D, 700-2.
[2]Categories A,B, 900-2; Categories C,D, 900-2¾.

BECKLEY, WV

RALEIGH COUNTY MEMORIAL ..... **ILS Rwy 19[1]**
VOR or GPS Rwy 19[2]

[1]ILS, Categories B,C,D, 700-2. LOC, NA.
[2]Category D, 800-2¼.

BLUEFIELD, WV

MERCER COUNTY ..... **ILS Rwy 23[1]**
VOR/DME or GPS Rwy 23
VOR Rwy 23

NA when FSS is closed.
[1]ILS, Categories C,D, 700-2.

CHARLESTON, WV

YEAGER ..... **ILS Rwy 5, 700-2**
ILS Rwy 23, 700-2
VOR/DME RNAV or GPS Rwy 33[1]
VOR or GPS-A[1]

[1]Category D, 800-2¼.

NAME — ALTERNATE MINIMUMS

CHARLOTTESVILLE, VA

CHARLOTTESVILLE-ALBEMARLE .. **ILS Rwy 3[1]**
NDB Rwy 3[2]

NA when control tower closed.
[1]ILS, Category D, 900-2¾. LOC, NA.
[2]Category D, 900-2¾.

CLARKSBURG, WV

BENEDUM ..... **ILS Rwy 21[1]**
VOR or GPS Rwy 3[2]

NA when control tower is closed, except for operators with approved weather reporting service.
[1]Categories A,B, 800-2; Category C, 900-2½; Category D, 900-2¾.
[2]Category C, 900-2½; Category D, 900-2¾.

DANVILLE, VA

DANVILLE REGIONAL ..... **RNAV Rwy 20**

NA when control zone not in effective.

ELKINS, WV

ELKINS-RANDOLPH COUNTY JENNINGS-RANDOLPH FIELD ..... **LDA-C[1]**
VOR/DME-B[2]

NA at night.
[1]Categories A,B, 1200-2; Categories C,D, 1500-3.
[2]Categories A,B, 1500-2; Categories C,D, 1500-3.

HAGERSTOWN, MD

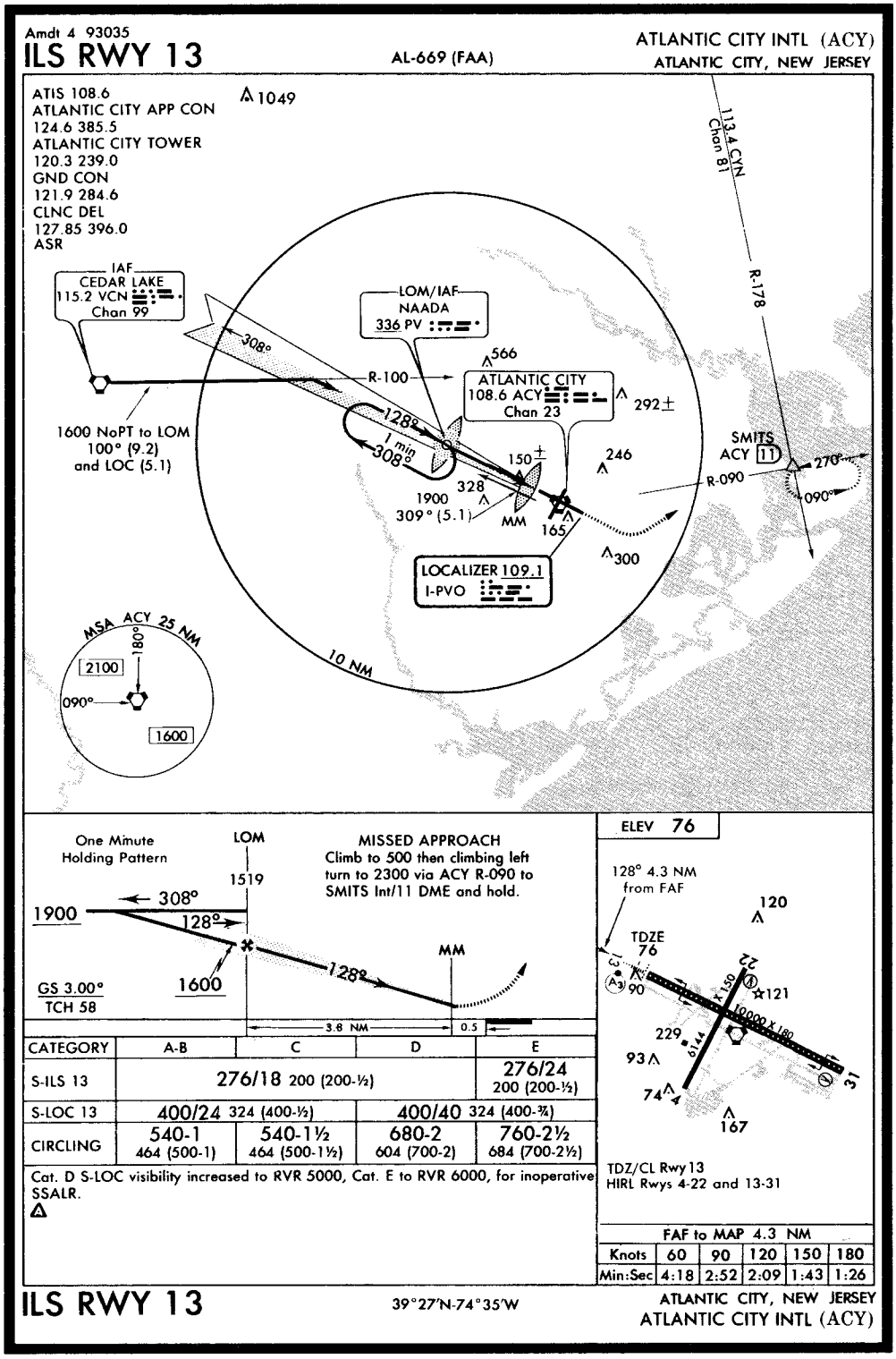
WASHINGTON COUNTY REGIONAL ..... **ILS Rwy 27[1]**
VOR or GPS Rwy 9[2]

[1]NA when control zone not in effect.
[2]NA when control zone not in effect except for operators with approved weather reporting service.

NE-3

A 94342 ALTERNATE MINS A

FIGURE 183.—IFR ALTERNATE MINIMUMS.



CATEGORY	A-B	C	D	E
S-ILS 13	276/18 200 (200-½)			276/24 200 (200-½)
S-LOC 13	400/24 324 (400-½)		400/40 324 (400-¾)	
CIRCLING	540-1 464 (500-1)	540-1½ 464 (500-1½)	680-2 604 (700-2)	760-2½ 684 (700-2½)

Cat. D S-LOC visibility increased to RVR 5000, Cat. E to RVR 6000, for inoperative SSALR.

FIGURE 183A.—ILS RWY 13 (ACY).

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 PROPOSED (Z)	6. DEPARTURE TIME ACTUAL (Z)	7. CRUISING ALTITUDE
VFR / X IFR / DVFR	HOSS 1	A109K2/A	** KTS	LAS			15000

8. ROUTE OF FLIGHT
LAS, ACLAM, V8 MMM, V21 REEKA, PVU

9. DESTINATION (Name of airport and city) PVU
PROVO MUNI
PROVO, UTAH

10. EST. TIME ENROUTE HOURS / MINUTES

11. REMARKS L/O = LEVEL OFF PPH = POUNDS PER HOUR
**CAS 135, ISA -10

12. FUEL ON BOARD HOURS / MINUTES

13. ALTERNATE AIRPORT(S)
SLC
SALT LAKE CITY

14. PILOT'S NAME, ADDRESS & TELEPHONE NUMBER & AIRCRAFT HOME BASE

15. NUMBER ABOARD
8

16. COLOR OF AIRCRAFT
GREEN/GOLD

17. DESTINATION CONTACT/TELEPHONE (OPTIONAL)

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

FLIGHT LOG

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
LAS	ACLAM	DIRECT / CLIMB					31		:15:00		152*
ACLAM	MMM	V-8 / 15000		210/71 / ISA-10							
MMM	REEKA	V-21 / 15000									
REEKA	PVU	DESCENT & APPROACH					19	:10:00		87	
PVU	SLC	DIRECT / 7000					41	:17:20			

OTHER DATA: * Includes Taxi Fuel
NOTE: Use 496 PPH Total Fuel Flow From L/O To Start Of Descent.
Use 480 PPH Total Fuel Flow For Reserve And Alternate Requirements.

A Missed Approach Requires 40# of Fuel.

TIME and FUEL: As required by FARs.

TIME	FUEL (LB)	
		EN ROUTE
		RESERVE
		ALTERNATE
		TOTAL

FIGURE 184.—Flight Plan/Flight Log.

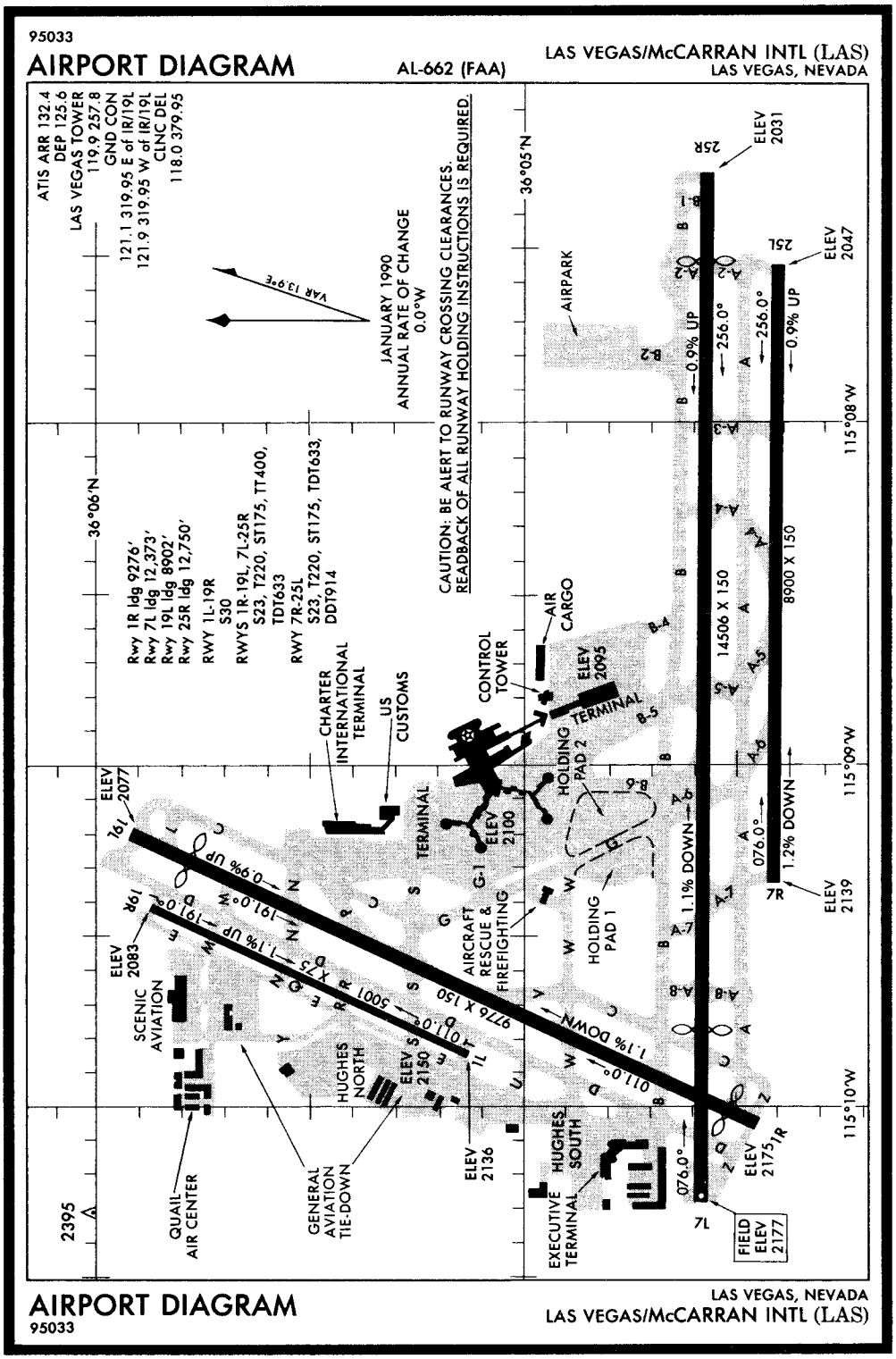


FIGURE 185.—AIRPORT DIAGRAM.

McCARRAN INTL (LAS) 5 S UTC-8(-7DT) N36°04.82' W115°09.02' LAS VEGAS
2177 B S4 FUEL 100, 100LL, JET A1 + OX 1, 2, 3 LRA ARFF Index D H-2B, L-5B
RWY 07L-25R: H14506X150 (ASPH-PFC) S-23, D-220, DT-633 HIRL 1.0% up W IAP
RWY 07L: VASI(V6L)—Upper GA 3.25° TCH 94'. Lower GA 3.0° TCH 47'. Thld dsplcd 2133'. Hangar.
RWY 25R: MALSR. Thld dsplcd 1400'.
RWY 01R-19L: H9776X150 (ASPH-PFC) S-23, D-220, DT-633 MIRL 1.0% up S
RWY 01R: VASI(V4L)—GA 3.0° TCH 50'. Thld dsplcd 500'. Railroad. Rgt tfc.
RWY 19L: VASI(V6L)—Upper GA 3.25° TCH 66'. Lower GA 3.0° TCH 35'. Thld dsplcd 874'. Pole.
RWY 07R-25L: H8900X150 (ASPH-PFC) S-23, D-220, DT-633, DDT-914 HIRL
RWY 07R: REIL. Pole. RWY 25L: MALSF.
RWY 01L-19R: H5001X75 (ASPH) S-30 MIRL 1.1% up S
RWY 01L: REIL. VASI(V4L)—GA 3.0° TCH 35'. Antenna.
RWY 19R: REIL. VASI(V4L)—GA 3.0° TCH 60'. Pole. Rgt tfc.
AIRPORT REMARKS: Attended continuously. Rwy 19R CLOSED arrival, Rwy 01L CLOSED departure Mon-Fri 1500-2300Z‡. Extensive glider/soaring operations weekends and holidays. Sunrise to sunset, LAS 187020, altitudes up to but not including FL180. Gliders remain clear of the CLASS B airspace but otherwise operate within the entire SW quadrant of the CLASS B airspace Veil. Lgtd crane 950' AGL 4 miles N of arpt. Rotating bcn not visible 115°—240° NE to SW from McCarran Twr. Acft may experience reflection of sun from glass pyramid located NW of arpt. Reflection may occur at various altitudes, headings and distances from arpt. Rwy 07R-25L DDT GWT 521,000 lbs for L-1011, 620,000 lbs for DC-10, 633,000 lbs for MD-11. PAEW between Rwy 01R-19L and Twy D north of Twy N. PAEW west of Rwy 01L-19R. PAEW west of Twy D. Twy E clsd between Twy Q and Twy R. Twy N, Twy S and Twy T clsd between Rwy 01L-19R and Twy D. Twy Y acft be alert keep nosewheel on centerline and acft with wing span greater than 70' prohibited north of New Quail Gate. Twy D clsd to B747 and clsd to all acft with wingspan 171' or greater north of Rwy 07L-25R. All non-standard rwy operations PPR from Department of Aviation. Turbojet operations not permitted Rwy 01R-19L and Rwy 01L-19R between 0400-1600Z‡. Exceptions will be made due to weather. Rwy 07L VASI out of svc indefinitely. Rwy 25 MALSR out of svc indefinitely. Tiedown fee. Flight Notification Service (ADCUS) available. NOTE: See Land and Hold Short Operations Section.
WEATHER DATA SOURCES: LLWAS.
COMMUNICATIONS: ATIS 132.4 (ARR) 125.6 (DEP) UNICOM 122.95
RENO FSS (RNO) TF 1-800-WX-BRIEF. NOTAM FILE LAS.
® LAS VEGAS APP CON 127.15
® LAS VEGAS DEP CON 133.95 (North) 125.9 (South)
LAS VEGAS TOWER 119.9 GND CON 121.9 (West of Rwy 01R-19L) 121.1 (East of Rwy 01R-19L) CLNC DEL 118.0
AIRSPACE: CLASS B See VFR Terminal Area Chart.
RADIO AIDS TO NAVIGATION: NOTAM FILE LAS.
LAS VEGAS (H) VORTACW 116.9 LAS Chan 116 N36°04.78' W115°09.59' at fld. 2140/15E.
ILS 110.3 I-LAS Rwy 25R.
ILS 111.75 I-RLE Rwy 25L. Loc unusable byd 19° South of course.

NORTH LAS VEGAS AIR TERMINAL (VGT) 3 NW UTC-8(-7DT) LAS VEGAS
N36°12.75' W115°11.82' H-2B, L-5B
2207 B S4 FUEL 100LL, JET A OX 2 TPA—3007(800)
RWY 07-25: H5005X75 (ASPH) S-30 MIRL
RWY 07: PAPI(P4L)—GA 3.0° TCH 37'. Pole. RWY 25: PAPI(P4L)—GA 3.0° TCH 36'.
RWY 12-30: H5000X75 (ASPH) S-30 MIRL
RWY 12: PAPI(P4L)—GA 3.0° TCH 25'.
RWY 30: MIRL. PAPI(P4L)—GA 3.0° TCH 45'. Thld dsplcd 290'. P-line.
AIRPORT REMARKS: Attended 1400-0630Z‡. Rwy 30 PAPI OTS indef. When twr clsd ACTIVATE MIRL Rwy 07-25 and Rwy 12-30—CTAF. NOTE: See Land and Hold Short Operations Section.
COMMUNICATIONS: CTAF 125.7 ATIS 118.05 (1400-0400Z‡) UNICOM 122.95
RENO FSS (RNO) TF 1-800-WX-BRIEF. NOTAM FILE RNO.
TOWER 125.7 (1400-0400Z‡) GND CON 121.7
AIRSPACE: CLASS D svc effective 1400-0400Z‡ other times CLASS G.
RADIO AIDS TO NAVIGATION: NOTAM FILE LAS.
LAS VEGAS (H) VORTACW 116.9 LAS Chan 116 N36°04.78' W115°09.59' 332° 8.2 NM to fld. 2140/15E.

LIDA JUNCTION (See GOLDFIELD)

LINCOLN CO (See PANACA)

FIGURE 185A.—Excerpt from Airport/Facilities Directory.

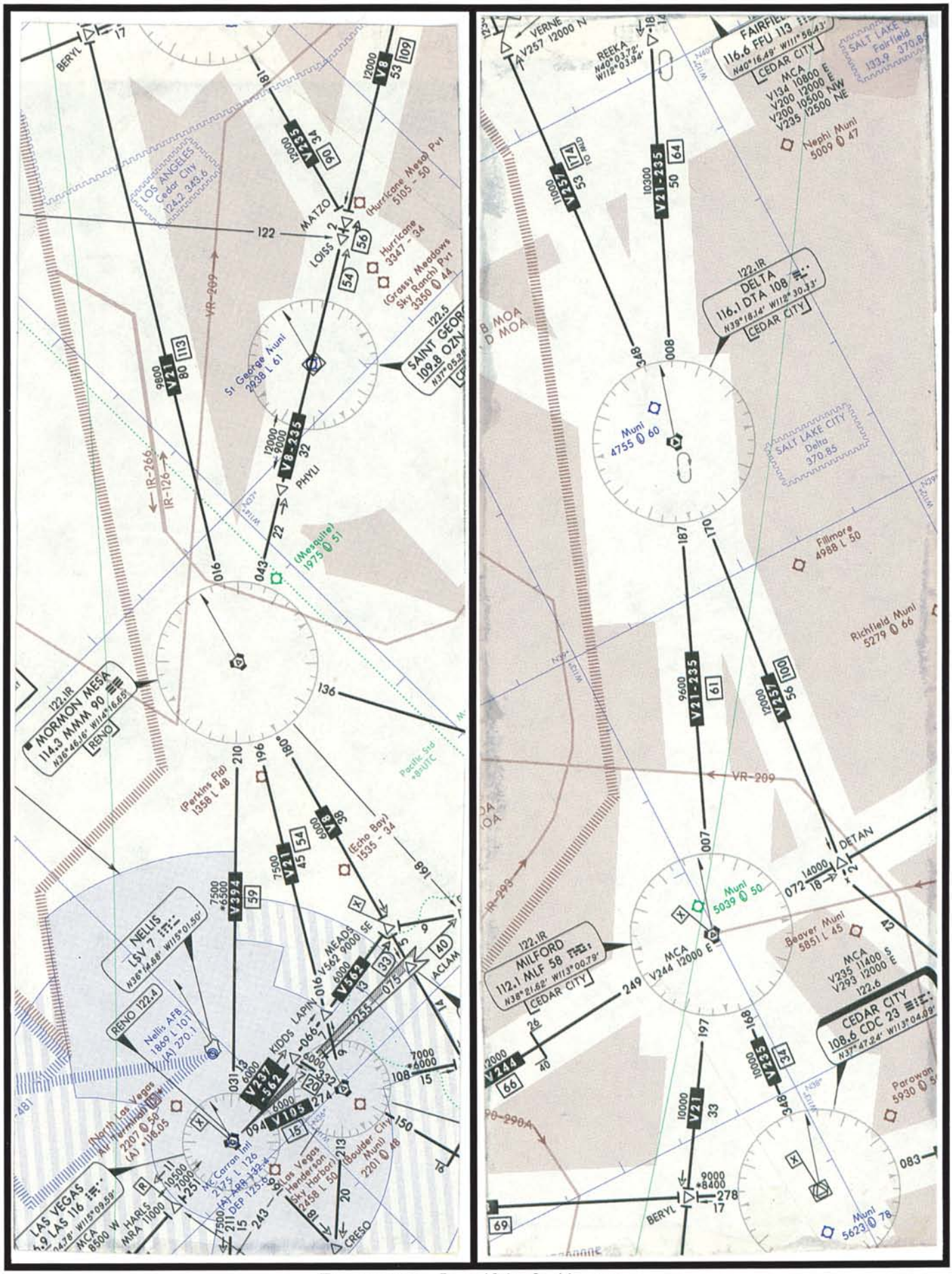


FIGURE 186.—Low Altitude Airways.

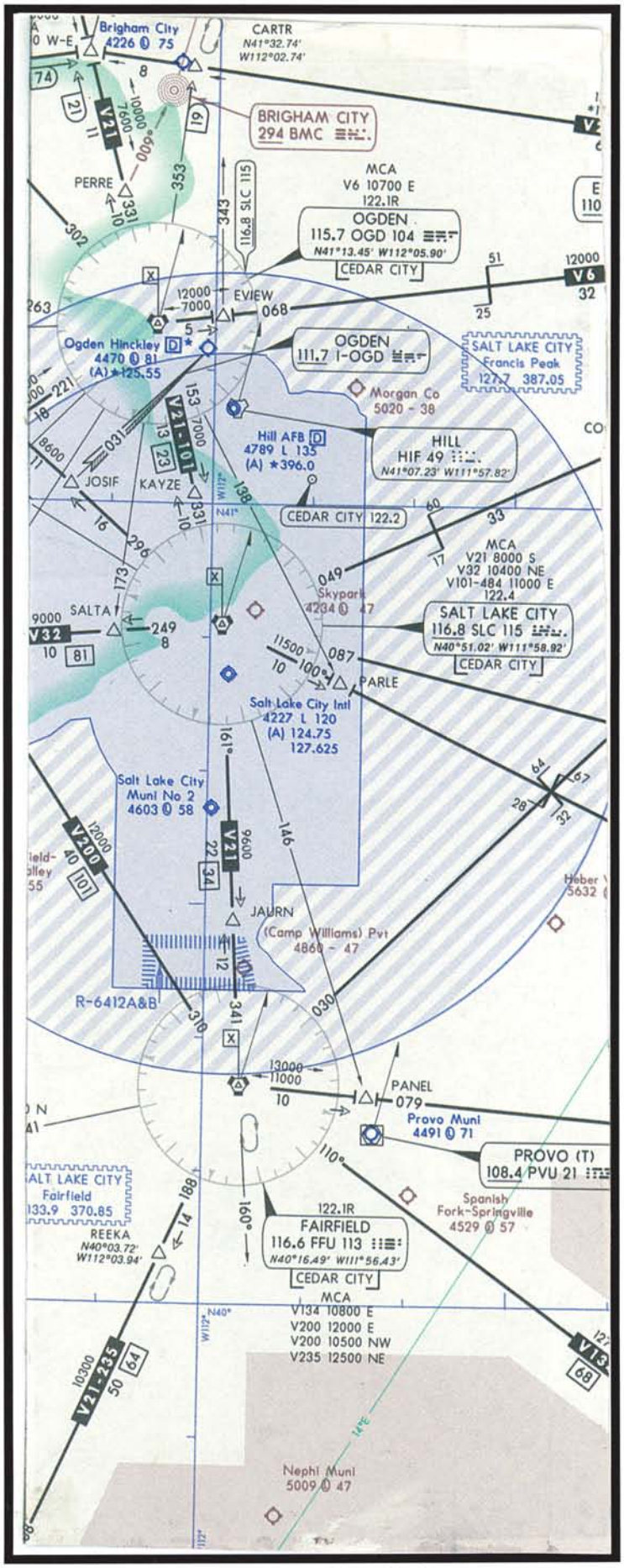


FIGURE 187.—Low Altitude Airways.

UTAH 177

PROVO MUNI (PVU) 2 SW UTC-7(-6DT) N40°12.94′ W111°43.29′ — SALT LAKE CITY H-2C, L-8E, 7D, 5C IAP
4491 B S4 FUEL 100, JET A OX 2
RWY 13-31: H7091X150 (ASPH-PFC) S-65, D-85, DT-140 MIRL
RWY 13: MALSF. VASI(V2L)—GA 3.0°TCH 40′. Thld dsplcd 438′. Road.
RWY 31: VASI(V2L)—GA 3.0°TCH 56′. Thld dsplcd 290′. Road.
RWY 18-36: H6937X150 (ASPH) S-50, D-70, DT-110 MIRL
RWY 18: VASI(V2L)—GA 3.0°TCH 55′. Thld dsplcd 373′. Road.
RWY 36: VASI(V2L)—GA 3.0°TCH 55′. Thld dsplcd 334′. Road.
RWY 06-24: H5596X150 (ASPH) S-50, D-70, DT-110
RWY 06: Thld dsplcd 611′. Brush. RWY 24: Thld dsplcd 598′. Road.
AIRPORT REMARKS: Attended 1400-0200Z‡. ACTIVATE ALS Rwy 13, MIRL and VASI Rwys 13-31 and 18-36 122.8.
WEATHER DATA SOURCES: AWOS-3 135.175 (801) 373-9782.
COMMUNICATIONS: CTAF/UNICOM 122.8
CEDAR CITY FSS (CDC) TF 1-800-WX-BRIEF. NOTAM FILE PVU.
® SALT LAKE CITY APP CON 124.3
® SALT LAKE CITY DEP CON 118.85
AIRSPACE: CLASS E svc effective 1400-0200Z‡ other times CLASS G.
RADIO AIDS TO NAVIGATION: NOTAM FILE PVU.
(T) VORW/DME 108.4 PVU Chan 21 N40°12.90′ W111°43.28′ at fld. 4490/15E.
Unusable 330°-170°beyond 10 NM below 13,000′
ILS/DME 110.3 I-PVU Chan 40 Rwy 13. LOC unusable inside threshold. ILS unmonitored 0200-1400Z‡.

• •

HELIPAD H1: H40X40 (CONC)
HELIPAD H2: H40X40 (CONC)

RICHFIELD MUNI (RIF) 1 SW UTC-7(-6DT) N38°44.50′ W112°05.71′ — LAS VEGAS H-2C, L-5C
5279 B FUEL 100, JET A
RWY 01-19: H6645X75 (ASPH) S-19 MIRL
RWY 01: Rgt tfc.
AIRPORT REMARKS: Attended Mon-Fri 1530-0000Z‡. For fuel after hours call 801-896-8918/7258. ACTIVATE MIRL Rwy 01-19—CTAF.
COMMUNICATIONS: CTAF/UNICOM 122.8
CEDAR CITY FSS (CDC) TF 1-800-WX-BRIEF. NOTAM FILE CDC.
RCO 122.5 (CEDAR CITY FSS)
RADIO AIDS TO NAVIGATION: NOTAM FILE CDC.
DELTA (H) VORTAC 116.1 DTA Chan 108 N39°18.14′ W112°30.33′ 134° 38.7 NM to fld. 4600/16E.

ROOSEVELT MUNI (74V) 3 SW UTC-7(-6DT) N40°16.70′ W110°03.08′ — SALT LAKE CITY H-2C, L-8E, 5C IAP
5172 B FUEL 100, JET A, MOGAS
RWY 07-25: H6500X75 (ASPH) S-12 MIRL 1.0% up W
RWY 07: VASI(V2L)—GA 3.0° TCH 34′. RWY 25: VASI(V2L)—GA 3.0° TCH 27′.
AIRPORT REMARKS: Attended on call. For svc call 801-722-4741. ACTIVATE MIRL and VASI Rwy 07-25—CTAF.
COMMUNICATIONS: CTAF/UNICOM 122.8
CEDAR CITY FSS (CDC) TF 1-800-WX-BRIEF. NOTAM FILE CDC.
MYTON RCO 122.1R 112.7T (CEDAR CITY FSS)
RADIO AIDS TO NAVIGATION: NOTAM FILE CDC.
MYTON (H) VORTAC 112.7 MTU Chan 74 N40°08.70′ W110°07.66′ 010° 8.7 NM to fld. 5332/14E.

ST GEORGE MUNI (SGU) 1 W UTC-7(-6DT) N37°05.48′ W113°35.58′ — LAS VEGAS H-2B, L-5B IAP
2938 B S4 FUEL 100, 100LL, JET A, MOGAS OX 2 ARFF Index Ltd.
RWY 16-34: H6101X100 (ASPH-PFC) S-26 MIRL 1.1% up N
RWY 16: VASI(V2R)—GA 4.0° TCH 44′. Road. RWY 34: REIL. VASI(V2L)—GA 3.0° TCH 43′.
AIRPORT REMARKS: Attended 1330-0230Z‡. CLOSED to Air Carrier ops with more than 30 passenger seat except PPR. Call arpt manager 801-634-5800. ACTIVATE REIL Rwy 34—CTAF.
WEATHER DATA SOURCES: AWOS-3 135.075 (801) 634-0940.
COMMUNICATIONS: CTAF/UNICOM 122.8
CEDAR CITY FSS (CDC) TF 1-800-WX-BRIEF. NOTAM FILE SGU.
RCO 122.5 (CEDAR CITY FSS)
RADIO AIDS TO NAVIGATION: NOTAM FILE CDC.
(T) VORW/DME 109.8 OZN Chan 35 N37°05.28′ W113°35.51′ at fld. 2898/15E.
VOR/DME unusable:
210°-235° beyond 15 NM below 8500′
235°-270° beyond 15 NM below 9700′
270°-350° all altitudes and distances;
350°-020° beyond 10 NM below 14000′.

FIGURE 188.—Excerpt from Airport/Facilities Directory.

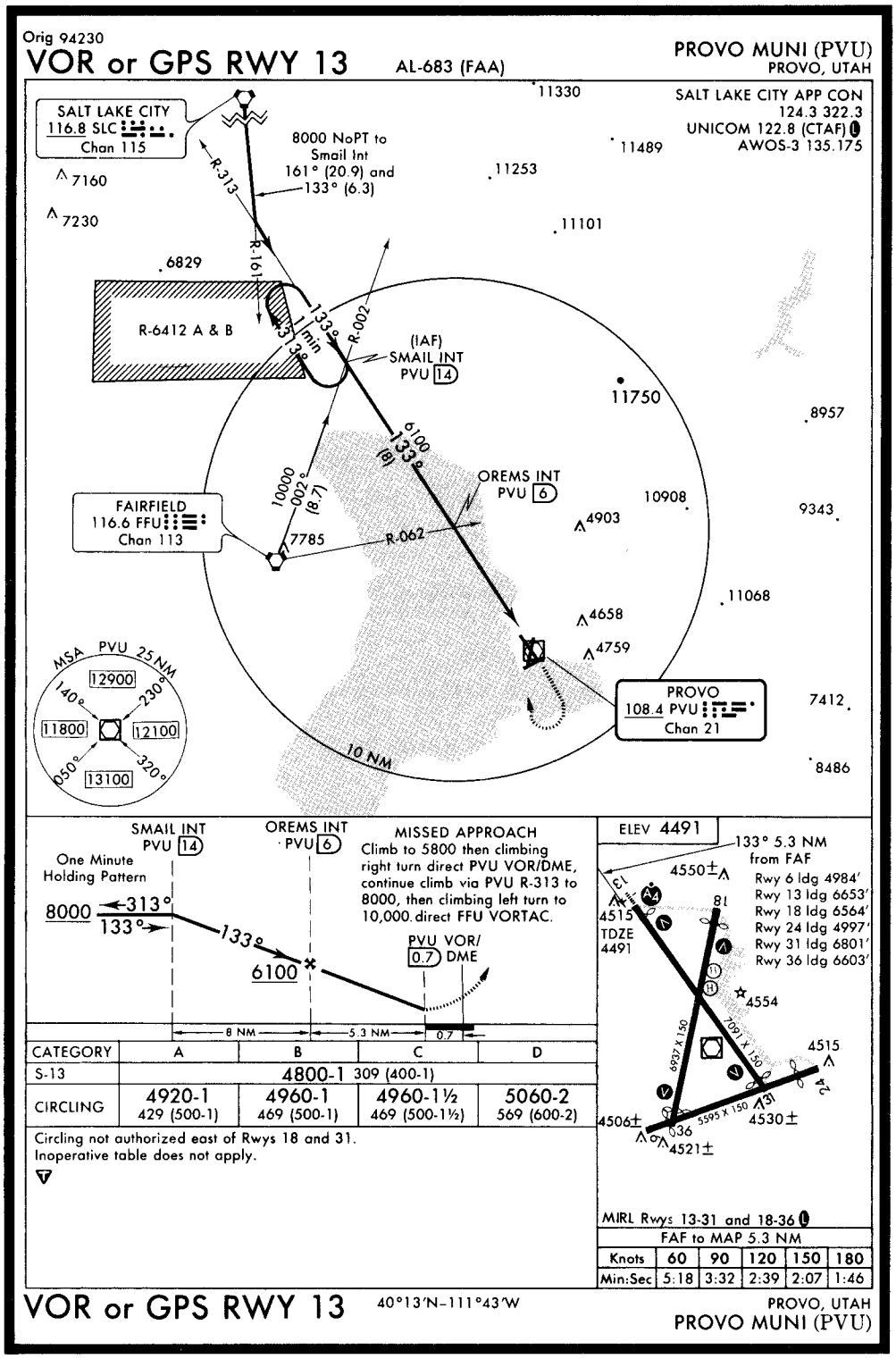


FIGURE 188A.—VOR or GPS RWY 13 (PVU).

178 **UTAH**

SALINA-GUNNISON (44U) 5 NE UTC–7(–6DT) N39°01.75′ W111°50.30′ **LAS VEGAS**
5159 B **L-5C**
RWY 02-20: H3815X60 (ASPH) S-6 MIRL
AIRPORT REMARKS: Unattended. ACTIVATE MIRL Rwy 02-20—CTAF.
COMMUNICATIONS: CTAF 122.9
CEDAR CITY FSS (CDC) TF 1-800-WX-BRIEF. NOTAM FILE CDC.
RADIO AIDS TO NAVIGATION: NOTAM FILE CDC.
DELTA (H) VORTAC 116.1 DTA Chan 108 N39°18.14′ W112°30.33′ 102° 35.2 NM to fld. 4600/16E.

SALT LAKE CITY

SALT LAKE CITY INTL (SLC) 3 W UTC–7(–6DT) N40°47.21′ W111°58.13′ **SALT LAKE CITY**
4227 B S4 **FUEL** 100, 100LL, JET A1 OX 1, 2, 3, 4 LRA ARFF Index D **H-1C, L-7D**
RWY 16-34: H12003X150 (ASPH-PFC) S-60+, D-200+, DT-350 HIRL CL **IAP**
RWY 16: ALSF2. TDZ. REIL. PAPI(P4L). **RWY 34:** ALSF2. TDZ. REIL. PAPI(P4L).
RWY 17-35: H9596X150 (ASPH-PFC) S-60 +, D-170, DT-320 HIRL
RWY 17: MALSR. PAPI(P4R)—GA 3.0° TCH 55′. **RWY 35:** PAPI(P4L)—GA 3.0° TCH 75′.
RWY 14-32: H4758X150 (ASPH-PFC) S-60 +, D-170, DT-320 MIRL
RWY 14: Thld dsplcd 202′. **RWY 32:** Thld dsplcd 479′. Road.
AIRPORT REMARKS: Attended continuously. CAUTION: Flocks of birds on and in vicinity of arpt. Preferential rwys, use Rwy 34 and Rwy 35 when wind and temperature permit. Rwy 14-32 GWT strengths for S, D, DT apply to center 75′ only. 180° turns by acft over 12,500 lbs, prohibited on all rwys and taxiways. Rwy 17-35 tfc on Twy K not visible from twr. Due to the high volume of tfc at SLC arpt during the following time periods: 1800-1845Z‡, 2200-2230Z‡, 0145-0230Z‡ and 0300-0330Z‡ local departures and arrivals are discouraged. Greater than normal delays can be expected during these time periods. Rwy 16R-34L under construction. Flight Notification Service (ADCUS) available. NOTE: See Land and Hold Short Operations Section. NOTE: See Special Notice—Runway Under Construction.
WEATHER DATA SOURCES: LLWAS.
COMMUNICATIONS: ATIS 127.625 124.75 (801) 539-2581 **UNICOM** 122.95
CEDAR CITY FSS (CDC) TF 1-800-WX-BRIEF. NOTAM FILE SLC.
RCO 122.4 (CEDAR CITY FSS)
® **APP/DEP CON** 121.1 (North of 41° latitude blo 8000′) 124.3 (105°-249°) 124.9 (297°-005° N of 41° N latitude above 8000′) 135.5 (250°-296° and 006°-104°) 125.7
TOWER 118.3 (E of Rwy 17-35) 119.05 (W of Rwy 16-34) 127.3 **GND CON** 121.9 **CLNC DEL** 127.3
PRE-TAXI CLNC 127.3
AIRSPACE: CLASS B See VFR Terminal Area Chart. Ctc **APP CON** 134.35 (West) all other quadrants 120.9.
RADIO AIDS TO NAVIGATION: NOTAM FILE SLC.
(H) VORTACW 116.8 SLC Chan 115 N40°51.02′ W111°58.92′ 155° 3.9 NM to fld. 4220/16E.
Unusable:
100°-140°beyond 30 NM below 13,000′
200°-230°beyond 25 NM below 10,800′
280°-290°beyond 30 NM below 8,100′
290°-315°beyond 35 NM below 8600′.
315°-330°beyond 20 NM below 8600′.
330°-345°beyond 24 NM below 7000′.
360°-070°beyond 20 NM below 11,200′
KERNN NDB (LOM) 338 SL N40°40.87′ W111°57.78′ 343° 6.3 NM to fld.
ILS/DME 110.7 I-MOY Chan 44 Rwy 16.
ILS 109.5 I-SLC Rwy 34 LOM KERNN NDB.
ILS/DME 111.5 I-BNT Chan 52 Rwy 17.
ILS 110.1 I-UTJ Rwy 35 LOM KERNN NOB. Localizer unusable byd 25° west of rwy centerline.
ASR

• •

HELIPAD H1: H100X75 (ASPH)
HELIPAD H2: H60X60 (ASPH)
HELIPAD H3: H60X60 (ASPH)
HELIPAD H4: H60X60 (ASPH)
HELIPAD H5: H60X60 (ASPH)
HELIPAD H6: H60X60 (ASPH)
HELIPORT REMARKS: Helipads H1 through H4 located on general aviation side of arpt and Helipads H5 and H6 located on air carrier side of arpt.

FIGURE 189.—Excerpt from Airport/Facilities Directory.

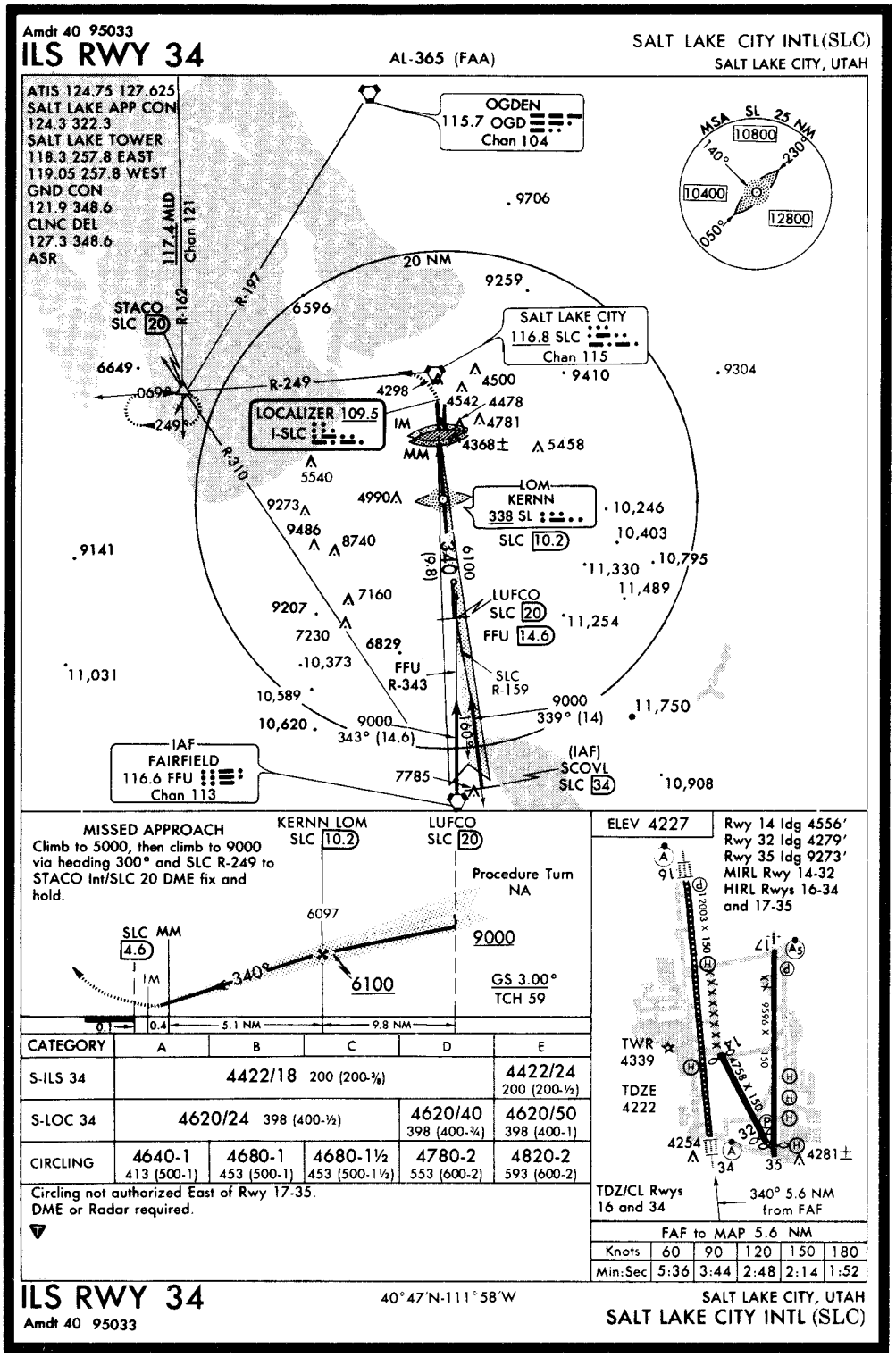


FIGURE 189A.—ILS RWY 34 (SLC).

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 PROPOSED (Z)	6. DEPARTURE TIME ACTUAL (Z)	7. CRUISING ALTITUDE
VFR / X IFR / DVFR	PIL 10	B767/G	456 KTS	MSP			FL430

8. ROUTE OF FLIGHT
MINNEAPOLIS FOUR DEPARTURE FSD, J197 OBH, J10 LBF, SAYGE.SAYGE1

9. DESTINATION (Name of airport and city)	10. EST. TIME ENROUTE HOURS	10. EST. TIME ENROUTE MINUTES	11. REMARKS
DEN			L/O = LEVEL OFF PPH = POUNDS PER HOUR L/O FSD R-048/90 VARIATION: FSD 9E, LBF 10E, MSP 3E

12. FUEL ON BOARD HOURS	12. FUEL ON BOARD MINUTES	13. ALTERNATE AIRPORT(S)	14. PILOT'S NAME, ADDRESS & TELEPHONE NUMBER & AIRCRAFT HOME BASE	15. NUMBER ABOARD
		ABQ ALBUQUERQUE	17. DESTINATION CONTACT/TELEPHONE (OPTIONAL)	190

16. COLOR OF AIRCRAFT
SILVER/RED

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

FLIGHT LOG

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
MSP	FSD R-048/90	VECTORS / CLIMB					90		:19:00		4170*
FSD R-048/90	FSD	DIRECT / FL430		290/89 / ISA-6							
FSD	OBH	J197 / FL430									
OBH	LBF	J10 / FL410		300/83 / ISA-5							
LBF	MODES	SAUGE.SAUGE.1 / FL410									
MODES	AMWAY	SAUGE.SAUGE.1 / FL410									
AMWAY	DEN	DESCENT & APPROACH					97	:25:00		3107	
DEN	ABQ	VECTORS / FL410						:36:00			

OTHER DATA:* Includes Taxi Fuel
NOTE: Use 9026 PPH Total Fuel Flow From L/O To Start Of Descent.
Use 7688 PPH Total Fuel Flow For Reserve And Alternate Requirements.

A Missed Approach Requires 1050# of Fuel.

TIME and FUEL: As required by FARs.

TIME	FUEL (LB)	
		EN ROUTE
		RESERVE
		ALTERNATE
		TOTAL

FIGURE 190.—Flight Plan/Flight Log.

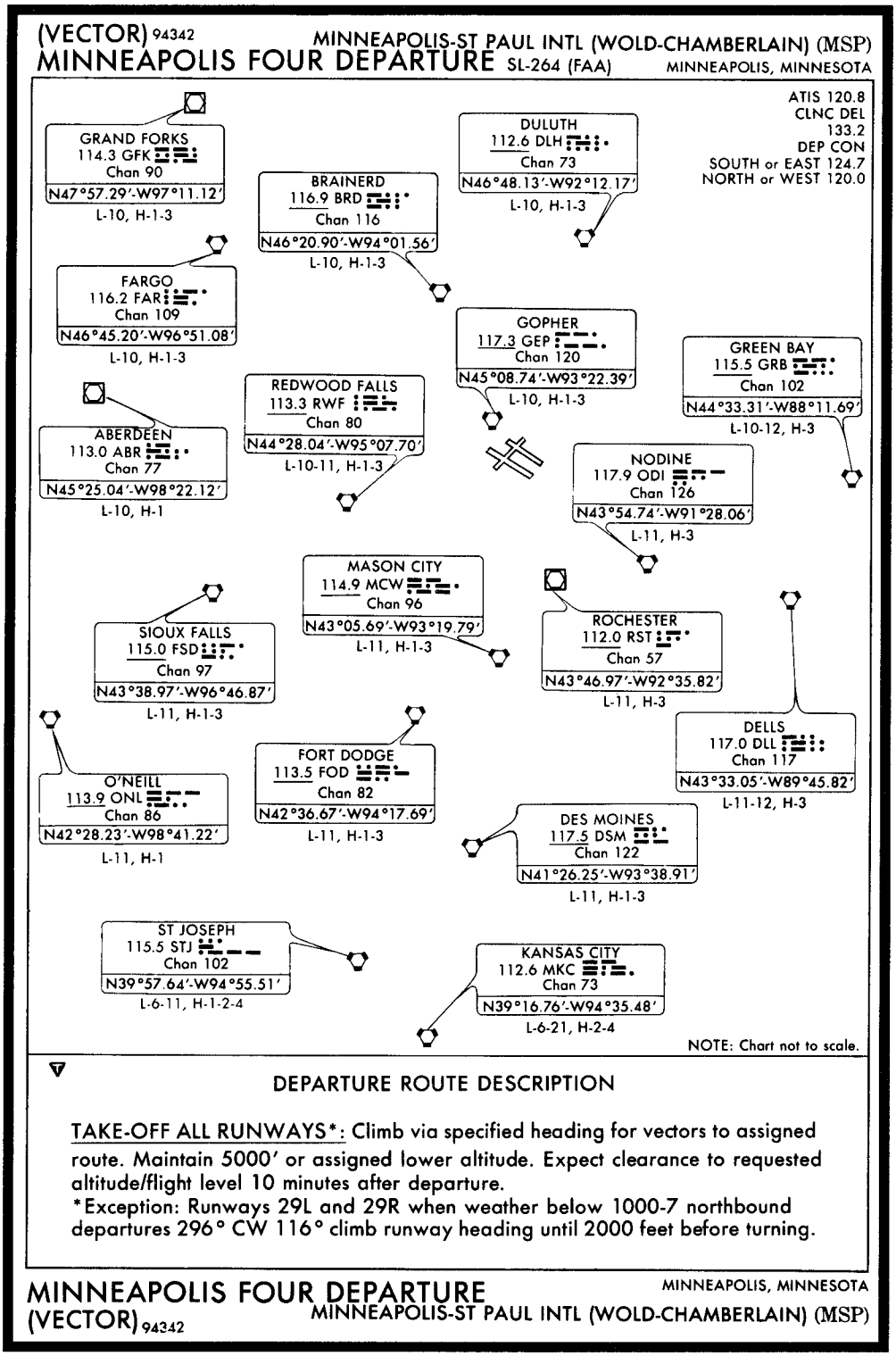


FIGURE 191.—MINNEAPOLIS FOUR DEPARTURE (MSP).

MINNESOTA 105

FLYING CLOUD (FCM) 11 SW UTC-6(-5DT) N44°49.63' W93°27.43' TWIN CITIES
906 B S4 FUEL 100, 100LL, JET A OX 3, 4 TPA-1906(1000) L-10G, A
RWY 09R-27L: H3909X75 (ASPH) S-30 HIRL IAP
RWY 09R: MALSR. VASI(V4L)—GA 3.0° TCH 41'. Rgt tfc.
RWY 27L: REIL. VASI(V4L)—GA 3.0° TCH 45'. Thld dsplcd 200'. Road.
RWY 09L-27R: H3599X75 (ASPH) S-30
RWY 27R: Road. Rgt tfc.
RWY 18-36: H2691X75 (ASPH) S-23 MIRL
RWY 18: VASI(V4L)—GA 3.0° TCH 37'. Barn. RWY 36: REIL. VASI(V4L)—GA 3.0° TCH 31'. Road.
AIRPORT REMARKS: Attended 1300-0400Z‡. Rwy 09L-27R CLOSED when twr clsd. Arpt CLOSED to jet acft not meeting FAR 36, jet training and jet acft over 20,000 lbs. Deer and waterfowl on and in vicinity of arpt. Rwy 09R and Rwy 27R rgt tfc during twr hours only. When twr clsd ACTIVATE VASI Rwy 09R, VASI Rwy 18, MALSR Rwy 09R, HIRL Rwy 09R-27L and MIRL Rwy 18-36—118.1.
WEATHER DATA SOURCES: LAWRS
COMMUNICATIONS: CTAF 118.1 ATIS 124.9 (612) 944-2970 UNICOM 122.95
PRINCETON FSS (PNM) TF 1-800-WX-BRIEF. NOTAM FILE FCM
® MINNEAPOLIS APP/DEP CON 125.0
MINNEAPOLIS CLNC DEL 121.7 (When twr closed)
TOWER 118.1 125.2 (Apr-Oct 1300-0400Z‡, Nov-Mar 1300-0300Z‡) GND CON 121.7 CLNC DEL 121.7
AIRSPACE: CLASS D svc effective Apr-Oct 1300-0400Z‡ Nov-Mar 1300-0300Z‡ other times CLASS G.
RADIO AIDS TO NAVIGATION: NOTAM FILE FCM.
(L) ABVORW/DME 111.8 FCM Chan 55 N44°49.54' W93°27.41' at fld. 900/6E.
Route forecast only on TWEB 0400-1100Z‡.
ILS 109.7 I-FCM RWY 09R. LOC unusable byd 30 degrees either side of centerline. GS unusable byd 5 degrees left of course.

MINNEAPOLIS-ST PAUL INTL (WOLD-CHAMBERLAIN) (MSP) 6 SW UTC-6(-5DT) TWIN CITIES
N44°53.05' W93°12.90' H-1E, 3G, L-10G, A
841 B S4 FUEL 100, JET A, A1 + OX 1, 2, 3, 4 LRA ARFF Index E IAP
RWY 11R-29L: H10000X200 (ASPH-CONC-GRVD) S-65, D-85, DT-145 HIRL CL 0.3% up W
RWY 11R: MALSR. PAPI(P4L)—GA 3.0° TCH 65'. Tree.
RWY 29L: ALSF1. TDZ. PAPI(P4L)—GA 3.0° TCH 73'. Pole.
RWY 04-22: H8256X150 (CONC-GRVD) S-65, D-85, DT-145 HIRL
RWY 04: SSALR. PAPI(P4L)—GA 3.0° TCH 76'.
RWY 22: MALSR. PAPI(P4L)—GA 3.0° TCH 42'. Thld dsplcd 988'. Fence.
RWY 11L-29R: H8200X150 (ASPH-CONC-GRVD) S-100, D-125, DT-210 HIRL
RWY 11L: MALSR. PAPI(P4L)—GA 3.0° TCH 75'. Tree. 0.3% down.
RWY 29R: REIL. PAPI(P4L)—GA 3.0° TCH 73'.
AIRPORT REMARKS: Attended continuously. Birds on and in vicinity of arpt. Training prohibited. Only Initial departure and full stop termination training flights permitted. PPR for noise abatement procedures —call 612-726-9411. No stage 1 noise Category Civil acft. Landing fee. Flight Notification Service (ADCUS) available. NOTE: See Land and Hold Short Operations Section.
WEATHER DATA SOURCES: LLWAS.
COMMUNICATIONS: ATIS 135.35 (612) 726-9240. 120.8 (TCA ARR INFO) UNICOM 122.95
PRINCETON FSS (PNM) TF 1-800-WX-BRIEF. NOTAM FILE MSP.
RCO 122.55 122.3 (PRINCETON FSS) RCO 122.1R 115.3T (PRINCETON FSS)
® APP CON 119.3 (N or E of arrival rwy) 126.95 (S or W of arrival rwy and Rwys 04, 11R and 29L)
TOWER 126.7 (Rwys 11R-29L and 04-22) 123.95 (Rwy 11L-29R) GND CON 121.9 (S) 121.8 (N) CLNC DEL 133.2
® DEP CON 127.925 (N or E of arrival rwy) 124.7 (S or W of arrival rwy)
AIRSPACE: CLASS B: See VFR Terminal Area Chart.
RADIO AIDS TO NAVIGATION: NOTAM FILE MSP.
(H) VORTAC 115.3 MSP Chan 100 N44°52.92' W93°13.99' at fld. 850/3E.
VOR portion unusable below 3000', beyond 20 NM below 4000', 205°-235°/265°-025° all distances and altitudes, 235°-265° below 7000'.
NARCO NDB (MH-SAB/LOM) 266 MS N44°49.55' W93°05.48' 299° 6.3 NM to fld.
Route forecast only on TWEB 0400-1100Z‡.
VAGEY NDB (LOM) 338 AP N44°49.45' W93°18.36' 042° 5.3 NM to fld. Unmonitored.
ILS 109.9 I-INN Rwy 29R
ILS/DME 110.3 I-MSP Chan 40 Rwy 29L LOM NARCO NDB.
ILS 109.3 I-APL Rwy 04 LOM VAGEY NDB. Glide slope unusable for coupled approaches below 1085.
ILS/DME 110.3 I-HKZ Chan 40 Rwy 11R.
ILS 110.7 I-PJL Rwy 11L.
ILS 110.5 I-SIJ Rwy 22.

MOBERG AIR BASE SPB (See BEMIDJI)

FIGURE 191A.—Excerpt from Airport/Facilities Directory.

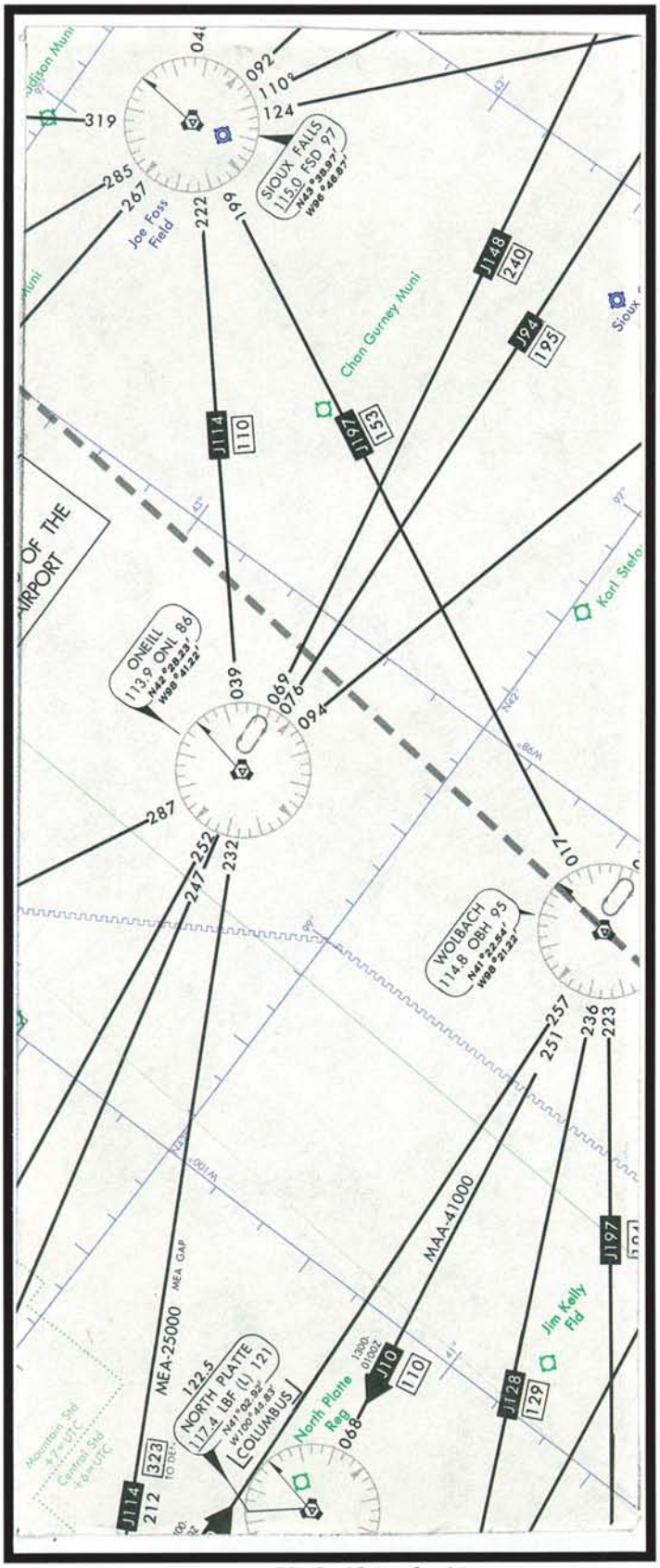


FIGURE 192.—High Altitude Airways.

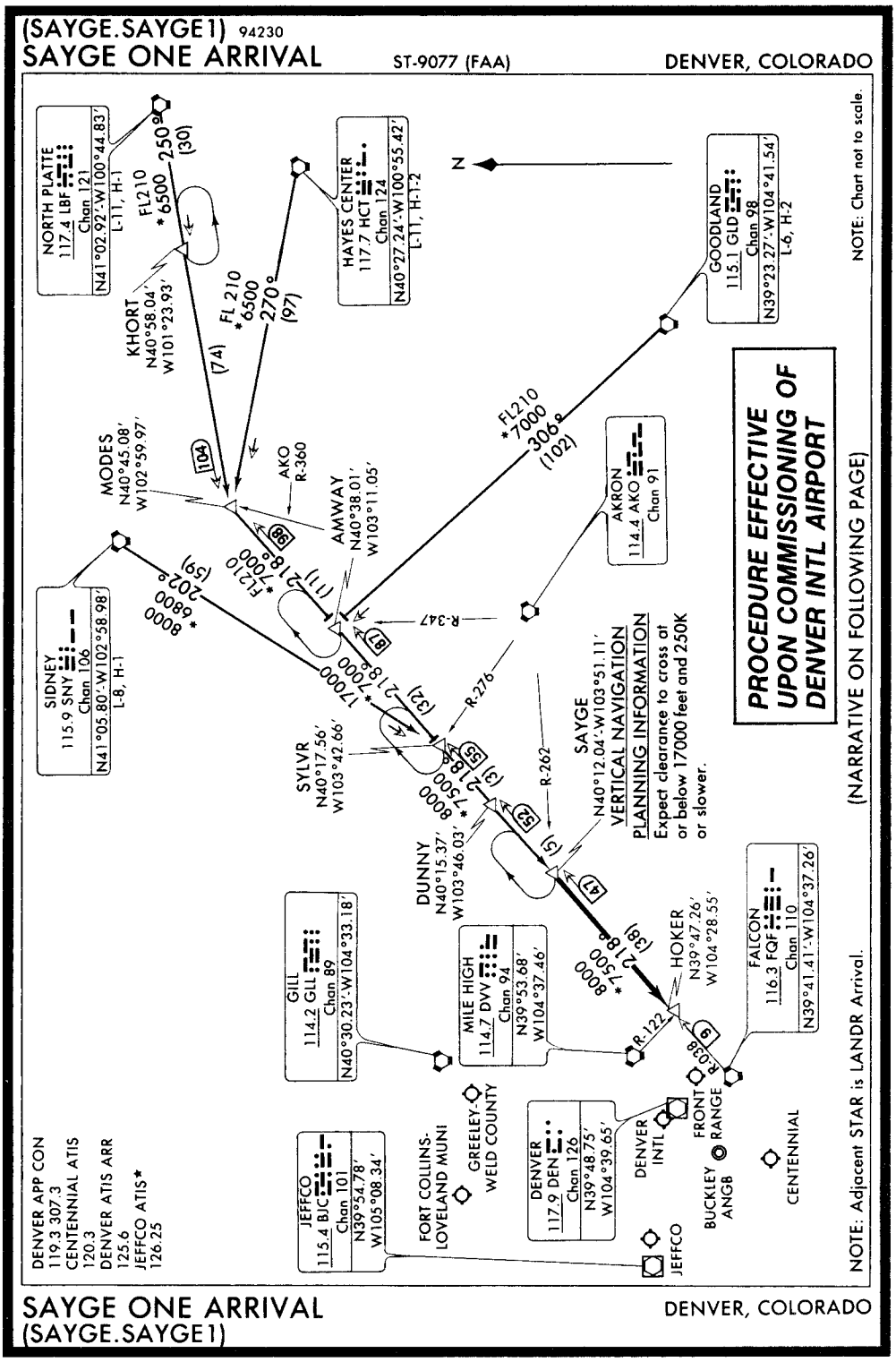


FIGURE 193.—SAYGE ONE ARRIVAL (SAYGE.SAYGE1).

(SAYGE.SAYGE1) 93315

SAYGE ONE ARRIVAL ST-9077 (FAA) DENVER, COLORADO

ARRIVAL DESCRIPTION

GOODLAND TRANSITION (GLD.SAYGE1): From over GLD VORTAC via GLD R-306 and FQF R-038 to SAYGE INT. Thence. . . .

HAYES CENTER TRANSITION (HCT.SAYGE1): From over HCT VORTAC via HCT R-270 and FQF R-038 to SAYGE INT. Thence. . . .

NORTH PLATTE TRANSITION (LBF.SAYGE1): From over LBF VORTAC via LBF R-250 and FQF R-038 to SAYGE INT. Thence. . . .

SIDNEY TRANSITION (SNY.SAYGE1): From over SNY VORTAC via SNY R-202 and FQF R-038 to SAYGE INT. Thence. . . .

. . . . From over SAYGE INT via FQF R-038 to HOKER INT. Expect radar vectors to the final approach course at or before HOKER INT.

PROCEDURE EFFECTIVE UPON COMMISSIONING OF DENVER INTL AIRPORT

SAYGE ONE ARRIVAL (SAYGE.SAYGE1) DENVER, COLORADO

FIGURE 193A.—SAYGE ONE ARRIVAL (SAYGE.SAYGE1).

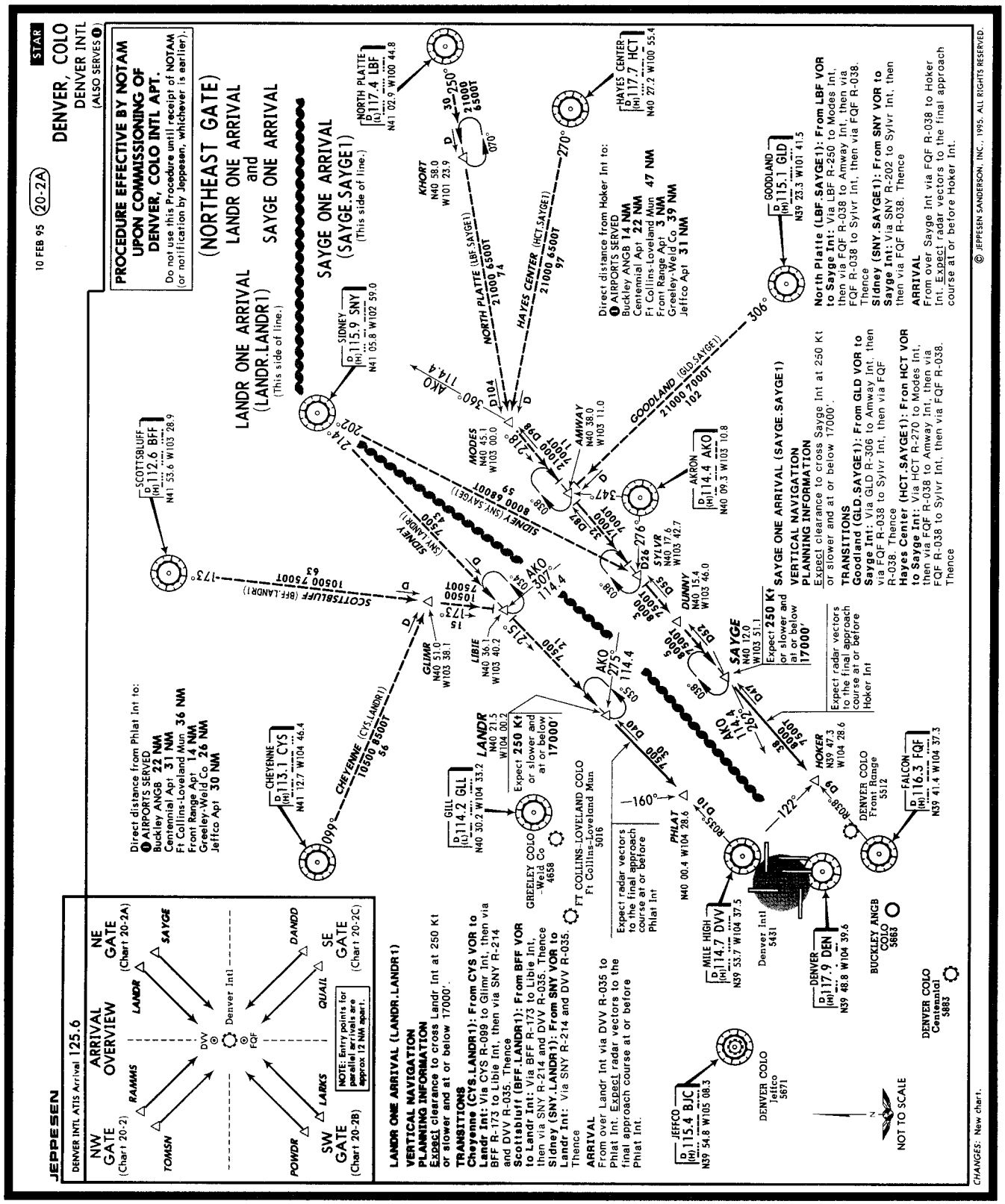


FIGURE 194.—Landr One Arrival/Sayge One Arrival.

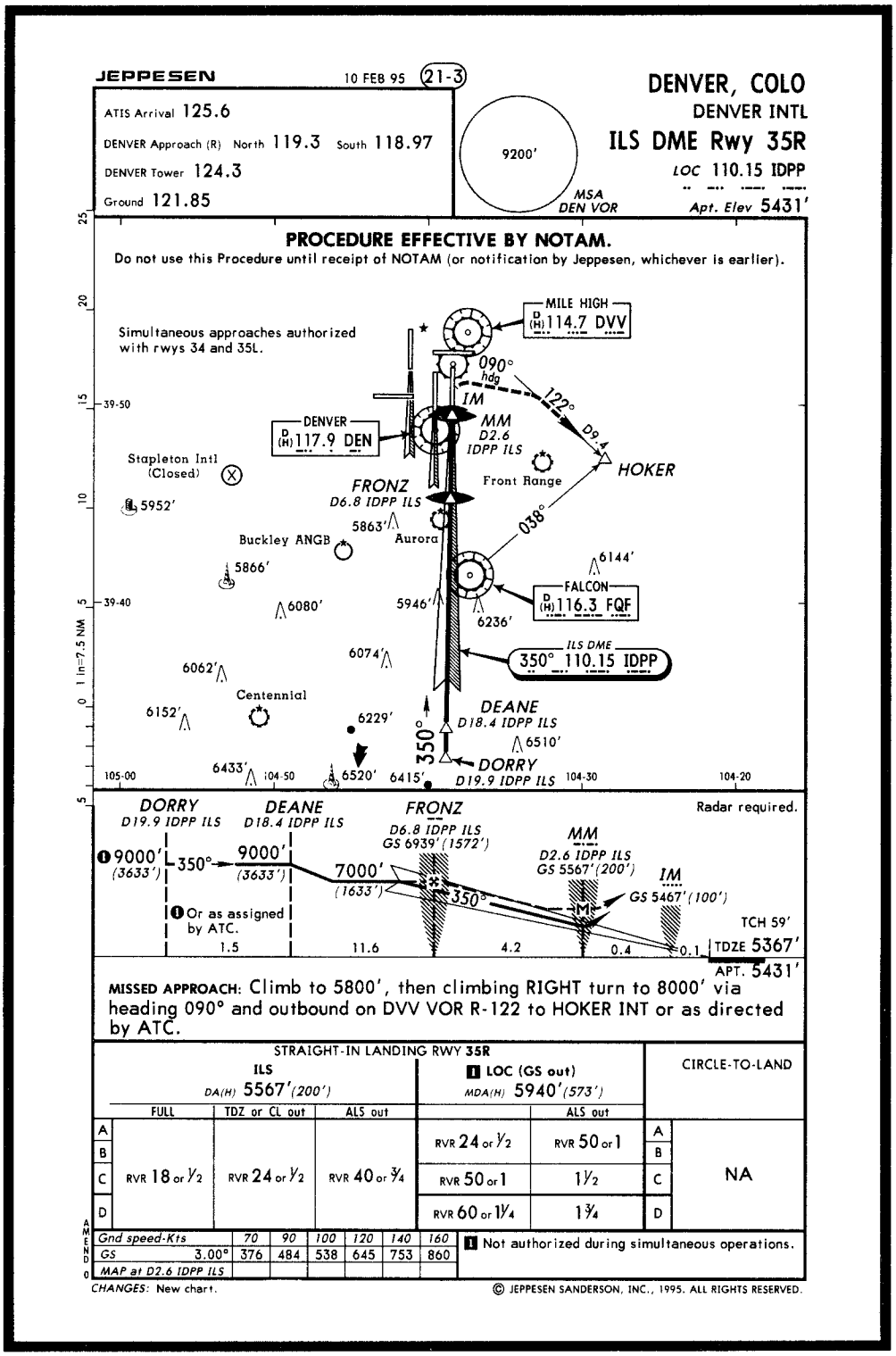


FIGURE 195.—ILS DME RWY 35R.

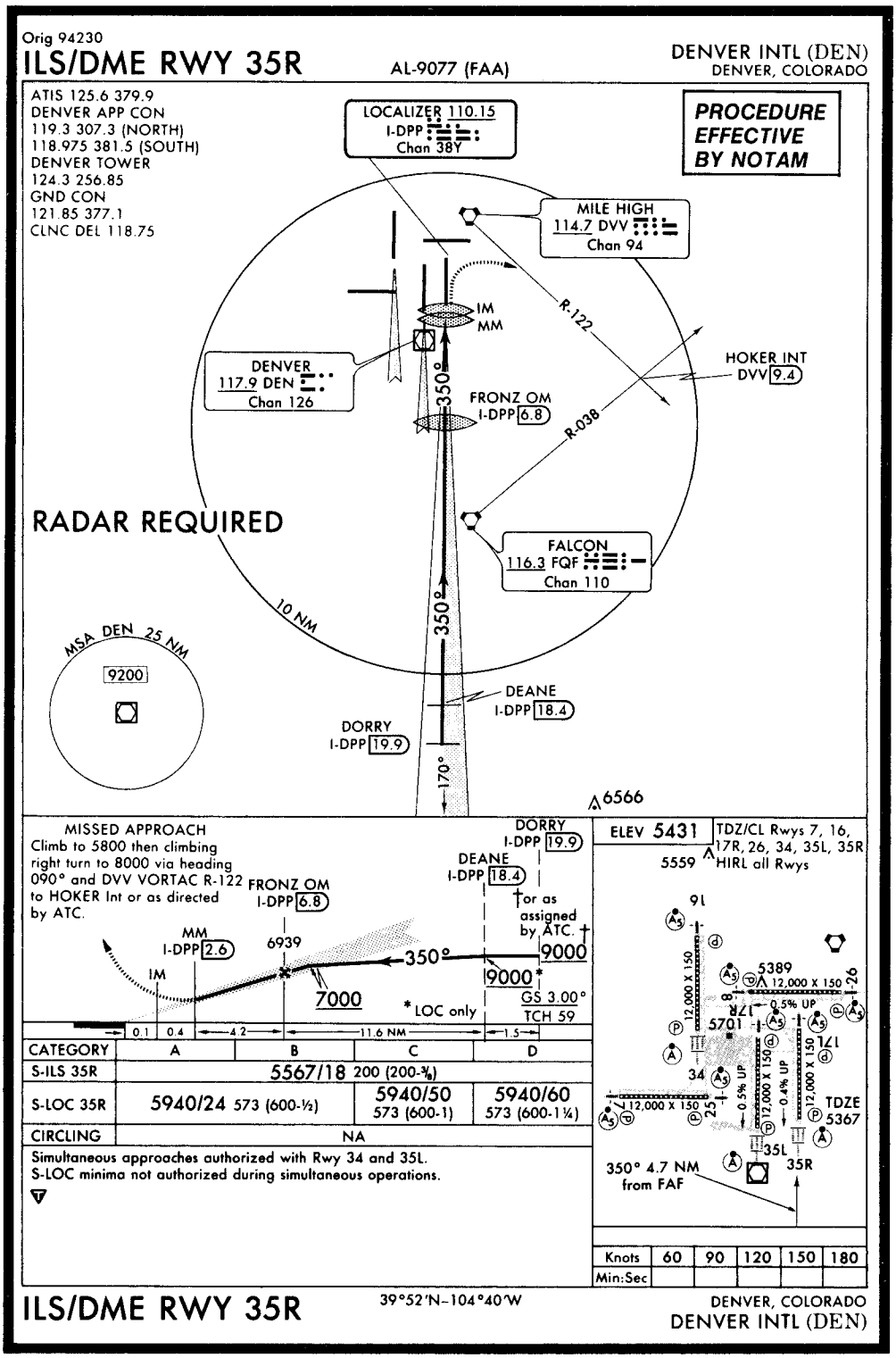


FIGURE 195A.—ILS/DME RWY 35R (DEN).

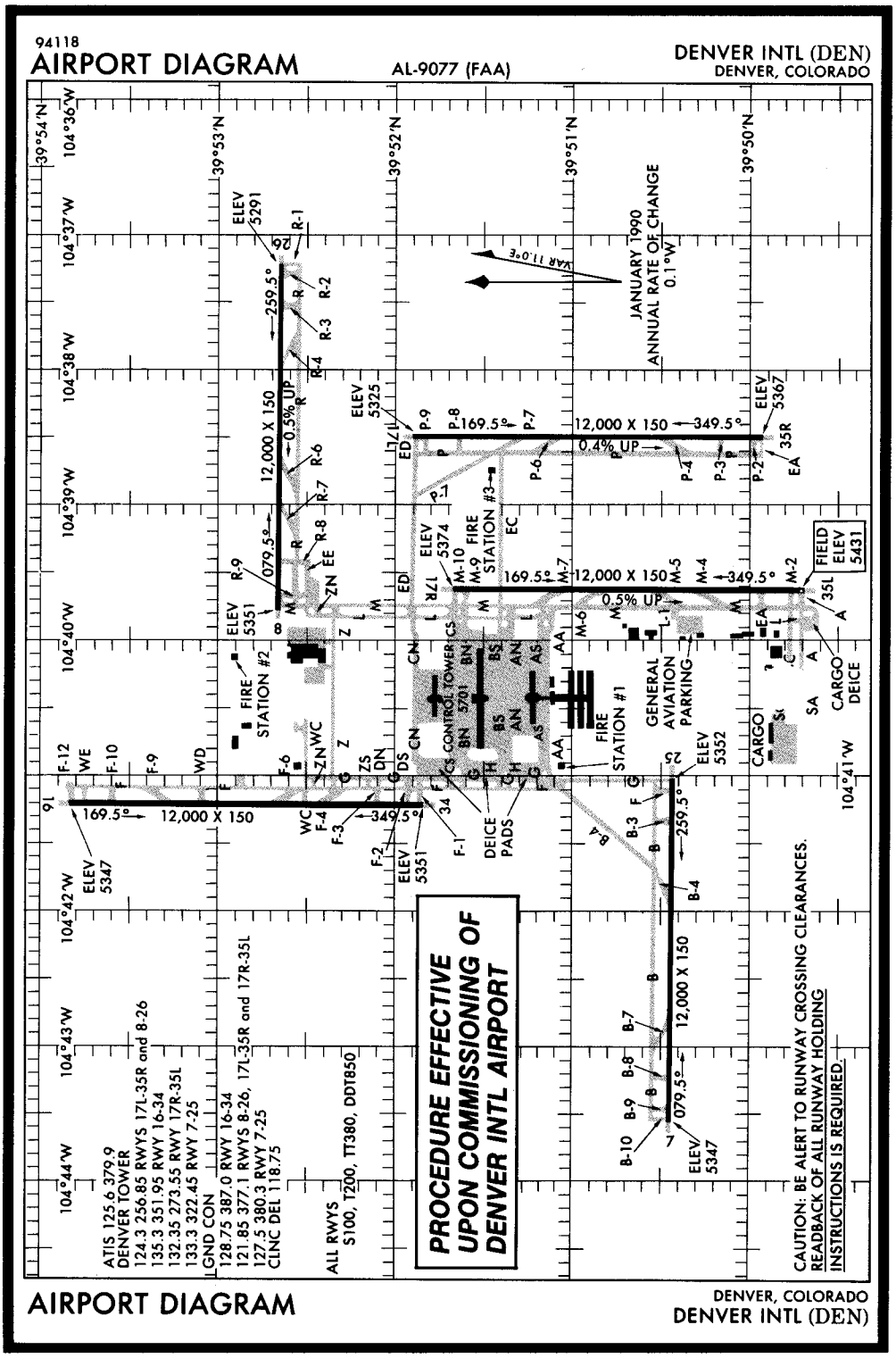


FIGURE 196.—AIRPORT DIAGRAM.

184 SPECIAL NOTICES

DENVER INTL (DEN) 16 NE UTC-7 (-6DT) N39°51.51' W104°40.02' **DENVER**
5431 B S4 **FUEL** 100, 100LL, MOGAS OX 1, 3 **H-2D, L-6E, 8G, A**
RWY 07-25: H12000X150 (CONC-GRVD) S-100, D-200, DT-380, DDT-850 HIRL CL **IAP**
RWY 07: MALSR. TDZ. PAPI(P4R)--GA 3.0° TCH 55.' **RWY 25:** MALSR. PAPI(P4L)--GA 3.0° TCH 55'.
RWY 08-26: H12000X150 (CONC-GRVD) S-100, D-200, DT-380, DDT-850 HIRL CL
RWY 08: MALSR. PAPI(P4L)--GA 3.0° TCH 55'. **RWY 26:** MALSR. TDZ. PAPI(P4L)--GA 3.0° TCH 55'.
RWY 16-34: H12000X150 (CONC-GRVD) S-100, D-200, DT-380, DDT-850 HIRL CL
RWY 16: MALSR. TDZ. PAPI(P4L)--GA 3.0° TCH 55.' **RWY 34:** ALSF2. TDZ. PAPI(P4L)--GA 3.0° TCH 55'.
RWY 17R-35L: H12000X150 (CONC-GRVD) S-100, D-200, DT-380, DDT-850 HIRL CL
RWY 17R: MALSR. TDZ. PAPI(P4L)--GA 3.0° TCH 55'. **RWY 35L:** ALSF2. TDZ. PAPI(P4R)--GA 3.0° TCH 55'.
RWY 17L-35R: H12000X150 (CONC-GRVD) S-100, D-200, DT-380, DDT-850 HIRL CL
RWY 17L: MALSR. PAPI(P4L)--GA 3.0° TCH 55'. **RWY 35R:** ALSF2. TDZ. PAPI(P4R)--GA 3.0° TCH 55'.
AIRPORT REMARKS: Attended continuously. Overhead walk-way on South side of concourse 'A' provides 44 ft high tail and 117 ft wide wing span clearance. Insufficient twy corner fillet pavement in the SE corner of the Twy M/M2 intersection for acft with wingspan over 107 ft. Noise abatement: Stage III or quieter acft only allowed to depart Rwy 25. Ldg fee.
WEATHER DATA SOURCES: ASOS (303)342-0838. LLWAS.
COMMUNICATIONS: ATIS 125.6 (Arr) (303) 342-0819 134.025 (Dep) (303) 342-0820 **UNICOM** 122.95
FSS (DEN) TF 1-800-WX-BRIEF. NOTAM FILE DEN.
Ⓡ **APP CON** 119.3 (North) 118.975 (South) **FINAL CON** 120.8
TOWER 135.3 (Rwy 16-34) 133.3 (Rwy 07-25) 132.35 (Rwy 17R-35L) 124.3 (Rwys 08-26 and 17L-35R)
GND CON 128.75 (Rwy 16-34) 127.5 (Rwy 07-25) 121.85 (Rwys 08-26, 17L-35R and 17R-35L) **CLNC DEL** 118.75
Ⓡ **DEP CON** 128.25 (East/South) 127.05 (North) 126.1 (West/South)
AIRSPACE: CLASS B See VFR Terminal Area Chart.
RADIO AIDS TO NAVIGATION: NOTAM FILE DEN.
(H) VORW/DME 117.9 DEN Chan 126 N39°48.75' W104°39.65' 343° 2.8 NM to fld. 5440/11E.

ILS/DME	111.1	I-LTT	Chan 48	Rwy 16.
ILS/DME	111.1	I-OUF	Chan 48	Rwy 34.
ILS/DME	108.9	I-FUI	Chan 26	Rwy 08.
ILS/DME	108.9	I-JOY	Chan 26	Rwy 26.
ILS/DME	108.5	I-ACX	Chan 22	Rwy 17R.
ILS/DME	108.5	I-AQD	Chan 22	Rwy 35L.
ILS/DME	110.15	I-BXP	Chan 38(Y)	Rwy 17L.
ILS/DME	110.15	I-DPP	Chan 38(Y)	Rwy 35R.
ILS/DME	111.55	I-DZG	Chan 52(Y)	Rwy 07.
ILS/DME	111.55	I-ERP	Chan 52(Y)	Rwy 25.

COMM/NAVAID REMARKS: Emerg frequency 121.5 not avbl at twr.

SATELLITE AIRPORT COMMUNICATIONS

DENVER, CENTENNIAL (APA)
DENVER APP/DEP CON 126.375
DENVER, FRONT RANGE (FTG)
DENVER APP/DEP CON 128.45
DENVER, JEFFCO (BJC)
DENVER APP/DEP CON 128.45
ERIE, TRI-COUNTY (48V)
DENVER APP/DEP CON 128.45
FORT COLLINS, DOWNTOWN FORT COLLINS AIRPARK (3V5)
DENVER APP/DEP CON 134.85
FORT COLLINS-LOVELAND MUNI (FNL)
DENVER APP/DEP CON 134.85 **CLNC DEL** 120.25
GREELEY-WELD COUNTY (GXY)
DENVER APP/DEP CON 134.85 **CLNC DEL** 126.65
LONGMONT, VANCE BRAND (2V2)
DENVER APP/DEP CON 128.45

FIGURE 196A.—Excerpt from Airport/Facilities Directory.

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 PROPOSED (Z)	6. DEPARTURE TIME ACTUAL (Z)	7. CRUISING ALTITUDE
VFR / X IFR / DVFR	HOSS 2	A109K2/A	** KTS	EGE EAGLE CO. REGIONAL			14000

8. ROUTE OF FLIGHT
DBL, VI34 FFU, V21 JAURN, SL, SLC

9. DESTINATION (Name of airport and city)	10. EST. TIME ENROUTE HOURS	MINUTES	11. REMARKS
SLC SALT LAKE CITY INT'L			L/O = LEVEL OFF PPH = POUNDS PER HOUR **CAS 139 ISA +20 TO +14 VARIATION: PUC 14E.

12. FUEL ON BOARD HOURS	MINUTES	13. ALTERNATE AIRPORT(S)	14. PILOT'S NAME, ADDRESS & TELEPHONE NUMBER & AIRCRAFT HOME BASE	15. NUMBER ABOARD
		OGD OGDEN HINCKLEY	17. DESTINATION CONTACT/TELEPHONE (OPTIONAL)	8

16. COLOR OF AIRCRAFT
ORANGE/BLUE

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

FLIGHT LOG

CHECK POINTS FROM	TO	ROUTE ALTITUDE	COURSE	WIND TEMP	SPEED-KTS TAS	GS	DIST NM	TIME LEG	TOT	FUEL LEG	TOT
EGE	DBL						13		:10:00		101*
DBL	JNC	V-134 14000		100/41 ISA+20							
JNC	PUC	V134 14000									
PUC	FFU	V134 1400		120/34 ISA+14							
FFU	JAURN	V21 14000									
JAURN	SLC	DESCENT & APPROACH					18	:10:00		92	
SLC	OGD					160	24	:09:00			

OTHER DATA:
NOTE: * Includes Taxi Fuel
Use 495 PPH Total Fuel Flow From L/O To Start Of Descent.
Use 469 PPH Total Fuel Flow For Reserve And Alternate Requirements.

A Missed Approach Requires 33# of Fuel.

TIME and FUEL: As required by FARs.

TIME	FUEL (LB)	
		EN ROUTE
		RESERVE
		ALTERNATE
		TOTAL

FIGURE 197.—Flight Plan/Flight Log.

COLORADO 135

EAGLE CO REGIONAL (EGE) 4 W UTC-7(-6DT) N39°38.55' W106°55.06' DENVER
6535 B S4 FUEL 100, 100LL, JET A1, JET A1 + OX 1, 3 ARFF Index C H-2C, L-5D, 6E, 8F
RWY 07-25: H8000X150 (ASPH) S-60, D-115 MIRL IAP
RWY 07: REIL. Tree. Rgt tfc. RWY 25: MALSR. REIL. PAPI(P4L)—GA 3.0° TCH 45'.
AIRPORT REMARKS: Attended 1400-0200Z‡. CLOSED to unscheduled air carrier operations with more than 30 passenger seats except PPR call arpt manager 303-524-9490. High unmarked terrain all quadrants. Ngt ops discouraged to pilots unfamiliar with arpt. Rwy 07 mountain top 10:1 clearance 12000' from thld 1500' left of rwy centerline extended. Recommend all acft departing Rwy 25 initiate a left turn as soon as altitude and safety permit to avoid high terrain. Extensive military helicopter training operations surface to 1000' AGL within 25 NM radius Eagle County Arpt 1330-0500Z‡. Wildlife in vicinity of arpt. No snow removal at nights. Rwy 25 PAPI only visible to 6° left of centerline due to terrain. After 0300Z‡ ACTIVATE MALSR Rwy 25 MIRL Rwy 07-25, PAPI Rwy 25 and REIL Rwy 07 and Rwy 25—CTAF.
WEATHER DATA SOURCES: AWOS-3 135.575 (303) 524-7386. Frequency 135.575 out of svc 1400-0200Z‡.
COMMUNICATIONS: CTAF 118.2 UNICOM 122.95
DENVER FSS (DEN) TF 1-800-WX-BRIEF. NOTAM FILE EGE.
RCO 122.2 (DENVER FSS)
DENVER CENTER APP/DEP CON 134.5
TOWER 118.2 NFCT (1400-0200Z‡) VFR only. GND CON 121.8
AIRSPACE: CLASS D svc effective 1400-0200Z‡ other times CLASS E.
RADIO AIDS TO NAVIGATION: NOTAM FILE DEN.
SNOW (L) VORW/DME 109.2 SXW Chan 29 N39°37.77' W106°59.47' 065° 3.5 NM to fld. 8060/12E. Unmonitored.
ILS/DME 110.1 I-EGE Chan 38 Rwy 25 (LOC only). LOC/DME unmonitored.

EASTON (VALLEY VIEW) (See GREELEY)

ECKERT/ORCHARD CITY
DOCTORS MESA (EØØ) 3 W UTC-7(-6DT) N38°51.17' W108°01.04' DENVER
5600 FUEL 100, MOGAS Not insp.
RWY 08-26: 6750X110 (DIRT-TURF)
RWY 08: Hill. RWY 26: Tree.
AIRPORT REMARKS: Attended continuously. Powerlines across middle of rwy 2352' from Rwy 26 end perpendicular to centerline, marked with 3 red powerline marker balls. Vegetation/grass on and in vicinity of rwy. +200' mountains 3 miles west of arpt. Wildlife on and in vicinity of arpt. Rwy 26 has end reflectors. Takeoffs to the east and landings to the west preferred, SW winds predominant. Rwy 08-26 soft when wet.
COMMUNICATIONS: CTAF/UNICOM 122.8
DENVER FSS (DEN) TF 1-800-WX-BRIEF. NOTAM FILE DEN.

ELLICOTT
COLORADO SPRINGS EAST (CO5Ø) 3 NW UTC-7(-6DT) N38°52.47' W104°24.60' DENVER
6145 S2 FUEL 100LL H-2D, L-6E
RWY 17-35: H5000X60 (ASPH) RWY LGTS (NSTD)
RWY 35: Rgt tfc.
RWY 08-26: 3440X60 (GRVL)
RWY 08: Fence.
AIRPORT REMARKS: Attended 1500-0000Z‡. P-line runs perpendicular to Rwy 08 1500' from rwy end. Rwy 17-35 asph broken and loose in areas. Rwy 08-26 rough at intersection of Rwy 17-35. 4' fence 125' from centerline both sides of Rwy 08-26 W of Rwy 17-35. Rwy 17-35 lights on E side of rwy only. For NSTD rwy lights call 719-683-2701. Fee for commercial acft ctc arpt manager 719-683-2701.
COMMUNICATIONS: CTAF 122.9
DENVER FSS (DEN) TF 1-800-WX-BRIEF. NOTAM FILE DEN.
RADIO AIDS TO NAVIGATION: NOTAM FILE COS.
COLORADO SPRINGS (L) VORTACW 112.5 COS Chan 72 N38°56.67' W104°38.01' 099° 11.3 NM to fld. 6930/13E.

FIGURE 198.—Excerpt from Airport/Facilities Directory.

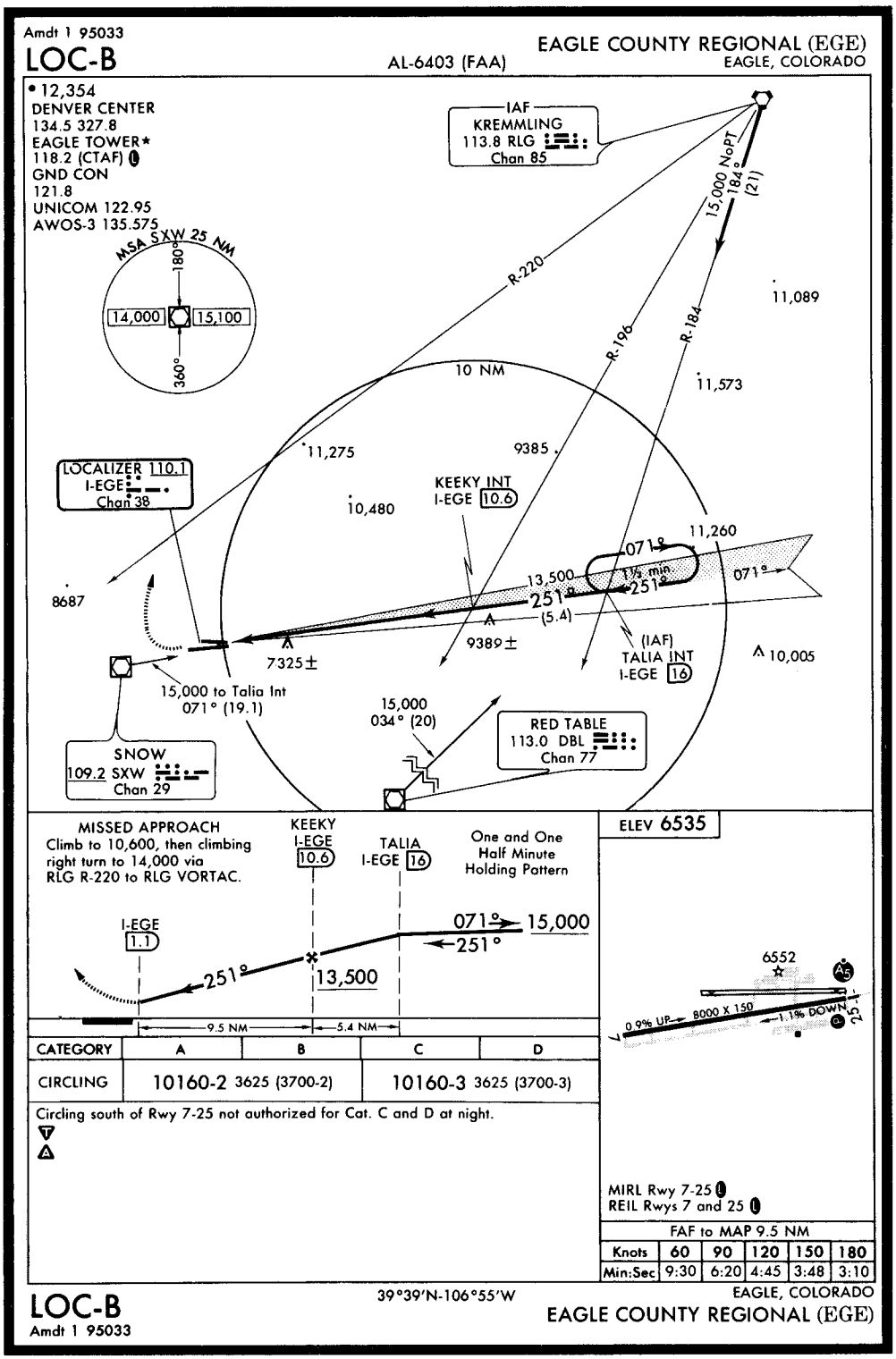


FIGURE 198A.—LOC-B (EGE).

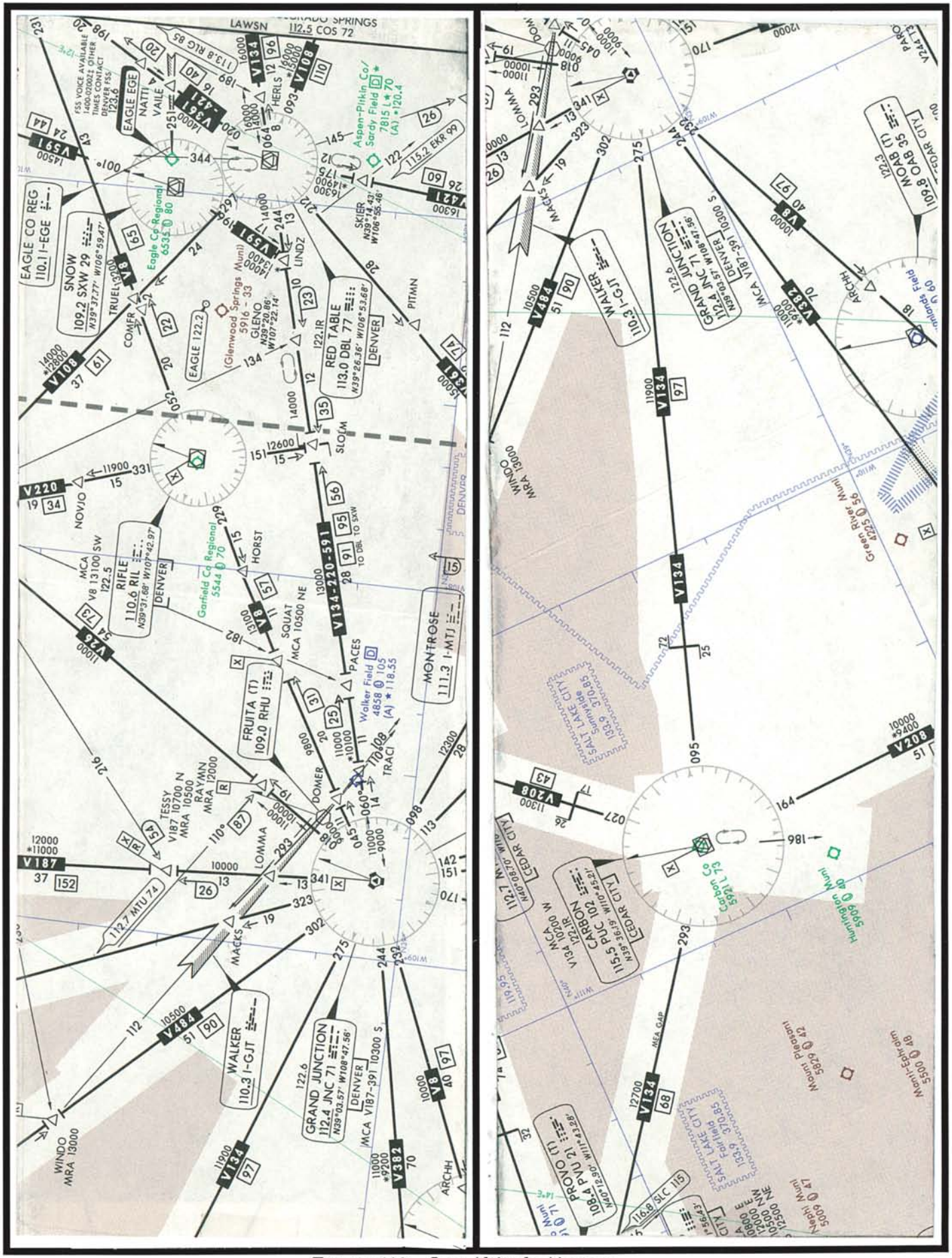


FIGURE 199.—Low Altitude Airways.

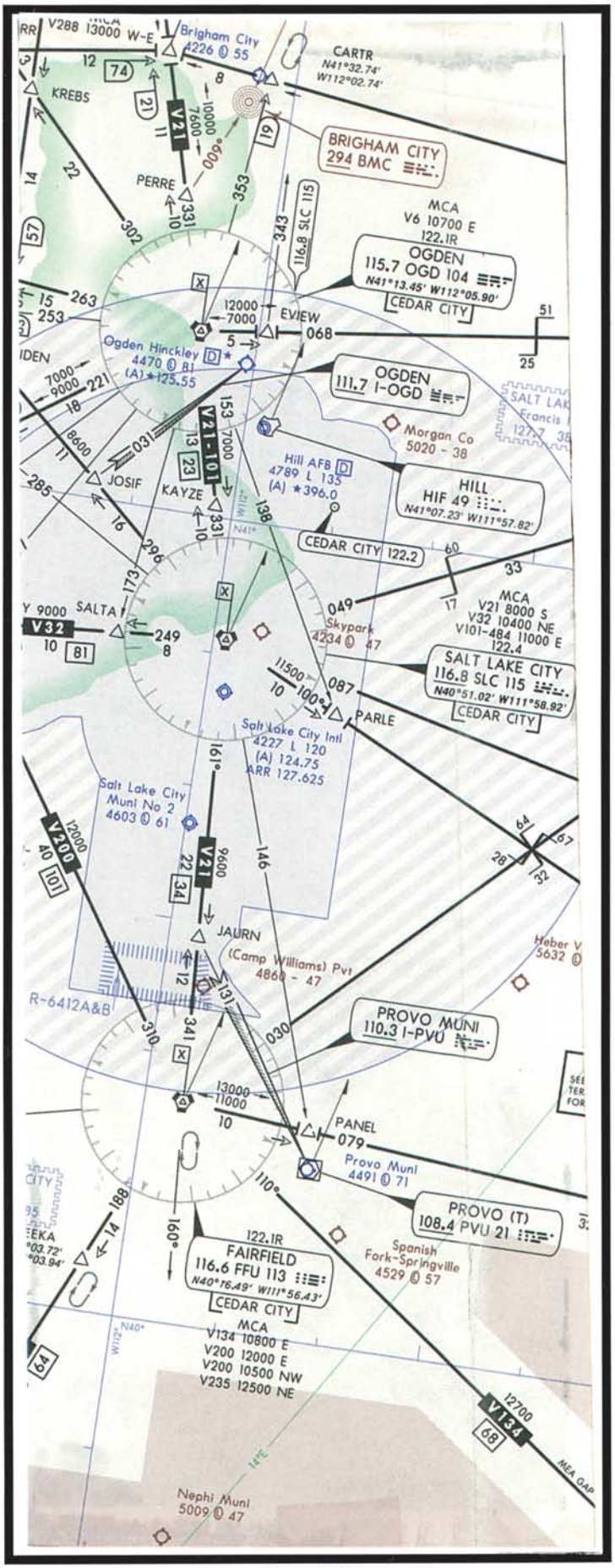
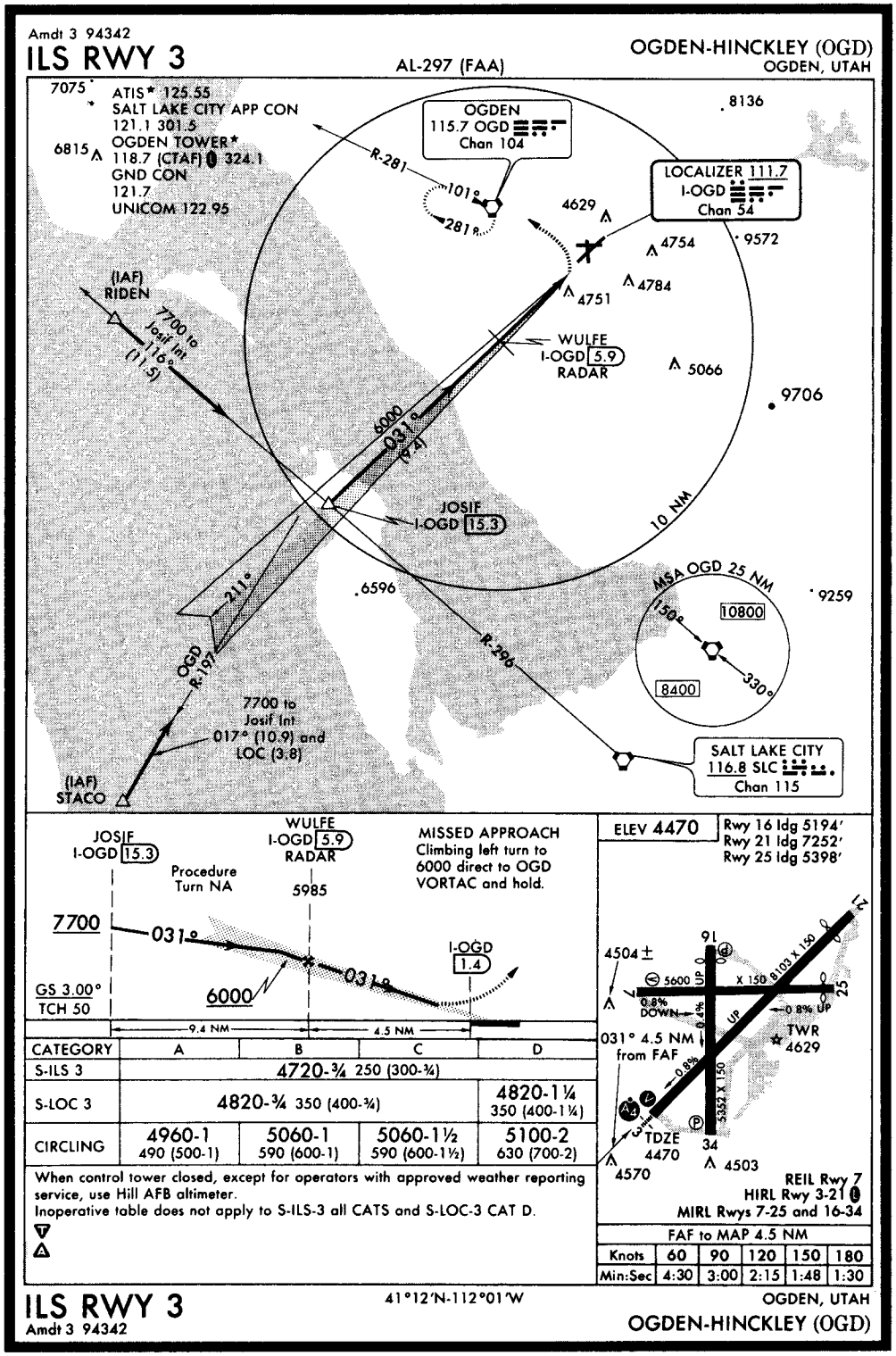


FIGURE 200.—Low Altitude Airways.



CATEGORY	A	B	C	D
S-ILS 3	4720-¾ 250 (300-¾)			
S-LOC 3	4820-¾ 350 (400-¾)			4820-1¼ 350 (400-1¼)
CIRCLING	4960-1 490 (500-1)	5060-1 590 (600-1)	5060-1½ 590 (600-1½)	5100-2 630 (700-2)

When control tower closed, except for operators with approved weather reporting service, use Hill AFB altimeter.
Inoperative table does not apply to S-ILS-3 all CATS and S-LOC-3 CAT D.

FAF to MAP 4.5 NM					
Knots	60	90	120	150	180
Min:Sec	4:30	3:00	2:15	1:48	1:30

FIGURE 201.—ILS RWY 3 (OGD).

UTAH 175

MOUNT PLEASANT (43U) 2 SW UTC-7(-6DT) N39°31.48′ W111°28.51′ LAS VEGAS L-5C
5829 B
RWY 02-20: H4260X60 (ASPH) MIRL
RWY 20: Road.
AIRPORT REMARKS: Unattended. Rwy 02-20 marked by stripes. For runway lights key 122.8 7 times.
COMMUNICATIONS: CTAF 122.9
CEDAR CITY FSS (CDC) TF 1-800-WX-BRIEF. NOTAM FILE CDC.
RADIO AIDS TO NAVIGATION: NOTAM FILE CDC.
DELTA (H) VORTAC 116.1 DTA Chan 108 N39°18.14′ W112°30.33′ 058° 49.7 NM to fld. 4600/16E.

MYTON N40°08.70′ W110°07.66′ NOTAM FILE CDC. SALT LAKE CITY H-2C, L-5C, 8E
(H) VORTAC 112.7 MTU Chan 74 270° 12.0 NM to Duchesne Muni. 5332/14E.
RCO 122.1R 112.7T (CEDAR CITY FSS)

NEPHI MUNI (U14) 3 NW UTC-7(-6DT) N39°44.33′ W111°52.30′ LAS VEGAS L-5C, 7D, 8E
5009 B S4 **FUEL** 100LL, JET A
RWY 16-34: H4700X75 (ASPH) S-21 MIRL
RWY 16: Thld dsplcd 200′. **RWY 34:** Thld dsplcd 400′.
AIRPORT REMARKS: Attended continuously. Rwy 16-34 cracking and loose chips on apron and rwy. Rwy 16 thld relocated 200′ for ngt operations, Rwy 34 thld relocated 400′ for ngt operations, 4100′ of rwy avbl for ngt operations. ACTIVATE MIRL Rwy 16-34—CTAF.
COMMUNICATIONS: CTAF/UNICOM 122.8
CEDAR CITY FSS (CDC) TF 1-800-WX-BRIEF. NOTAM FILE CDC.
RADIO AIDS TO NAVIGATION: NOTAM FILE PVU.
PROVO (T) VORW/DME 108.4 PVU Chan 21 N40°12.90′ W111°43.28′ 179° 29.4 NM to fld. 4490/15E.

OGDEN-HINCKLEY (OGD) 3 SW UTC-7(-6DT) N41°11.76′ W112°00.73′ SALT LAKE CITY H-1C, L-7D IAP
4470 B S4 **FUEL** 80, 100, JET A1 + OX 1, 2 TPA—5215(745) ARFF Index Ltd.
RWY 03-21: H8103X150 (ASPH-PFC) S-75, D-100, DT-170 HIRL 0.8% up SW
RWY 03: MALS. VASI(V2L). Trees. **RWY 21:** Thld dsplcd 851′. Signs. Rgt tfc.
RWY 07-25: H5600X150 (ASPH) S-20, D-50, DT-70 MIRL 0.3% up W
RWY 07: REIL. VASI(V4L)—GA 3.5° TCH 50′. Tree. **RWY 25:** Thld dsplcd 202′. Road. Rgt tfc.
RWY 16-34: H5352X150 (ASPH) S-50, D-75, DT-120 MIRL 0.4% up S
RWY 16: PAPI(P2L)—GA 3.0° TCH 40′. Thld dsplcd 158′. Ditch. Rgt tfc.
RWY 34: PAPI(P2L)—GA 3.0° TCH 40′. Sign.
AIRPORT REMARKS: Attended continuously. Parachute jumping on arpt between Rwys 21 and 25. Rwy 07-25 CLOSED indefinitely. Flocks of birds on and in vicinity of arpt. No multiple approaches. No practice approaches—full stop ldgs only from 0500-1400Z‡. CLOSED to air carrier ops with more than 30 passenger seats except PPR call arpt manager or twr 801-629-8251/625-5569. Be alert parking lot lgts off the apch end of Rwy 34 can be confused for rwy lgts. Acft exceeding S-50, D-75 and DT-120 use Taxiway C and conc apron except PPR call arpt manager 801-629-8251/625-5569. Air carriers use Rwy 03-21 and Taxiway C only. No snow removal after twr closes. When twr clsd ACTIVATE HIRL Rwy 03-21 and taxiway lights—CTAF. MIRL Rwys 07-25 and 16-34 and REIL Rwy 07 not avbl when twr closed. NOTE: See Land and Hold Short Operations Section.
WEATHER DATA SOURCE: LAWRS.
COMMUNICATIONS: CTAF 118.7 **ATIS** 125.55 (1400-0500Z‡) **UNICOM** 122.95
CEDAR CITY FSS (CDC) TF 1-800-WX-BRIEF. NOTAM FILE OGD.
RCO 122.1R 115.7T (CEDAR CITY FSS)
Ⓡ **SALT LAKE CITY APP/DEP CON** 121.1
TOWER 118.7 (1400-0500Z‡) **GND CON** 121.7
AIRSPACE: CLASS D svc effective 1400-0500Z‡ other times CLASS G.
RADIO AIDS TO NAVIGATION: NOTAM FILE OGD.
(L) VORTAC 115.7 OGD Chan 104 N41°13.45′ W112°05.90′ 099° 4.3 NM to fld. 4220/14E.
VORTAC unusable 010°-130° beyond 25 NM below 11,300′ 350°-010° beyond 38 NM below 11,000′
ILS/DME 111.7 I-OGD Chan 54 Rwy 03. ILS/DME unmonitored when twr clsd.
COMM/NAVAID REMARKS: Emerg frequency 121.5 not avbl at twr.

FIGURE 201A.—Excerpt from Airport/Facilities Directory.

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 PROPOSED (Z)	6. DEPARTURE TIME ACTUAL (Z)	7. CRUISING ALTITUDE
VFR / X IFR / DVFR	PTL 55	B/B747/R	460 KTS	LAS LAS VEGAS			FL390

8. ROUTE OF FLIGHT
LAS OASIS8.BTY, J92 OAL, OAL.LOCKE SFO

9. DESTINATION (Name of airport and city)	10. EST. TIME ENROUTE HOURS	MINUTES	11. REMARKS
SFO SAN FRANCISCO INT'L.			L/O = LEVEL OFF PPH = POUNDS PER HOUR

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	OAK METROPOLITAN OAKLAND INT'L	17. DESTINATION CONTACT/TELEPHONE (OPTIONAL)	339

16. COLOR OF AIRCRAFT
WHITE/GREEN

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

FLIGHT LOG

CHECK POINTS FROM	TO	ROUTE / ALTITUDE	COURSE	WIND TEMP	SPEED-KTS TAS	GS	DIST NM	TIME LEG	TIME TOT	FUEL LEG	FUEL TOT
LAS	L/O	OASIS8.BTY / CLIMB					65		:21:00		5600*
L/O	BTY	BTY R-126 / FL390		340/53 / ISA+4							
BTY	OAL	J92 / FL390									
OAL	GROAN	OAL LOCKE.1 / FL390									
GROAN	SFO	DESCENT					75	:26:00		4500	
SFO	OAK	VECTORS / 3000					29	:09:00			

OTHER DATA:
NOTE: * Includes Taxi Fuel
Use 12,000 PPH Total Fuel Flow From L/O To Start Of Descent.
Use 11,000 PPH Total Fuel Flow For Reserve/Alternate Requirements.

A Missed Approach Requires 1133# of Fuel

TIME and FUEL: As required by FARs.

TIME	FUEL (LB)	
		EN ROUTE
		RESERVE
		ALTERNATE
		TOTAL

FIGURE 202.—Flight Plan/Flight Log.

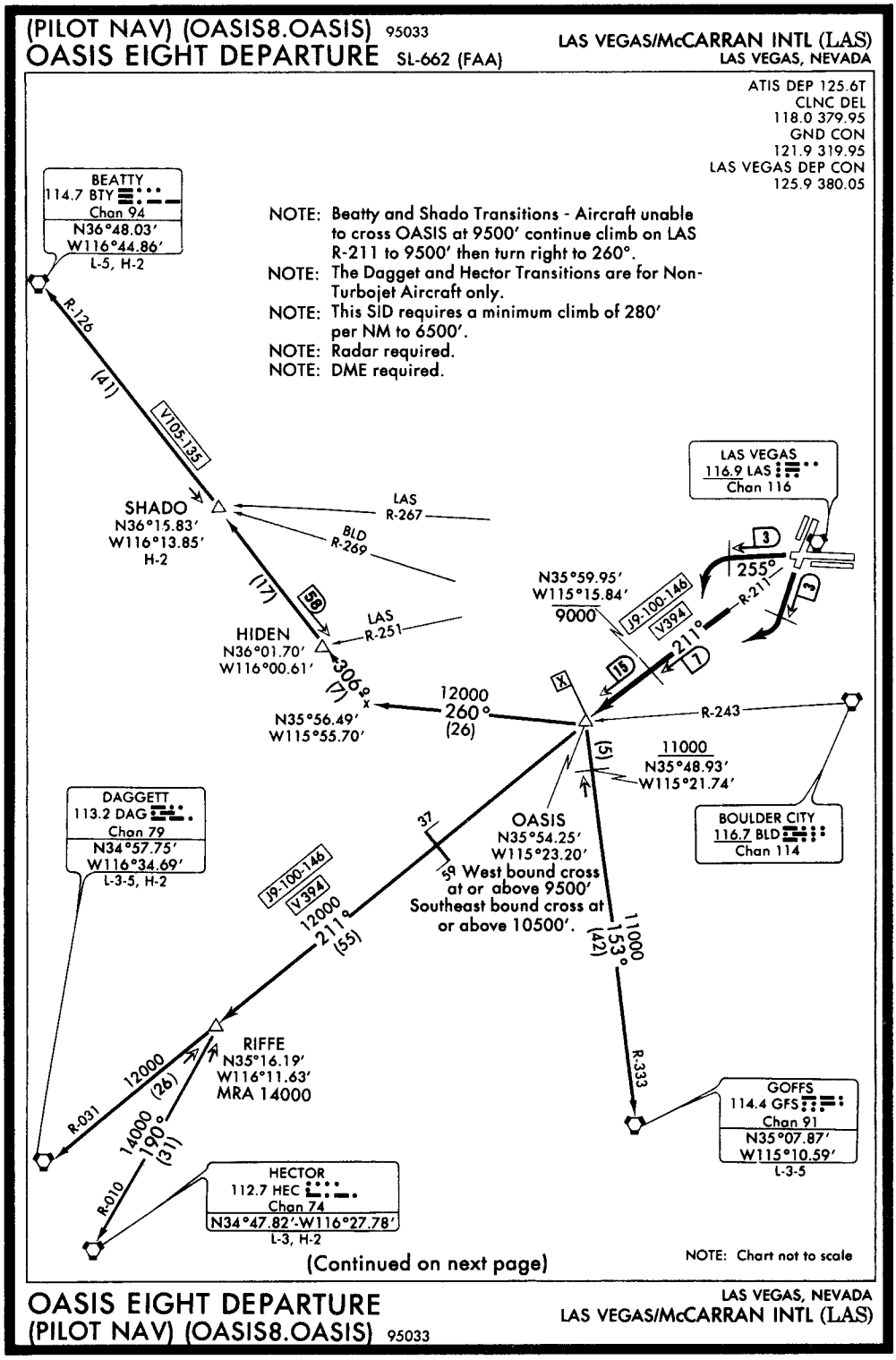


FIGURE 203.—OASIS EIGHT DEPARTURE (LAS).

(PILOT NAV) (OASIS8.OASIS) 95033
OASIS EIGHT DEPARTURE SL-662 (FAA)

LAS VEGAS/McCARRAN INTL (LAS)
LAS VEGAS, NEVADA

DEPARTURE ROUTE DESCRIPTION

TAKE-OFF RUNWAYS 19L/R: Climb on runway heading until reaching 3 DME, then turn right to intercept and proceed via the LAS R-211, thence. . . .
TAKE-OFF RUNWAYS 25L/R: Fly heading 255° until reaching 3 DME, then turn left to intercept and proceed via the LAS R-211, thence. . . .
. . . . cross the LAS R-211 7 DME at or below 9000′, then climb via LAS R-211 to OASIS INT, then via (transition) or (assigned route).
ALL RUNWAYS: Aircraft filing 17000 or above expect filed altitude/flight level 10 minutes after departure.
BEATTY TRANSITION (OASIS8.BTY): From over OASIS INT via heading 260° to intercept BTY R-126 to BTY VORTAC.
DAGGETT TRANSITION (OASIS8.DAG): From over OASIS INT via LAS R-211 and DAG R-031 to DAG VORTAC.
GOFFS TRANSITION (OASIS8.GFS): From over OASIS INT via GFS R-333 to GFS VORTAC.
HECTOR TRANSITION (OASIS8.HEC): From over OASIS INT via LAS R-211 and DAG R-031 to RIFFE INT, then via HEC R-010 to HEC VORTAC.
SHADO TRANSITION (OASIS8.SHADO): From over OASIS INT via heading 260° to intercept BTY R-126 to SHADO INT.

OASIS EIGHT DEPARTURE
(PILOT NAV) (OASIS8.OASIS) 95033

LAS VEGAS, NEVADA
LAS VEGAS/McCARRAN INTL (LAS)

FIGURE 203A.—OASIS EIGHT DEPARTURE (DEPARTURE ROUTE DESCRIPTIONS).

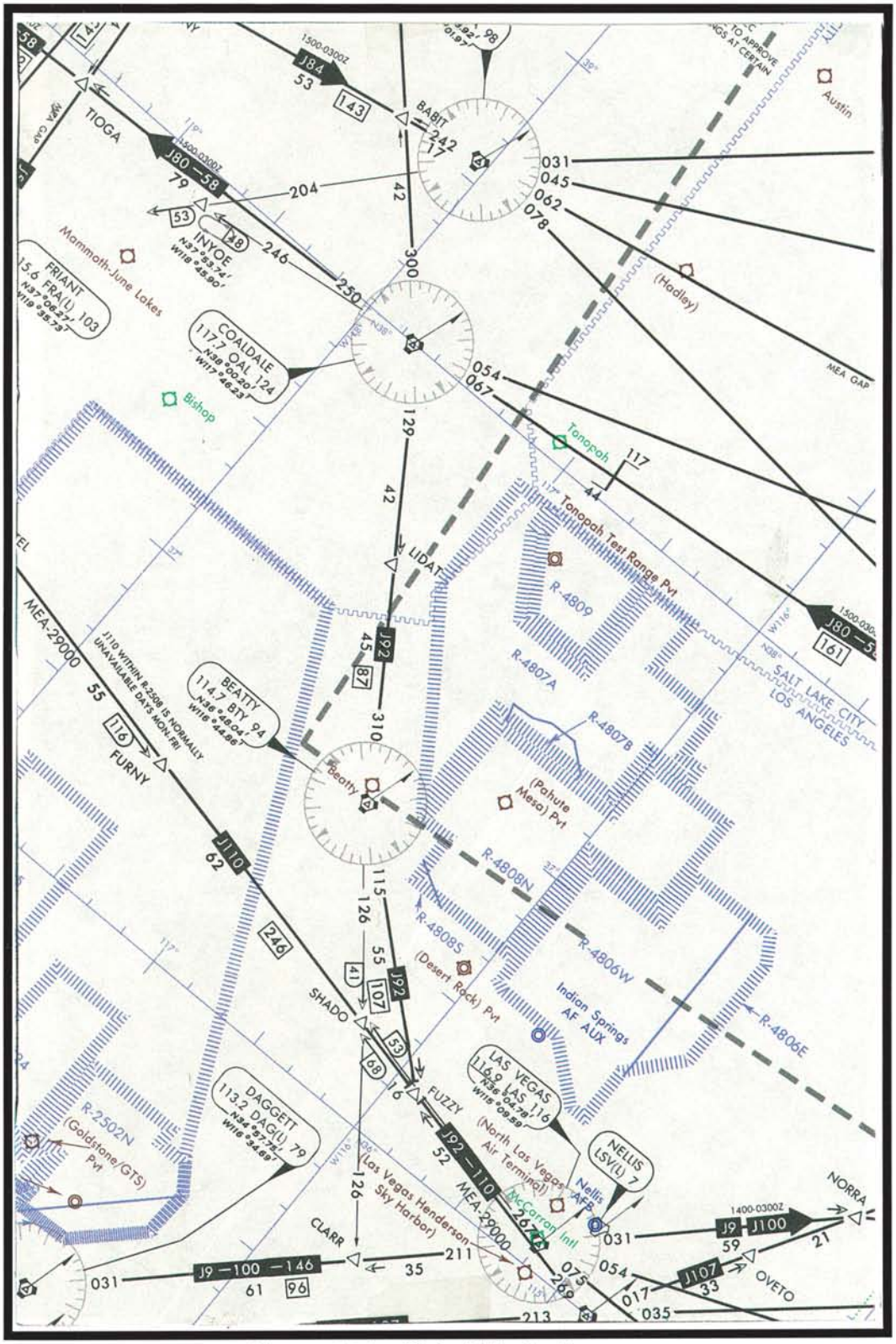


FIGURE 204.—High Altitude Airways.

CALIFORNIA 103

SAN FRANCISCO INTL (SFO) 8 SE UTC-8(-7DT) N37°37.14' W122°22.49' — SAN FRANCISCO H-2A, L-2F, A IAP
11 B S4 **FUEL** 100, 100LL OX 1, 2, 3, 4 ARFF Index E
RWY 10L-28R: H11870X200 (ASPH-GRVD) S-60, D-200, DT-355, DDT-710 HIRL CL
RWY 10L: REIL. VASI(V6L)—Upper GA 3.25° TCH 109', Lower GA 3.0° TCH 69'. Transmission twr.
RWY 28R: ALSF2. TDZ. PAPI(P4L)—GA 3.0° TCH 51'. Rgt tfc.
RWY 10R-28L: H10600X200 (ASPH-GRVD) S-60, D-200, DT-355, DDT-710 HIRL CL
RWY 10R: VASI(V6L)—Upper GA 3.25° TCH 101', Lower GA 3.0° TCH 60'. Transmission twr. Rgt tfc.
RWY 28L: SSALR.
RWY 01R-19L: H8901X200 (ASPH-GRVD) S-60, D-195, DT-325, DDT-710 HIRL CL
RWY 01R: REIL. Thld dsplcd 492'. Blast fence. **RWY 19L:** SSALS. TDZ.
RWY 01L-19R: H7001X200 (ASPH) S-60, D-170, DT-270, DDT-710 HIRL
RWY 01L: REIL. Trees. **RWY 19R:** VASI(V6L)—Upper GA 3.25° TCH 79', Lower GA 3.0° TCH 47'.
AIRPORT REMARKS: Attended continuously. Rwy 19L SALSF are only 1100' long with only one flasher on the last light station. Flocks of birds feeding along shoreline adjacent to arpt; on occasions fly across various parts of arpt. Noise sensitive arpt. For noise abatement procedures ctc arpt noise office Monday-Friday 1600-0100Z‡ by calling 415-876-2220. Ldg fee. Rubber accumulated on first 3000 feet of Rwys 28L-28R. No grooving exists at arpt rwy intersections. Rwy 01R-19L is grooved full length except area between Rwys 28L and 28R and 535' from Taxiway Charlie north. Rwy 10L-28R grooved full length except from Taxiway Tango to Rwy 10L thld. Rwy 10R-28L grooved full length except from east edge of Rwy 01R-19L to Taxiway Kilo. Rwy 01L-19R grooved full length except from south edge of Taxiway Foxtrot to north edge of Rwy 10L-28R. Widebody acft restricted on Taxiway M west of Taxiway A. Several rwy hold position signs are on the right rather than the left side of the taxiways. Rwys 01L-19R, 01R-19L, 10L-28R and 10R-28L gross weight limit DC-10-10 430,000 pounds, DC-10-30 555,000 pounds, L-1011-100 450,000 pounds, L-1011-200 466,000 pounds, B-747 710,000 pounds. 747-400's shall taxi at a speed of less than 10 miles per hour on all non-restricted taxiways on the terminal side of the intersecting rwys. Movement speed of not more than 5 miles per hour is required when two 747-400's pass or overtake each other on parallel taxiways A and B. 747-400 are restricted from using Twy E to or from Twy B. Airline pilots shall strictly follow the painted nose-gear lines and no oversteering adjustment is permitted. Acft with wingspan of 140-156' must be under tow with wing walkers on Twy R southwest of the fix-base operator, acft with wingspan exceeding 156' are prohibited. B747 and larger acft are prohibited from using Twy A between Twy S and the United Airline Freedom area. Twy M clsd west of Gate 16 to acft exceeding a wingspan of 125'. Flight Notification Service (ADCUS) available. NOTE: See Land and Hold Short Operations Section.
WEATHER DATA SOURCES: AWOS-1 118.05 (San Bruno Hill). LLWAS.
COMMUNICATIONS: ATIS (ARR) 118.85 113.7 108.9 (415) 877-3585 (DEP) 135.45 (415) 877-8422/8423
UNICOM 122.95
OAKLAND FSS (OAK) TF 1-800-WX-BRIEF. NOTAM FILE SFO.
Ⓡ **BAY APP CON** 134.5 132.55 135.65
Ⓡ **BAY DEP CON** 135.1 (SE-W) 120.9 (NW-E)
TOWER 120.5 **GND CON** 121.8 (Gates 53-90 W side) 124.25 (Gates 1-52 E side) **CLNC DEL** 118.2
PRE TAXI CLNC 118.2
AIRSPACE: CLASS B See VFR Terminal Area Chart.
RADIO AIDS TO NAVIGATION: NOTAM FILE SFO.
(L) VORW/DME 115.8 SFO Chan 105 N37°37.17' W122°22.43' at fld. 10/17E.
VOR/DME unusable:
035-055°beyond 15 NM below 6500'
025-065°beyond 30 NM
150-190°beyond 25 NM below 4500'
190-260°beyond 10 NM below 4500'
260-295°beyond 35 NM below 3000'
295-330°beyond 20 NM below 4000'
BRIJJ NDB (LOM) 379 SF N37°34.33' W122°15.59' 280° 6.2 NM to fld.
Unusable 160°-195° byd 6 NM all altitudes.
ILS/DME 109.55 I-SFO Chan 32Y Rwy 28L. LOM BRIJJ NDB. LOM unusable 160°-195° byd 6 NM all altitudes.
ILS/DME 111.7 I-GWQ Chan 54 Rwy 28R. LOM BRIJJ NDB. LOM unusable 160°-195° byd 6 NM all altitudes.
ILS/DME 108.9 I-SIA Chan 26 Rwy 19L.
LDA/DME 110.75 Chan 44(Y) Rwy 28R.
COMM/NAVID REMARKS: ILS Rwy 19L-pilots be alert for momentary LOC course excursions due to large acft opr in vicinity of LOC antenna. ATIS frequency 108.9 avbl when SFO VOR out of service 415-877-3585.

SAN JACINTO N33°47.70' W116°59.96' NOTAM FILE RAL. — LOS ANGELES L-3C
NDB (MHW) 227 SJY 184° 3.8 NM to Hemet-Ryan. NDB unmonitored.

FIGURE 205.—Excerpt from Airport/Facilities Directory.

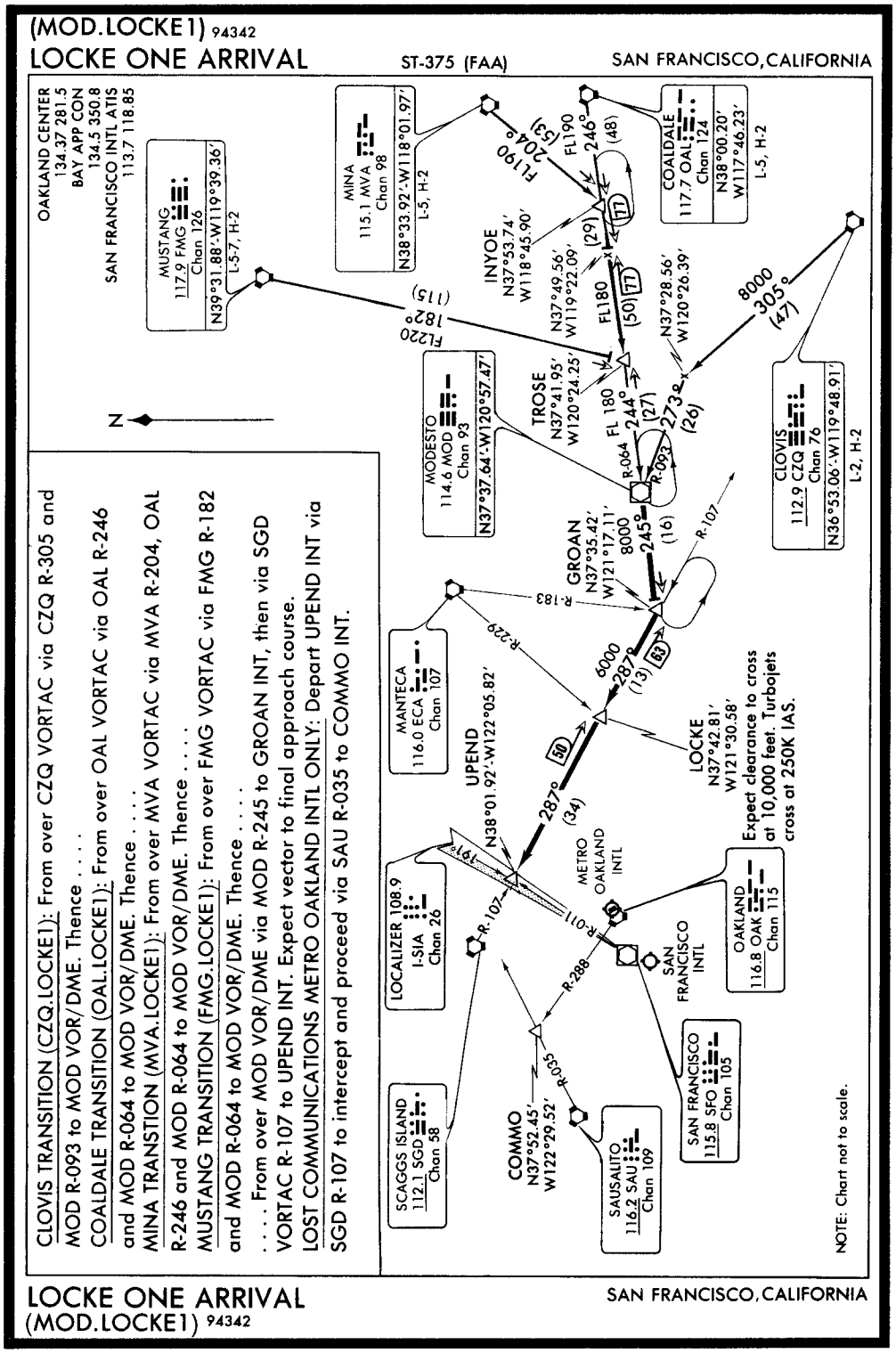
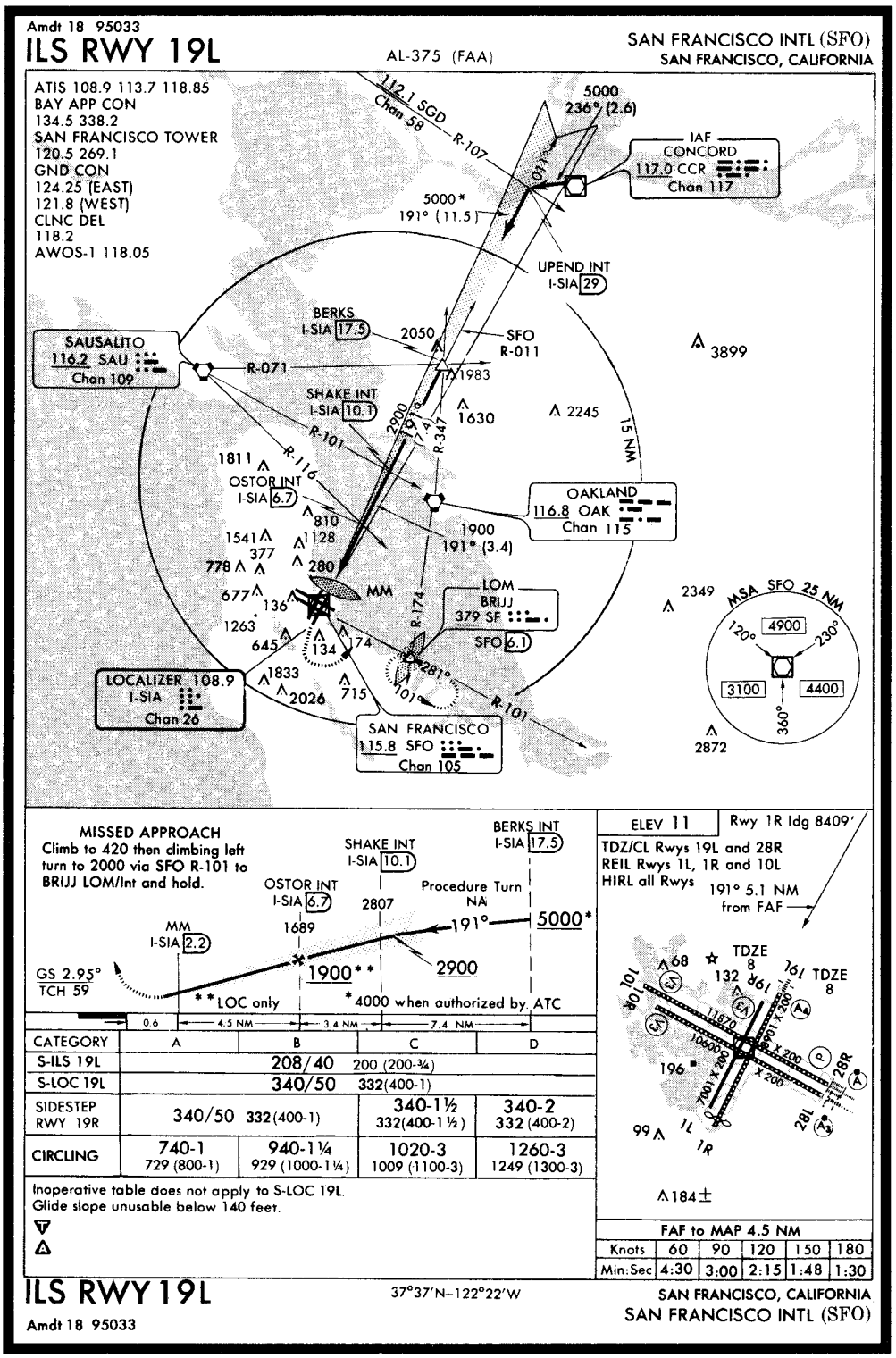


FIGURE 205A.—LOCKE ONE ARRIVAL (MOD.LOCKE1).



CATEGORY	A	B	C	D
S-ILS 19L	208/40 200 (200-¾)			
S-LOC 19L	340/50 332(400-1)			
SIDESTEP RWY 19R	340/50 332(400-1)		340-1½ 332(400-1½)	340-2 332 (400-2)
CIRCLING	740-1 729 (800-1)	940-1¼ 929 (1000-1¼)	1020-3 1009 (1100-3)	1260-3 1249 (1300-3)

Inoperative table does not apply to S-LOC 19L.
Glide slope unusable below 140 feet.

FAF to MAP 4.5 NM					
Knots	60	90	120	150	180
Min:Sec	4:30	3:00	2:15	1:48	1:30

FIGURE 206.—ILS RWY 19L (SFO).

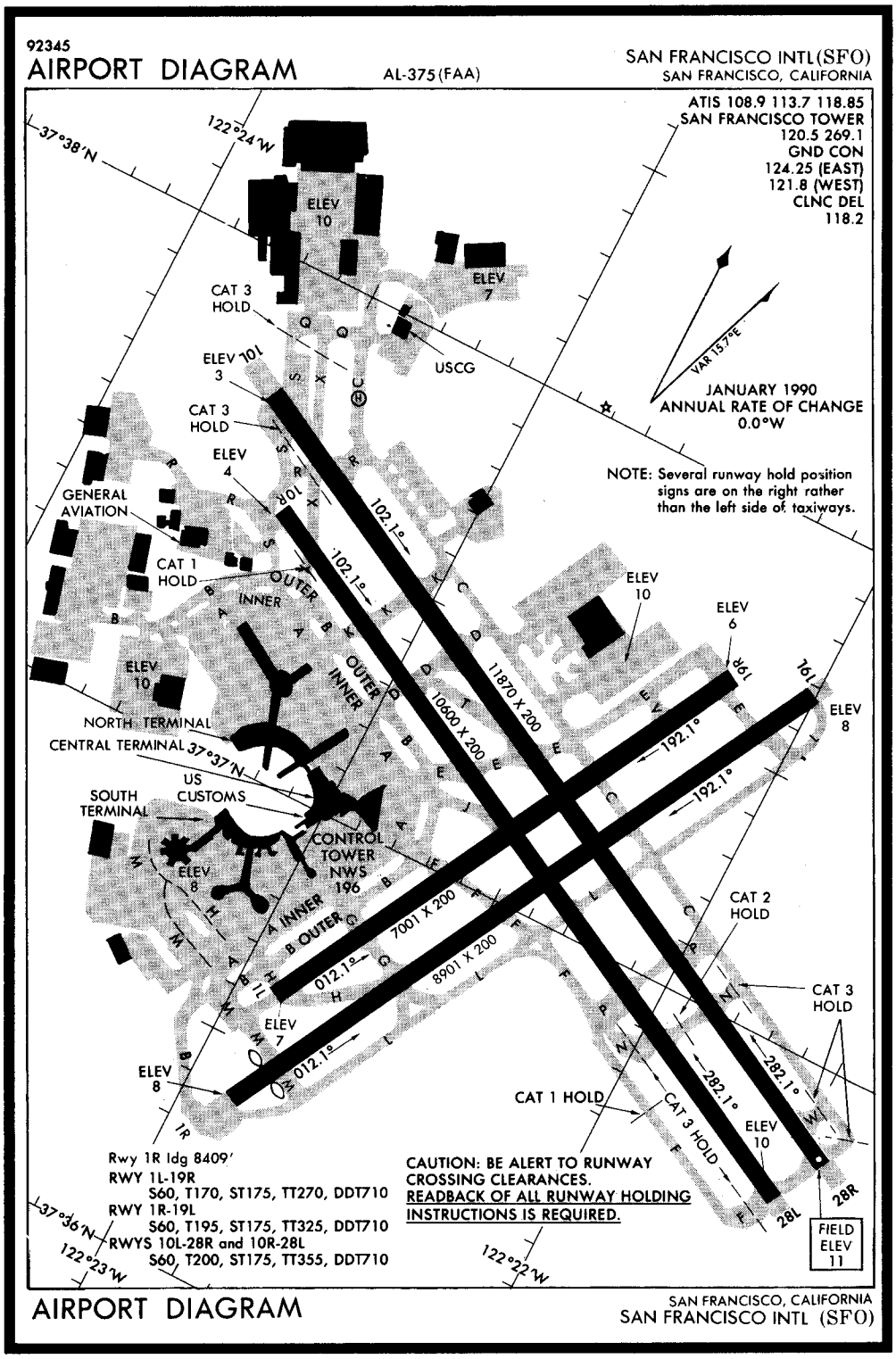


FIGURE 206A.—AIRPORT DIAGRAM.

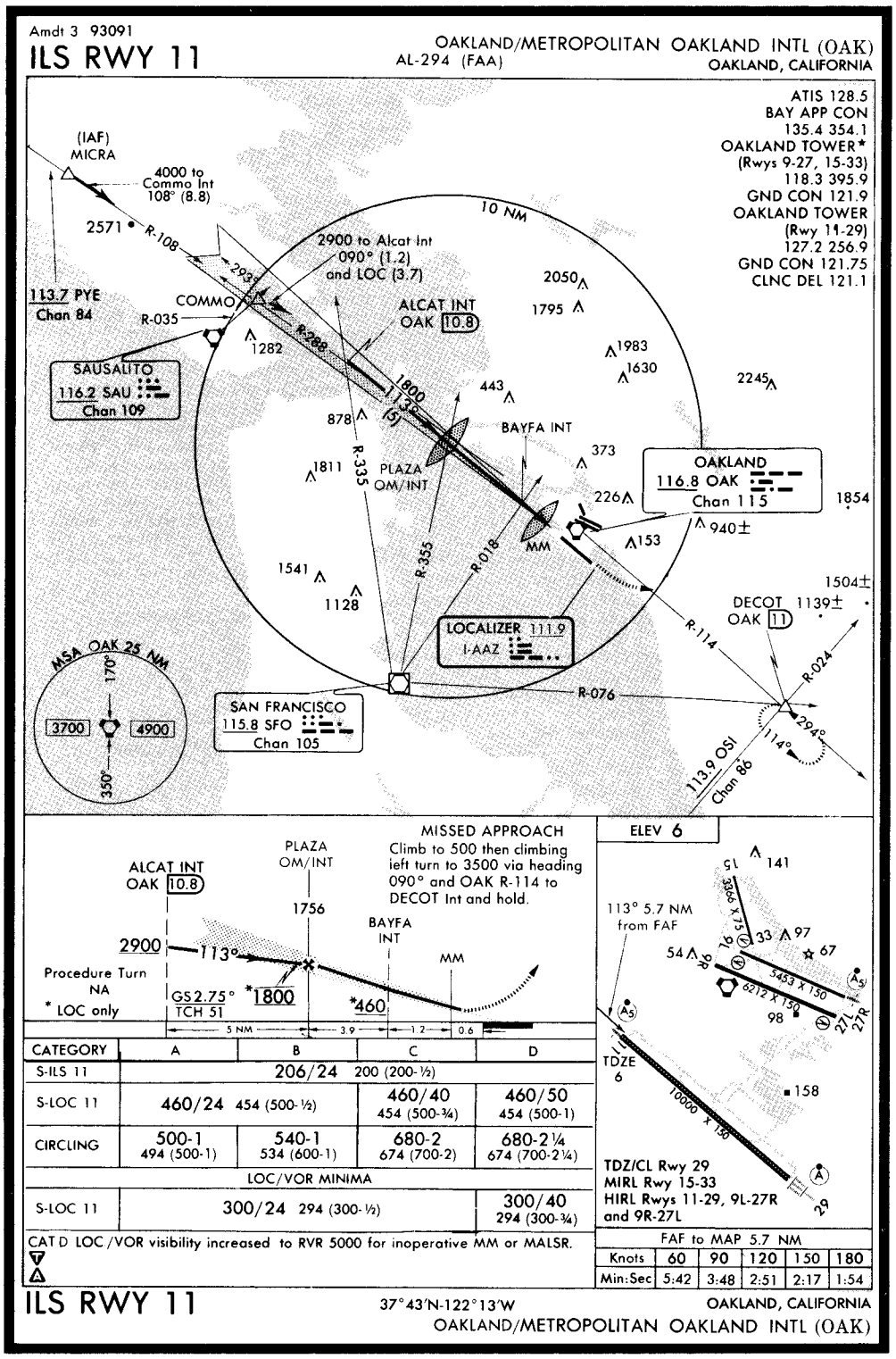


FIGURE 207.—ILS RWY 11 (OAK).

84 CALIFORNIA

OAKLAND

METROPOLITAN OAKLAND INTL (OAK) 4 S UTC-8(-7DT) N37°43.28' W122°13.24' SAN FRANCISCO
06 B S4 FUEL 100LL, JET A OX 1, 2, 3, 4 TPA—See Remarks LRA ARFF Index D H-2A, L-2F, A
RWY 11-29: H10000X150 (ASPH-PFC) S-200, D-200, DT-400, DDT-900 HIRL CL IAP
RWY 11: MALSR. Rgt tfc. RWY 29: ALSF2. TDZ.
RWY 09R-27L: H6212X150 (ASPH-PFC) S-75, D-200, DT-400, DDT-800 HIRL
RWY 09R: VASI(V4L)—GA 3.0° TCH 46'. Tree. RWY 27L: VASI(V4L)—GA 3.0° TCH 55'.
RWY 09L-27R: H5453X150 (ASPH) S-75, D-115, DT-180 HIRL
RWY 09L: VASI(V4L)—GA 3.0° TCH 38'. RWY 27R: MALSR. Building. Rgt tfc.
RWY 15-33: H3366X75 (ASPH) S-12.5, D-65, DT-100 MIRL
RWY 33: Rgt tfc.
AIRPORT REMARKS: Attended continuously. Fee Rwy 11-29 and tiedown Birds on and in vicinity of arpt. Rwy 09L-27R and Rwy 15-33 CLOSED to air carrier acft, except air carrier acft may use Rwy 09L and 27R for taxiing. Rwy 09L-27R and Rwy 09R-27L CLOSED to 4 engine wide body acft except Rwy 09R-27L operations avbl PPR call operations supervisor 510-577-4067. All turbo-jet/fan acft, all 4-engine acft and turbo-prop acft with certificated gross weight over 12,500 pounds are prohibited from tkf Rwys 27R/27L or ldg Rwy 09L and Rwy 09R. Preferential rwy use program in effect 0600-1400Z‡: All acft preferred north fld arrive Rwys 27R/27L or Rwy 33; all acft preferred north fld dep Rwys 09R/09L or Rwy 15. If these rwys unacceptable for safety or ATC instructions then Rwy 11-29 must be used. Prohibitions not applicable in emerg or whenever Rwy 11-29 is closed due to maintenance, construction or safety. For noise abatement information ctc noise abatement office at 510-577-4276. 400' blast pad Rwy 29 and 500' blast pad Rwy 11. Rwy 29 and Rwy 27L distance remaining signs left side. Acft with experimental or limited certification having over 1,000 horsepower or 4,000 pounds are restricted to Rwy 11-29. Rwy 09R-27L FAA gross weight strength DC 10-10 350,000 pounds, DC 10-30 450,000 pounds, L-1011 350,000 pounds. Rwy 11-29 FAA gross weight strength DC 10-10 600,000 pounds, DC 10-30 700,000 pounds, L-1011 600,000 pounds. TPA—Rwy 27L 606(600), TPA—Rwy 27R 1006(1000). Rwy 29 centerline lgts 6500'. Flight Notification Service (ADCUS) available.
COMMUNICATIONS: ATIS 128.5 (510) 635-5850 (N and S Complex) UNICOM 122.95
OAKLAND FSS (OAK) on arpt. 122.5 122.2. TF 1-800-WX-BRIEF. NOTAM FILE OAK.
® BAY APP CON 135.65 133.95 (South) 135.4 134.5 (East) 135.1 (West) 127.0 (North) 120.9 (Northwest) 120.1 (Southeast)
® BAY DEP CON 135.4 (East) 135.1 (West) 127.0 (North) 120.9 (Northwest)
OAKLAND TOWER 118.3 (N Complex) 127.2 (S Complex) 124.9
GND CON 121.75 (S Complex) 121.9 (N Complex) CLNC DEL 121.1
AIRSPACE: CLASS C svc ctc APP CON
RADIO AIDS TO NAVIGATION: NOTAM FILE OAK.
OAKLAND (H) VORTACW 116.8 OAK Chan 115 N37°43.55' W122°13.42' at fld. 10/17E. HIWAS.
RORAY NDB (LMM) 341 AK N37°43.28' W122°11.65' 253° 1.3 NM to fld.
ILS 108.7 I-INB Rwy 29
ILS 111.9 I-AAZ Rwy 11
ILS 109.9 I-OAK Rwy 27R LMM RORAY NDB.

OAKLAND N37°43.56' W122°13.42' NOTAM FILE OAK. SAN FRANCISCO
(H) VORTACW 116.8 OAK Chan 115 at Metropolitan Oakland Intl. 10/17E. HIWAS. H-2A, L-2F, A
VOR unusable: 307°-323° byd 10 NM blo 5,000' 307°-323° byd 17 NM blo 12,500'
DME unusable:
307°-323° byd 30 NM blo 1,500' 040°-065° byd 30 NM blo 4,100'
350°-030° byd 20 NM blo 3,500'
FSS (OAK) at Metropolitan Oakland Intl. 122.5 122.2 TF 1-800-WX-BRIEF.

OCEANO CO (L52) 1 W UTC-8(-7DT) N35°06.08' W120°37.33' LOS ANGELES
14 B S4 FUEL 100LL TPA—1000(986)
RWY 11-29: H2325X50 (ASPH) S-12.5 MIRL
RWY 11: P-line. Rgt tfc. RWY 29: Pole.
AIRPORT REMARKS: Attended 1600-0100Z‡. Arpt unattended Christmas day. For fuel after hours call 805-481-6100. Ultralight activity on and in vicinity of arpt. Recurring flocks of waterfowl on and in vicinity of arpt. Be alert for kites flown along beach 1/2 mile west of rwy. Unsurfaced areas soft and unusable. Taxilanes very narrow near buildings and parked acft. Extremely noise sensitive arpt and community, for tkf Rwy 29 pilots are requested to maintain rwy heading until crossing the shoreline. ACTIVATE MIRL Rwy 11-29—CTAF.
COMMUNICATIONS: CTAF/UNICOM 122.7
HAWTHORNE FSS (HHR) TF 1-800-WX-BRIEF. NOTAM FILE HHR.

OCEAN RIDGE (See GUALALA)

OCEANSIDE N33°14.44' W117°25.06' NOTAM FILE CRQ. LOS ANGELES
(H) VORTAC 115.3 OCN Chan 100 097° 3.6 NM to Oceanside Muni. 90/15E. H-2B, L-3C
VOR unusable 260°-265° byd 20NM.

FIGURE 207A.—Excerpt from Airport/Facilities Directory.

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 PROPOSED (Z)	6. DEPARTURE TIME ACTUAL (Z)	7. CRUISING ALTITUDE
VFR / X IFR / DVFR	SLING 2	S76/A	** KTS	EYW KEY WEST INT'L			9000

8. ROUTE OF FLIGHT
TIGAR, V157 MIA, V51 PHK, V437 MLB, V3 SMYRA, DA, DAB

9. DESTINATION (Name of airport and city)	10. EST. TIME ENROUTE HOURS	MINUTES	11. REMARKS
DAB DAYTONA BEACH			PPH = POUNDS PER HOUR **CAS 120 TEMP ISA+10 TO ISA+1

12. FUEL ON BOARD HOURS	MINUTES	13. ALTERNATE AIRPORT(S)	14. PILOT'S NAME, ADDRESS & TELEPHONE NUMBER & AIRCRAFT HOME BASE	15. NUMBER ABOARD
		SGJ ST. AUGUSTINE	17. DESTINATION CONTACT/TELEPHONE (OPTIONAL)	6

16. COLOR OF AIRCRAFT
GREY/RED

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

FLIGHT LOG

CHECK POINTS FROM	TO	ROUTE / ALTITUDE	COURSE	WIND / TEMP	SPEED-KTS TAS	GS	DIST NM	TIME LEG	TOT	FUEL LEG	TOT
EYW	TIGAR	DIRECT / CLIMB					28		:14:00		205.4*
TIGAR	MIA	V157 / 9000		220/23 / ISA+10							
MIA	PHK	V51		200/19 / ISA+10							
PHK	MLB	V437		180/17 / ISA+1							
MLB	SMYRA	V3		190/19 / ISA+1							
SMYRA	DAB	DESCENT / APPROACH					16	:09:08		139.3	
DAB	SGJ	DIRECT / 4000					48	:21:00			

OTHER DATA: * Includes Taxi Fuel
NOTE: Use 740 PPH Total Fuel Flow From L/O To Start Of Descent.
Use 705 PPH Total Fuel Flow For Reserve And Alternate Requirements.

A Missed Approach Requires 51# of Fuel.

TIME and FUEL: As required by FARs.

TIME	FUEL (LB)	
		EN ROUTE
		RESERVE
		ALTERNATE
		TOTAL

FIGURE 208.—Flight Plan/Flight Log.

56 FLORIDA

KEYSTONE HEIGHTS

KEYSTONE AIRPARK (42J) 3 N UTC-5(-4DT) N29°50.66′ W82°03.01′ — JACKSONVILLE
196 B S4 FUEL 100LL, JET A TPA 1196 (1000) — H-5E, L-18H, 19B
RWY 04-22: H5025X100 (ASPH) S-40, D-80 MIRL — IAP
RWY 04: PAPI(P2L)—GA 3.0° TCH 40′. Trees. RWY 22: PAPI(P2L)—GA 3.0° TCH 40′. Trees.
RWY 10-28: H4900X75 (ASHP) S-30, D-60
RWY 10: Trees. RWY 28: Trees.
RWY 16-34: H4400X150 (ASPH) S-25
RWY 16: Thld dsplcd 200′. Trees. RWY 34: Trees.
AIRPORT REMARKS: Attended 1300-2300Z‡. Parachute Jumping. CAUTION: Ultralgt activity on and in vicinity of arpt. CAUTION—Animals on and in vicinity of arpt. ACTIVATE MIRL Rwy 04-22—CTAF. Rwy 16-34 cracked with loose grvl and weeds growing thru cracks.
COMMUNICATIONS: CTAF/UNICOM 122.7
GAINESVILLE FSS (GNV) TF 1-800-WX-BRIEF. NOTAM FILE GNV.
® JACKSONVILLE APP/DEP CON 123.8
RADIO AIDS TO NAVIGATION: NOTAM FILE GNV.
GAINESVILLE (L) VORTAC 116.2 GNV Chan 109 N29°34.33′ W82°21.76′ 044° 23.1 NM to fld. 60/01E.
HIWAS.

KEY WEST N24°35.15′ W81°48.03′ NOTAM FILE EYW. — MIAMI
(H) VORTAC 113.5 EYW Chan 82 128° 2.8 NM to Key West Intl. 10/01E. HIWAS. — H-5E, L-19D
RCO 123.65 122.2 122.1R 113.5T (MIAMI FSS)
FSS freqs 123.65 and 122.2 unusable 330°-015° byd 20 NM blo 1500′.

KEY WEST INTL (EYW) 2 E UTC-5(-4DT) N24°33.37′ W81°45.57′ — MIAMI
4 B S4 FUEL 100, JET A AOE ARFF Index A — L-19D
RWY 09-27: H4800X100 (ASPH-GRVD) S-40, D-95, DT-130 MIRL — IAP
RWY 09: REIL. VASI(V4L)—GA 3.0° TCH 34′. Tree. RWY 27: REIL. VASI(V4L)—GA 3.0° TCH 34′. Tree.
AIRPORT REMARKS: Attended 1300-2300Z‡. CAUTION: Numerous flocks of birds on and in the vicinity of airport. CAUTION—Restricted area R-2916 14 NM NE of arpt has strobe-lgtd and marked balloon and cable to 14,000 ft. Noise Sensitive Area: all jet acft use NBAA close in noise abatement procedures. PPR for unscheduled air carrier operations with more than 30 passenger seats 0430-1045Z‡; Call arpt manager 305-296-7223. ACTIVATE MIRL Rwy 09-27, VASI/REIL Rwys 09-27—CTAF. Intensive military jet tfc S and E of arpt; acft entering arpt tfc area from SE through W. Enter arpt tfc area blo 2000′; refer to MIAMI VFR Terminal Area Chart for suggested VFR flyway routes. Flight Notification Service (ADCUS) available.
COMMUNICATIONS: CTAF 118.2 UNICOM 122.95
MIAMI FSS (MIA) TF 1-800-WX-BRIEF. NOTAM FILE EYW.
RCO 123.65 122.2 122.1R 113.5T (MIAMI FSS)
® NAVY KEY WEST APP/DEP CON 124.45 (1200-0500Z‡) ® MIAMI CENTER APP/DEP CON 132.2 (0500-1200Z‡)
TOWER 118.2 (1100-0300Z‡) GND CON 121.9 CLNC DEL 121.9
AIRSPACE: CLASS D svc effective 1100-0300Z‡ other times CLASS G.
RADIO AIDS TO NAVIGATION: NOTAM FILE EYW. VHF/DF ctc MIAMI FSS.
(H) VORTAC 113.5 EYW Chan 82 N24°35.15′ W81°48.03′ 127° 2.9 NM to fld. 10/01E. HIWAS.
FISH HOOK NDB (H) 332 FIS N24°32.90′ W81°47.18′ 073° 1.5 NM to fld.
ASR
COMM/NAVAID REMARKS: FSS freqs 123.65 and 122.2 unusable 330°-015° beyond 20 NM below 1500′.

KEY WEST NAS AIRSPACE: CLASS D svc effective 1100-0300Z‡ other times CLASS G.

KISSIMMEE MUNI (See ORLANDO)

KNIGHT N27°54.50′ W82°27.26′ NOTAM FILE PIE. — MIAMI
NDB (MHW) 270 TPF at Peter O'Knight. NDB unusable byd 20NM. — L-19B

KOBRA N30°51.19′ W86°32.20′ NOTAM FILE CEW. — NEW ORLEANS
NDB (LOM) 201 CE 170° 4.5 NM to Bob Sikes.

LA BELLE N26°49.69′ W81°23.49′ NOTAM FILE MIA — MIAMI
(L) VORTAC 110.4 LBV Chan 41 205° 5.2 NM to La Belle Muni. 30/01E. — H-5E, L-19C
RCO 122.1R 110.4T (MIAMI FSS)

FIGURE 209.—Excerpt from Airport/Facilities Directory.

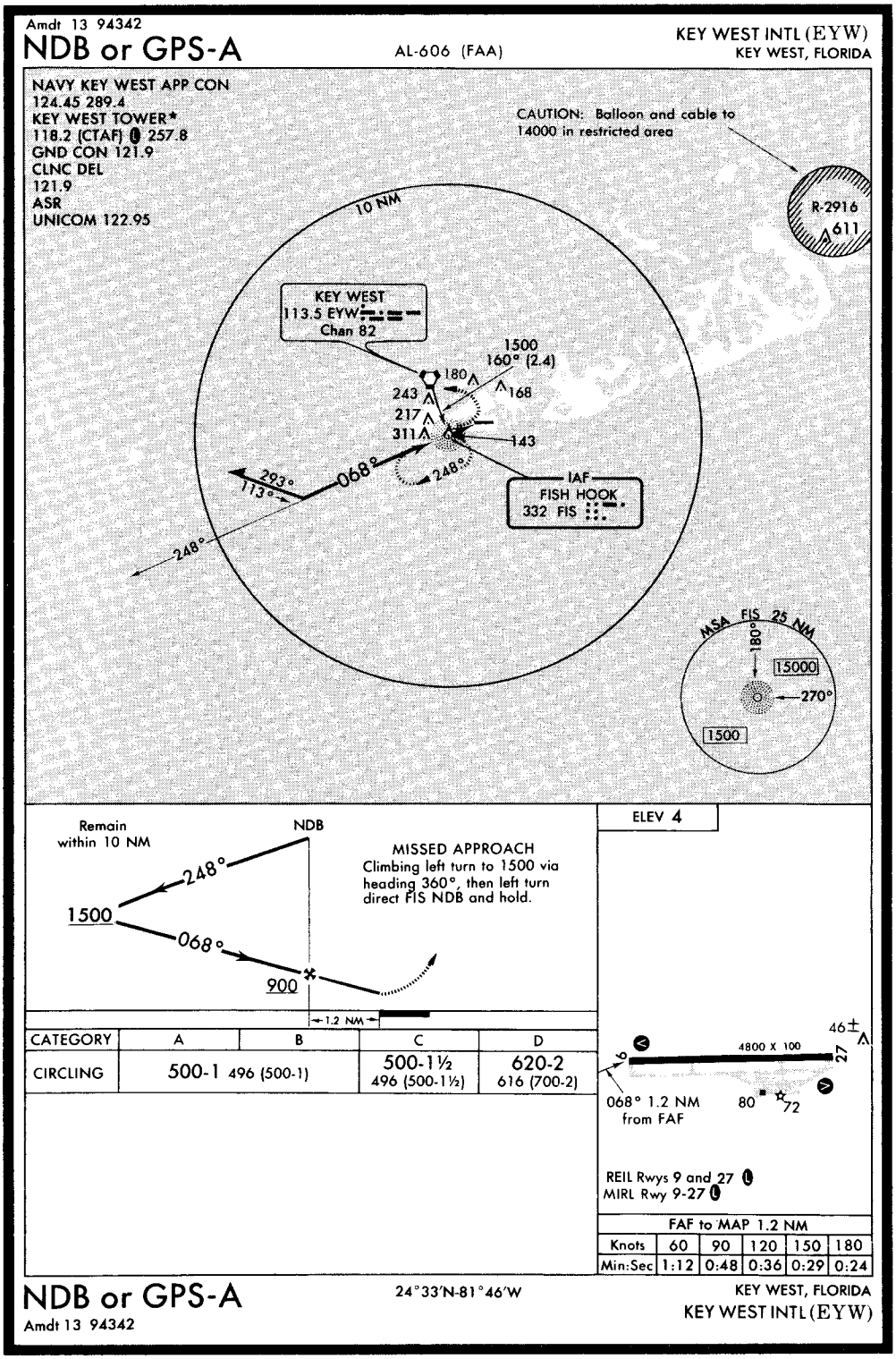


FIGURE 209A.—NDB or GPS-A (EYW).

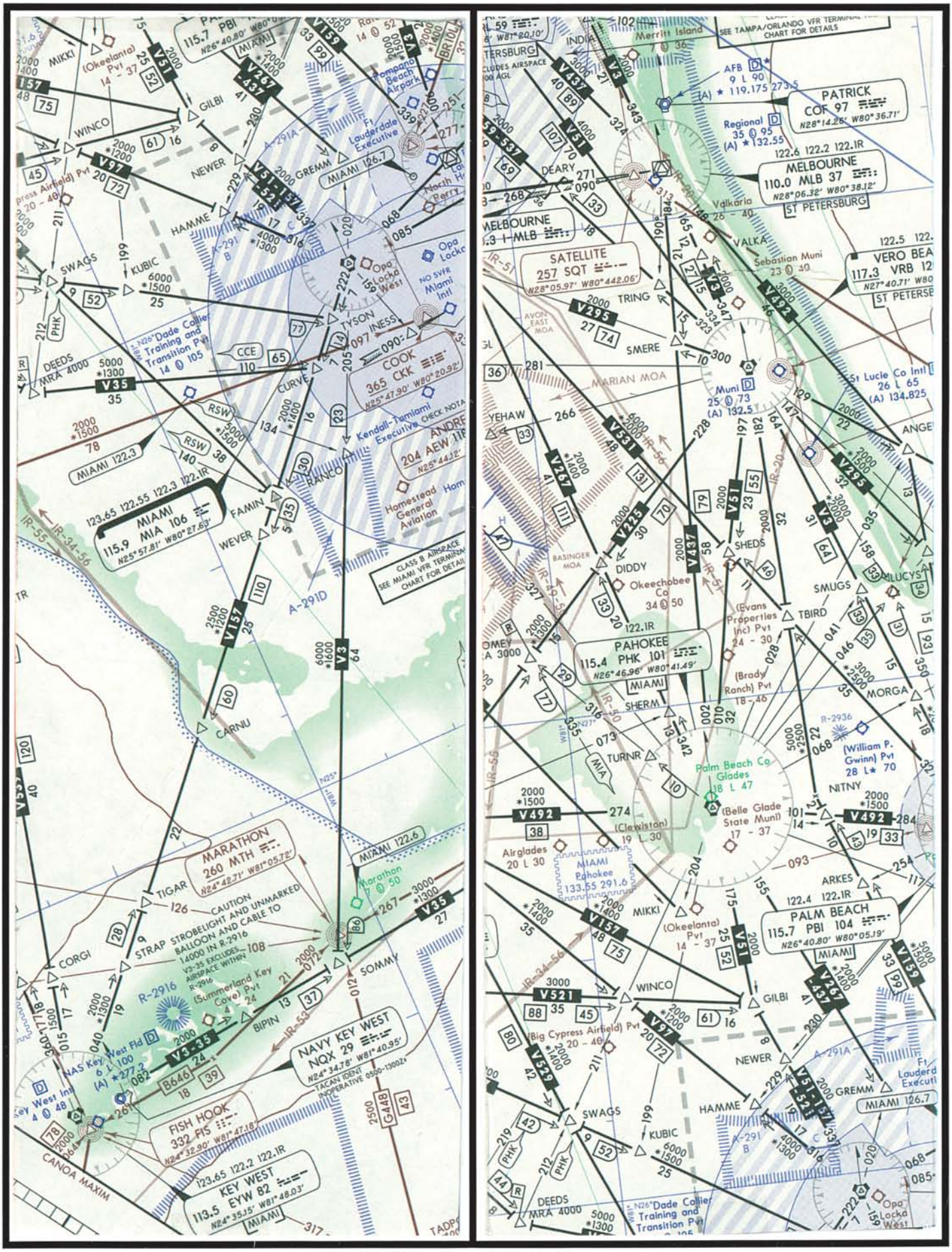


FIGURE 210.—Low Altitude Airways.

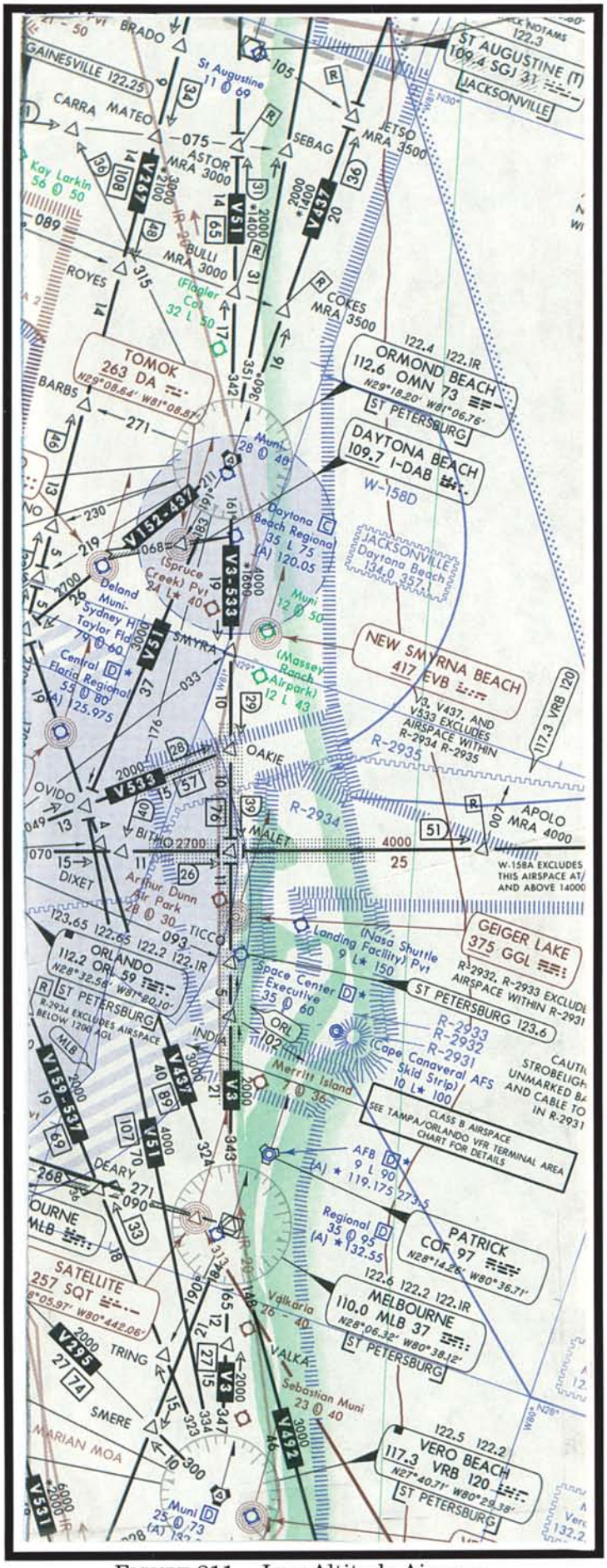


FIGURE 211.—Low Altitude Airways.

46 FLORIDA

CROSS CITY (CTY) 1 E UTC-5(-4DT) N29°38.07' W83°06.34' — JACKSONVILLE
42 B FUEL 100LL — H-5D, L-18G, 19B
RWY 13-31: H5001X150 (ASPH) S-13 MIRL — IAP
RWY 13: Trees. RWY 31: Trees.
RWY 04-22: H4050X150 (ASPH) S-13 MIRL
RWY 04: Trees. RWY 22: Trees.
AIRPORT REMARKS: Attended continuously. ACTIVATE MIRL Rwy 13-31 and 04-22—CTAF.
COMMUNICATIONS: CTAF/UNICOM 122.8
GAINESVILLE FSS (GNV) TF 1-800-WX-BRIEF. NOTAM FILE GNV.
RCO 122.1R 112.0T (GAINESVILLE FSS)
® JAX CENTER APP/DEP CON 127.8
RADIO AIDS TO NAVIGATION: NOTAM FILE GNV.
(L) VORTAC 112.0 CTY Chan 57 N29°35.94' W83°02.92' 308° 3.7 NM to fld. 30/02W.

CRYSTAL RIVER (X31) 3 SE UTC-5(-4DT) N28°52.07' W82°34.47' — JACKSONVILLE
10 B S2 FUEL 100LL, JET A — L-19B
RWY 09-27: H4297X60 (ASPH) LIRL — IAP
RWY 09: PAPI(P2R)—GA 3.0° TCH 38'. P-line. RWY 27: REIL. Trees.
RWY 18-36: 3020X57 (TURF)
RWY 18: Thld dsplcd 517'. Building. RWY 36: Thld dsplcd 748'. Road.
AIRPORT REMARKS: Attended 1200-0000Z‡. Aerobatic activity along N side of Rwy 09-27 and 4 NM SW of arpt. Ctc unicom for tfc info and ST PETERSBURG FSS for specific times. Rwy 18-36 dsplcd thld marked with green pipes. Rwy 18-36 marked with white pipes every 200'. Rwy 18-36 acft parked 45' from rwy W edge. ACTIVATE LIRL Rwy 09-27—CTAF. Glider ops within 25 NM.
COMMUNICATIONS: CTAF/UNICOM 122.7
ST PETERSBURG FSS (PIE) TF 1-800-WX-BRIEF. NOTAM FILE PIE.
® JAX CENTER APP/DEP CON 135.75
RADIO AIDS TO NAVIGATION: NOTAM FILE OCF.
OCALA (L) VORTAC 113.7 OCF Chan 84 N29°10.65' W82°13.58' 225° 26 NM to fld. 80/00E.

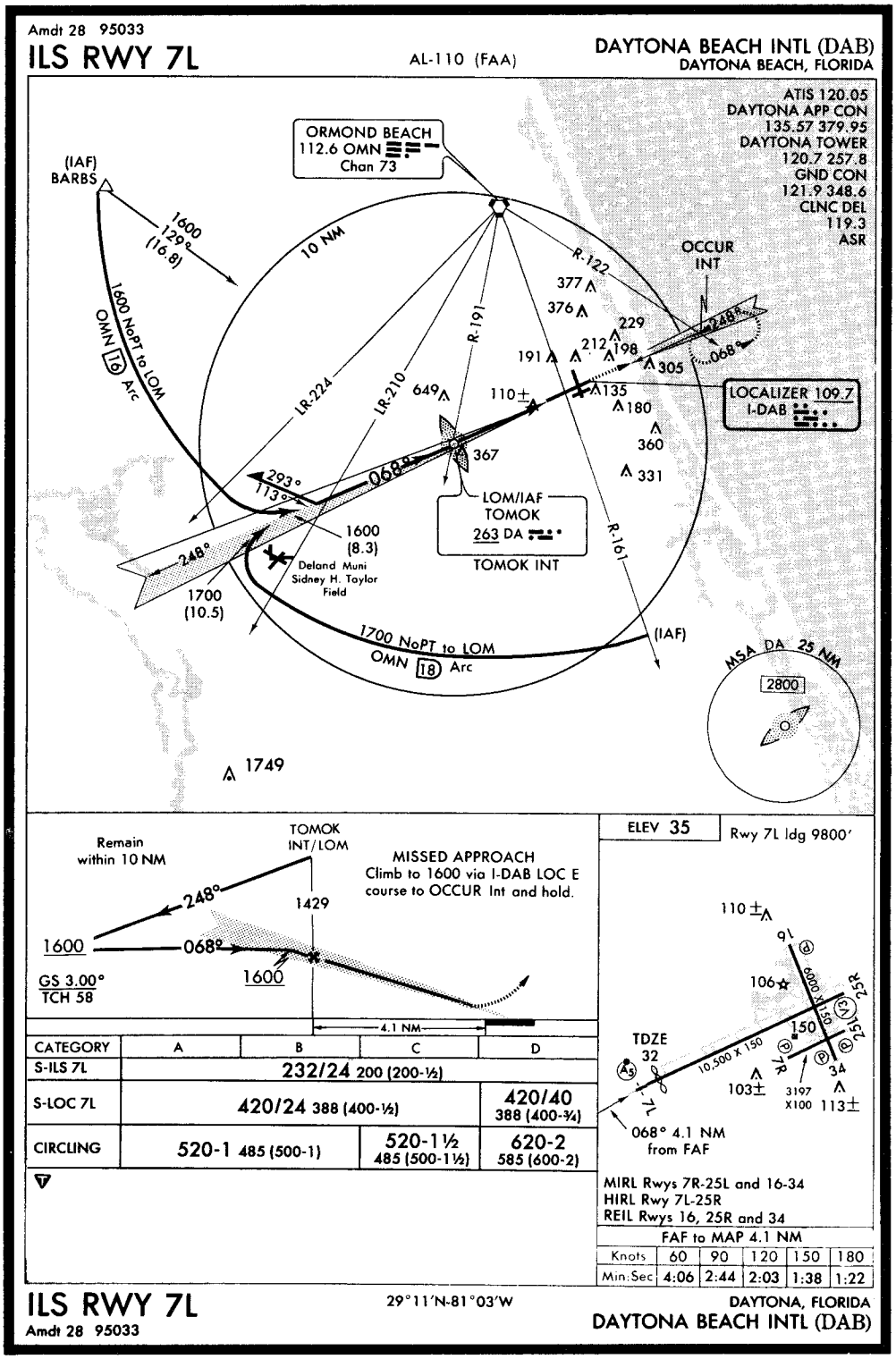
CYPRESS N26°09.21' W81°46.69' NOTAM FILE APF. — MIAMI
(T) VORW/DME 108.6 CCE Chan 23 at Naples Muni. 10/00E. — H-5E, L-19C

DADE-COLLIER TRAINING AND TRANSITION (See MIAMI)

DAVIE N26°04.34' W80°14.69' — MIAMI
RCO 126.7 (MIAMI FSS) — L-19C, A

DAYTONA BEACH INTL (DAB) 3 SW UTC-5(-4DT) N29°10.80' W81°03.48' — JACKSONVILLE
35 B S4 FUEL 100LL, JET A OX 2 TPA—See Remarks ARFF Index C — H-5E, L-18H, 19B
RWY 07L-25R: H10500X150 (ASPH-GRVD) S-75, D-140, DT-220 HIRL — IAP
RWY 07L: MALSR. Thld dsplcd 700'.
RWY 25R: REIL. VASI(V6L)—Upper GA 3.25° TCH 95.3'. Lower GA 2.75° TCH 53.4'. Rgt tfc.
RWY 16-34: H6000X150 (ASPH-GRVD) S-75, D-150, DT-260 MIRL
RWY 16: REIL. PAPI(P4L)—GA 3.0° TCH 45'. Road. Rgt tfc.
RWY 34: REIL. PAPI(P4L)—GA 3.0° TCH 45'. Trees.
RWY 07R-25L: H3197X100 (ASPH) S-30 MIRL
RWY 07R: PAPI(P2L)—GA 2.86° TCH 40'. Trees. Rgt tfc. RWY 25L: PAPI(P2L)—GA 2.86° TCH 32'. Ground.
AIRPORT REMARKS: Attended continuously. Heavy migratory bird activity on and in vicinity of arpt. TPA—835(800) lgt acft; 1235(1200) high performance acft. E end of Twy S is non-movement area. NOTE: See Land and Hold Short Operations Section.
WEATHER DATA SOURCES: LLWAS.
COMMUNICATIONS: ATIS 120.05 UNICOM 122.95
ST PETERSBURG FSS (PIE) TF 1-800-WX-BRIEF. NOTAM FILE DAB.
® APP CON 135.57 (9000' and above) 118.85 (N 4000'-8500') 127.07 (S 4000'-8500') 125.8 (N 3500' and blo) 125.35 (S 3500' and blo)
TOWER 120.7 118.1 GND CON 121.9 CLNC DEL 119.3
® DEP CON 123.9
AIRSPACE: CLASS C svc continuous ctc APP CON
RADIO AIDS TO NAVIGATION: NOTAM FILE PIE.
ORMOND BEACH (H) VORTAC 112.6 OMN Chan 73 N29°18.20' W81°06.76' 159° 7.9 NM to fld. 20/00E.
TOMOK NDB (LOM) 263 DA N29°08.66' W81°08.87' 069° 5.2 NM to fld.
ILS 109.7 I-DAB Rwy 07L. LOM TOMOK NDB.
ASR

FIGURE 212.—Excerpt from Airport/Facilities Directory.



CATEGORY	A	B	C	D
S-ILS 7L	232/24 200 (200-½)			
S-LOC 7L	420/24 388 (400-½)			420/40 388 (400-¾)
CIRCLING	520-1 485 (500-1)		520-1½ 485 (500-1½)	620-2 585 (600-2)

FAF to MAP 4.1 NM					
Knots	60	90	120	150	180
Min:Sec	4:06	2:44	2:03	1:38	1:22

FIGURE 212A.—ILS RWY 7L (DAB).

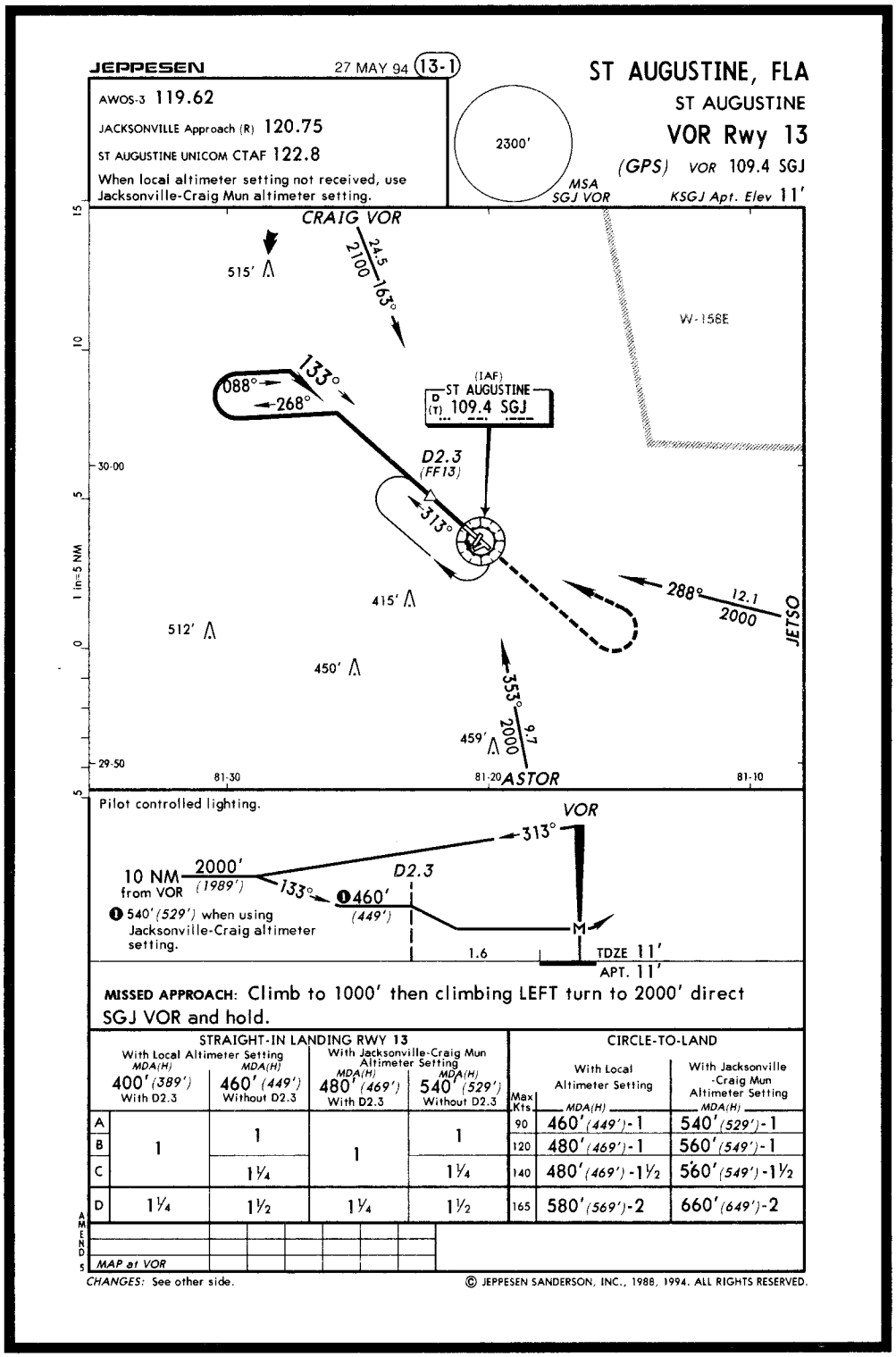


FIGURE 213.—VOR RWY 13.

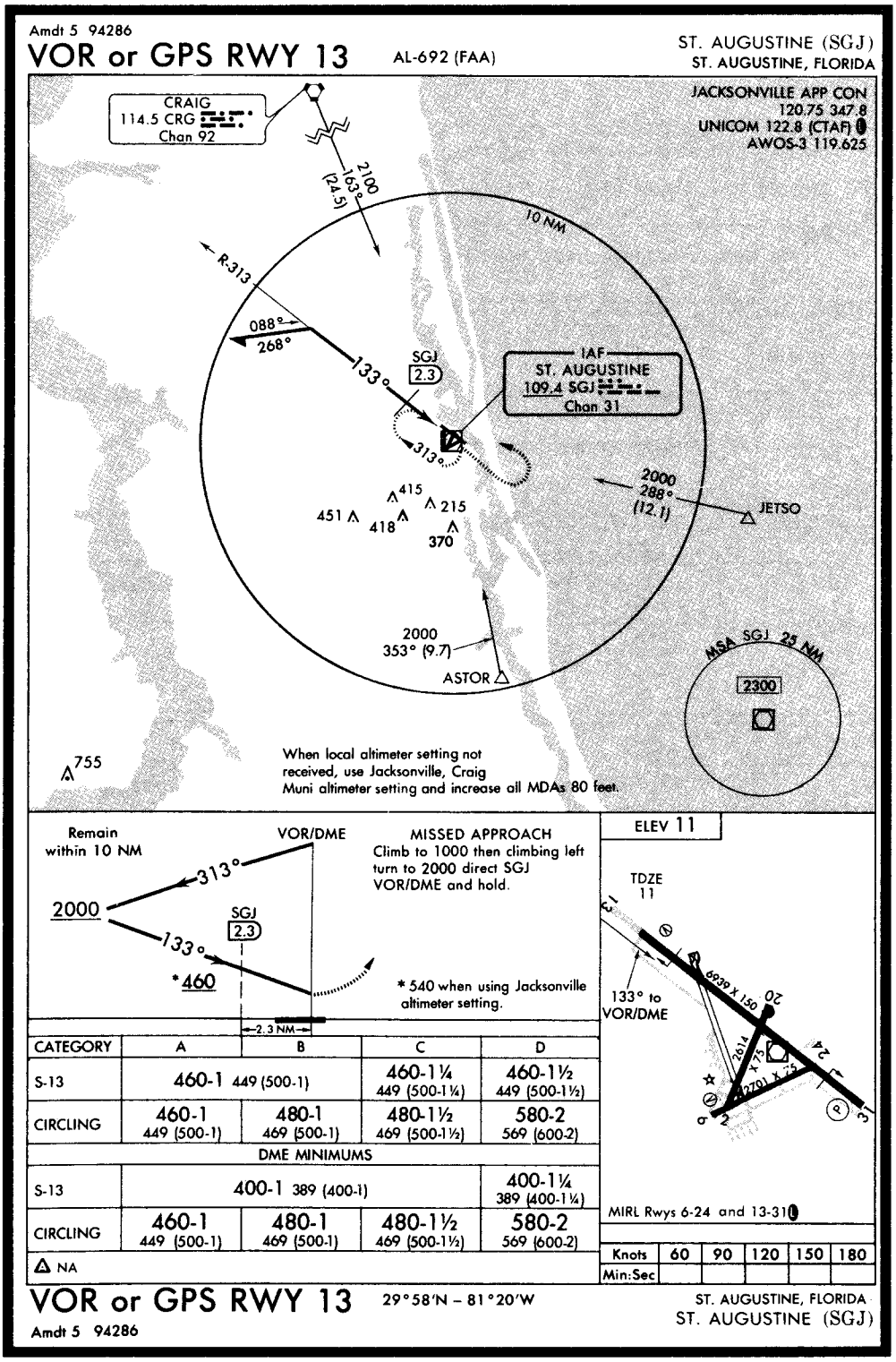


FIGURE 213A.—VOR or GPS RWY 13 (SGJ).

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 PROPOSED (Z)	6. DEPARTURE TIME ACTUAL (Z)	7. CRUISING ALTITUDE
VFR / X IFR / DVFR	TNA 90	MD90/G	440 KTS	KBDL Bradley Int'l			FL330

8. ROUTE OF FLIGHT
CSTL.SHERL, J121 BRIGS, BRIGS.VCN 5 PHL

9. DESTINATION (Name of airport and city)	10. EST. TIME ENROUTE HOURS	MINUTES	11. REMARKS
KPHL PHILADELPHIA INT'L PHILADELPHIA			L/O = Level Off PPH = Pounds Per Hour TEC = Tower to Tower Variation: BDL 14W, PHL 10W

12. FUEL ON BOARD HOURS	MINUTES	13. ALTERNATE AIRPORT(S)	14. PILOT'S NAME, ADDRESS & TELEPHONE NUMBER & AIRCRAFT HOME BASE	15. NUMBER ABOARD
2	20	KACY ATLANTIC CITY INT'L	17. DESTINATION CONTACT/TELEPHONE (OPTIONAL)	99

16. COLOR OF AIRCRAFT
BLACK/RED

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

FLIGHT LOG

CHECK POINTS FROM	TO	ROUTE ALTITUDE	COURSE	WIND TEMP	SPEED-KTS TAS	GS	DIST NM	TIME LEG	TOT	FUEL LEG	TOT
BDL	YODER INTER	CSTL1.SHERL CLIMB					45		:15:00		2560*
Yoder Inter	SHERL INTER	CSTL1.SHERL FL330		340/55 ISA							
Sherl Inter	BRIGS INTER	J121 FL330									
Brigs Inter	VCN	BRIGS.VCN5 FL300									
VCN	PHL	BRIGS.VCN5 DESCENT & APPROACH					46	:14:00		1190	
PHL	ACY	TEC 3000					44	:12:00			

OTHER DATA: * Includes Taxi Fuel
NOTE: Use 6150 PPH Total Fuel Flow From L/O To Start Of Descent.
Use 5900 PPH Total Fuel Flow For Reserve And Alternate Requirements.

A Missed Approach Requires 244# of Fuel.

TIME and FUEL: As required by FARs.

TIME	FUEL (LB)	
		EN ROUTE
		RESERVE
		ALTERNATE
		TOTAL

FIGURE 214.—Flight Plan/Flight Log.

20 CONNECTICUT

WINDSOR LOCKS

BRADLEY INTL (BDL) 3 W UTC-5(-4DT) N41°56.33' W72°40.99' NEW YORK
174 B S4 **FUEL** 100LL, JET A OX 1, 2, 3, 4 TPA—See Remarks H-3J, 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. **RWY 24:** MALSR. VASI(V4L)—GA 3.0°TCH 56'. Trees.
RWY 15-33: H6846X150 (ASPH-GRVD) 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: H5145X100 (ASPH) S-60, D-190, DT-328 MIRL
RWY 01: Building. **RWY 19:** Trees.
AIRPORT REMARKS: Attended continuously. Numerous birds frequently on or in vicinity or arpt. TPA—1174(1000) light acft, 1874(1700) heavy acft. Landing fee for business, corporate and revenue producing aircraft. Flight Notification Service (ADCUS) available. NOTE: See Land and Hold Short Operations Section.
WEATHER DATA SOURCES: LLWAS.
COMMUNICATIONS: ATIS 118.15 (203-627-3423) **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** 127.8 (South) 125.35 (North and West) 123.95 (Northeast)
TOWER 120.3 **GND CON** 121.9 **CLNC DEL** 121.75
AIRSPACE: CLASS C svc continuous ctc **APP CON**
RADIO AIDS TO NAVIGATION: NOTAM FILE BDL.
(T) **VORTACW** 109.0 BDL Chan 27 N41°56.45' W72°41.32' at fld. 160/14W.
VOR portion unusable:
093°-103° byd 24 NM blo 5000' 140°-170° byd 15 NM blo 6000'
104°-139° byd 10 NM blo 6000' 260°-290° byd 15 NM blo 6000'
DME unusable 250°-290° byd 18 NN blo 6000'.
CHUPP NDB (LOM) 388 BD N41°52.64' W72°45.98' 059° 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.

TAKE-OFF MINS

94286

INSTRUMENT APPROACH PROCEDURE CHARTS

IFR TAKE-OFF MINIMUMS AND DEPARTURE PROCEDURES

Civil Airports and Selected Military Airports

CIVIL USERS: FAR 91 prescribes take-off rules and establishes take-off minimums for certain operators as follows: (1) Aircraft having two engines or less - one statute mile. (2) Aircraft having more than two engines - one-half statute mile. Airports with IFR take-off minimums other than standard are listed below. Departure procedures and/or ceiling visibility minimums are established to assist all pilots conducting IFR flight in avoiding obstacles during climb to the minimum enroute altitude. Take-off minimums and departures apply to all runways unless otherwise specified. Altitudes, unless otherwise indicated, are minimum altitudes in feet MSL.
MILITARY USERS: Special IFR departures not published as Standard Instrument Departure (SIDS) and civil take-off minima are included below and are established to assist pilots in obstacle avoidance. Refer to appropriate service directives for take-off minimums.

WINDSOR LOCKS, CT

BRADLEY INTL

TAKE-OFF MINIMUMS: **Rwy 15,** 300-1 or std. with a min. climb of 350' per NM to 300. **Rwy 33,** 700-1 or std. with a min. climb of 300' per NM to 1000.
DEPARTURE PROCEDURE: **Rwy 1,** climb to 1000 via runway heading before turning westbound.

FIGURE 215.—Excerpts from Airport/Facilities Directory.

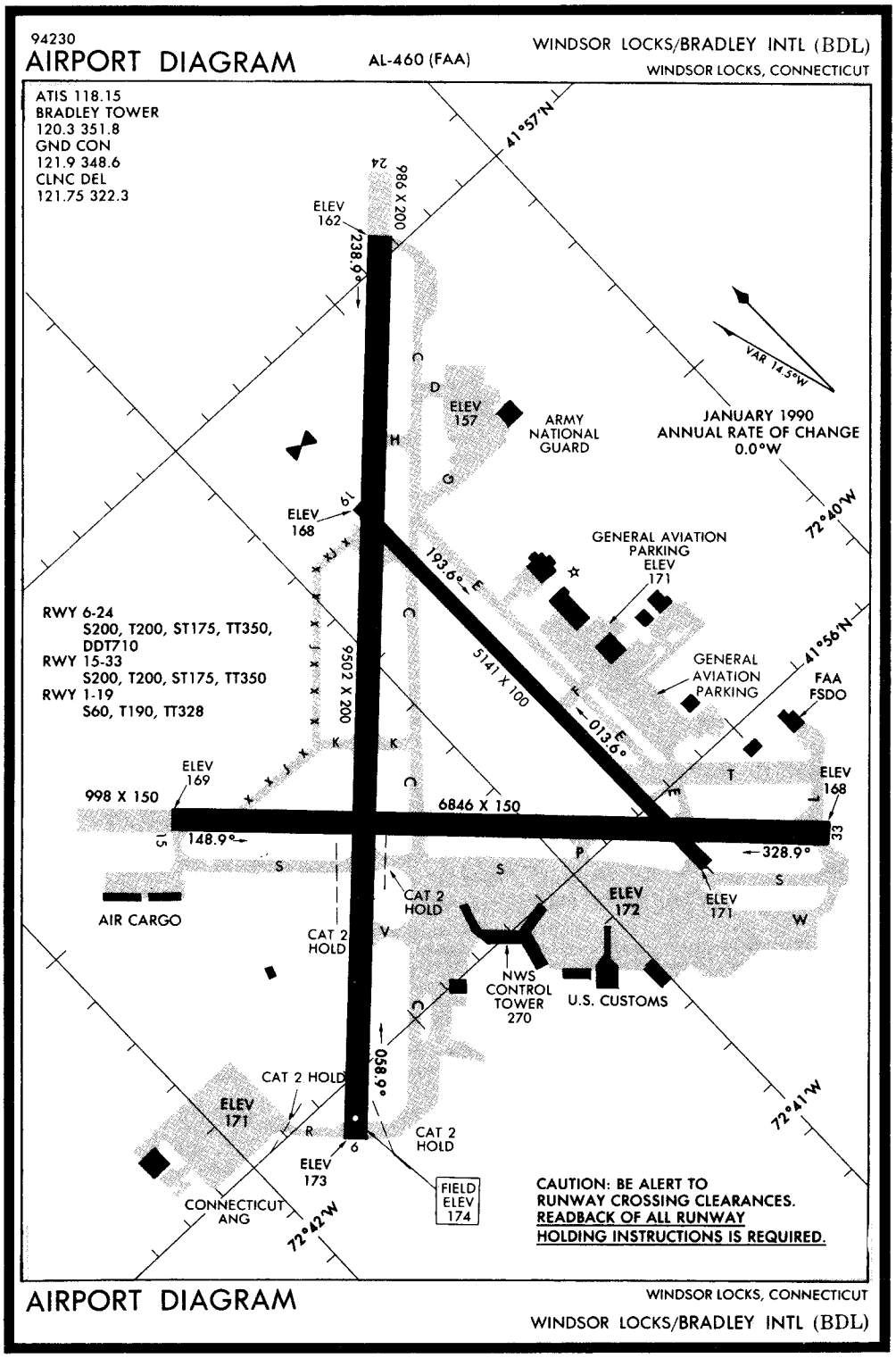


FIGURE 215A.—AIRORT DIAGRAM.

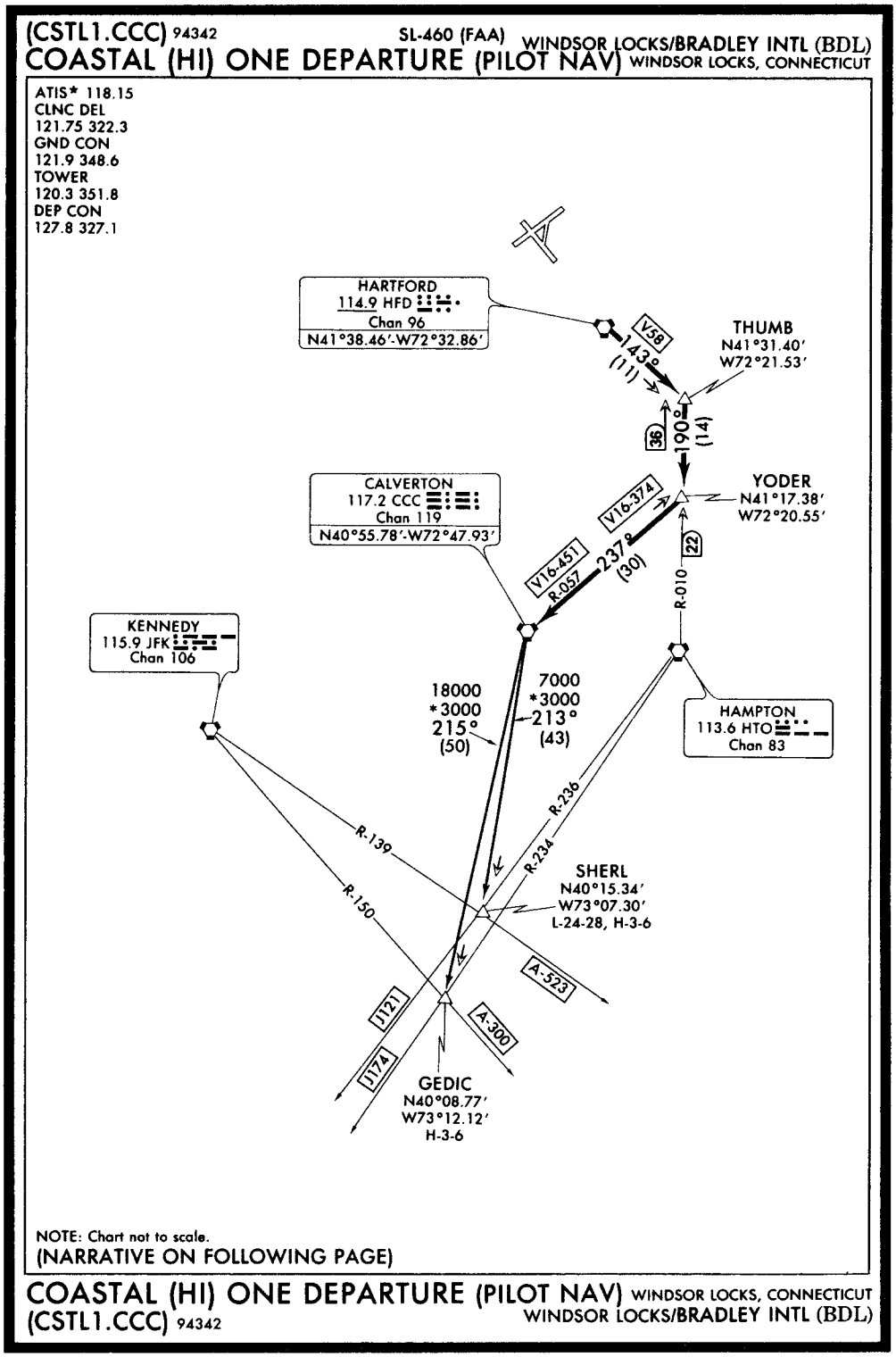


FIGURE 216.—COASTAL (HI) DEPARTURE (BDL).

(CSTL1.CCC) 94342 SL-460 (FAA) WINDSOR LOCKS/BRADLEY INTL (BDL)

COASTAL (HI) ONE DEPARTURE (PILOT NAV) WINDSOR LOCKS, CONNECTICUT

DEPARTURE ROUTE DESCRIPTION

TAKE-OFF RWY 6: Turn right heading 075° or as assigned for radar vectors to HFD VORTAC.

TAKE-OFF ALL OTHER RUNWAYS: Fly runway heading or as assigned for radar vectors to HFD VORTAC. Maintain 4000 feet or assigned altitude. Expect clearance to requested flight level ten (10) minutes after departure.

. . . . From over HFD VORTAC proceed via the HFD R-143 to THUMB INT, then proceed via the HTO R-010 to YODER INT, then via the CCC R-057 to CCC VORTAC. Then via (transition) or (assigned route).

GEDIC TRANSITION (CSTL1.GEDIC): From over CCC VORTAC via CCC R-215 to GEDIC INT.

SHERL TRANSITION (CSTL1.SHERL): From over CCC VORTAC via CCC R-213 to SHERL INT.

COASTAL (HI) ONE DEPARTURE (PILOT NAV) WINDSOR LOCKS, CONNECTICUT

(CSTL1.CCC) 94342 WINDSOR LOCKS/BRADLEY INTL (BDL)

FIGURE 216A.—Departure Route Description.

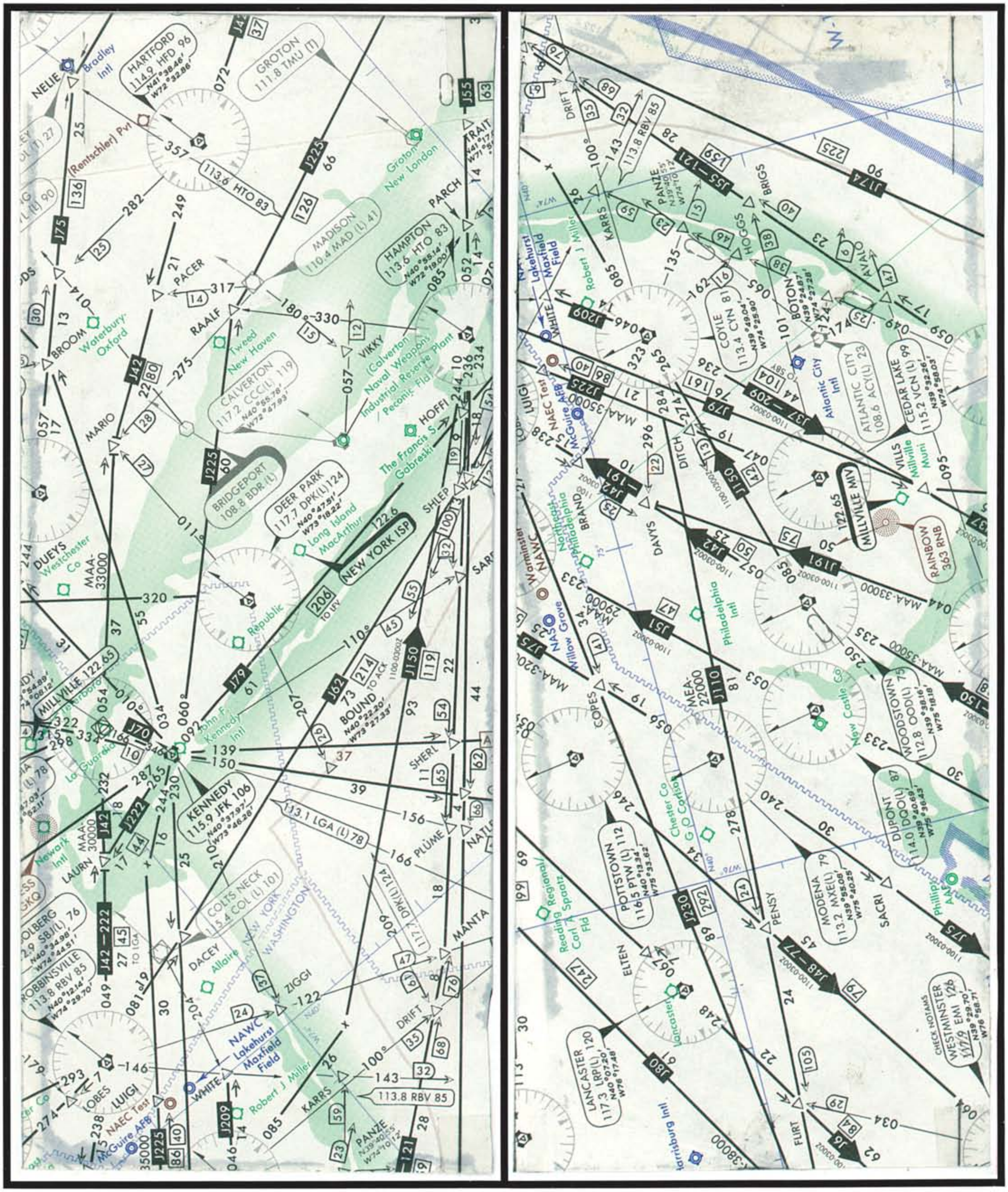


FIGURE 217.—High Altitude Airways.

FIGURE 218.—Low Altitude Airways.

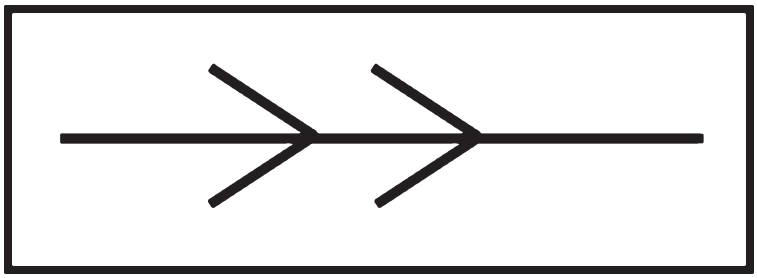


FIGURE 219.—Chart and Navigation Symbol.

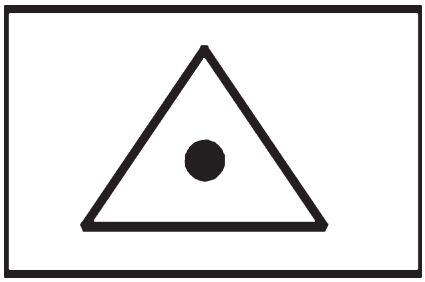


FIGURE 220.—Chart and Navigation Symbol.

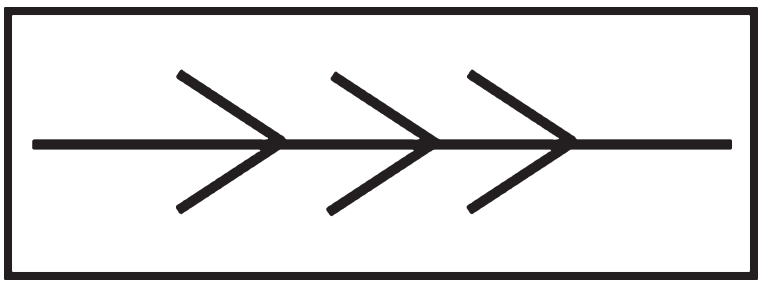


FIGURE 221.—Chart and Navigation Symbol.

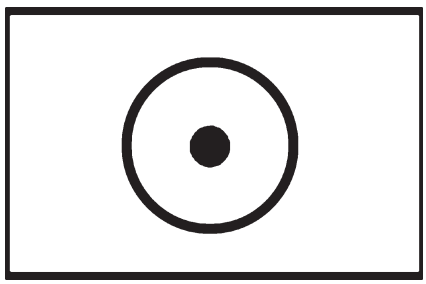


FIGURE 222.—Chart and Navigation Symbol.

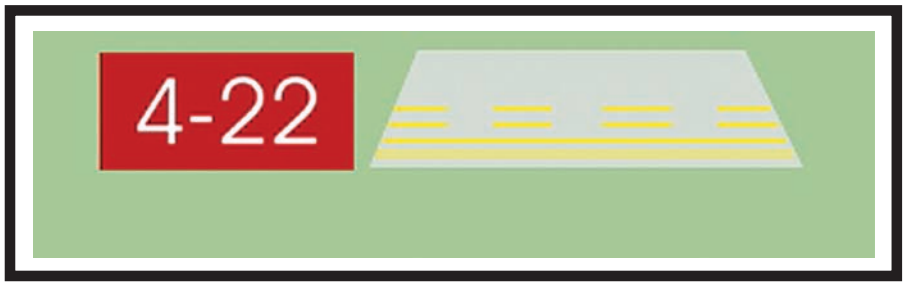


FIGURE 223.—Holding Position Markings.

FIGURE 224.—ILS Critical Area Markings.

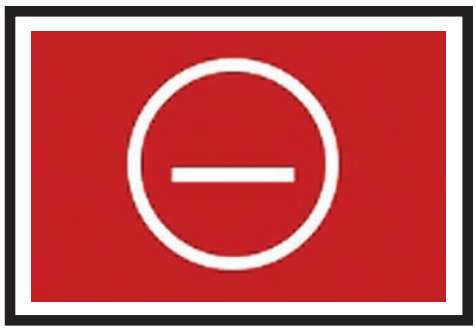


FIGURE 225.—No Entry.

FIGURE 226.—Outbound Destination.

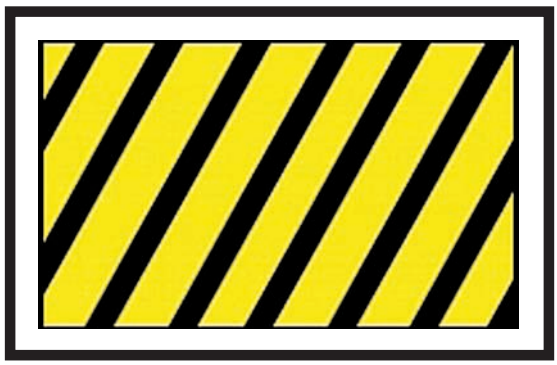


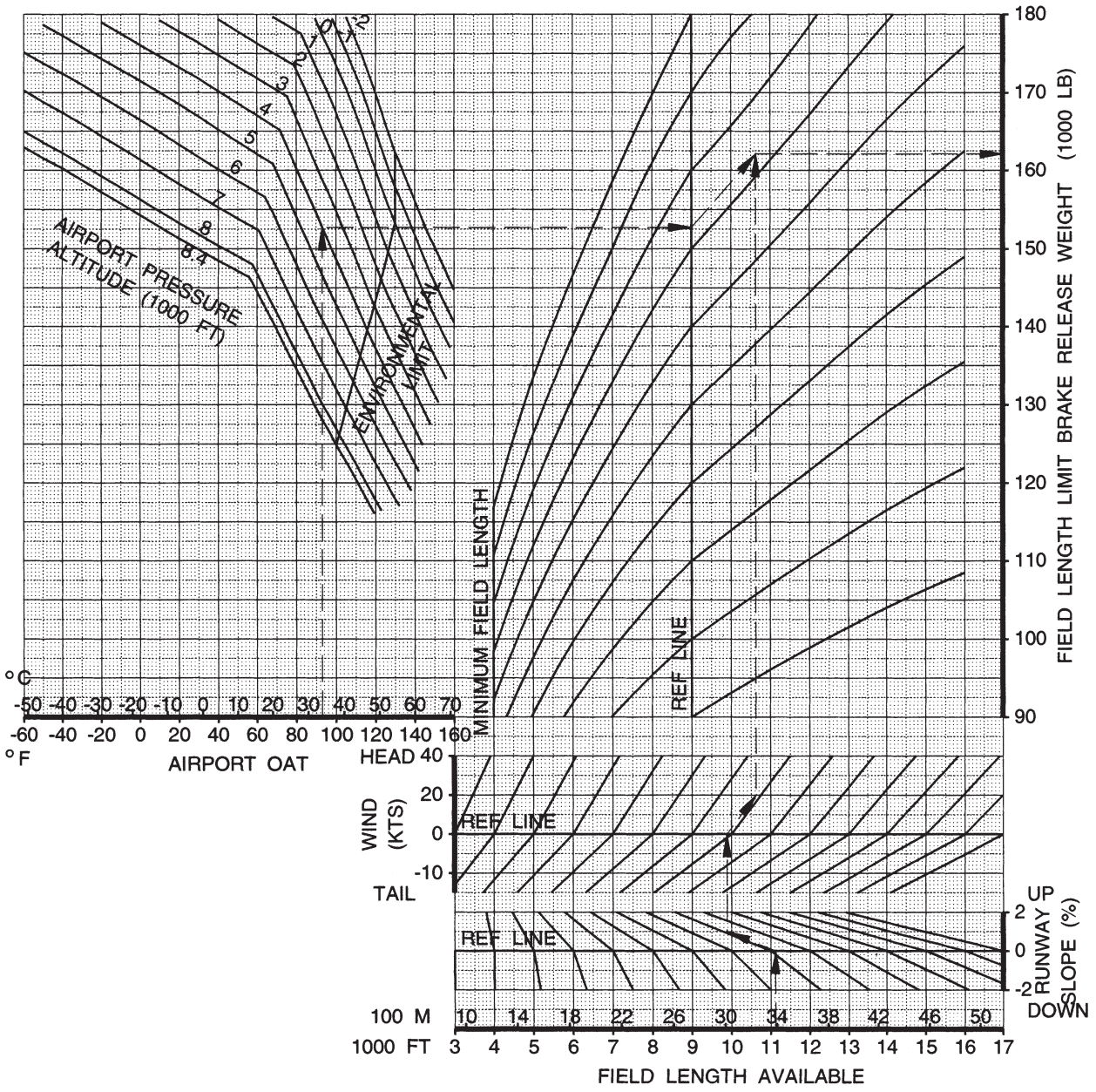
FIGURE 227.—Taxiway End Marker.

FIGURE 228.—TWY-RWY Hold Position.

Takeoff Field Limit - Dry Runway

Flaps 10

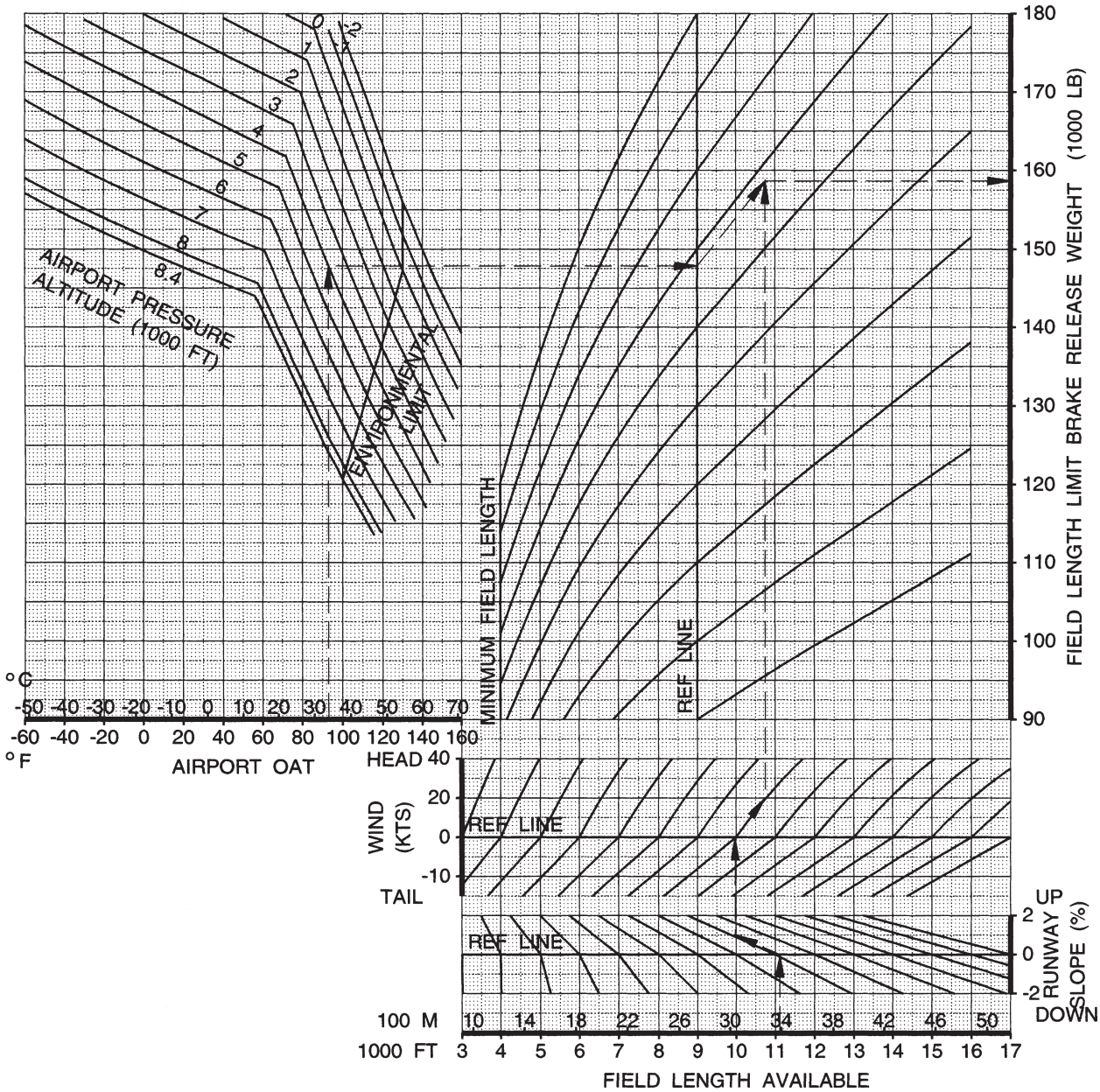
Based on engine bleed for packs on and anti-ice off



With engine bleed for packs off, increase weight by 900 lb.
With engine anti-ice on, decrease weight by 450 lb.
With engine and wing anti-ice on, decrease weight by 1800 lb (optional system).

FIGURE 229.—Takeoff Field Limit—Dry Runway.

Takeoff Field Limit - Dry Runway
Flaps 15
Based on engine bleed for packs on and anti-ice off



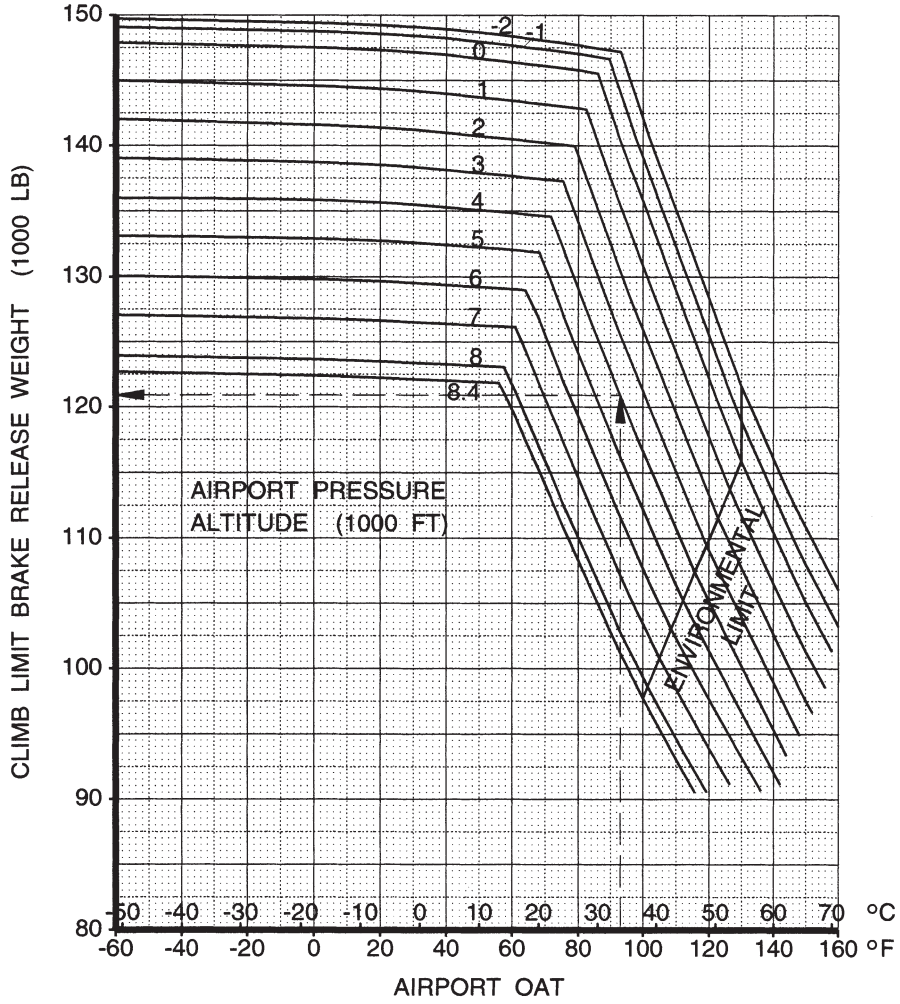
With engine bleed for packs off, increase weight by 1000 lb.
With engine anti-ice on, decrease weight by 450 lb.
With engine and wing anti-ice on, decrease weight by 1800 lb (optional system).

FIGURE 230.—Takeoff Field Limit—Dry Runway.

Takeoff Climb Limit

Flaps 15

Based on engine bleed for packs on and anti-ice off



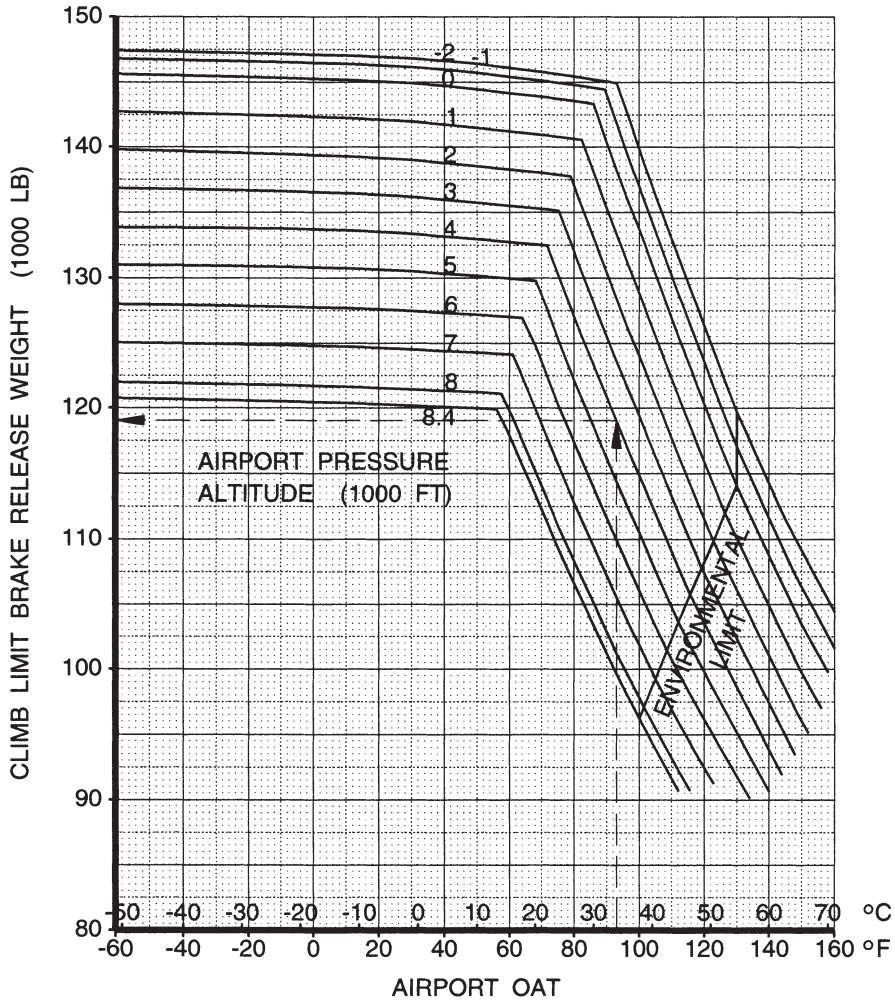
With engine bleed for packs off, increase weight by 2400 lb.
With engine anti-ice on, decrease weight by 400 lb.
With engine and wing anti-ice on, decrease weight by 2300 lb (optional system).

FIGURE 231.—Takeoff Climb Limit.

Takeoff Climb Limit

Flaps 25

Based on engine bleed for packs on and anti-ice off



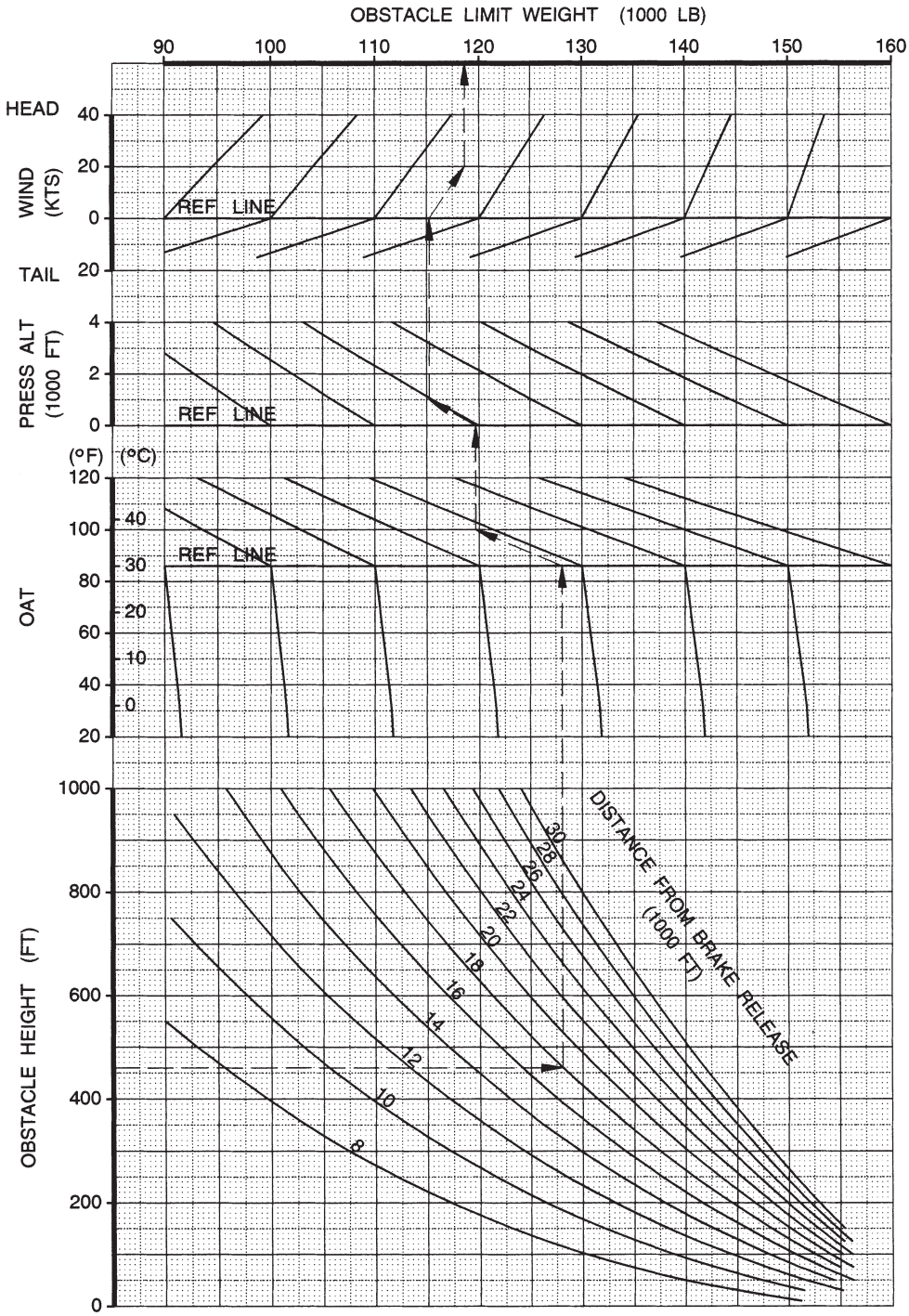
With engine bleed for packs off, increase weight by 2300 lb.
With engine anti-ice on, decrease weight by 400 lb.
With engine and wing anti-ice on, decrease weight by 2300 lb (optional system).

FIGURE 232.—Takeoff Climb Limit.

Obstacle Limit

Flaps 15

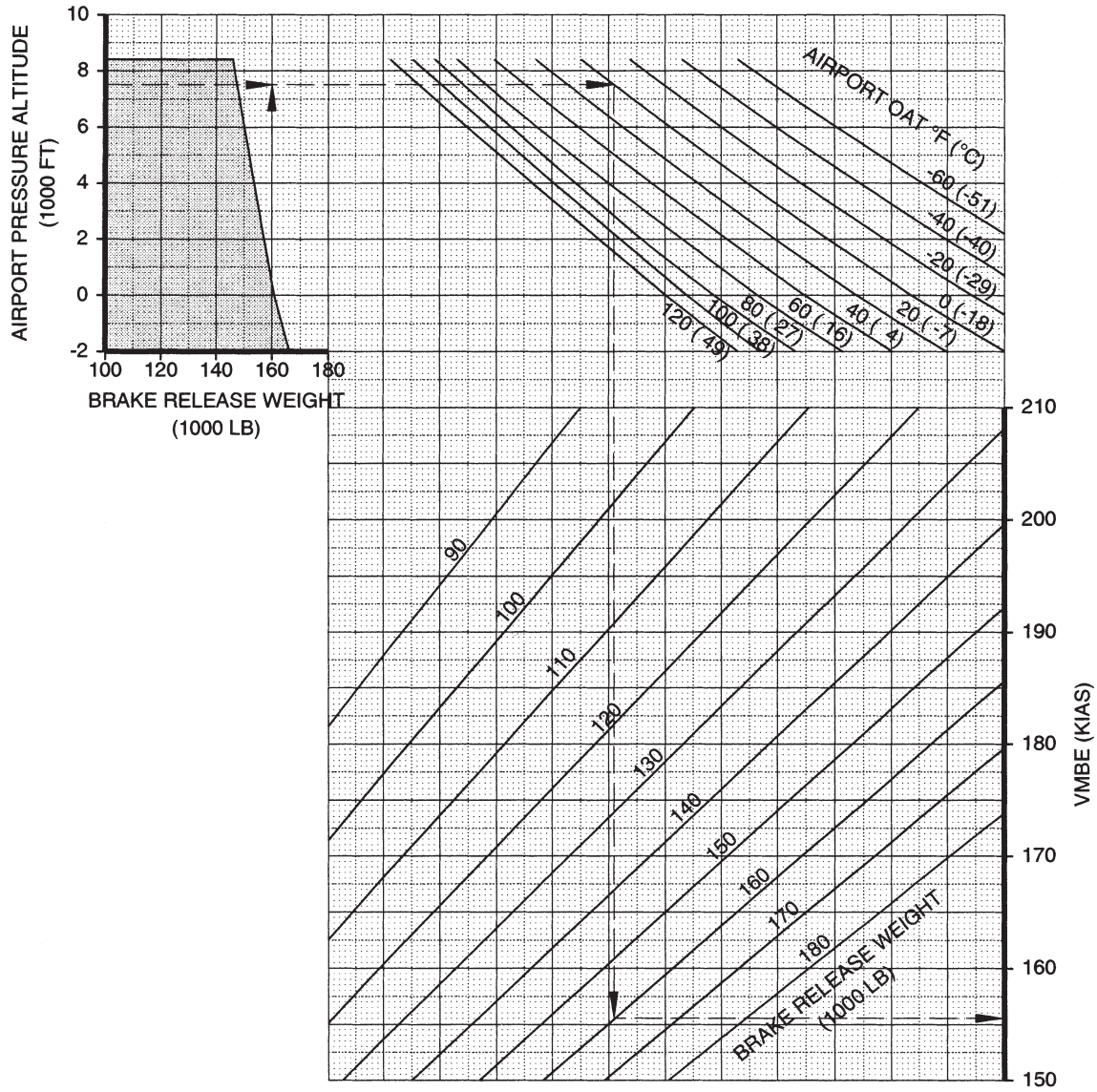
Based on engine bleed for packs on and anti-ice off



Obstacle height must be calculated from the lowest point of the runway to conservatively account for runway slope.
With engine bleed for packs off, increase weight by 1900 lb.
With engine anti-ice on, decrease weight by 400 lb.
With engine and wing anti-ice on, decrease weight by 2000 lb (optional system).

FIGURE 233.—Obstacle Limit.

Brake Energy Limits VMBE



Check VMBE when outside shaded area or when operating with tailwind.
Increase VMBE by 2 knots per 1% uphill runway slope. Decrease VMBE by 3 knots per 1% downhill runway slope.
Increase VMBE by 4 knots per 10 knots headwind. Decrease VMBE by 18 knots per 10 knots tailwind.

Normal takeoff:
Decrease brake release weight by 1100 lb for each knot V1 exceeds VMBE.
Determine normal V1, VR, V2 speeds for lower brake release weight.

Improved climb takeoff:
Decrease climb weight improvement by 550 lb for each knot V1 exceeds VMBE.
Determine V1, VR, V2 speed increments for the lower climb weight improvement.

FIGURE 234.—Brake Energy Limits VMBE.

ADVISORY INFORMATION

Slush/Standing Water Takeoff

No Reverse Thrust

Weight Adjustments (1000 LB)

DRY FIELD/OBSTACLE LIMIT WEIGHT (1000 LB)	SLUSH/STANDING WATER DEPTH								
	0.12 INCHES (3 mm)			0.25 INCHES (6 mm)			0.50 INCHES (13 mm)		
	PRESSURE ALTITUDE (FT)			PRESSURE ALTITUDE (FT)			PRESSURE ALTITUDE (FT)		
	S.L.	5000	10000	S.L.	5000	10000	S.L.	5000	10000
180	-26.4	-34.9	-43.4	-30.8	-39.3	-47.8	-39.8	-48.3	-56.8
170	-23.4	-31.9	-40.4	-27.0	-35.5	-44.0	-34.4	-42.9	-51.4
160	-20.7	-29.2	-37.7	-23.6	-32.1	-40.6	-29.6	-38.1	-46.6
150	-18.3	-26.8	-35.3	-20.6	-29.1	-37.6	-25.5	-34.0	-42.5
140	-16.2	-24.7	-33.2	-18.0	-26.5	-35.0	-22.0	-30.5	-39.0
130	-14.4	-22.9	-31.4	-15.9	-24.4	-32.9	-19.3	-27.8	-36.3
120	-12.9	-21.4	-29.9	-14.2	-22.7	-31.2	-17.2	-25.7	-34.2
110	-11.6	-20.1	-28.6	-12.8	-21.3	-29.8	-15.6	-24.1	-32.6
100	-10.4	-18.9	-27.4	-11.4	-19.9	-28.4	-14.1	-22.6	-31.1
90	-9.1	-17.6	-26.1	-10.1	-18.6	-27.1	-12.5	-21.0	-29.5

V1(MCG) Limit Weight (1000 LB)

ADJUSTED FIELD LENGTH (FT)	SLUSH/STANDING WATER DEPTH								
	0.12 INCHES (3 mm)			0.25 INCHES (6 mm)			0.50 INCHES (13 mm)		
	PRESSURE ALTITUDE (FT)			PRESSURE ALTITUDE (FT)			PRESSURE ALTITUDE (FT)		
	S.L.	5000	10000	S.L.	5000	10000	S.L.	5000	10000
5800							86.8		
6200				78.7			105.6		
6600	81.1			99.7			125.0	86.8	
7000	103.5			120.8	78.7		145.2	105.6	
7400	125.9	81.1		142.1	99.7		166.1	125.0	86.8
7800	148.3	103.5		163.6	120.8	78.7	188.0	145.2	105.6
8200	170.6	125.9	81.1	185.2	142.1	99.7		166.1	125.0
8600	192.9	148.3	103.5		163.6	120.8		188.0	145.2
9000		170.6	125.9		185.2	142.1			166.1
9400		192.9	148.3			163.6			188.0
9800			170.6			185.2			
10200			192.9						

1. **Enter Weight Adjustment table with slush/standing water depth and dry field/obstacle limit weight to obtain slush/standing water weight adjustment.**
2. **Adjust field length available by -150 ft/+140 ft for every 5°C above/below 4°C.**
3. **Find V1(MCG) limit weight for adjusted field length and pressure altitude.**
4. **Max allowable slush/standing water limited weight is lesser of weights from 1 and 3.**

V1 Adjustment (KIAS)

WEIGHT (1000 LB)	SLUSH/STANDING WATER DEPTH								
	0.12 INCHES (3 mm)			0.25 INCHES (6 mm)			0.50 INCHES (13 mm)		
	PRESSURE ALTITUDE (FT)			PRESSURE ALTITUDE (FT)			PRESSURE ALTITUDE (FT)		
	S.L.	5000	10000	S.L.	5000	10000	S.L.	5000	10000
180	-21	-16	-11	-12	-7	-2	0	0	0
170	-22	-17	-12	-14	-9	-4	0	0	0
160	-23	-18	-13	-17	-12	-7	-3	0	0
150	-24	-19	-14	-19	-14	-9	-7	-2	0
140	-25	-20	-15	-21	-16	-11	-10	-5	0
130	-26	-21	-16	-22	-17	-12	-14	-9	-4
120	-27	-22	-17	-24	-19	-14	-17	-12	-7
110	-28	-23	-18	-25	-20	-15	-20	-15	-10
100	-29	-24	-19	-27	-22	-17	-22	-17	-12
90	-29	-24	-19	-28	-23	-18	-25	-20	-15

1. **Obtain V1, VR and V2 for the actual weight using the Dry Runway Takeoff Speeds table.**
2. **If V1(MCG) limited, set V1 = V1(MCG). If not V1(MCG) limited, enter V1 Adjustment table with the actual weight to obtain V1 speed adjustment. If adjusted V1 is less than V1(MCG), set V1 = V1(MCG).**

FIGURE 235.—Slush/Standing Water Takeoff.

ADVISORY INFORMATION

Slush/Standing Water Takeoff

Maximum Reverse Thrust
Weight Adjustments (1000 LB)

DRY FIELD/OBSTACLE LIMIT WEIGHT (1000 LB)	SLUSH/STANDING WATER DEPTH								
	0.12 INCHES (3 mm)			0.25 INCHES (6 mm)			0.50 INCHES (13 mm)		
	PRESSURE ALTITUDE (FT)			PRESSURE ALTITUDE (FT)			PRESSURE ALTITUDE (FT)		
	S.L.	5000	10000	S.L.	5000	10000	S.L.	5000	10000
180	-21.9	-27.4	-32.9	-26.4	-31.9	-37.4	-37.5	-43.0	-48.5
170	-19.3	-24.8	-30.3	-22.8	-28.3	-33.8	-31.1	-36.6	-42.1
160	-17.0	-22.5	-28.0	-19.7	-25.2	-30.7	-25.8	-31.3	-36.8
150	-15.0	-20.5	-26.0	-17.2	-22.7	-28.2	-21.7	-27.2	-32.7
140	-13.3	-18.8	-24.3	-15.1	-20.6	-26.1	-18.8	-24.3	-29.8
130	-11.9	-17.4	-22.9	-13.4	-18.9	-24.4	-16.6	-22.1	-27.6
120	-10.5	-16.0	-21.5	-11.7	-17.2	-22.7	-14.4	-19.9	-25.4
110	-9.1	-14.6	-20.1	-10.0	-15.5	-21.0	-12.2	-17.7	-23.2
100	-7.6	-13.1	-18.6	-8.2	-13.7	-19.2	-10.0	-15.5	-21.0
90	-6.2	-11.7	-17.2	-6.5	-12.0	-17.5	-7.8	-13.3	-18.8

V1(MCG) Limit Weight (1000 LB)

ADJUSTED FIELD LENGTH (FT)	SLUSH/STANDING WATER DEPTH								
	0.12 INCHES (3 mm)			0.25 INCHES (6 mm)			0.50 INCHES (13 mm)		
	PRESSURE ALTITUDE (FT)			PRESSURE ALTITUDE (FT)			PRESSURE ALTITUDE (FT)		
	S.L.	5000	10000	S.L.	5000	10000	S.L.	5000	10000
4600							74.3		
5000	75.8			82.9			93.3		
5400	94.0			100.9			111.9		
5800	112.6			119.4	73.9		130.1	83.9	
6200	131.5	84.9		138.2	91.9		147.9	102.7	
6600	150.8	103.2		157.4	110.1		165.4	121.1	74.3
7000	170.6	122.0	75.8	177.0	128.7	82.9	182.6	139.1	93.3
7400	190.9	141.1	94.0	197.0	147.7	100.9	199.5	156.7	111.9
7800		160.7	112.6		167.1	119.4		174.0	130.1
8200		180.7	131.5		186.9	138.2		191.0	147.9
8600			150.8			157.4			165.4
9000			170.6			177.0			182.6
9400			190.9			197.0			199.5

1. **Enter Weight Adjustment table with slush/standing water depth and dry field/obstacle limit weight to obtain slush/standing water weight adjustment.**
2. **Adjust field length available by -120 ft/+110 ft for every 5°C above/below 4°C.**
3. **Find V1(MCG) limit weight for adjusted field length and pressure altitude.**
4. **Max allowable slush/standing water limited weight is lesser of weights from 1 and 3.**

V1 Adjustment (KIAS)

WEIGHT (1000 LB)	SLUSH/STANDING WATER DEPTH								
	0.12 INCHES (3 mm)			0.25 INCHES (6 mm)			0.50 INCHES (13 mm)		
	PRESSURE ALTITUDE (FT)			PRESSURE ALTITUDE (FT)			PRESSURE ALTITUDE (FT)		
	S.L.	5000	10000	S.L.	5000	10000	S.L.	5000	10000
180	-15	-12	-10	-8	-5	-3	-3	0	0
170	-16	-13	-11	-10	-7	-5	-3	-1	0
160	-17	-15	-12	-12	-10	-7	-4	-2	0
150	-18	-16	-13	-14	-11	-9	-6	-3	-1
140	-19	-16	-14	-15	-13	-10	-8	-5	-3
130	-20	-17	-15	-17	-14	-12	-10	-7	-5
120	-20	-18	-15	-18	-16	-13	-12	-10	-7
110	-21	-19	-16	-19	-17	-14	-15	-12	-10
100	-23	-20	-18	-21	-18	-16	-17	-14	-12
90	-24	-21	-19	-22	-20	-17	-19	-17	-14

1. **Obtain V1, VR and V2 for the actual weight using the Dry Runway Takeoff Speeds table.**
2. **If V1(MCG) limited, set V1 = V1(MCG). If not V1(MCG) limited, enter V1 Adjustment table with the actual weight to obtain V1 speed adjustment. If adjusted V1 is less than V1(MCG), set V1 = V1(MCG).**

FIGURE 236.—Slush/Standing Water Takeoff.

Takeoff Speeds - Dry Runway

Flaps 10, 15 and 25

V1, VR, V2 for Max Takeoff Thrust

WEIGHT (1000 LB)	FLAPS 10			FLAPS 15			FLAPS 25		
	V1	VR	V2	V1	VR	V2	V1	VR	V2
170	138	140	145	136	136	141			
160	134	135	141	132	132	138	131	131	136
150	129	131	137	128	128	135	126	126	133
140	124	126	133	123	123	131	121	122	129
130	118	121	129	117	118	127	116	117	125
120	112	115	124	111	113	122	109	111	121
110	106	109	119	105	107	117	103	106	116
100	99	103	114	98	101	113	97	100	111
90	92	97	109	91	95	107	90	94	106

Check V1(MCG).

V1, VR, V2 Adjustments*

TEMP		V1						VR						V2					
		PRESSURE ALTITUDE (1000 FT)						PRESSURE ALTITUDE (1000 FT)						PRESSURE ALTITUDE (1000 FT)					
°F	°C	-2	0	2	4	6	8	-2	0	2	4	6	8	-2	0	2	4	6	8
140	60	5	6	7	9			3	4	5	6			-2	-2	-2	-3		
120	49	3	4	5	7	8	10	2	3	4	5	6	6	-1	-1	-2	-2	-3	-3
100	38	1	2	3	5	6	8	1	1	2	3	4	5	0	-1	-1	-2	-2	-3
80	27	0	0	1	3	5	6	0	0	1	2	3	4	0	0	0	-1	-1	-2
60	16	0	0	1	2	3	4	0	0	1	1	2	3	0	0	0	0	-1	-1
-60	-51	0	0	1	2	3	3	0	0	1	1	2	3	0	0	0	0	-1	-1

Slope and Wind V1 Adjustments*

WEIGHT (1000 LB)	SLOPE (%)					WIND (KTS)							
	-2	-1	0	1	2	-15	-10	-5	0	10	20	30	40
170	-3	-1	0	1	1	-1	-1	-1	0	0	1	1	1
160	-3	-1	0	1	2	-1	-1	-1	0	0	1	1	1
150	-3	-1	0	1	2	-1	-1	-1	0	0	1	1	1
140	-2	-1	0	1	2	-2	-1	-1	0	0	1	1	1
130	-2	-1	0	1	2	-2	-1	-1	0	0	1	1	1
120	-2	-1	0	1	2	-2	-1	-1	0	0	1	1	1
110	-2	-1	0	1	2	-2	-1	-1	0	0	1	1	2
100	-2	-1	0	1	2	-2	-1	-1	0	0	1	2	2
90	-1	-1	0	1	1	-2	-1	-1	0	0	1	2	2

Clearway and Stopway V1 Adjustments*

NORMAL V1 (KIAS)	CLEARWAY MINUS STOPWAY (FT)								
	800	600	400	200	0	-200	-400	-600	-800
140	-3	-3	-3	-2	0	2	2	2	2
120	-3	-3	-3	-2	0	2	2	2	2
100	-3	-3	-2	-1	0	1	1	1	1

***V1 not to exceed VR.**

Max Allowable Clearway for V1 Adjustment

FIELD LENGTH (FT)	4000	6000	8000	10000	12000	14000
MAX ALLOWABLE CLEARWAY (FT)	450	650	850	1000	1450	1550

V1(MCG)

Max Takeoff Thrust

TEMP		PRESSURE ALTITUDE (FT)						
°F	°C	-2000	0	2000	4000	6000	8000	10000
160	71	102						
140	60	102	99	97	96			
120	49	104	102	98	96	94	92	90
100	38	110	107	103	100	96	92	90
80	27	112	111	109	105	101	97	93
60	16	112	112	109	107	104	101	97
-60	-51	113	113	110	108	105	102	100

FIGURE 237.—Takeoff Speeds—Dry Runway.

Takeoff Speeds - Wet Runway

Flaps 10, 15 and 25

V1, VR, V2 for Max Takeoff Thrust

WEIGHT (1000 LB)	FLAPS 10			FLAPS 15			FLAPS 25		
	V1	VR	V2	V1	VR	V2	V1	VR	V2
170	133	139	145	133	136	141			
160	128	135	141	128	132	138	126	131	136
150	123	131	137	122	128	135	121	126	133
140	117	126	133	117	123	131	115	122	129
130	111	121	129	111	118	127	109	117	125
120	105	115	124	104	113	122	103	111	121
110	99	109	119	98	107	117	97	106	116
100	92	103	114	92	101	112	91	100	111
90	86	97	109	85	95	107	84	94	106

Check V1(MCG).

V1, VR, V2 Adjustments*

TEMP		V1						VR						V2					
		PRESSURE ALTITUDE (1000 FT)						PRESSURE ALTITUDE (1000 FT)						PRESSURE ALTITUDE (1000 FT)					
°F	°C	-2	0	2	4	6	8	-2	0	2	4	6	8	-2	0	2	4	6	8
140	60	6	7	9	10			3	4	5	6			-2	-2	-2	-3		
120	49	4	4	6	8	9	11	2	3	4	4	5	6	-1	-1	-2	-2	-3	-3
100	38	1	2	3	5	7	9	1	1	2	3	4	5	0	-1	-1	-2	-2	-2
80	27	0	0	1	3	4	6	0	0	1	2	3	4	0	0	0	-1	-1	-2
60	16	0	0	1	2	3	4	0	0	1	1	2	3	0	0	0	0	-1	-1
-60	-51	0	0	1	2	3	4	0	0	1	1	2	3	0	0	0	0	-1	-1

Slope and Wind V1 Adjustments*

WEIGHT (1000 LB)	SLOPE (%)					WIND (KTS)							
	-2	-1	0	1	2	-15	-10	-5	0	10	20	30	40
170	-4	-2	0	2	4	-3	-2	-1	0	1	1	2	3
160	-4	-2	0	2	4	-3	-2	-1	0	1	1	2	3
150	-4	-2	0	2	4	-3	-2	-1	0	1	1	2	3
140	-4	-2	0	2	3	-4	-2	-1	0	1	1	2	3
130	-3	-1	0	1	3	-4	-3	-1	0	1	2	2	3
120	-3	-1	0	1	3	-4	-3	-1	0	1	2	2	3
110	-2	-1	0	1	2	-4	-3	-1	0	1	2	2	3
100	-2	-1	0	1	2	-4	-3	-1	0	1	2	2	3
90	-2	-1	0	1	2	-4	-3	-1	0	1	2	3	3

Stopway V1 Adjustments*

NORMAL V1 (KIAS)	STOPWAY (FT)				
	0	200	400	600	800
160	0	1	2	2	3
140	0	1	2	2	3
120	0	1	2	3	4
100	0	1	2	3	4

Use of clearway not allowed on wet runways.
***V1 not to exceed VR.**

V1(MCG)

Max Takeoff Thrust

TEMP		PRESSURE ALTITUDE (FT)						
°F	°C	-2000	0	2000	4000	6000	8000	10000
160	71	102						
140	60	102	99	97	96			
120	49	104	102	98	96	94	92	90
100	38	110	107	103	100	96	92	90
80	27	112	111	109	105	101	97	93
60	16	112	112	109	107	104	101	97
-60	-51	113	113	110	108	105	102	100

FIGURE 238.—Takeoff Speeds—Wet Runway.

Takeoff %N1

Based on engine bleeds for packs on, engine and wing anti-ice on or off

OAT (°F)	AIRPORT PRESSURE ALTITUDE (FT)												
	-2000	-1000	0	1000	2000	3000	4000	5000	6000	7000	8000	9000	10000
170	87.6	88.0	88.9	89.4	89.8	90.4	91.0	91.7	92.4	92.9	93.4	93.5	93.6
160	88.5	89.0	89.3	89.2	89.1	89.7	90.3	91.0	91.7	92.2	92.6	92.8	92.9
150	89.4	89.9	90.3	90.2	90.1	90.1	90.0	90.3	91.0	91.4	91.9	92.0	92.1
140	90.3	90.8	91.2	91.2	91.1	91.1	91.0	91.1	91.2	91.0	91.2	91.3	91.4
130	91.1	91.7	92.1	92.1	92.0	92.0	92.0	92.0	92.0	91.9	91.8	91.4	90.9
120	92.0	92.6	93.0	93.0	93.0	92.9	92.9	92.9	92.9	92.8	92.7	92.4	92.0
110	92.9	93.5	93.9	93.9	93.8	93.8	93.8	93.7	93.7	93.6	93.6	93.4	93.1
100	93.8	94.3	94.8	94.7	94.7	94.7	94.6	94.6	94.5	94.4	94.4	94.3	94.2
90	94.2	95.3	95.7	95.7	95.7	95.6	95.6	95.5	95.4	95.4	95.3	95.2	95.2
80	93.3	94.5	95.6	96.1	96.5	96.5	96.4	96.4	96.3	96.2	96.2	96.1	96.1
70	92.5	93.7	94.8	95.3	95.8	96.4	97.1	97.4	97.3	97.2	97.1	97.1	97.0
60	91.6	92.8	93.9	94.4	95.0	95.6	96.2	96.9	97.6	98.3	98.5	98.4	98.3
50	90.8	92.0	93.0	93.6	94.1	94.7	95.3	96.0	96.7	97.5	98.2	99.1	100.0
40	89.9	91.1	92.2	92.7	93.2	93.8	94.4	95.1	95.8	96.6	97.4	98.3	99.2
30	89.1	90.2	91.3	91.8	92.3	92.9	93.6	94.2	94.9	95.7	96.5	97.4	98.3
20	88.2	89.3	90.4	90.9	91.4	92.0	92.7	93.4	94.0	94.8	95.6	96.6	97.5
10	87.3	88.4	89.5	90.0	90.5	91.1	91.7	92.4	93.1	93.9	94.7	95.7	96.6
0	86.4	87.5	88.6	89.1	89.6	90.2	90.8	91.5	92.2	93.0	93.8	94.8	95.8
-10	85.5	86.6	87.6	88.1	88.6	89.3	89.9	90.6	91.3	92.1	92.9	94.0	94.9
-20	84.6	85.7	86.7	87.2	87.7	88.3	89.0	89.7	90.4	91.2	92.0	93.1	94.0
-30	83.6	84.7	85.7	86.2	86.7	87.4	88.0	88.7	89.4	90.2	91.1	92.2	93.1
-40	82.7	83.8	84.8	85.3	85.8	86.4	87.0	87.8	88.5	89.3	90.1	91.2	92.2
-50	81.7	82.8	83.8	84.3	84.8	85.4	86.1	86.8	87.5	88.3	89.2	90.3	91.3
-60	80.8	81.8	82.8	83.3	83.8	84.4	85.1	85.8	86.5	87.3	88.2	89.4	90.3

%N1 Adjustments for Engine Bleeds

BLEED CONFIGURATION	PRESSURE ALTITUDE (FT)												
	-2000	-1000	0	1000	2000	3000	4000	5000	6000	7000	8000	9000	10000
PACKS OFF	0.7	0.7	0.7	0.7	0.7	0.7	0.8	0.8	0.8	0.8	0.8	0.9	1.0

FIGURE 239.—Takeoff % N1.

Stab Trim Setting

Max Takeoff Thrust

Flaps 1 and 5

WEIGHT (1000 LB)	C.G. (%MAC)								
	9	11	13	16	20	24	28	30	33
160-180	8 1/2	8 1/2	8 1/2	7 3/4	6 3/4	6	5 1/4	4 3/4	4 1/4
140	8 1/2	8 1/2	8	7 1/4	6 1/2	5 1/2	4 3/4	4 1/2	3 3/4
120	8 1/2	8	7 1/2	6 1/2	5 3/4	5	4 1/4	4	3 1/4
80-100	6 3/4	6 1/2	6	5 1/2	5	4 1/4	3 1/2	3 1/4	2 3/4

Flaps 10, 15 and 25

WEIGHT (1000 LB)	C.G. (%MAC)								
	9	11	13	16	20	24	28	30	33
160-180	8 1/2	8 1/2	8 1/2	7 1/4	6 1/2	5 1/2	4 1/2	4 1/4	3 1/2
140	8 1/2	8 1/2	7 3/4	6 3/4	6	5	4 1/4	3 3/4	3
120	8 1/2	7 3/4	7	6	5 1/4	4 1/2	3 3/4	3 1/4	2 3/4
80-100	6 1/4	6	5 1/2	5	4 1/2	3 3/4	3	2 3/4	2 3/4

FIGURE 240.—Stab Trim Setting.