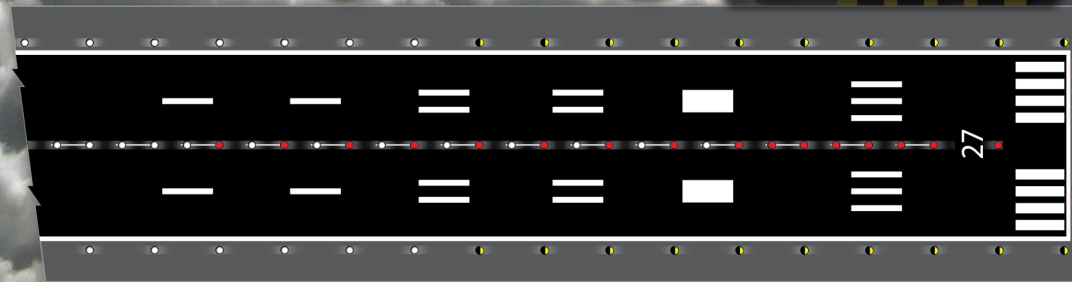


Airman Knowledge Testing Supplement for Airline Transport Pilot and Aircraft Dispatcher



U.S. Department
of Transportation

Federal Aviation
Administration



*This publication was formerly known as “Computer Testing Supplement
for Airline Transport Pilot and Aircraft Dispatcher.”*

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U.S. Department of Transportation
FEDERAL AVIATION ADMINISTRATION
Flight Standards Service

Preface

This Airman Knowledge Testing Supplement is designed by the Federal Aviation Administration (FAA) Flight Standards Service. It is intended for use by Airman Knowledge Testing (AKT) Organization Designation Authorization (ODA) Holders and other entities approved and/or authorized to administer airman knowledge tests on behalf of the FAA in the following knowledge areas:

- Airline Transport Pilot (FAR 121) Multiengine Airplane (ATM)
- Airline Transport Pilot (FAR 135) Single-Engine Airplane (ATS)
- 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)
- Airline Transport Pilot Multiengine Airplane **Canadian Conversion** (ACM)
- Airline Transport Pilot Single-Engine Airplane **Canadian Conversion** (ASC)
- Airline Transport Pilot Helicopter **Canadian Conversion** (ACH)
- Aircraft Dispatcher (ADX)
- Flight Navigator (FNX)

FAA-CT-8080-7D supersedes FAA-CT-8080-7C dated 2005.

All figures in this supplement are for testing purposes only and are not to be used for flight or flight planning.

Comments regarding this supplement, or any Airman Testing publication, should be emailed to AFS630comments@faa.gov.

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Appendix 1

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GENERAL INFORMATION

ABBREVIATIONS

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

Abbreviation	Description	Abbreviation	Description
A/G	air/ground	AM	Amplitude Modulation, midnight til noon
AAF	Army Air Field	AMC	Air Mobility Command
AAS	Airport Advisory Service	amdt.....	amendment
AB	Airbase	AMSL	Above Mean Sea Level
abm	abeam	ANGS	Air National Guard Station
ABn	Aerodrome Beacon	ant	antenna
abv	above	AOE.....	Airport/Aerodrome of Entry
ACC	Air Combat Command Area Control Center	AP	Area Planning
acft	aircraft	APAPI	Abbreviated Precision Approach Path Indicator
ACLS.....	Automatic Carrier Landing System	apch	approach
act	activity	apn.....	apron
ACWS	Aircraft Control and Warning Squadron	APP	Approach Control
ADA	Advisory Area	Apr	April
ADCC.....	Air Defense Control Center	aprx.....	approximate
ADCUS.....	Advise Customs	APU	Auxiliary Power Unit
addn	addition	apv, apvl	approve, approval
ADF	Automatic Direction Finder	ARB.....	Air Reserve Base
adj	adjacent	ARCAL (CANADA)	Aircraft Radio Control of Aerodrome Lighting
admin	administration	ARFF	Aircraft Rescue and Fire Fighting
ADR.....	Advisory Route	ARINC	Aeronautical Radio Inc
adv.....	advise	arng.....	arrange
advy	advisory	arpt	airport
AEIS.....	Aeronautical Enroute Information Service	arr	arrive
AER	approach end rwy	ARS.....	Air Reserve Station
AFA.....	Army Flight Activity	ARSA.....	Airport Radar Service Area
AFB	Air Force Base	ARSR.....	Air Route Surveillance Radar
afct	affect	ARTCC.....	Air Route Traffic Control Center
AFFF.....	Aqueous Film Forming Foam	AS	Air Station
AFHP	Air Force Helicopter	ASAP	as soon as possible
AFIS.....	Aerodrome Flight Information Service	ASDA.....	Accelerate-Stop Distance Available
afld	airfield	ASDE.....	Airport Surface Detection
AFOD	Army Flight Operations Detachment	ASDE-X	Airport Surface Detection Equipment-Model X
AFR	Air Force Regulation	asgn	assign
AFRC	Armed Forces Reserve Center/Air Force Reserve Command	ASL	Above Sea Level
AFRS	American Forces Radio Stations	ASOS	Automated Surface Observing System
AFS.....	Air Force Station	ASR.....	Airport Surveillance Radar
AFSS.....	Automated Flight Service Station	ASSC.....	Airport Surface Surveillance Capability
AFTN	Aeronautical Fixed Telecommunication Network	ASU.....	Aircraft Starting Unit
AG	Agriculture	ATA	Actual Time of Arrival
A-G, A-GEAR	Arresting Gear	ATC	Air Traffic Control
agcy.....	Agency	ATCC	Air Traffic Control Center
AGL	above ground level	ATCT	Airport Traffic Control Tower
AHP	Army helicopter	ATD	Actual Time of Departure Along Track Distance
AID	Airport Information Desk	ATIS	Automatic Terminal Information Service
AIS	Aeronautical Information Services	ATS	Air Traffic Service
AL	Approach and Landing Chart	attn	attention
ALF.....	Auxiliary Landing Field	Aug	August
ALS.....	Approach Light System	auth.....	authority
ALSF-1	High Intensity ALS Category I configuration with sequenced Flashers (code)	auto.....	automatic
ALSF-2	High Intensity ALS Category II configuration with sequenced Flashers (code)	AUW	All Up Weight (gross weight)
alt.....	altitude	aux.....	auxiliary
altn.....	alternate	AVASI	abbreviated VASI
		avbl.....	available
		AvGas	Aviation gasoline
		avn	aviation
		AvOil.....	aviation oil

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Abbreviation	Description	Abbreviation	Description
AWOS.....	Automatic Weather Observing System	crdr.....	corridor
AWSS.....	Automated Weather Sensor System	cross.....	cross
awt.....	await	CRP.....	Compulsory Reporting Point
awy.....	airway	crs.....	course
az.....	azimuth	CS.....	call sign
		CSTMS.....	Customs
BA.....	braking action	CTA.....	Control Area
BASH.....	Bird Aircraft Strike Hazard	CTAF.....	Common Traffic Advisory Frequency
BC.....	back course	ctc.....	contact
bcn.....	beacon	ctl.....	control
bcst.....	broadcast	CTLZ.....	Control Zone
bdry.....	boundary	CVFR.....	Controlled Visual Flight Rules Areas
bldg.....	building	CW.....	Clockwise, Continuous Wave, Carrier Wave
blkd.....	blocked		
blo, blw.....	below	dalgt.....	daylight
BOQ.....	Bachelor Officers Quarters	D-ATIS.....	Digital Automatic Terminal Information Service
brg.....	bearing	daylt.....	daylight
btn.....	between	db.....	decibel
bus.....	business	DCL.....	Departure Clearance
byd.....	beyond	Dec.....	December
		decom.....	decommission
C.....	Commercial Circuit (Telephone)	deg.....	degree
CAC.....	Centralized Approach Control	del.....	delivery
cap.....	capacity	dep.....	depart
cat.....	category	DEP.....	Departure Control
CAT.....	Clear Air Turbulence	destn.....	destination
CCW or cntclkws.....	counterclockwise	det.....	detachment
ceil.....	ceiling	DF.....	Direction Finder
CERAP.....	Center Radar Approach Control	DH.....	Decision Height
CG.....	Coast Guard	DIAP.....	DoD Instrument Approach Procedure
CGAF.....	Coast Guard Air Facility	direc.....	directional
CGAS.....	Coast Guard Air Station	disem.....	disseminate
CH, chan.....	channel	displ.....	displace
CHAPI.....	Chase Helicopter Approach Path Indicator	dist.....	district, distance
chg.....	change	div.....	division
cht.....	chart	DL.....	Direct Line to FSS
cir.....	circle, circling	dlt.....	delete
CIV, civ.....	Civil, civil, civilian	dly.....	daily
ck.....	check	DME.....	Distance Measuring Equipment (UHF standard, TACAN compatible)
CL.....	Centerline Lighting System	DNVT.....	Digital Non-Secure Voice Telephone
cl.....	class	DoD.....	Department of Defense
clnc.....	clearance	drct.....	direct
clsd.....	closed	DSN.....	Defense Switching Network (Telephone)
CNATRA.....	Chief of Naval Air Training	DSN.....	Defense Switching Network
cnl.....	cancel	dsplcd.....	displaced
cntr.....	center	DT.....	Daylight Savings Time
cntrln.....	centerline	dur.....	during
Co.....	Company, County	durn.....	duration
CO.....	Commanding Officer	DV.....	Distinguished Visitor
com.....	communication		
comd.....	command	E.....	East
Comdr.....	Commander	ea.....	each
coml.....	commercial	EAT.....	Expected Approach Time
compul.....	compulsory	ECN.....	Enroute Change Notice
comsn.....	commission	EFAS.....	Enroute Flight Advisory Service
conc.....	concrete	eff.....	effective, effect
cond.....	condition	E-HA.....	Enroute High Altitude
const.....	construction	E-LA.....	Enroute Low Altitude
cont.....	continue	elev.....	elevation
CONUS.....	Continental United States	ELT.....	Emergency Locator Transmitter
convl.....	conventional		
coord.....	coordinate	EMAS.....	Engineered Material Arresting System
copter.....	helicopter	emerg.....	emergency
corr.....	correct	eng.....	engine
CPDLC.....	Controller Pilot Data Link Communication		

Legend 2. Chart Supplement Abbreviations.

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Abbreviation	Description	Abbreviation.....	Description
EOR	End of Runway	govt	government
eqpt	equipment	GP	Glide Path
ERDA	Energy Research and Development Administration	Gp	Group
E-S	Enroute Supplement	GPI	Ground Point of Intercept
est	estimate	grad	gradient
estab	establish	grd	guard
ETA	Estimated Time of Arrival	GS	glide slope
ETD	Estimated Time of Departure	GWT	gross weight
ETE	Estimated Time Enroute	H	Enroute High Altitude Chart (followed by identification)
ETS	European Telephone System	H+	Hours or hours plus...minutes past the hour
EUR	European (ICAO Region)	H24	continuous operation
ev	every	HAA	Height Above Airport/Aerodrome
evac	evacuate	HAL	Height Above Landing Area
exc	except	HAR	Height Above Runway
excl'd	exclude	HAT	Height Above Touchdown
exer	exercise	haz	hazard
exm	exempt	hdg	heading
exp	expect	HDTA	High Density Traffic Airport/Aerodrome
extd	extend	HF	High Frequency (3000 to 30,000 KHz)
extn	extension	hgr	hangar
extv	extensive	hgt	height
F/W	Fixed Wing	hi	high
FAA	Federal Aviation Administration	HIRL	High Intensity Runway Lights
fac	facility	HIWAS	Hazardous Inflight Weather Advisory Service
FAWS	Flight Advisory Weather Service	HO	Service available to meet operational requirements
fax	facsimile	hol	holiday
FBO	Fixed Base Operator	HOLF	Helicopter Outlying Field
FCC	Flight Control Center	hosp	hospital
FCG	Foreign Clearance Guide	HQ	Headquarters
FCLP	field carrier landing practice	hr	hour
fcst	forecast	HS	Service available during hours of scheduled operations
Feb	February	hsg	housing
FIC	Flight Information Center	hvy	heavy
FIH	Flight Information Handbook	HW	Heavy Weight
FIR	Flight Information Region	hwy	highway
FIS	Flight Information Service	HX	station having no specific working hours
FL	flight level	Hz	Hertz (cycles per second)
fld	field	I	Island
flg	flashing	IAP	Instrument Approach Procedure
FLIP	Flight Information Publication	IAS	Indicated Air Speed
flt	flight	IAW	in accordance with
flw	follow	ICAO	International Civil Aviation Organization
FM	Fan Marker, Frequency Modulation	ident	identification
FOC	Flight Operations Center	IFF	Identification, Friend or Foe
FOD	Foreign Object Damage	IFR	Instrument Flight Rules
fone	telephone	IFR-S	FLIP IFR Supplement
FPL	Flight Plan	IFSS	International Flight Service Station
fpm	feet per minute	ILS	Instrument Landing System
fr	from	IM	Inner Marker
freq	frequency, frequent	IMC	Instrument Meteorological Conditions
Fri	Friday	IMG	Immigration
frng	firing	immed	immediate
FSC	Flight Service Center	inbd	inbound
FSS	Flight Service Station	Inc	Incorporated
ft	foot	incl	include
ftn	fighter	incr	increase
GA	Glide Angle	indef	indefinite
gal	gallon	info	information
GAT	General Air Traffic (Europe-Asia)	inop	inoperative
GCA	Ground Control Approach	inst	instrument
GCO	Ground Communication Outlet		
gldr	glider		
GND	Ground Control		
gnd	ground		

Legend 3. Chart Supplement Abbreviations.

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Abbreviation	Description	Abbreviation	Description
instl	install	LSB	lower side band
instr	instruction	ltd	limited
int	intersection		
intcntl	intercontinental	M	meters, magnetic (after a bearing), Military Circuit (Telephone)
intcp	intercept	MACC	Military Area Control Center
intl	international	mag	magnetic
intmt	intermittent	maint	maintain, maintenance
ints	intense, intensity	maj	major
invof	in the vicinity of	MALS	Medium Intensity Approach Lighting System
irreg	irregularly	MALSF	MALS with Sequenced Flashers
		MALSR	MALS with Runway Alignment Indicator Lights
Jan	January	Mar	March
JASU	Jet Aircraft Starting Unit	MARA	Military Activity Restricted Area
JATO	Jet Assisted Take-Off	MATO	Military Air Traffic Operations
JOAP	Joint Oil Analysis Program	MATZ	Military Aerodrome Traffic Zone
JOSAC	Joint Operational Support Airlift Center	max	maximum
JRB	Joint Reserve Base	mb	millibars
Jul	July	MCAC	Military Common Area Control
Jun	June	MCAF	Marine Corps Air Facility
		MCALF	Marine Corps Auxiliary Landing Field
K or Kt	Knots	MCAS	Marine Corps Air Station
kHz	kilohertz	MCB	Marine Corps Base
KIAS	Knots Indicated Airspeed	MCC	Military Climb Corridor
KLIZ	Korea Limited Identification Zone	MCOLF	Marine Corps Outlying Field
km	Kilometer	MDA	Minimum Descent Altitude
kw	kilowatt	MEA	Minimum Enroute Altitude
		med	medium
L	Compass locator (Component of ILS system) under 25 Watts, 15 NM, Enroute Low Altitude Chart (followed by identification)	MEHT	Minimum Eye Height over Threshold
L	Local Time	mem	memorial
LAA	Local Airport Advisory	MET	Meteorological, Meteorology
LAHSO	Land and Hold-Short Operations	METAR	Aviation Routine Weather Report (in international MET figure code)
L-AOE	Limited Airport of Entry	METRO	Pilot-to-Metro voice cell
LAWRS	Limited Aviation Weather Reporting Station	MF	Medium Frequency (300 to 3000 KHz), Mandatory Frequency (Canada)
lb, lbs	pound (weight)	MFA	Minimum Flight Altitude
LC	local call	mgmt	Management
lcl	local	mgr	manager
LCP	French Peripheral Classification Line	MHz	Megahertz
lctd	located	mi	mile
lctn	location	MID/ASIA	Middle East/Asia (ICAO Region)
lctr	locator	MIJI	Meaconing, Intrusion, Jamming, and Interference
LCVASI	Low Cost Visual Approach Slope Indicator	Mil, mil	military
lczr	localizer	min	minimum, minute
LD	long distance	MIRL	Medium Intensity Runway Lights
LDA	Landing Distance Available	misl	missile
ldg	landing	mkr	marker (beacon)
LDIN	Lead-in Lights	MM	Middle Marker of ILS
LDOCF	Long Distance Operations Control Facility	mnt	monitor
len	length	MOA	Military Operations Area
lgt, lgtd, lgts	light, lighted, lights	MOCA	Minimum Obstruction Clearance Altitude
LIRL	Low Intensity Runway Lights	mod	modify
LLWAS	Low-Level Wind Shear Alert System	MOG	Maximum (aircraft) on the Ground
LLZ	Localizer (Instrument Approach Procedures Identification only)	Mon	Monday
LMM	Compass locator at Middle Marker ILS	MP	Maintenance Period
lo	low	MR	Medium Range
LoALT or LA	Low Altitude	MRA	Minimum Reception Altitude
LOC	Localizer	mrk	mark, marker
LOM	Compass locator at Outer Marker ILS	MSAW	minimum safe altitude warning
LR	Long Range, Lead Radial	msg	message
LRA	Landing Rights Airport	MSL	Mean Sea Level
LRRS	Long Range RADAR Station	msn	Mission

Legend 4. Chart Supplement Abbreviations

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GENERAL INFORMATION

Abbreviation	Description	Abbreviation	Description
mt	mount, mountain	ODALS.....	Omnidirectional Approach Lighting System
MTAF	Mandatory Traffic Advisory Frequency	ODO	Operations Duty Officer
MTCA.....	Military Terminal Control Area	offl	official
mt hly	monthly	OIC.....	Officer In Charge
MUAC	Military Upper Area Control	OLF.....	Outlying Field
muni	municipal	OLS.....	Optical Landing System
MWARA	Major World Air Route Area	OM.....	Outer Marker, ILS
N.....	North	opr	operate, operator, operational
N/A.....	not applicable	OPS, ops.....	operations
NA.....	not authorized (For Instrument Approach Procedure take-off and alternate MINIMA only)	orig.....	original
NAAS.....	Naval Auxiliary Air Station	OROCA	Off Route Obstruction Clearance Altitude
NADC.....	Naval Air Development Center	ORTCA.....	Off Route Terrain Clearance Altitude
NADEP.....	Naval Air Depot	OT.....	other times
NAEC.....	Naval Air Engineering Center	OTS.....	out of service
NAES.....	Naval Air Engineering Station	outbd.....	outbound
NAF.....	Naval Air Facility	ovft.....	overflight
NALCO.....	Naval Air Logistics Control Office	ovrn.....	overrun
NALF.....	Naval Auxiliary Landing Field	OX.....	oxygen
NALO.....	Navy Air Logistics Office	P/L.....	plain language
NAS.....	Naval Air Station	PAC.....	Pacific (ICAO Region)
NAT.....	North Atlantic (ICAO Region)	PAEW.....	personnel and equipment working
natl.....	national	PALS.....	Precision Approach and Landing System (NAVY)
nav.....	navigation	PAPI.....	Precision Approach Path Indicator
navaid.....	navigation aid	PAR.....	Precision Approach Radar
NAVMTO.....	Navy Material Transportation Office	para.....	paragraph
NAWC.....	Naval Air Warfare Center	parl.....	parallel
NAWS.....	Naval Air Weapons Station	pat.....	pattern
NCRP.....	Non-Compulsory Reporting Point	PAX.....	Passenger
NDB.....	Non-Directional Radio Beacon	PCL.....	pilot controlled lighting
NE.....	Northeast	pent.....	penetrate
nec.....	necessary	perm.....	permanent
NEW.....	Net Explosives Weight	perms.....	permission
ngt.....	night	pers.....	personnel
NM.....	nautical miles	PFC.....	Porous Friction Courses
nml.....	normal	PJE.....	Parachuting Activities/Exercises
NMR.....	nautical mile radius	p-line.....	power line
No or Nr.....	number	PM.....	Post meridian, noon til midnight
NOLF.....	Naval Outlying Field	PMRF.....	Pacific Missile Range Facility
NORDO.....	Lost communications or no radio installed/available in aircraft	PMSV.....	Pilot-to-Metro Service
NOTAM.....	Notice to Airmen	PN.....	prior notice
Nov.....	November	POB.....	persons on board
npi.....	non precision instrument	POL.....	Petrol, Oils and Lubricants
Nr or No.....	number	posn.....	position
NS.....	Naval Station	PPR.....	prior permission required
NS ABTMT.....	Noise Abatement	prcht.....	parachute
NSA.....	Naval Support Activity	pref.....	prefer
NSF.....	Naval Support Facility	prev.....	previous
NSTD, nstd.....	nonstandard	prim.....	primary
ntc.....	notice	prk.....	park
NVD.....	Night Vision Devices	PRM.....	Precision Runway Monitor
NVG.....	Night Vision Goggles	pro.....	procedure
NW.....	Northwest	proh.....	prohibited
NWC.....	Naval Weapons Center	pt.....	point
O/A.....	On or about	PTD.....	Pilot to Dispatcher
O/S.....	out of service	pub.....	publication
O/R.....	On Request	publ.....	publish
OAT.....	Operational Air Traffic	PVASI.....	Pulsating Visual Approach Slope Indicator
obsn.....	observation	pvt.....	private
obst.....	obstruction	pwr.....	power
OCA.....	Oceanic Control Area	QFE.....	Altimeter Setting above station
ocnl.....	occasional		
Oct.....	October		

Legend 5. Chart Supplement Abbreviations.

GENERAL INFORMATION

Abbreviation	Description	Abbreviation	Description
QNE	Altimeter Setting of 29.92 inches which provides height above standard datum plane	SAR	Search and Rescue
QNH	Altimeter Setting which provides height above mean sea level	Sat	Saturday
qtrs	quarters	SAVASI	Simplified Abbreviated Visual Approach Slope Indicator
quad	quadrant	SAWRS	Supplement Aviation Weather Reporting Station
R/T	Radiotelephony	sby	standby
R/W	Rotary/Wing	Sched	scheduled services
RACON	Radar Beacon	sctr	sector
rad	radius, radial	SDF	Simplified Directional Facility
RAIL	Runway Alignment Indicator Lights	SE	Southeast
RAMCC	Regional Air Movement Control Center	sec	second, section
R-AOE	Regular Airport of Entry	secd	secondary
RAPCON	Radar Approach Control (USAF)	SELCAL	Selective Calling System
RATCF	Radar Air Traffic Control Facility (Navy)	SELF	Strategic Expeditionary Landing Field
RCAG	Remote Center Air to Ground Facility	SEng	Single Engine
RCAGL	Remote Center Air to Ground Facility Long Range	Sep	September
RCL	runway centerline	SFA	Single Frequency Approach
RCLS	Runway Centerline Light System	sfc	surface
RCO	Remote Communications Outlet	SFL	Sequence Flashing Lights
rcpt	reception	SFRA	Special Flight Rules Area
RCR	Runway Condition Reading	SID	Standard Instrument Departure
rcv	receive	SIDA	Secure Identification Display Area
rcvr	receiver	SIF	Selective Identification Feature
rdo	radio	sked	schedule
reconst	reconstruct	SM	statute miles
reful	refueling	SOAP	Spectrometric Oil Analysis Program
reg	regulation, regular	SOF	Supervisor of Flying
REIL	Runway End Identifier Lights	SPB	Seaplane Base
rel	reliable	SR	sunrise
relctd	relocated	SRE	Surveillance Radar Element of GCA (Instrument Approach Procedures Identification only)
REP	Reporting Point	SS	sunset
req	request	SSALS/R	Simplified Short Approach Lighting System/with RAIL
RETIL	Rapid Exit Taxiway Indicator Light	SSB	Single Sideband
Rgn	Region	SSR	Secondary Surveillance Radar
Rgnl	Regional	STA	Straight-in Approach
rgt	right	std	standard
rgt tfc	right traffic	stn	station
rlgd	realigned	stor	storage
RLLS	Runway Lead-in Light System	str-in	Straight-in
rmk	remark	stu	student
rng	range, radio range	subj	subject
RNP	Required Navigation Performance	sum	summer
RON	Remain Overnight	Sun	Sunday
Rot Lt or Bcn	Rotating Light or Beacon	sur	surround
RPI	Runway Point of Intercept	survl	survival, surveillance
rpt	report	suspd	suspended
rqr	require	svc	service
RR	Railroad	svcg	servicing
RRP	Runway Reference Point	SW	Southwest
RSC	Runway Surface Condition	sys	system
RSDU	Radar Storm Detection Unit	TA	Transition Altitude
RSE	Runway Starter Extension/Starter Strip	TAC	Tactical Air Command
RSRS	Reduced Same Runway Separation	TAF	Aerodrome (terminal or alternate) forecast in abbreviated form
rstd	restricted	TALCE	Tanker Aircraft Control Element
rte	route	TCA	Terminal Control Area
ruf	rough	TCH	Threshold Crossing Height
RVR	Runway Visual Range	TCTA	Transcontinental Control Area
RVSM	Reduced Vertical Separation Minima	TD	Touchdown
rwy	runway	TDWR	Terminal Doppler Weather Radar
S	South	TDZ	Touchdown Zone
S/D	Seadrome	TDZL	Touchdown Zone Lights
SALS	Short Approach Lighting System		

Legend 6. Chart Supplement Abbreviations.

10

GENERAL INFORMATION

Abbreviation	Description	Abbreviation	Description
tfc.....	traffic	vcnty	vicinity
thld.....	threshold	VDF	Very High Frequency Direction Finder
thou.....	thousand	veh	vehicle
thru.....	through	vert	vertical
Thu.....	Thursday	VFR.....	Visual Flight Rules
til.....	until	VFR-S	FLIP VFR Supplement
tkf, tkof.....	take-off	VHF	Very High Frequency (30 to 300 MHz)
TLv.....	Transition Level	VIP	Very Important Person
tmpry.....	temporary	vis	visibility
TODA.....	Take-Off Distance Available	VMC.....	Visual Meteorological Conditions
TORA.....	Take-Off Run Available	VOIP.....	Voice Over Internet Protocol
TP	Tire Pressure	VOLMET	Meteorological Information for Aircraft in Flight
TPA.....	Traffic Pattern Altitude	VOT.....	VOR Receiver Testing Facility
TRACON.....	Terminal Radar Approach Control (FAA)		
tran.....	transient	W.....	Warning Area (followed by identification), Watts, West, White
trans	transmit	WCH	Wheel Crossing Height
trml.....	terminal	Wed.....	Wednesday
trng.....	training	Wg.....	Wing
trns	transition	WIE.....	with immediate effect
TRSA	Terminal Radar Service Area	win.....	winter
Tue	Tuesday	WIP.....	work in progress
TV	Television	WSO.....	Weather Service Office
TWEB	Transcribed Weather Broadcast	WSFO.....	Weather Service Forecast Office
twr.....	tower	wk.....	week
twy	taxiway	wkd	weekday
		wkly	weekly
UACC.....	Upper Area Control Center (used outside US)	wng.....	warning
UAS	Unmanned Aerial Systems	wo.....	without
UC.....	Under Construction	WSP.....	Weather System Processor
UCN	Urgent Change Notice	wt	weight
UDA.....	Upper Advisory Area	wx.....	weather
UDF.....	Ultra High Frequency Direction Finder		
UFN.....	until further notice	yd.....	yard
UHF.....	Ultra High Frequency (300 to 3000 MHz)	yr	year
UIR.....	Upper Flight Information Region		
unauthd.....	unauthorized	Z.....	Greenwich Mean Time (time groups only)
unavbl.....	unavailable		
unctl	uncontrolled		
unk	unknown		
unlgtd	unlighted		
unltd	unlimited		
unmrk	unmarked		
unmto	unmonitored		
unrel	unreliable		
unrstd	unrestricted		
unsatfy.....	unsatisfactory		
unsked	unscheduled		
unsvc	unserviceable		
unuse, unusbl	unusable		
USA.....	United States Army		
USAF.....	United States Air Force		
USB.....	Upper Side Band		
USCG.....	United States Coast Guard		
USMC	United States Marine Corps		
USN.....	United States Navy		
UTA	Upper Control Area		
UTC	Coordinated Universal Time		
V.....	Defense Switching Network (telephone, formerly AUTOVON)		
V/STOL.....	Vertical and Short Take-off and Landing aircraft		
VAL.....	Visiting Aircraft Line		
var	variation (magnetic variation)		
VASI	Visual Approach Slope Indicator		

Legend 7. Chart Supplement Abbreviations.

AIRPORT/FACILITY DIRECTORY LEGEND

(10) SKETCH LEGEND	
RUNWAYS/LANDING AREAS	RADIO AIDS TO NAVIGATION
Hard Surfaced	VORTAC . . .
Metal Surface	VOR/DME . .
Sod, Gravel, etc.	TACAN
Light Plane,	DME
Ski Landing Area or Water	
Under Construction	MISCELLANEOUS AERONAUTICAL FEATURES
Closed Rwy	Airport Beacon
Closed Pavement	Wind Cone
Helicopter Landings Area	Landing Tee
Displaced Threshold	Tetrahedron
Taxiway, Apron and Stopways	Control Tower or TWR
	When control tower and rotating beacon are co-located beacon symbol will be used and further identified as TWR.
MISCELLANEOUS BASE AND CULTURAL FEATURES	APPROACH LIGHTING SYSTEMS
Buildings	A dot "•" portrayed with approach lighting letter identifier indicates sequenced flashing lights (F) installed with the approach lighting system e.g. Negative symbology, e.g.,
Power Lines	indicates Pilot Controlled Lighting (PCL).
Fence	Runway Centerline Lighting
Towers	Approach Lighting System ALSF-2
Wind Turbine	Approach Lighting System ALSF-1
Tanks	Short Approach Lighting System SALS/SALSF
Oil Well	Simplified Short Approach Lighting System (SSALR) with RAIL
Smoke Stack	Medium Intensity Approach Lighting System (MALS and MALSF)/(SSALS and SSALF)
Obstruction	Medium Intensity Approach Lighting System (MALS) and RAIL
Controlling Obstruction	Omnidirectional Approach Lighting System (ODALS)
Trees	Navy Parallel Row and Cross Bar
Populated Places	Air Force Overrun
Cuts and Fills	Visual Approach Slope Indicator with Standard Threshold Clearance provided
Cliffs and Depressions	Pulsating Visual Approach Slope Indicator (PVASI)
Ditch	Visual Approach Slope Indicator with a threshold crossing height to accommodate long bodied or jumbo aircraft
Hill	Tri-color Visual Approach Slope Indicator (TRCV)
	Approach Path Alignment Panel (APAP)
	Precision Approach Path Indicator (PAPI)

Legend 9. Airport/Facility Directory Legend from Chart Supplement.

AIRPORT/FACILITY DIRECTORY LEGEND

LEGEND

This directory is a listing of data on record with the FAA on public-use airports, military airports and selected private-use airports specifically requested by the Department of Defense (DoD) for which a DoD Instrument Approach Procedure has been published in the U.S. Terminal Procedures Publication. Additionally this listing contains data for 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. Civil airports and joint Civil/Military airports which are open to the public are listed alphabetically by state, associated city and airport name and cross-referenced by airport name. Military airports and private-use (limited civil access) joint Military/Civil airports are listed alphabetically by state and official airport name and cross-referenced by associated city name. Nav aids, flight service stations and remote communication outlets that are associated with an airport, but with a different name, are listed alphabetically under their own name, as well as under the airport with which they are associated.

The listing of an airport as open to the public in this directory merely indicates the airport operator's willingness to accommodate transient aircraft, and does not represent that the airport conforms with any Federal or local standards, or that it has been approved for use on the part of the general public. Military airports, private-use airports, and private-use (limited civil access) joint Military/Civil airports are open to civil pilots only in an emergency or with prior permission. See Special Notice Section, Civil Use of Military Fields.

The information on obstructions is taken from reports submitted to the FAA. Obstruction data has not been verified in all cases. Pilots are cautioned that objects not indicated in this tabulation (or on the airports sketches and/or charts) may exist which can create a hazard to flight operation. Detailed specifics concerning services and facilities tabulated within this directory are contained in the Aeronautical Information Manual, Basic Flight Information and ATC Procedures.

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

① CITY/AIRPORT NAME

Civil and joint Civil/Military airports which are open to the public are listed alphabetically by state and associated city. 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. A solid rule line will separate all others. FAA approved helipads and seaplane landing areas associated with a land airport will be separated by a dotted line. Military airports and private-use (limited civil access) joint Military/Civil airports are listed alphabetically by state and official airport name.

② ALTERNATE NAME

Alternate names, if any, will be shown in parentheses.

③ LOCATION IDENTIFIER

The location identifier is a three or four character FAA code followed by a four-character ICAO code, when assigned, to airports. If two different military codes are assigned, both codes will be shown with the primary operating agency's code listed first. These identifiers are used by ATC in lieu of the airport name in flight plans, flight strips and other written records and computer operations. Zeros "0" will appear with a slash to differentiate them from the letter "O".

④ OPERATING AGENCY

Airports within this directory are classified into two categories, Military/Federal Government and Civil airports open to the general public, plus selected private-use airports. The operating agency is shown for military, private-use and joint use airports. The operating agency is shown by an abbreviation as listed below. When an organization is a tenant, the abbreviation is enclosed in parenthesis. No classification indicates the airport is open to the general public with no military tenant.

A	US Army	MC	Marine Corps
AFRC	Air Force Reserve Command	MIL/CIV	Joint Use Military/Civil Limited Civil Access
AF	US Air Force	N	Navy
ANG	Air National Guard	NAF	Naval Air Facility
AR	US Army Reserve	NAS	Naval Air Station
ARNG	US Army National Guard	NASA	National Air and Space Administration
CG	US Coast Guard	P	US Civil Airport Wherein Permit Covers Use by Transient Military Aircraft
CIV/MIL	Joint Use Civil/Military Open to the Public	PVT	Private Use Only (Closed to the Public)
DND	Department of National Defense Canada		

⑤ AIRPORT LOCATION

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

⑥ 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 (DST) effective hours will be one hour earlier than shown. In those areas where daylight saving time is not observed the (-4DT) and ‡ will not be shown. Daylight saving time is in effect from 0200 local time the second Sunday in March to 0200 local time the first Sunday in November. Canada and all U.S. Conterminous States observe daylight saving time except Arizona and Puerto Rico, and the Virgin Islands. If the state observes daylight saving time and the operating times are other than daylight saving times, the operating hours will include the dates, times and no ‡ symbol will be shown, i.e., April 15-Aug 31 0630-1700Z, Sep 1-Apr 14 0600-1700Z.

AIRPORT/FACILITY DIRECTORY LEGEND

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⑦ GEOGRAPHIC POSITION OF AIRPORT—AIRPORT REFERENCE POINT (ARP)

Positions are shown as hemisphere, degrees, minutes and hundredths of a minute and represent the approximate geometric center of all usable runway surfaces.

⑧ CHARTS

Charts refer to the Sectional Chart and Low and High Altitude Enroute Chart and panel on which the airport or facility is depicted. Helicopter Chart depictions will be indicated as COPTER. IFR Gulf of Mexico West and IFR Gulf of Mexico Central will be referenced as GOMW and GOMC.

⑨ INSTRUMENT APPROACH PROCEDURES, AIRPORT DIAGRAMS

IAP indicates an airport for which a prescribed (Public Use) FAA Instrument Approach Procedure has been published. DIAP indicates an airport for which a prescribed DoD Instrument Approach Procedure has been published in the U.S. Terminal Procedures. See the Special Notice Section of this directory, Civil Use of Military Fields and the Aeronautical Information Manual 5-4-5 Instrument Approach Procedure Charts for additional information. AD indicates an airport for which an airport diagram has been published. Airport diagrams are located in the back of each Chart Supplement volume alphabetically by associated city and airport name.

⑩ AIRPORT SKETCH

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

⑪ ELEVATION

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

⑫ ROTATING LIGHT BEACON

B indicates rotating beacon is available. Rotating beacons operate sunset to sunrise unless otherwise indicated in the AIRPORT REMARKS or MILITARY REMARKS segment of the airport entry.

⑬ 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. Multiple TPA shall be shown as "TPA—See Remarks" and detailed information shall be shown in the Airport or Military Remarks Section. Traffic pattern data for USAF bases, USN facilities, and U.S. Army airports (including those on which ACC or U.S. Army is a tenant) that deviate from standard pattern altitudes shall be shown in Military Remarks.

⑭ 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 to land. However, at least one hour advance notice of arrival is required.

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 is required.

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, Canada, and U.S. Communications facilities by flight plan, the aircraft operator is solely responsible for ensuring 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.)

U.S. CUSTOMS AIR AND SEA PORTS, INSPECTORS AND AGENTS

Northeast Sector (New England and Atlantic States—ME to MD)	407-975-1740
Southeast Sector (Atlantic States—DC, WV, VA to FL)	407-975-1780
Central Sector (Interior of the US, including Gulf states—MS, AL, LA)	407-975-1760
Southwest East Sector (OK and eastern TX)	407-975-1840
Southwest West Sector (Western TX, NM and AZ)	407-975-1820
Pacific Sector (WA, OR, CA, HI and AK)	407-975-1800

⑮ CERTIFICATED AIRPORT (14 CFR PART 139)

Airports serving Department of Transportation certified carriers and certified under 14 CFR part 139 are indicated by the Class and the ARFF Index; e.g. Class I, ARFF Index A, which relates to the availability of crash, fire, rescue equipment. Class I airports can have an ARFF Index A through E, depending on the aircraft length and scheduled departures. Class II, III, and IV will always carry an Index A.

AIRPORT CLASSIFICATIONS

Type of Air Carrier Operation	Class I	Class II	Class III	Class IV
Scheduled Air Carrier Aircraft with 31 or more passenger seats	X			
Unscheduled Air Carrier Aircraft with 31 or more passengers seats	X	X		X
Scheduled Air Carrier Aircraft with 10 to 30 passenger seats	X	X	X	

Legend 11. Airport/Facility Directory Legend from Chart Supplement.

AIRPORT/FACILITY DIRECTORY LEGEND

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 ₂ O
B	1 or 2	≥90', <126'	≥5	Index A + 1500 gal H ₂ O
		≥126', <159'	<5	
C	2 or 3	≥126', <159'	≥5	Index A + 3000 gal H ₂ O
		≥159', <200'	<5	
D	3	≥159', <200'	≥5	Index A + 4000 gal H ₂ O
		>200'	<5	
E	3	≥200'	≥5	Index A + 6000 gal H ₂ O

> Greater Than; < Less Than; ≥ Equal or Greater Than; ≤ Equal or Less Than; H₂O—Water; DC—Dry Chemical.

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

16 NOTAM SERVICE

All public use landing areas are provided NOTAM service. A NOTAM FILE identifier is shown for individual landing areas, e.g., "NOTAM FILE BNA". See the AIM, Basic Flight Information and ATC Procedures for a detailed description of NOTAMS. Current NOTAMS are available from flight service stations at 1-800-WX-BRIEF (992-7433) or online through the FAA PilotWeb at <https://pilotweb.nas.faa.gov>. Military NOTAMS are available using the Defense Internet NOTAM Service (DINS) at <https://www.notams.faa.gov>. Pilots flying to or from airports not available through the FAA PilotWeb or DINS can obtain assistance from Flight Service.

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 is shown on the second or following line. Runway direction, surface, length, width, weight bearing capacity, lighting, and slope, when available are shown for each runway. Multiple runways are shown with the longest runway first. Direction, length, width, and lighting are shown for sea-lanes. The full dimensions of helipads are shown, e.g., 50X150. Runway data that requires clarification will be placed in the remarks section.

RUNWAY DESIGNATION

Runways are normally numbered in relation to their magnetic orientation rounded off to the nearest 10 degrees. Parallel runways can be designated L (left)/R (right)/C (center). Runways may be designated as Ultralight or assault strips. Assault strips are shown by magnetic bearing.

RUNWAY DIMENSIONS

Runway length and width are shown in feet. Length shown is runway end to end including displaced thresholds, but excluding those areas designed as overruns.

RUNWAY SURFACE AND SURFACE TREATMENT

Runway lengths prefixed by the letter "H" indicate that the runways are hard surfaced (concrete, asphalt, or part asphalt-concrete). 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 | (GRVL)—Gravel, or cinders | (SAND)—Sand |
| (AM2)—Temporary metal planks coated with nonskid material | (MATS)—Pierced steel planking, landing mats, membranes | (TURF)—Turf |
| (ASPH)—Asphalt | (PEM)—Part concrete, part asphalt | (TRTD)—Treated |
| (CONC)—Concrete | (PFC)—Porous friction courses | (WC)—Wire combed |
| (DIRT)—Dirt | (PSP)—Pierced steel plank | |
| (GRVD)—Grooved | (RFSC)—Rubberized friction seal coat | |

Legend 12. Airport/Facility Directory Legend from Chart Supplement.

AIRPORT/FACILITY DIRECTORY LEGEND

17

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 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. Runway strength figures are shown in thousand of pounds, with the last three figures being omitted. Add 000 to figure following S, D, 2S, 2T, AUW, SWL, etc., for gross weight capacity. A blank space following the letter designator is used to indicate the runway can sustain aircraft with this type landing gear, although definite runway weight bearing capacity figures are not available, e.g., S, D. Applicable codes for typical gear configurations with S=Single, D=Dual, T=Triple and Q=Quadruple:

CURRENT	NEW	NEW DESCRIPTION
S	S	Single wheel type landing gear (DC3), (C47), (F15), etc.
D	D	Dual wheel type landing gear (BE1900), (B737), (A319), etc.
T	D	Dual wheel type landing gear (P3, C9).
ST	2S	Two single wheels in tandem type landing gear (C130).
TRT	2T	Two triple wheels in tandem type landing gear (C17), etc.
DT	2D	Two dual wheels in tandem type landing gear (B707), etc.
TT	2D	Two dual wheels in tandem type landing gear (B757, KC135).
SBTT	2D/D1	Two dual wheels in tandem/dual wheel body gear type landing gear (KC10).
None	2D/2D1	Two dual wheels in tandem/two dual wheels in tandem body gear type landing gear (A340–600).
DDT	2D/2D2	Two dual wheels in tandem/two dual wheels in double tandem body gear type landing gear (B747, E4).
TTT	3D	Three dual wheels in tandem type landing gear (B777), etc.
TT	D2	Dual wheel gear two struts per side main gear type landing gear (B52).
TDT	C5	Complex dual wheel and quadruple wheel combination landing gear (C5).

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).

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).

Omission of weight bearing capacity indicates information unknown.

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

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

- | | |
|--|--|
| <p>(1) The PCN NUMBER—The reported PCN indicates that an aircraft with an ACN equal or less than the reported PCN can operate on the pavement subject to any limitation on the tire pressure.</p> <p>(2) The type of pavement:
R — Rigid
F — Flexible</p> <p>(3) The pavement subgrade category:
A — High
B — Medium
C — Low
D — Ultra-low</p> | <p>(4) The maximum tire pressure authorized for the pavement:
W — Unlimited, no pressure limit
X — High, limited to 254 psi (1.75 MPa)
Y — Medium, limited to 181 psi (1.25MPa)
Z — Low, limited to 73 psi (0.50 MPa)</p> <p>(5) Pavement evaluation method:
T — Technical evaluation
U — By experience of aircraft using the pavement</p> |
|--|--|

RUNWAY LIGHTING

Lights are in operation sunset to sunrise. Lighting available by prior arrangement only or operating part of the night and/or pilot controlled lighting with specific operating hours are indicated under airport or military remarks. At USN/USMC facilities lights are available only during airport hours of operation. 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 or military 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 or military

Legend 13. Airport/Facility Directory Legend from Chart Supplement.

AIRPORT/FACILITY DIRECTORY LEGEND

service. Temporary, emergency or limited runway edge lighting such as flares, smudge pots, lanterns or portable runway lights will also be shown in airport remarks or military service. Types of lighting are shown with the runway or runway end they serve.

NSTD—Light system fails to meet FAA standards.	SALS—Short Approach Lighting System.
LIRL—Low Intensity Runway Lights.	SALSF—Short Approach Lighting System with Sequenced Flashing Lights.
MIRL—Medium Intensity Runway Lights.	SSALS—Simplified Short Approach Lighting System.
HIRL—High Intensity Runway Lights.	SSALF—Simplified Short Approach Lighting System with Sequenced Flashing Lights.
RAIL—Runway Alignment Indicator Lights.	SSALR—Simplified Short Approach Lighting System with Runway Alignment Indicator Lights.
REIL—Runway End Identifier Lights.	ALSAF—High Intensity Approach Lighting System with Sequenced Flashing Lights.
CL—Centerline Lights.	ALSF1—High Intensity Approach Lighting System with Sequenced Flashing Lights, Category I, Configuration.
TDZL—Touchdown Zone Lights.	ALSF2—High Intensity Approach Lighting System with Sequenced Flashing Lights, Category II, Configuration.
ODALS—Omni Directional Approach Lighting System.	SF—Sequenced Flashing Lights.
AF OVRN—Air Force Overrun 1000' Standard Approach Lighting System.	OLS—Optical Landing System.
MALS—Medium Intensity Approach Lighting System.	WAVE—OFF.
MALSF—Medium Intensity Approach Lighting System with Sequenced Flashing Lights.	
MALSR—Medium Intensity Approach Lighting System with Runway Alignment Indicator Lights.	
RLLS—Runway Lead-in Light System	

NOTE: Civil ALSF2 may be operated as SSALR during favorable weather conditions. When runway edge lights are positioned more than 10 feet from the edge of the usable runway surface a remark will be added in the "Remarks" portion of the airport entry. This is applicable to Air Force, Air National Guard and Air Force Reserve Bases, and those joint use airfields on which they are tenants.

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
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PAPI—Precision Approach Path Indicator

P2L 2-identical light units placed on left side of runway	P4L 4-identical light units placed on left side of runway
P2R 2-identical light units placed on right 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
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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
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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
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VASI—Visual Approach Slope Indicator

V2L 2-box VASI on left side of runway	V6L 6-box VASI on left side of runway
V2R 2-box VASI on right side of runway	V6R 6-box VASI on right side of runway
V4L 4-box VASI on left side of runway	V12 12-box VASI on both sides of runway
V4R 4-box VASI on right side 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 Service section, e.g., LGT ACTIVATE HIRL Rwy 07-25, MALSR Rwy 07, and VASI Rwy 07-122.8.

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

When available, runway slope data will be provided. Runway slope will be shown only when it is 0.3 percent or greater. On runways less than 8000 feet, the direction of the slope up will be indicated, e.g., 0.3% up NW. On runways 8000 feet or greater, the slope will be shown (up or down) on the runway end line, e.g., RWY 13: 0.3% up., RWY 31: Pole. Rgt tfc. 0.4% down.

AIRPORT/FACILITY DIRECTORY LEGEND

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RUNWAY END DATA

Information pertaining to the runway approach end such as approach lights, touchdown zone lights, runway end identification lights, visual glideslope indicators, displaced thresholds, controlling obstruction, and right hand traffic pattern, 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. Runway Visual Range shall be shown as "RVR" appended with "T" for touchdown, "M" for midpoint, and "R" for rollout; e.g., RVR-TMR.

19 LAND AND HOLD—SHORT OPERATIONS (LAHSO)

LAHSO is an acronym for "Land and Hold—Short Operations" These operations include landing and holding short of an intersection runway, an intersecting taxiway, or other predetermined points on the runway other than a runway or taxiway. Measured distance represents the available landing distance on the landing runway, in feet.

Specific questions regarding these distances should be referred to the air traffic manager of the facility concerned. The Aeronautical Information Manual contains specific details on hold—short operations and markings.

20 RUNWAY DECLARED DISTANCE INFORMATION

TORA—Take-off Run Available. The length of runway declared available and suitable for the ground run of an aeroplane take-off.

TODA—Take-off Distance Available. The length of the take-off run available plus the length of the clearway, if provided.

ASDA—Accelerate—Stop Distance Available. The length of the take-off run available plus the length of the stopway, if provided.

LDA—Landing Distance Available. The length of runway which is declared available and suitable for the ground run of an aeroplane landing.

21 ARRESTING GEAR/SYSTEMS

Arresting gear is shown as it is located on the runway. The a—gear distance from the end of the appropriate runway (or into the overrun) is indicated in parentheses. A—Gear which has a bi—direction capability and can be utilized for emergency approach end engagement is indicated by a (B). Up to 15 minutes advance notice may be required for rigging A—Gear for approach and engagement. Airport listing may show availability of other than US Systems. This information is provided for emergency requirements only. Refer to current aircraft operating manuals for specific engagement weight and speed criteria based on aircraft structural restrictions and arresting system limitations.

Following is a list of current systems referenced in this publication identified by both Air Force and Navy terminology:

BI—DIRECTIONAL CABLE (B)

<u>TYPE</u>	<u>DESCRIPTION</u>
BAK-9	Rotary friction brake.
BAK-12A	Standard BAK-12 with 950 foot run out, 1—inch cable and 40,000 pound weight setting. Rotary friction brake.
BAK-12B	Extended BAK-12 with 1200 foot run, 1¼ inch Cable and 50,000 pounds weight setting. Rotary friction brake.
E28	Rotary Hydraulic (Water Brake).
M21	Rotary Hydraulic (Water Brake) Mobile.

The following device is used in conjunction with some aircraft arresting systems:

BAK-14	A device that raises a hook cable out of a slot in the runway surface and is remotely positioned for engagement by the tower on request. (In addition to personnel reaction time, the system requires up to five seconds to fully raise the cable.)
H	A device that raises a hook cable out of a slot in the runway surface and is remotely positioned for engagement by the tower on request. (In addition to personnel reaction time, the system requires up to one and one-half seconds to fully raise the cable.)

UNI—DIRECTIONAL CABLE

<u>TYPE</u>	<u>DESCRIPTION</u>
MB60	Textile brake—an emergency one-time use, modular braking system employing the tearing of specially woven textile straps to absorb the kinetic energy.
E5/E5-1/E5-3	Chain Type. At USN/USMC stations E-5 A—GEAR systems are rated, e.g., E-5 RATING-13R-1100 HW (DRY), 31L/R-1200 STD (WET). This rating is a function of the A—GEAR chain weight and length and is used to determine the maximum aircraft engaging speed. A dry rating applies to a stabilized surface (dry or wet) while a wet rating takes into account the amount (if any) of wet overrun that is not capable of withstanding the aircraft weight. These ratings are published under Service/Military/A-Gear in the entry.

FOREIGN CABLE

<u>TYPE</u>	<u>DESCRIPTION</u>	<u>US EQUIVALENT</u>
44B-3H	Rotary Hydraulic (Water Brake)	
CHAG	Chain	E-5

UNI—DIRECTIONAL BARRIER

<u>TYPE</u>	<u>DESCRIPTION</u>
MA-1A	Web barrier between stanchions attached to a chain energy absorber.
BAK-15	Web barrier between stanchions attached to an energy absorber (water squeezer, rotary friction, chain). Designed for wing engagement.

NOTE: Landing short of the runway threshold on a runway with a BAK-15 in the underrun is a significant hazard. The barrier in the down position still protrudes several inches above the underrun. Aircraft contact with the barrier short of the runway threshold can cause damage to the barrier and substantial damage to the aircraft.

OTHER

<u>TYPE</u>	<u>DESCRIPTION</u>
EMAS	Engineered Material Arresting System, located beyond the departure end of the runway, consisting of high energy absorbing materials which will crush under the weight of an aircraft.

Legend 15. Airport/Facility Directory Legend from Chart Supplement.

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AIRPORT/FACILITY DIRECTORY LEGEND

② SERVICE

SERVICING—CIVIL

S1: Minor airframe repairs.	S5: Major airframe repairs.
S2: Minor airframe and minor powerplant repairs.	S6: Minor airframe and major powerplant repairs.
S3: Major airframe and minor powerplant repairs.	S7: Major powerplant repairs.
S4: Major airframe and major powerplant repairs.	S8: Minor powerplant repairs.

FUEL

CODE	FUEL	CODE	FUEL
80	Grade 80 gasoline (Red)	B	Jet B, Wide-cut, turbine fuel without FS-II*, FP** minus 50° C.
100	Grade 100 gasoline (Green)	B+	Jet B, Wide-cut, turbine fuel with FS-II*, FP** minus 50° C
100LL	100LL gasoline (low lead) (Blue)	J4 (JP4)	(JP-4 military specification) FP** minus 58° C.
115	Grade 115 gasoline (115/145 military specification) (Purple)	J5 (JP5)	(JP-5 military specification) Kerosene with FS-II, FP** minus 46°C.
A	Jet A, Kerosene, without FS-II*, FP** minus 40° C.	J8 (JP8)	(JP-8 military specification) Jet A-1, Kerosene with FS-II*, Cl/LI#, SDA##, FP** minus 47°C.
A+	Jet A, Kerosene, with FS-II*, FP** minus 40°C.	J8+100	(JP-8 military specification) Jet A-1, Kerosene with FS-II*, Cl/LI#, SDA##, FP** minus 47°C, with +100 fuel additive that improves thermal stability characteristics of kerosene jet fuels.
A++	Jet A, Kerosene, with FS-II*, Cl/LI#, SDA##, FP** minus 40°C.	J	(Jet Fuel Type Unknown)
A++100	Jet A, Kerosene, with FS-II*, Cl/LI#, SDA##, FP** minus 40°C, with +100 fuel additive that improves thermal stability characteristics of kerosene jet fuels.	MOGAS	Automobile gasoline which is to be used as aircraft fuel.
A1	Jet A-1, Kerosene, without FS-II*, FP** minus 47°C.	UL91	Unleaded Grade 91 gasoline
A1+	Jet A-1, Kerosene with FS-II*, FP** minus 47° C.	UL94	Unleaded Grade 94 gasoline

*(Fuel System Icing Inhibitor) ** (Freeze Point) # (Corrosion Inhibitors/Lubricity Improvers) ## (Static Dissipator Additive)

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

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

OXYGEN—CIVIL

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

SERVICE—MILITARY

Specific military services available at the airport are listed under this general heading. Remarks applicable to any military service are shown in the individual service listing.

JET AIRCRAFT STARTING UNITS (JASU)—MILITARY

The numeral preceding the type of unit indicates the number of units available. The absence of the numeral indicates ten or more units available. If the number of units is unknown, the number one will be shown. Absence of JASU designation indicates non-availability.

The following is a list of current JASU systems referenced in this publication:

USAF JASU (For variations in technical data, refer to T.O. 35-1-7.)

ELECTRICAL STARTING UNITS:

A/M32A-86	AC: 115/200v, 3 phase, 90 kva, 0.8 pf, 4 wire DC: 28v, 1500 amp, 72 kw (with TR pack)
MC-1A	AC: 115/208v, 400 cycle, 3 phase, 37.5 kva, 0.8 pf, 108 amp, 4 wire DC: 28v, 500 amp, 14 kw
MD-3	AC: 115/208v, 400 cycle, 3 phase, 60 kva, 0.75 pf, 4 wire DC: 28v, 1500 amp, 45 kw, split bus
MD-3A	AC: 115/208v, 400 cycle, 3 phase, 60 kva, 0.75 pf, 4 wire DC: 28v, 1500 amp, 45 kw, split bus
MD-3M	AC: 115/208v, 400 cycle, 3 phase, 60 kva, 0.75 pf, 4 wire DC: 28v, 500 amp, 15 kw
MD-4	AC: 120/208v, 400 cycle, 3 phase, 62.5 kva, 0.8 pf, 175 amp, "WYE" neutral ground, 4 wire, 120v, 400 cycle, 3 phase, 62.5 kva, 0.8 pf, 303 amp, "DELTA" 3 wire, 120v, 400 cycle, 1 phase, 62.5 kva, 0.8 pf, 520 amp, 2 wire

AIRPORT/FACILITY DIRECTORY LEGEND

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AIR STARTING UNITS

AM32-95	150 +/- 5 lb/min (2055 +/- 68 cfm) at 51 +/- 2 psia
AM32A-95	150 +/- 5 lb/min @ 49 +/- 2 psia (35 +/- 2 psig)
LASS	150 +/- 5 lb/min @ 49 +/- 2 psia
MA-1A	82 lb/min (1123 cfm) at 130° air inlet temp, 45 psia (min) air outlet press
MC-1	15 cfm, 3500 psia
MC-1A	15 cfm, 3500 psia
MC-2A	15 cfm, 200 psia
MC-11	8,000 cu in cap, 4000 psig, 15 cfm

COMBINED AIR AND ELECTRICAL STARTING UNITS:

AGPU	AC: 115/200v, 400 cycle, 3 phase, 30 kw gen DC: 28v, 700 amp AIR: 60 lb/min @ 40 psig @ sea level
AM32A-60*	AIR: 120 +/- 4 lb/min (1644 +/- 55 cfm) at 49 +/- 2 psia AC: 120/208v, 400 cycle, 3 phase, 75 kva, 0.75 pf, 4 wire, 120v, 1 phase, 25 kva DC: 28v, 500 amp, 15 kw
AM32A-60A	AIR: 150 +/- 5 lb/min (2055 +/- 68 cfm) at 51 +/- psia AC: 120/208v, 400 cycle, 3 phase, 75 kva, 0.75 pf, 4 wire DC: 28v, 200 amp, 5.6 kw
AM32A-60B*	AIR: 130 lb/min, 50 psia AC: 120/208v, 400 cycle, 3 phase, 75 kva, 0.75 pf, 4 wire DC: 28v, 200 amp, 5.6 kw

*NOTE: During combined air and electrical loads, the pneumatic circuitry takes preference and will limit the amount of electrical power available.

USN JASU

ELECTRICAL STARTING UNITS:

NC-8A/A1	DC: 500 amp constant, 750 amp intermittent, 28v; AC: 60 kva @ .8 pf, 115/200v, 3 phase, 400 Hz.
NC-10A/A1/B/C	DC: 750 amp constant, 1000 amp intermittent, 28v; AC: 90 kva, 115/200v, 3 phase, 400 Hz.

AIR STARTING UNITS:

GTC-85/GTE-85	120 lbs/min @ 45 psi.
MSU-200NAV/A/U47A-5	204 lbs/min @ 56 psia.
WELLS AIR START SYSTEM	180 lbs/min @ 75 psi or 120 lbs/min @ 45 psi. Simultaneous multiple start capability.

COMBINED AIR AND ELECTRICAL STARTING UNITS:

NCPP-105/RCPT	180 lbs/min @ 75 psi or 120 lbs/min @ 45 psi. 700 amp, 28v DC. 120/208v, 400 Hz AC, 30 kva.
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ARMY JASU

59B2-1B	28v, 7.5 kw, 280 amp.
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OTHER JASU

ELECTRICAL STARTING UNITS (DND):

CE12	AC 115/200v, 140 kva, 400 Hz, 3 phase
CE13	AC 115/200v, 60 kva, 400 Hz, 3 phase
CE14	AC/DC 115/200v, 140 kva, 400 Hz, 3 phase, 28vDC, 1500 amp
CE15	DC 22-35v, 500 amp continuous 1100 amp intermittent
CE16	DC 22-35v, 500 amp continuous 1100 amp intermittent soft start

AIR STARTING UNITS (DND):

CA2	ASA 45.5 psig, 116.4 lb/min
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COMBINED AIR AND ELECTRICAL STARTING UNITS (DND)

CEA1	AC 120/208v, 60 kva, 400 Hz, 3 phase DC 28v, 75 amp AIR 112.5 lb/min, 47 psig
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ELECTRICAL STARTING UNITS (OTHER)

C-26	28v 45kw 115-200v 15kw 380-800 Hz 1 phase 2 wire
C-26-B, C-26-C	28v 45kw: Split Bus: 115-200v 15kw 380-800 Hz 1 phase 2 wire
E3	DC 28v/10kw

AIR STARTING UNITS (OTHER):

A4	40 psi/2 lb/sec (LPAS Mk12, Mk12L, Mk12A, Mk1, Mk2B)
MA-1	150 Air HP, 115 lb/min 50 psia
MA-2	250 Air HP, 150 lb/min 75 psia

CARTRIDGE:

MXU-4A	USAF
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AIRPORT/FACILITY DIRECTORY LEGEND

FUEL—MILITARY

Fuel available through US Military Base supply, DESC Into-Plane Contracts and/or reciprocal agreement is listed first and is followed by (Mil). At commercial airports where Into-Plane contracts are in place, the name of the refueling agent is shown. Military fuel should be used first if it is available. When military fuel cannot be obtained but Into-Plane contract fuel is available, Government aircraft must refuel with the contract fuel and applicable refueling agent to avoid any breach in contract terms and conditions. Fuel not available through the above is shown preceded by NC (no contract). When fuel is obtained from NC sources, local purchase procedures must be followed. The US Military Aircraft Identaplates DD Form 1896 (Jet Fuel), DD Form 1897 (Avgas) and AF Form 1245 (Avgas) are used at military installations only. The US Government Aviation Into-Plane Reimbursement (AIR) Card (currently issued by AVCARD) is the instrument to be used to obtain fuel under a DESC Into-Plane Contract and for NC purchases if the refueling agent at the commercial airport accepts the AVCARD. A current list of contract fuel locations is available online at https://cis.energy.dla.mil/ip_cis/. See legend item 14 for fuel code and description.

SUPPORTING FLUIDS AND SYSTEMS—MILITARY

CODE

ADI	Anti-Detonation Injection Fluid—Reciprocating Engine Aircraft.
W	Water Thrust Augmentation—Jet Aircraft.
WAI	Water-Alcohol Injection Type, Thrust Augmentation—Jet Aircraft.
SP	Single Point Refueling.
PRESAIR	Air Compressors rated 3,000 PSI or more.
De-Ice	Anti-icing/De-icing/Defrosting Fluid (MIL-A-8243).

OXYGEN:

LPOX	Low pressure oxygen servicing.
HPOX	High pressure oxygen servicing.
LHOX	Low and high pressure oxygen servicing.
LOX	Liquid oxygen servicing.
OXR	Oxygen replacement bottles. (Maintained primarily at Naval stations for use in acft where oxygen can be replenished only by replacement of cylinders.)
OX	Indicates oxygen servicing when type of servicing is unknown.
NOTE: Combinations of above items is used to indicate complete oxygen servicing available;	
LHOXR	Low and high pressure oxygen servicing and replacement bottles;
LPOXR	Low pressure oxygen replacement bottles only, etc.

NOTE: Aircraft will be serviced with oxygen procured under military specifications only. Aircraft will not be serviced with medical oxygen.

NITROGEN:

LPNIT	Low pressure nitrogen servicing.
HPNIT	High pressure nitrogen servicing.
LHNIT	Low and high pressure nitrogen servicing.

OIL—MILITARY

US AVIATION OILS (MIL SPECS):

CODE	GRADE, TYPE
O-113	1065, Reciprocating Engine Oil (MIL-L-6082)
O-117	1100, Reciprocating Engine Oil (MIL-L-6082)
O-117+	1100, O-117 plus cyclohexanone (MIL-L-6082)
O-123	1065, (Dispersant), Reciprocating Engine Oil (MIL-L-22851 Type III)
O-128	1100, (Dispersant), Reciprocating Engine Oil (MIL-L-22851 Type II)
O-132	1005, Jet Engine Oil (MIL-L-6081)
O-133	1010, Jet Engine Oil (MIL-L-6081)
O-147	None, MIL-L-6085A Lubricating Oil, Instrument, Synthetic
O-148	None, MIL-L-7808 (Synthetic Base) Turbine Engine Oil
O-149	None, Aircraft Turbine Engine Synthetic, 7.5c St
O-155	None, MIL-L-6086C, Aircraft, Medium Grade
O-156	None, MIL-L-23699 (Synthetic Base), Turboprop and Turboshaft Engines
JOAP/SOAP	Joint Oil Analysis Program. JOAP support is furnished during normal duty hours, other times on request. (JOAP and SOAP programs provide essentially the same service, JOAP is now the standard joint service supported program.)

TRANSIENT ALERT (TRAN ALERT)—MILITARY

Tran Alert service is considered to include all services required for normal aircraft turn-around, e.g., servicing (fuel, oil, oxygen, etc.), debriefing to determine requirements for maintenance, minor maintenance, inspection and parking assistance of transient aircraft. Drag chute repack, specialized maintenance, or extensive repairs will be provided within the capabilities and priorities of the base. Delays can be anticipated after normal duty hours/holidays/weekends regardless of the hours of transient maintenance operation. Pilots should not expect aircraft to be serviced for TURN-AROUNDS during time periods when servicing or maintenance manpower is not available. In the case of airports not operated exclusively by US military, the servicing indicated by the remarks will not always be available for US military aircraft. When transient alert services are not shown, facilities are unknown. NO PRIORITY BASIS—means that transient alert services will be provided only after all the requirements for mission/tactical assigned aircraft have been accomplished.

AIRPORT/FACILITY DIRECTORY LEGEND

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23 AIRPORT REMARKS

The Attendance Schedule is the months, days and hours the airport is actually attended. Airport attendance does not mean watchman duties or telephone accessibility, but rather an attendant or operator on duty to provide at least minimum services (e.g., repairs, fuel, transportation).

Airport Remarks have been grouped in order of applicability. Airport remarks are limited to those items of information that are determined essential for operational use, i.e., conditions of a permanent or indefinite nature and conditions that will remain in effect for more than 30 days concerning aeronautical facilities, services, maintenance available, procedures or hazards, knowledge of which is essential for safe and efficient operation of aircraft. Information concerning permanent closing of a runway or taxiway will not be shown. A note "See Special Notices" shall be applied within this remarks section when a special notice applicable to the entry is contained in the Special Notices section of this publication.

Parachute Jumping indicates parachute jumping areas associated with the airport. See Parachute Jumping Area section of this publication for additional information.

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.

Note: Unless otherwise stated, remarks including runway ends refer to the runway's approach end.

24 MILITARY REMARKS

Joint Civil/Military airports contain both Airport Remarks and Military Remarks. Military Remarks published for these airports are applicable only to the military. Military and joint Military/Civil airports contain only Military Remarks. Remarks contained in this section may not be applicable to civil users. When both sets of remarks exist, the first set is applicable to the primary operator of the airport. Remarks applicable to a tenant on the airport are shown preceded by the tenant organization, i.e., (A) (AF) (N) (ANG), etc. Military airports operate 24 hours unless otherwise specified. Airport operating hours are listed first (airport operating hours will only be listed if they are different than the airport attended hours or if the attended hours are unavailable) followed by pertinent remarks in order of applicability. Remarks will include information on restrictions, hazards, traffic pattern, noise abatement, customs/agriculture/immigration, and miscellaneous information applicable to the Military.

Type of restrictions:

CLOSED: When designated closed, the airport is restricted from use by all aircraft unless stated otherwise. Any closure applying to specific type of aircraft or operation will be so stated. USN/USMC/USAF airports are considered closed during non-operating hours. Closed airports may be utilized during an emergency provided there is a safe landing area.

OFFICIAL BUSINESS ONLY: The airfield is closed to all transient military aircraft for obtaining routine services such as fueling, passenger drop off or pickup, practice approaches, parking, etc. The airfield may be used by aircrews and aircraft if official government business (including civilian) must be conducted on or near the airfield and prior permission is received from the airfield manager.

AF OFFICIAL BUSINESS ONLY OR NAVY OFFICIAL BUSINESS ONLY: Indicates that the restriction applies only to service indicated.

PRIOR PERMISSION REQUIRED (PPR): Airport is closed to transient aircraft unless approval for operation is obtained from the appropriate commander through Chief, Airfield Management or Airfield Operations Officer. Official Business or PPR does not preclude the use of US Military airports as an alternate for IFR flights. If a non-US military airport is used as a weather alternate and requires a PPR, the PPR must be requested and confirmed before the flight departs. The purpose of PPR is to control volume and flow of traffic rather than to prohibit it. Prior permission is required for all aircraft requiring transient alert service outside the published transient alert duty hours. All aircraft carrying hazardous materials must obtain prior permission as outlined in AFJI 11-204, AR 95-27, OPNAVINST 3710.7.

Note: OFFICIAL BUSINESS ONLY AND PPR restrictions are not applicable to Special Air Mission (SAM) or Special Air Resource (SPAR) aircraft providing person or persons on board are designated Code 6 or higher as explained in AFJMAN 11-213, AR 95-11, OPNAVINST 3722-8J. Official Business Only or PPR do not preclude the use of the airport as an alternate for IFR flights.

25 AIRPORT MANAGER

The phone number of the airport manager.

26 WEATHER DATA SOURCES

Weather data sources will be listed alphabetically followed by their assigned frequencies and/or telephone number and hours of operation.

ASOS—Automated Surface Observing System. Reports the same as an AWOS-3 plus precipitation identification and intensity, and freezing rain occurrence;

AWOS—Automated Weather Observing System

AWOS-A—reports altimeter setting (all other information is advisory only).

AWOS-AV—reports altimeter and visibility.

AWOS-1—reports altimeter setting, wind data and usually temperature, dew point 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.

AWOS-3P reports the same as the AWOS-3 system, plus a precipitation identification sensor.

AWOS-3PT reports the same as the AWOS-3 system, plus precipitation identification sensor and a thunderstorm/lightning reporting capability.

AIRPORT/FACILITY DIRECTORY LEGEND

AWOS-3T reports the same as AWOS-3 system and includes a thunderstorm/lightning reporting capability.

See AIM, Basic Flight Information and ATC Procedures for detailed description of Weather Data Sources.

AWOS-4—reports same as AWOS-3 system, plus precipitation occurrence, type and accumulation, freezing rain, thunderstorm and runway surface sensors.

HIWAS—See RADIO AIDS TO NAVIGATION

LAWRS—Limited Aviation Weather Reporting Station where observers report cloud height, weather, obstructions to vision, temperature and dewpoint (in most cases), surface wind, altimeter and pertinent remarks.

LLWAS—indicates a Low Level Wind Shear Alert System consisting of a center field and several field perimeter anemometers.

SAWRS—identifies airports that have a Supplemental Aviation Weather Reporting Station available to pilots for current weather information.

SWSL—Supplemental Weather Service Location providing current local weather information via radio and telephone.

TDWR—indicates airports that have Terminal Doppler Weather Radar.

WSP—indicates airports that have Weather System Processor.

When the automated weather source is broadcast over an associated airport NAVAID frequency (see NAVAID line), it shall be indicated by a bold ASOS, AWOS, or HIWAS followed by the frequency, identifier and phone number, if available.

27 COMMUNICATIONS

Airport terminal control facilities and radio communications associated with the airport shall be shown. When the call sign is not the same as the airport name the call sign will be shown. Frequencies shall normally be shown in descending order with the primary frequency listed first. Frequencies will be listed, together with sectorization indicated by outbound radials, and hours of operation. Communications will be listed in sequence as follows:

Single Frequency Approach (SFA), Common Traffic Advisory Frequency (CTAF), Aeronautical Advisory Stations (UNICOM) or (AUNICOM), and Automatic Terminal Information Service (ATIS) along with their frequency is shown, where available, on the line following the heading "COMMUNICATIONS." When the CTAF and UNICOM frequencies are the same, the frequency will be shown as CTAF/UNICOM 122.8.

The FSS telephone nationwide is toll free 1-800-WX-BRIEF (1-800-992-7433). When the FSS is located on the field it will be indicated as "on arpt". Frequencies available at the FSS will follow in descending order. Remote Communications Outlet (RCO) providing service to the airport followed by the frequency and FSS RADIO name will be shown when available. FSS's provide information on airport conditions, radio aids and other facilities, and process flight plans. Airport Advisory Service (AAS) is provided on the CTAF by FSS's for select non-tower airports or airports where the tower is not in operation.

(See AIM, Para 4-1-9 Traffic Advisory Practices at Airports Without Operating Control Towers 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 that is remotely controlled and provides 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 operated on 122.0, 122.2, 123.6; emergency 121.5; plus receive-only on 122.1.

- a. 122.0 is assigned as the Enroute Flight Advisory Service frequency at selected FSS RADIO outlets.
- b. 122.2 is assigned as a common enroute frequency.
- c. 123.6 is assigned as the airport advisory frequency at select non-tower locations. At airports with a tower, FSS may provide airport advisories on the tower frequency when tower is closed.
- d. 122.1 is the primary receive-only frequency at VOR's.
- e. Some FSS's are assigned 50 kHz frequencies in the 122-126 MHz band (eg. 122.45). 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.

Emergency frequency 121.5 and 243.0 are available at all Flight Service Stations, most Towers, Approach Control and RADAR facilities.

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 (NAVAID) frequencies are transmit only. In cases where communications frequencies are annotated with (R) or (E), (R) indicates Radar Capability and (E) indicates Emergency Frequency.

TERMINAL SERVICES

SFA—Single Frequency Approach.

CTAF—A program designed to get all vehicles and aircraft at airports without an operating control tower on a common frequency.

ATIS—A continuous broadcast of recorded non-control information in selected terminal areas.

D-ATIS—Digital ATIS provides ATIS information in text form outside the standard reception range of conventional ATIS via landline & data link communications and voice message within range of existing transmitters.

AUNICOM—Automated UNICOM is a computerized, command response system that provides automated weather, radio check capability and airport advisory information selected from an automated menu by microphone clicks.

UNICOM—A non-government air/ground radio communications facility which may provide airport information.

PTD—Pilot to Dispatcher.

APP CON—Approach Control. The symbol **Ⓡ** indicates radar approach control.

TOWER—Control tower.

GCA—Ground Control Approach System.

GND CON—Ground Control.

Legend 20. Airport/Facility Directory Legend from Chart Supplement.

AIRPORT/FACILITY DIRECTORY LEGEND

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GCO—Ground Communication Outlet—An unstaffed, remotely controlled, ground/ground communications facility. Pilots at uncontrolled airports may contact ATC and FSS via VHF to a telephone connection to obtain an instrument clearance or close a VFR or IFR flight plan. They may also get an updated weather briefing prior to takeoff. Pilots will use four “key clicks” on the VHF radio to contact the appropriate ATC facility or six “key clicks” to contact the FSS. The GCO system is intended to be used only on the ground.

DEP CON—Departure Control. The symbol **Ⓡ** indicates radar departure control.

CLNC DEL—Clearance Delivery.

CPDLC—Controller Pilot Data Link Communication. FANS ATC data communication capability from the aircraft to the ATC Data Link system.

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.

COMD POST—Command Post followed by the operator call sign in parenthesis.

PMSV—Pilot-to-Metro Service call sign, frequency and hours of operation, when full service is other than continuous. PMSV installations at which weather observation service is available shall be indicated, following the frequency and/or hours of operation as “Wx obsn svc 1900–0000Z $\frac{1}{4}$ ” or “other times” may be used when no specific time is given. PMSV facilities manned by forecasters are considered “Full Service”. PMSV facilities manned by weather observers are listed as “Limited Service”.

OPS—Operations followed by the operator call sign in parenthesis.

CON

RANGE

FLT FLW—Flight Following

MEDIVAC

NOTE: Communication frequencies followed by the letter “X” indicate frequency available on request.

Ⓢ AIRSPACE

Information concerning Class B, C, and part-time D and E surface area airspace shall be published with effective times, if available.

CLASS B—Radar Sequencing and Separation Service for all aircraft in CLASS B airspace.

CLASS C—Separation between IFR and VFR aircraft and sequencing of VFR arrivals to the primary airport.

TRSA—Radar Sequencing and Separation Service for participating VFR Aircraft within a Terminal Radar Service Area.

Class C, D, and E airspace described in this publication is that airspace usually consisting of a 5 NM radius core surface area that begins at the surface and extends upward to an altitude above the airport elevation (charted in MSL for Class C and Class D). Class E surface airspace normally extends from the surface up to but not including the overlying controlled airspace.

When part-time Class C or Class D airspace defaults to Class E, the core surface area becomes Class E. This will be formatted as:

AIRSPACE: CLASS C svc “times” ctc **APP CON** other times CLASS E:

or

AIRSPACE: CLASS D svc “times” other times CLASS E.

When a part-time Class C, Class D or Class E surface area defaults to Class G, the core surface area becomes Class G up to, but not including, the overlying controlled airspace. Normally, the overlying controlled airspace is Class E airspace beginning at either 700’ or 1200’ AGL and may be determined by consulting the relevant VFR Sectional or Terminal Area Charts. This will be formatted as:

AIRSPACE: CLASS C svc “times” ctc **APP CON** other times CLASS G, with CLASS E 700’ (or 1200’) AGL & abv:

or

AIRSPACE: CLASS D svc “times” other times CLASS G with CLASS E 700’ (or 1200’) AGL & abv:

or

AIRSPACE: CLASS E svc “times” other times CLASS G with CLASS E 700’ (or 1200’) AGL & abv.

NOTE: AIRSPACE SVC “TIMES” INCLUDE ALL ASSOCIATED ARRIVAL EXTENSIONS. Surface area arrival extensions for instrument approach procedures become part of the primary core surface area. These extensions may be either Class D or Class E airspace and are effective concurrent with the times of the primary core surface area. For example, when a part-time Class C, Class D or Class E surface area defaults to Class G, the associated arrival extensions will default to Class G at the same time. When a part-time Class C or Class D surface area defaults to Class E, the arrival extensions will remain in effect as Class E airspace.

NOTE: CLASS E AIRSPACE EXTENDING UPWARD FROM 700 FEET OR MORE ABOVE THE SURFACE, DESIGNATED IN CONJUNCTION WITH AN AIRPORT WITH AN APPROVED INSTRUMENT PROCEDURE.

Class E 700’ AGL (shown as magenta vignette on sectional charts) and 1200’ AGL (blue vignette) areas are designated when necessary to provide controlled airspace for transitioning to/from the terminal and enroute environments. Unless otherwise specified, these 700’/1200’ AGL Class E airspace areas remain in effect continuously, regardless of airport operating hours or surface area status. These transition areas should not be confused with surface areas or arrival extensions.

(See Chapter 3, AIRSPACE, in the Aeronautical Information Manual for further details)

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AIRPORT/FACILITY DIRECTORY LEGEND

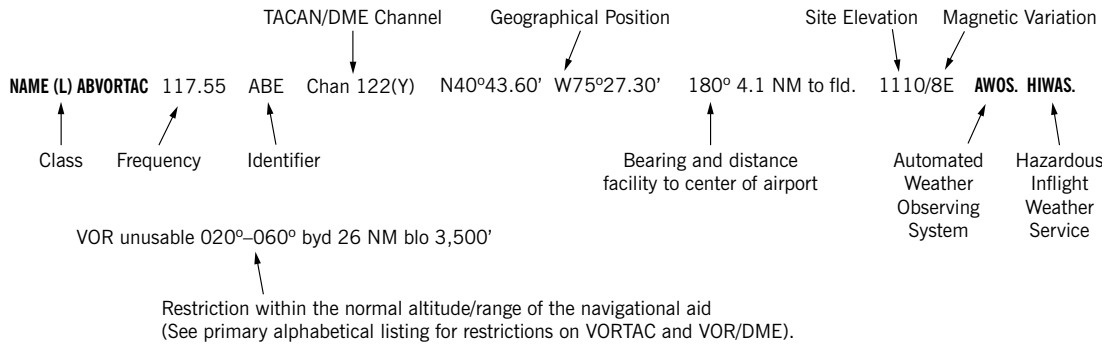
②9 **VOR TEST FACILITY (VOT)**

The VOT transmits a signal which provided users a convenient means to determine the operational status and accuracy of an aircraft VOR receiver while on the ground. Ground based VOTs and the associated frequency shall be shown when available. VOTs are also shown with identifier, frequency and referenced remarks in the VOR Receiver Check section in the back of this publication.

③0 **RADIO AIDS TO NAVIGATION**

The Airport/Facility Directory section of the Chart Supplement lists, by facility name, all Radio Aids to Navigation that appear on FAA, Aeronautical Information Services Visual or IFR Aeronautical Charts and those upon which the FAA has approved an Instrument Approach Procedure, with exception of selected TACANs. All VOR, VORTAC, TACAN and ILS 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 monitoring 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 from that shown on the Radio Aids to Navigation line, it will be shown with the NAVAID listing. NOTAM file identifiers for ILSs and its components (e.g., NDB (LOM) are the same as the associated airports and are not repeated. Automated Surface Observing System (ASOS), Automated Weather Observing System (AWOS), and Hazardous Inflight Weather Advisory Service (HIWAS) will be shown when this service is broadcast over selected NAVAIDS.

NAVAID information is tabulated as indicated in the following sample:



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 throughout the U.S.

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

AIRPORT/FACILITY DIRECTORY LEGEND

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RADIO CLASS DESIGNATIONS

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

SSV Class	Altitudes	Distance (NM)
(T) Terminal	1000' to 12,000'	25
(L) Low Altitude	1000' to 18,000'	40
(H) High Altitude	1000' to 14,500'	40
	14,500' to 18,000'	100
	18,000' to 45,000'	130
	45,000' to 60,000'	100

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

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

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

AIRPORT/FACILITY DIRECTORY LEGEND

ILS FACILITY PERFORMANCE CLASSIFICATION CODES


Codes define the ability of an ILS to support autoland operations. The two portions of the code represent Official Category and farthest point along a Category I, II, or III approach that the Localizer meets Category III structure tolerances.

Official Category: I, II, or III; the lowest minima on published or unpublished procedures supported by the ILS.

Farthest point of satisfactory Category III Localizer performance for Category I, II, or III approaches: A – 4 NM prior to runway threshold, B – 3500 ft prior to runway threshold, C – glide angle dependent but generally 750–1000 ft prior to threshold, T – runway threshold, D – 3000 ft after runway threshold, and E – 2000 ft prior to stop end of runway.

ILS information is tabulated as indicated in the following sample:

ILS/DME 108.5 I-ORL Chan 22 Rwy 18. Class IIE. LOM HERNY NDB.

ILS Facility Performance Classification Code 

FREQUENCY PAIRING TABLE

VHF FREQUENCY	TACAN CHANNEL	VHF FREQUENCY	TACAN CHANNEL	VHF FREQUENCY	TACAN CHANNEL	VHF FREQUENCY	TACAN CHANNEL
108.10	18X	108.55	22Y	111.05	47Y	114.85	95Y
108.30	20X	108.65	23Y	111.15	48Y	114.95	96Y
108.50	22X	108.75	24Y	111.25	49Y	115.05	97Y
108.70	24X	108.85	25Y	111.35	50Y	115.15	98Y
108.90	26X	108.95	26Y	111.45	51Y	115.25	99Y
109.10	28X	109.05	27Y	111.55	52Y	115.35	100Y
109.30	30X	109.15	28Y	111.65	53Y	115.45	101Y
109.50	32X	109.25	29Y	111.75	54Y	115.55	102Y
109.70	34X	109.35	30Y	111.85	55Y	115.65	103Y
109.90	36X	109.45	31Y	111.95	56Y	115.75	104Y
110.10	38X	109.55	32Y	113.35	80Y	115.85	105Y
110.30	40X	109.65	33Y	113.45	81Y	115.95	106Y
110.50	42X	109.75	34Y	113.55	82Y	116.05	107Y
110.70	44X	109.85	35Y	113.65	83Y	116.15	108Y
110.90	46X	109.95	36Y	113.75	84Y	116.25	109Y
111.10	48X	110.05	37Y	113.85	85Y	116.35	110Y
111.30	50X	110.15	38Y	113.95	86Y	116.45	111Y
111.50	52X	110.25	39Y	114.05	87Y	116.55	112Y
111.70	54X	110.35	40Y	114.15	88Y	116.65	113Y
111.90	56X	110.45	41Y	114.25	89Y	116.75	114Y
108.05	17Y	110.55	42Y	114.35	90Y	116.85	115Y
108.15	18Y	110.65	43Y	114.45	91Y	116.95	116Y
108.25	19Y	110.75	44Y	114.55	92Y	117.05	117Y
108.35	20Y	110.85	45Y	114.65	93Y	117.15	118Y
108.45	21Y	110.95	46Y	114.75	94Y	117.25	119Y

FREQUENCY PAIRING TABLE

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

TACAN CHANNEL	VHF FREQUENCY	TACAN CHANNEL	VHF FREQUENCY	TACAN CHANNEL	VHF FREQUENCY	TACAN CHANNEL	VHF FREQUENCY
2X	134.5	25X	108.80	36X	109.90	47X	111.00
2Y	134.55	25Y	108.85	36Y	109.95	47Y	111.05
11X	135.4	26X	108.90	37X	110.00	48X	111.10
11Y	135.45	26Y	108.95	37Y	110.05	48Y	111.15
12X	135.5	27X	109.00	38X	110.10	49X	111.20
12Y	135.55	27Y	109.05	38Y	110.15	49Y	111.25
17X	108.00	28X	109.10	39X	110.20	50X	111.30
17Y	108.05	28Y	109.15	39Y	110.25	50Y	111.35
18X	108.10	29X	109.20	40X	110.30	51X	111.40
18Y	108.15	29Y	109.25	40Y	110.35	51Y	111.45
19X	108.20	30X	109.30	41X	110.40	52X	111.50
19Y	108.25	30Y	109.35	41Y	110.45	52Y	111.55
20X	108.30	31X	109.40	42X	110.50	53X	111.60
20Y	108.35	31Y	109.45	42Y	110.55	53Y	111.65
21X	108.40	32X	109.50	43X	110.60	54X	111.70
21Y	108.45	32Y	109.55	43Y	110.65	54Y	111.75
22X	108.50	33X	109.60	44X	110.70	55X	111.80
22Y	108.55	33Y	109.65	44Y	110.75	55Y	111.85
23X	108.60	34X	109.70	45X	110.80	56X	111.90
23Y	108.65	34Y	109.75	45Y	110.85	56Y	111.95
24X	108.70	35X	109.80	46X	110.90	57X	112.00
24Y	108.75	35Y	109.85	46Y	110.95	57Y	112.05

Legend 24. Airport/Facility Directory Legend from Chart Supplement.

AIRPORT/FACILITY DIRECTORY LEGEND

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TACAN CHANNEL	VHF FREQUENCY	TACAN CHANNEL	VHF FREQUENCY	TACAN CHANNEL	VHF FREQUENCY	TACAN CHANNEL	VHF FREQUENCY
58X	112.10	77X	113.00	96X	114.90	115X	116.80
58Y	112.15	77Y	113.05	96Y	114.95	115Y	116.85
59X	112.20	78X	113.10	97X	115.00	116X	116.90
59Y	112.25	78Y	113.15	97Y	115.05	116Y	116.95
60X	133.30	79X	113.20	98X	115.10	117X	117.00
60Y	133.35	79Y	113.25	98Y	115.15	117Y	117.05
61X	133.40	80X	113.30	99X	115.20	118X	117.10
61Y	133.45	80Y	113.35	99Y	115.25	118Y	117.15
62X	133.50	81X	113.40	100X	115.30	119X	117.20
62Y	133.55	81Y	113.45	100Y	115.35	119Y	117.25
63X	133.60	82X	113.50	101X	115.40	120X	117.30
63Y	133.65	82Y	113.55	101Y	115.45	120Y	117.35
64X	133.70	83X	113.60	102X	115.50	121X	117.40
64Y	133.75	83Y	113.65	102Y	115.55	121Y	117.45
65X	133.80	84X	113.70	103X	115.60	122X	117.50
65Y	133.85	84Y	113.75	103Y	115.65	122Y	117.55
66X	133.90	85X	113.80	104X	115.70	123X	117.60
66Y	133.95	85Y	113.85	104Y	115.75	123Y	117.65
67X	134.00	86X	113.90	105X	115.80	124X	117.70
67Y	134.05	86Y	113.95	105Y	115.85	124Y	117.75
68X	134.10	87X	114.00	106X	115.90	125X	117.80
68Y	134.15	87Y	114.05	106Y	115.95	125Y	117.85
69X	134.20	88X	114.10	107X	116.00	126X	117.90
69Y	134.25	88Y	114.15	107Y	116.05	126Y	117.95
70X	112.30	89X	114.20	108X	116.10		
70Y	112.35	89Y	114.25	108Y	116.15		
71X	112.40	90X	114.30	109X	116.20		
71Y	112.45	90Y	114.35	109Y	116.25		
72X	112.50	91X	114.40	110X	116.30		
72Y	112.55	91Y	114.45	110Y	116.35		
73X	112.60	92X	114.50	111X	116.40		
73Y	112.65	92Y	114.55	111Y	116.45		
74X	112.70	93X	114.60	112X	116.50		
74Y	112.75	93Y	114.65	112Y	116.55		
75X	112.80	94X	114.70	113X	116.60		
75Y	112.85	94Y	114.75	113Y	116.65		
76X	112.90	95X	114.80	114X	116.70		
76Y	112.95	95Y	114.85	114Y	116.75		

③1 **COMM/NAV/WEATHER REMARKS:** These remarks consist of pertinent information affecting the current status of communications, NAVAIDs, weather, and in the absence of air-ground radio outlets identified in the Communications section some approach control facilities will have a clearance delivery phone number listed here.

INOP COMPONENTS 18088

INOPERATIVE COMPONENTS OR VISUAL AIDS TABLE
(For Civil Use Only)

Straight-in and Sidestep landing minimums published on instrument approach procedure charts are based on full operation of all components and visual aids associated with the particular 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 glideslope inoperative minimums are published on the instrument approach charts as localizer minimums. This table applies to approach categories A thru D and is to be used unless amended by notes on the approach chart. Such notes apply only to the particular approach category(ies) as stated. Category E inoperative notes will be specified when published on civil charts. The inoperative table does not apply to Circling minimums. See legend page for description of components indicated below.

(1) ILS, PAR, LPV, GLS minima

Inoperative Component or Visual Aid	Increase Visibility
All ALS types (except ODALS)	¼ mile

(2) ILS, LPV, GLS with visibility minima of RVR 1800[†]/2000*/2200*

Inoperative Component or Visual Aid	Increase Visibility
ALSF 1 & 2, MALSR, SSALR	To RVR 4000 [†] To RVR 4500*
TDZL or RCLS	To RVR 2400#
RVR	To ½ mile

#For ILS, LPV, GLS procedures with a 200 foot HAT, RVR 1800 authorized with use of FD or AP or HUD to DA.

(3) All Approach Types and all lines of minima other than (1) & (2) above

Inoperative Component or Visual Aid	Increase Visibility
ALSF 1 & 2, MALSR, SSALR	½ mile
MALSF, MALS, SSALF, SSALS, SALSF, SALS	¼ mile

(4) Sidestep minima (CAT C-D)

Inoperative Component or Visual Aid to Sidestep Runway	Increase Visibility
ALSF 1 & 2, MALSR, SSALR	½ mile

(5) All Approach Types, All lines of minima

Inoperative Component or Visual Aid	Increase Visibility
ODALS (CAT A-B)	¼ mile
ODALS (CAT C-D)	⅛ mile

INOP COMPONENTS 18088

Legend 26. U.S. Terminal Procedures Inoperative Components or Visual Aids Table.

TERMS/LANDING MINIMA DATA 17117

IFR LANDING MINIMA

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

LANDING MINIMA FORMAT

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

Category	A	B	C	D
S-ILS 27	1352/24		200	(200-½)
S-LOC 27	1440/24	288	(300-½)	1440/50 288 (300-1)
CIRCLING	1540-1 361 (400-1)	1640-1 461 (500-1)	1640-1½ 461 (500-1½)	1740-2 561 (600-2)

Labels: DA, Visibility (RVR 100's of feet), Aircraft Approach Category HAT/HATh, MDA, HAA, Visibility in Statute Miles.

Annotations: Straight-in ILS to Runway 27, Straight-in with Glide Slope Inoperative or not used to Runway 27, Copter Approach Direction, Height of MDA/DA Above Landing Area (HAL).

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

COPTER MINIMA ONLY

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

No circling minimums are provided.

NOTE: The **W** symbol indicates outages of the WAAS vertical guidance may occur daily at this location due to initial system limitations. WAAS NOTAMS for vertical outages are not provided for this approach. Use LNAV minima for flight planning at these locations, whether as a destination or alternate. For flight operations at these locations, when the WAAS avionics indicate that LNAV/VNAV or LPV service is available, then vertical guidance may be used to complete the approach using the displayed level of service. Should an outage occur during the procedure, reversion to LNAV minima may be required. As the WAAS coverage is expanded, the **W** will be removed.

RNAV minimums are dependent on navigation equipment capability, as stated in the applicable AFM, AFMS, or other FAA approved document. See AIM paragraph 5-4-5, AC 90-105 and AC 90-107 for detailed requirements for each line of minima.

COLD TEMPERATURE RESTRICTED AIRPORTS

NOTE: A **❄**-12°C symbol indicates a cold temperature altitude correction is required at this airport when reported temperature is at or below the published restricted temperature. Pilots familiar with cold temperature procedure in the Notice to Airmen Publication (NTAP) and correcting all altitudes from the IAF to the MA final holding altitude do not have to reference the NTAP. Pilots wishing to correct on individual segments must reference the NTAP airport list for affected segments. See Notice to Airmen Publication (NTAP) Graphic Notices General for complete list of published airports, temperature, segments, and procedure information. www.faa.gov/air_traffic/publications/notices. Pilots will advise ATC with the required altitude correction when making a correction to any segment other than the final segment. See following Cold Temperature Error Table to make manual corrections.

COLD TEMPERATURE ERROR TABLE

HEIGHT ABOVE AIRPORT IN FEET

REPORTED TEMP °C	200	300	400	500	600	700	800	900	1000	1500	2000	3000	4000	5000
+10	10	10	10	10	20	20	20	20	20	30	40	60	80	90
0	20	20	30	30	40	40	50	50	60	90	120	170	230	280
-10	20	30	40	50	60	70	80	90	100	150	200	290	390	490
-20	30	50	60	70	90	100	120	130	140	210	280	420	570	710
-30	40	60	80	100	120	140	150	170	190	280	380	570	760	950
-40	50	80	100	120	150	170	190	220	240	360	480	720	970	1210
-50	60	90	120	150	180	210	240	270	300	450	590	890	1190	1500

AIRCRAFT APPROACH CATEGORIES

Aircraft approach category indicates a grouping of aircraft based on a speed of VREF, if specified, or if VREF not specified, 1.3 VSO at the maximum certificated landing weight. VREF, VSO, and the maximum certificated landing weight are those values as established for the aircraft by the certification authority of the country of registry. Helicopters are Category A aircraft. An aircraft shall fit in only one category. However, if it is necessary to operate at a speed in excess of the upper limit of the speed range for an aircraft's category, the minimums for the category for that speed shall be used. For example, an airplane which fits into Category B, but is circling to land at a speed of 145 knots, shall use the approach Category D minimums. As an additional example, a Category A airplane (or helicopter) which is operating at 130 knots on a straight-in approach shall use the approach Category C minimums. 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

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CIRCLING APPROACH OBSTACLE PROTECTED AIRSPACE

The circling MDA provides vertical obstacle clearance during a circle-to-land maneuver. The circling MDA protected area extends from the threshold of each runway authorized for landing following a circle-to-land maneuver for a distance as shown in the tables below. The resultant arcs are then connected tangentially to define the protected area.

STANDARD CIRCLING APPROACH MANEUVERING RADIUS

Circling approach protected areas developed prior to late 2012 used the radius distances shown in the following table, expressed in nautical miles (NM), dependent on aircraft approach category. The approaches using standard circling approach areas can be identified by the absence of the **C** symbol on the circling line of minima.

Circling MDA in feet MSL	Approach Category and Circling Radius (NM)				
	CAT A	CAT B	CAT C	CAT D	CAT E
All Altitudes	1.3	1.5	1.7	2.3	4.5

C EXPANDED CIRCLING APPROACH MANEUVERING AIRSPACE RADIUS

Circling approach protected areas developed after late 2012 use the radius distance shown in the following table, expressed in nautical miles (NM), dependent on aircraft approach category, and the altitude of the circling MDA, which accounts for true airspeed increase with altitude. The approaches using expanded circling approach areas can be identified by the presence of the **C** symbol on the circling line of minima.

Circling MDA in feet MSL	Approach Category and Circling Radius (NM)				
	CAT A	CAT B	CAT C	CAT D	CAT E
1000 or less	1.3	1.7	2.7	3.6	4.5
1001-3000	1.3	1.8	2.8	3.7	4.6
3001-5000	1.3	1.8	2.9	3.8	4.8
5001-7000	1.3	1.9	3.0	4.0	5.0
7001-9000	1.4	2.0	3.2	4.2	5.3
9001 and above	1.4	2.1	3.3	4.4	5.5

Comparable Values of RVR and Visibility

The following table shall be used for converting RVR to ground or flight visibility. For converting RVR values that fall between listed values, use the next higher RVR value; do not interpolate. For example, when converting 1800 RVR, use 2400 RVR with the resultant visibility of ½ mile.

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

RADAR MINIMA

	RWY	GP/TCH/RPI	CAT	DA/ MDA-VIS	HAT/ HATh/ HAA	CEIL-VIS	CAT	DA/ MDA-VIS	HAT/ HATh/ HAA	CEIL-VIS
PAR	10	2.5°/42/1000	ABCDE	195/16	100	(100-¼)				
	28	2.5°/48/1068	ABCDE	187/16	100	(100-¼)				
ASR	10		ABC	560/40	463	(500-¾)	DE	560/50	463	(500-1)
	28		AB	600/50	513	(600-1)	CDE	600/60	513	(600-1¼)
CIR	10		AB	560-1¼	463	(500-1¼)	CDE	560-1½	463	(500-1½)
	28		AB	600-1¼	503	(600-1¼)	CDE	600-1½	503	(600-1½)

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.

NOTE: Military RADAR MINIMA may be shown with communications symbology that indicates emergency frequency monitoring capability by the radar facility as follows:

- (E) VHF and UHF emergency frequencies monitored
- (V) VHF emergency frequency (121.5) monitored
- (U) UHF emergency frequency (243.0) monitored

Additionally, unmonitored frequencies which are available on request from the controlling agency may be annotated with an "x".

- ▲ Alternate Minima not standard. Civil users refer to tabulation. USA/USN/USAF pilots refer to appropriate regulations.
- ▲ NA Alternate minima are Not Authorized due to unmonitored facility or absence of weather reporting service.
- ▼ Airport is published in the Takeoff Minima, (Obstacle) Departure Procedures, and Diverse Vector Area (Radar Vectors) tabulation.

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GENERAL INFORMATION

This publication is issued every 56 days and includes Standard Instrument Approach Procedures (SIAPs), Standard Instrument Departures (SIDs), Standard Terminal Arrivals (STARs), IFR Takeoff Minimums and (Obstacle) Departure Procedures (ODPs), IFR Alternate Minimums, and Radar Instrument Approach Minimums for use by civil and military aviation. The organization responsible for SIAPs, Radar Minimums, SIDs, STARs and graphic ODPs is identified in parentheses in the top margin of the procedure; e.g., (FAA), (FAA-O), (USA), (USAF), (USN). SIAPs with the (FAA) and (FAA-O) designation are regulated under 14 CFR, Part 97. SIAPs with the (FAA-O) designation have been developed under Other Transaction Agreement (OTA) by private providers and have been certified by the FAA. See 14 CFR, Part 91.175 (a) and the AIM for further details. 14 CFR, Part 91.175 (g) and the Special Notices section of the Chart Supplement contains information on civil operations at military airports.

The FAA uses an internal numbering system on all charts in the TPP. This Approach and Landing (AL) number is located on the top center margin of the chart followed by the organization responsible for the procedure in parentheses, e.g., AL-18 (FAA), AL-227 (USAF).

CHART CURRENCY INFORMATION

Date of Latest Revision 09365

The Date of Latest Revision identifies the Julian date the chart was added or last revised for any reason. The first two digits indicate the year, the last three digits indicate the day of the year (001 to 365/6) in which the latest revision of any kind has been made to the chart.

FAA Procedure Amendment Number	←	Orig 31DEC09 Amdt 2B 12MAR09	←	Procedure Amendment Effective Date
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The FAA Procedure Amendment Number represents the most current amendment of a given procedure. The Procedure Amendment Effective Date represents the AIRAC cycle date on which the procedure amendment was incorporated into the chart. Updates to the amendment number & effective date represent procedural/criteria revisions to the charted procedure, e.g., course, fix, altitude, minima, etc.

NOTE: Inclusion of the "Procedure Amendment Effective Date" will be phased in as procedures are amended. As this occurs, the Julian date will be relocated to the upper right corner of the chart.

MISCELLANEOUS

- ★ Indicates a non-continuously operating facility, see Chart Supplement.
- For Civil (FAA) instrument procedures, "RADAR REQUIRED" in the planview of the chart indicates that ATC radar must be available to assist the pilot when transitioning from the en route environment. "Radar required" in the pilot briefing portion of the chart indicates that ATC radar is required on portions of the procedure outside the final approach segment, including the missed approach. Some military procedures also have equipment requirements such as "Radar Required", but do not conform to the same charting application standards used by the FAA. Distances in nautical miles (except visibility in statute miles and Runway Visual Range in hundreds of feet). Runway Dimensions in feet. Elevations in feet. Mean Sea Level (MSL). Ceilings in feet above airport elevation. Radials/bearings/headings/courses are magnetic. Horizontal Datum: Unless otherwise noted on the chart, all coordinates are referenced to North American Datum 1983 (NAD 83), which for charting purposes is considered equivalent to World Geodetic System 1984 (WGS 84).

Terrain is scaled within the neat lines (planview boundaries) and does not accurately underlie not-to-scale distance depictions or symbols.

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STANDARD TERMINAL ARRIVALS AND DEPARTURE PROCEDURES

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

RNAV DP and STAR. Effective March 15, 2007, these procedures, formerly identified as Type-A and Type-B, will be designated as RNAV 1 in accordance with amended Advisory Circular (AC) and ICAO terminology.

Refer to AC 90-100A U.S. TERMINAL AND EN ROUTE AREA NAVIGATION (RNAV) OPERATIONS and the Aeronautical Information Manual for additional guidance regarding these procedures.

Standard RNAV 1 Procedure Chart Notes

- NOTE: RNAV 1
- NOTE: DME/DME/IRU or GPS required

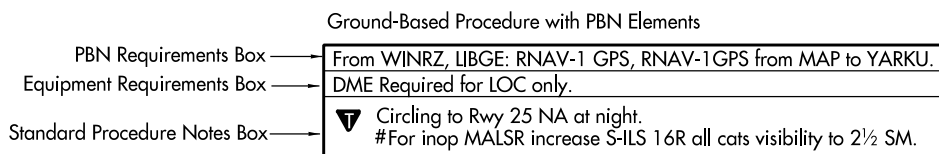
Some procedures may require use of GPS and will be identified by a "GPS required" note.

RNAV 1 Procedure Characteristics and Operations

1. Require use of an RNAV system with DME/DME/IRU, and/or GPS inputs.
2. Require use of a CDI, flight director, and/or autopilot, in lateral navigation mode, for flight guidance while operating on RNAV paths (track, course, or direct leg). Other methods providing an equivalent level of performance may be acceptable.
3. RNAV paths may start as low as 500 feet above airport elevation.

PROCEDURE EQUIPMENT REQUIREMENTS

Users will begin to see Performance-Based Navigation (PBN) Requirements and ground-based Equipment Requirements prominently displayed in separate, standardized notes boxes. For procedures with PBN elements, the PBN box will contain the procedure's navigation specification(s); and, if required: specific sensors or infrastructure needed for the navigation solution; any additional or advanced functional requirements; the minimum Required Navigation Performance (RNP) value and any amplifying remarks. Items listed in this PBN box are REQUIRED for the procedure's PBN elements. The separate Equipment Requirements Box will list ground-based equipment requirements. On procedures with both PBN elements and equipment requirements, the PBN requirements box will be listed first. The publication of these notes will continue incrementally until all charts have been amended to comply with the new standard.



PILOT CONTROLLED AIRPORT LIGHTING SYSTEMS

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

1. Approach lighting systems that bear a system identification are symbolized using negative symbology, e.g., , , .
2. Approach lighting systems that do not bear a system identification are indicated with a negative "L" beside the name. A star (*) indicates non-standard PCL, consult Chart Supplement, e.g., .

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

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

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ABBREVIATIONS

AAUP.....	Attention All Users Page	GPS.....	Global Positioning System
ADF.....	Automatic Direction Finder	GS.....	Glide Slope
ADIZ.....	Air Defense Identification Zone	HAA.....	Height above Airport
AFIS.....	Automatic Flight Information Service	HAL.....	Height above Landing
ALS.....	Approach Light System	HAT.....	Height above Touchdown
ALSF.....	Approach Light System with Sequenced Flashing Lights	HATh.....	Height Above Threshold
AP.....	Autopilot System	HGS.....	Head-up Guidance System
APCH.....	Approach	HIRL.....	High Intensity Runway Lights
APP CON.....	Approach Control	HUD.....	Head-up Display
ARR.....	Arrival	IAF.....	Initial Approach Fix
ASOS.....	Automated Surface Observing System	ICAO.....	International Civil Aviation Organization
ASR/PAR.....	Published Radar Minimums at this Airport	IF.....	Intermediate Fix
ASSC.....	Airport Surface Surveillance Systems	IM.....	Inner Marker
ATIS.....	Automatic Terminal Information Service	INOP.....	Inoperative
AUNICOM.....	Automated UNICOM	INT.....	Intersection
AWOS.....	Automated Weather Observing System	K.....	Knots
AZ.....	Azimuth	KIAS.....	Knots Indicated Airspeed
BC.....	Back Course	LAAS.....	Local Area Augmentation System
BND.....	Bound	LDA.....	Localizer Type Directional Aid
C.....	Circling	Ldg.....	Landing
CAT.....	Category	LIRL.....	Low Intensity Runway Lights
CCW.....	Counter Clockwise	LNAV.....	Lateral Navigation
CDI.....	Course Deviation Indicator	LOC.....	Localizer
Chan.....	Channel	LP.....	Localizer Performance
CIFP.....	Coded Instrument Flight Procedures	LPV.....	Localizer Performance with Vertical Guidance
CIR.....	Circling	LR.....	Lead Radial. Provides at least 2 NM (Copter 1 NM) of lead to assist in turning onto the intermediate/final course.
CLNC DEL.....	Clearance Delivery	MAA.....	Maximum Authorized Altitude
CNF.....	Computer Navigation Fix	MALS.....	Medium Intensity Approach Light System
CTAF.....	Common Traffic Advisory Frequency	MALSF.....	Medium Approach Lighting System with Sequenced Flashers
CW.....	Clockwise	MALSR.....	Medium Intensity Approach Light System with RAIL
D-ATIS.....	Digital-Automatic Terminal Information Service	MAP.....	Missed Approach Point
DA.....	Decision Altitude	MDA.....	Minimum Descent Altitude
DER.....	Departure End of Runway	MIRL.....	Medium Intensity Runway Lights
DH.....	Decision Height	MM.....	Middle Marker
DME.....	Distance Measuring Equipment	MRA.....	Minimum Reception Altitude
DTHR.....	Displaced Threshold	N/A.....	Not Applicable
DVA.....	Diverse Vector Area	NA.....	Not Authorized
ELEV.....	Elevation	NDB.....	Non-directional Radio Beacon
EMAS.....	Engineered Material Arresting System	NFD.....	National Flight Database
FAF.....	Final Approach Fix	NM.....	Nautical Mile
FD.....	Flight Director System	NoPT.....	No Procedure Turn Required (Procedure Turn shall not be executed without ATC clearance)
FM.....	Fan Marker	ODALS.....	Omnidirectional Approach Light System
FMS.....	Flight Management System	ODP.....	Obstacle Departure Procedure
GBAS.....	Ground Based Augmentation System	OM.....	Outer Marker
GCO.....	Ground Communications Outlet	PAR.....	Precision Approach Radar
GLS.....	Ground Based Augmentation System Landing System	PRM.....	Precision Runway Monitor
GP.....	Glidepath		
GPI.....	Ground Point of Interception		

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R.....	Radial
RA.....	Radio Altimeter setting height
RAIL.....	Runway Alignment Indicator Lights
RCLS.....	Runway Centerline Light System
REIL.....	Runway End Identifier Lights
RF.....	Radius-to-Fix
RLLS.....	Runway Lead-in Light System
RNAV.....	Area Navigation
RNP.....	Required Navigation Performance
RPI.....	Runway Point of Intercept(ion)
RRL.....	Runway Remaining Lights
Rwy.....	Runway
RVR.....	Runway Visual Range
S.....	Straight-in
SALS.....	Short Approach Light System
SALSF.....	Short Approach Lighting System with Sequenced Flashing Lights
SSALF.....	Simplified Short Approach Lighting System with Sequenced Flashers
SSALR.....	Simplified Short Approach Light System with RAIL
SSALS.....	Simplified Short Approach Lighting System
SDF.....	Simplified Directional Facility
SM.....	Statute Mile
SOIA.....	Simultaneous Offset Instrument Approach
TAA.....	Terminal Arrival Area
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
THR.....	Threshold
THRE.....	Threshold Elevation
TODA.....	Takeoff Distance Available
TORA.....	Takeoff Run Available
TR.....	Track
VASI.....	Visual Approach Slope Indicator
VCOA.....	Visual Climb Over Airport
VDP.....	Visual Descent Point
VGSI.....	Visual Glide Slope Indicator
VNAV.....	Vertical Navigation
WAAS.....	Wide Area Augmentation System
WP/WPT.....	Waypoint (RNAV)

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INSTRUMENT APPROACH PROCEDURES (CHARTS)

PLANVIEW SYMBOLS

TERMINAL ROUTES

Procedure Track
Missed Approach
Visual Flight Path
Procedure Turn (Type degree and point of turn optional)
Feeder Route
Minimum Altitude
Mileage

HOLDING PATTERNS

Missed Approach
In lieu of Procedure Turn
Arrival
HOLD 8000

Holding pattern with max. restricted airspeed: (175K) applies to all altitudes. (210K) applies to altitudes above 6000' to and including 14000'. Arrival Holding Pattern altitude restrictions will be indicated when they deviate from the adjacent leg. Limits will only be specified when they deviate from the standard. DME fixes may be shown.

RADIO AIDS TO NAVIGATION

110.1 Underline indicates No Voice transmitted on this frequency

Compulsory:

Non-Compulsory:

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

Marker Beacon

Marker beacons that are not specifically part of the procedure but underlie the final approach course are shown in screened color.

Localizer (LOC/LDA) Course

SDF Course

LOC/DME

LOC/LDA/SDF Transmitter (shown when installation is offset from its normal position off the end of the runway.)

FIXES/ATC REPORTING REQUIREMENTS

Reporting Point

WAYPOINT (Compulsory) WAYPOINT (Non-Compulsory)

FLYOVER POINT MAP WP (Flyover)

Computer Navigation Fix (CNF)
x (NAME) ("x" omitted when it conflicts with runway pattern)

DME Distance From Facility AUSTN INT ARC/DME/RNAV Fix

R-198 Radial line and value
LR-198 Lead Radial
LB-198 Lead Bearing

ALTITUDES

5500 Mandatory Altitude 3000 Recommended Altitude
2500 Minimum Altitude 5000 Mandatory Block
4300 Maximum Altitude 3000 Altitude

INDICATED AIRSPEED

175K 120K 250K 180K
Mandatory Minimum Maximum Recommended
Airspeed Airspeed Airspeed Airspeed

Waypoint Data

Coordinates: N38° 58.30' W89° 51.50'
Frequency: 112.7 CAP 187.1°-56.2
Identifier: PRAYS Reference Facility: 590 Radial-Distance (Facility to Waypoint): 187.1°-56.2
Waypoint Name: PRAYS

Primary Navaid with Coordinate Values

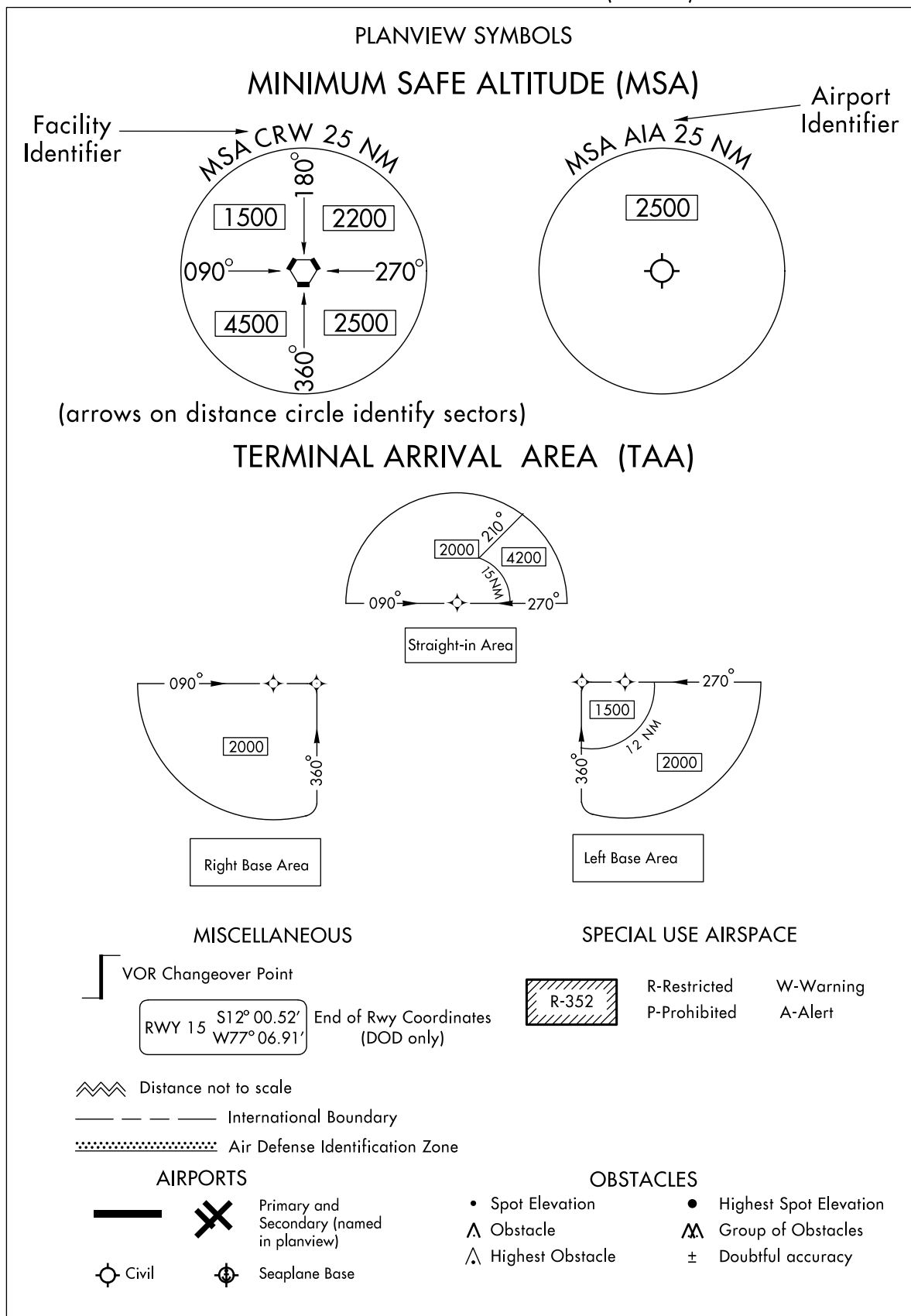
Secondary Navaid

SCOTT Chan 59 SKE (112.2) VHF Paired Frequency

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Legend 33. U.S. Terminal Procedures Planview Symbols.

LEGEND 15232 INSTRUMENT APPROACH PROCEDURES (CHARTS)



LEGEND 15232

Legend 34. U.S. Terminal Procedures Planview Symbols.

LEGEND 17229

INSTRUMENT APPROACH PROCEDURES (CHARTS)

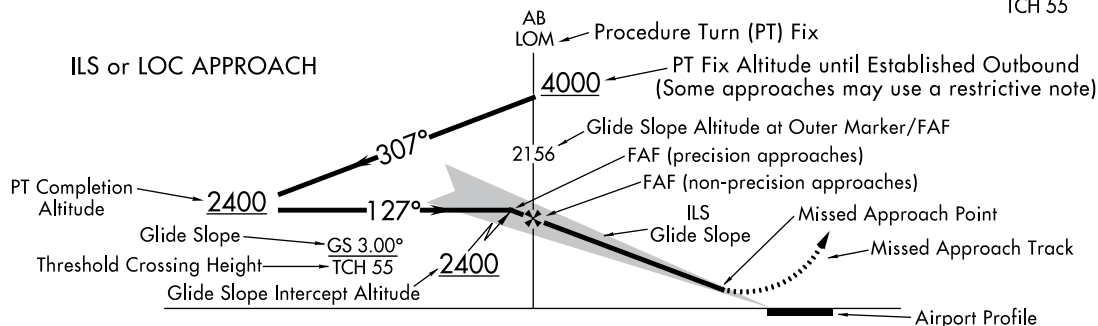
PROFILE VIEW

Three different methods are used to depict either electronic or vertical guidance: "GS", "GP", or "VDA".

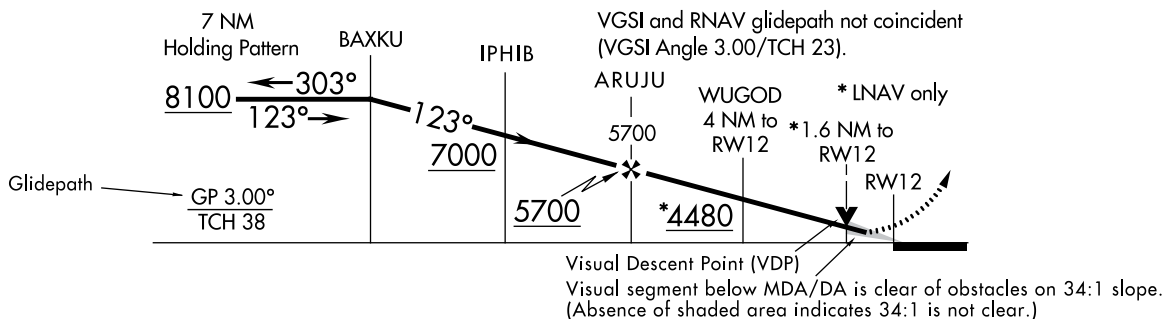
1. "GS" indicates that an Instrument Landing System (ILS) electronic glide slope (a ground antenna) provides vertical guidance. The profile section of ILS procedures depict a GS angle and TCH in the following format: \angle GS 3.00°
TCH 55

2. "GP" on GLS and RNAV procedures indicates that either electronic vertical guidance (via Wide Area Augmentation System - WAAS or Ground Based Augmentation System - GBAS) or barometric vertical guidance is provided. GLS and RNAV procedures with a published decision altitude (DA/H) depict a GP angle and TCH in the following format: \angle GP 3.00°
TCH 50

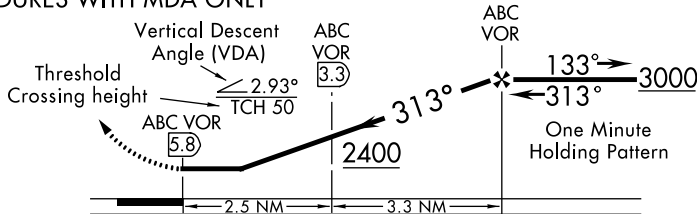
3. An advisory vertical descent angle (VDA) is provided on non-vertically guided conventional procedures and RNAV procedures with only a minimum descent altitude (MDA) to assist in preventing controlled flight into terrain. On Civil (FAA) procedures, this information is placed above or below the procedure track following the fix it is based on. Absence of a VDA or a note that the VDA is not authorized indicates that the prescribed obstacle clearance surface is not clear and the VDA must not be used below MDA. VDA is depicted in the following format: \angle 3.00°
TCH 55



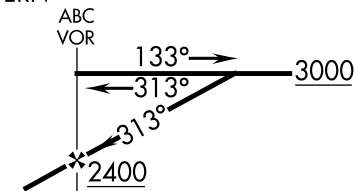
RNAV and GLS PROCEDURES WITH VERTICAL GUIDANCE



NON-VERTICALLY GUIDED CONVENTIONAL PROCEDURES AND RNAV PROCEDURES WITH MDA ONLY



DESCENT FROM HOLDING PATTERN



ALTITUDES

<u>5500</u>	Mandatory Altitude	3000	Recommended Altitude
<u>2500</u>	Minimum Altitude	<u>5000</u>	Mandatory Block Altitude
<u>4300</u>	Maximum Altitude	<u>3000</u>	Altitude

PROFILE SYMBOLS

- Glide Slope/Glidepath Intercept Altitude and final approach fix for vertically guided approach procedures.
 - Visual Descent Point (VDP)
 - Visual Flight Path
- Note: Facilities and waypoints are depicted as a solid vertical line while fixes and intersections are depicted as a dashed vertical line.

LEGEND 17229

Legend 35. U.S. Terminal Procedures Profile View.

LEGEND 17229

LEGEND

STANDARD TERMINAL ARRIVAL (STAR) CHARTS DEPARTURE PROCEDURE (DP) CHARTS

Applies to both STAR and DP Charts unless otherwise noted.

RADIO AIDS TO NAVIGATION

Compulsory:

- VOR VORTAC DME NDB/DME
- VOR/DME TACAN NDB

Non-Compulsory:

- VOR VORTAC DME
- VOR/DME TACAN NDB NDB/DME

LMM, LOM (Compass locator) LOC LOC/DME
(shown when installation is offset from its normal position off the end of the runway.) (DP)

Marker Beacon

Localizer Course

SDF Course

ROUTES

4500 MEA-Minimum Enroute Altitude
*3500 MOCA-Minimum Obstruction Clearance Altitude

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

Transition Route

R-275 Radial line and value

Lost Communications Track

[V12] [J80] Airway/Jet Route Identification

DP Holding Pattern STAR Holding Pattern

(IAS) Holding pattern with max. restricted airspeed (175K) applies to all altitudes (210K) applies to altitudes above 6000' to and including 14000'

SPECIAL USE AIRSPACE

R-352 R-Restricted W-Warning
P-Prohibited A-Alert
MOA-Military Operations Area

ALTITUDES

5500 Mandatory Altitude (Cross at) 2300 Minimum Altitude (Cross at or above) 4800 Maximum Altitude (Cross at or below)

15000 Block Altitude Altitude change at other than Radio Aids (STAR)

12000 Block Altitude

INDICATED AIRSPEED

175K Mandatory Airspeed 120K Minimum Airspeed 250K Maximum Airspeed

AIRPORTS

(DP) Civil Military Joint Civil-Military

Airports not served by the procedure shown in screened color (STAR)

Civil Military Joint Civil-Military

MISCELLANEOUS

Changeover Point

Distance not to scale (DP)

International Boundary (DP)

Air Defense Identification Zone

Takeoff Minimums and (Obstacle) Departure Procedures entry published. (DP)

FIXES/ATC REPORTING REQUIREMENTS

Reporting Points
N00°00.00' W00°00.00'

75 → DME Mileage (when not obvious)

▲ Fix-Compulsory and
△ Non-Compulsory Position Report

DME fix

WAYPOINT (Compulsory) WAYPOINT (Non-Compulsory)

FLYOVER POINT

X Computer Navigation Fix (CNF)
N00°00.00' W00°00.00'

(T) indicates frequency protection range (STAR) (Y) TACAN must be placed in "Y" mode to receive distance information

Identifier Frequency Geographic Position

112.25 (T) ORL Chan 59 (Y) N28°32.56' - W81°20.10'

Underline indicates no voice transmitted on this frequency Enroute Chart Reference DME or TACAN Channel

Coordinates Waypoint Name Radial-Distance (Facility to Waypoint)

112.7 CAP 187.1°-56.2 590

Identifier Reference Facility Elevation

LEGEND 17229

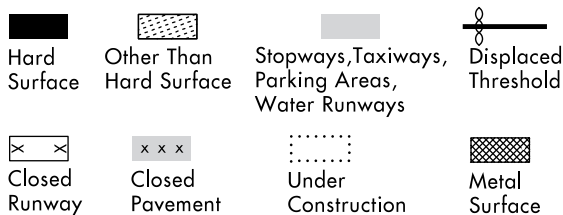
Legend 36. U.S. Terminal Procedures STAR and DP Charts.

LEGEND

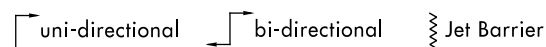
INSTRUMENT APPROACH PROCEDURES (CHARTS)

AIRPORT DIAGRAM/AIRPORT SKETCH

Runways

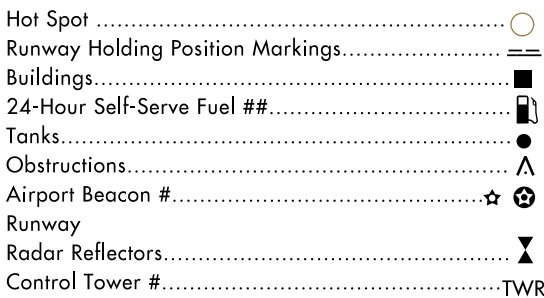


ARRESTING GEAR: Specific arresting gear systems; e.g., BAK12, MA-1A etc., shown on airport diagrams, not applicable to Civil Pilots. Military Pilots refer to appropriate DOD publications.



ARRESTING SYSTEM (EMAS)

REFERENCE FEATURES



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

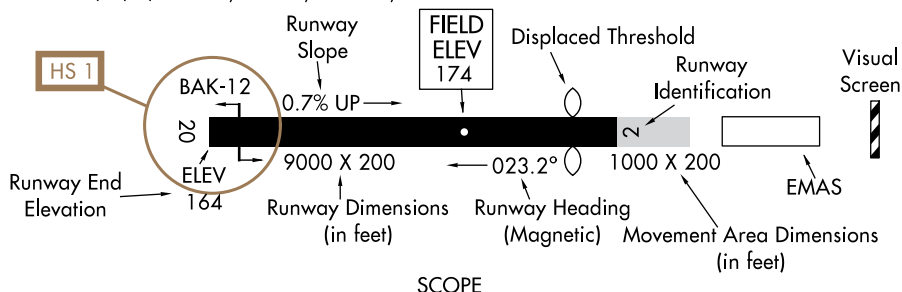
A fuel symbol is shown to indicate 24-hour self-serve fuel available, see appropriate Chart Supplement for information.

Runway length depicted is the physical length of the runway (end-to-end, including displaced thresholds if any) but excluding areas designated as stopways.

A **D** symbol is shown to indicate runway declared distance information available, see appropriate Chart Supplement for distance information.

Runway Weight Bearing Capacity/or PCN Pavement Classification Number is shown as a codified expression.

Refer to the appropriate Supplement/Directory for applicable codes e.g., RWY 14-32 PCN 80 F/D/X/U S-75, D-185, 2S-175, 2D-325



SCOPE

Airport diagrams are specifically designed to assist in the movement of ground traffic at locations with complex runway/taxiway configurations. Airport diagrams are not intended to be used for approach and landing or departure operations. For revisions to Airport Diagrams: Consult FAA Order 7910.4.

Helicopter Alighting Areas Negative Symbols used to identify Copter Procedures landing point.....

Runway Threshold elevation.....THRE 123
Runway TDZ elevation.....TDZE 123
Runway Slope.....0.3% DOWN
(shown when runway slope is greater than or equal to 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 1/2 minute increments. They are further broken down into 6 second ticks, within each 1 minute increments.

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 (WGS) (noted on appropriate diagram), and may not be compatible with local coordinates published in FLIP. (Foreign Only)

LEGEND

Legend 37. U.S. Terminal Procedures Airport Diagram/Airport Sketch.

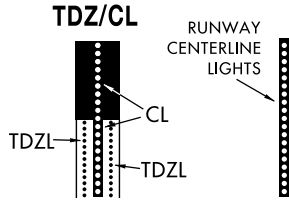
LEGEND 15344

INSTRUMENT APPROACH PROCEDURES (CHARTS)
APPROACH LIGHTING SYSTEM - UNITED STATES

Approach lighting and visual glide slope systems are indicated on the airport sketch by an identifier, e.g., (A2), (V), etc.

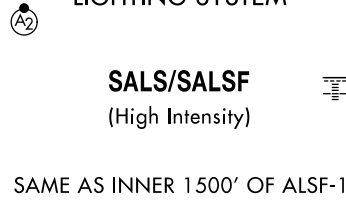
A dot "•" portrayed with approach lighting letter identifier indicates sequenced flashing lights (F) installed with the approach lighting system e.g., (A1). Negative symbology, e.g., (A1), (V) indicates Pilot Controlled Lighting (PCL).

RUNWAY TOUCHDOWN ZONE AND CENTERLINE LIGHTING SYSTEMS

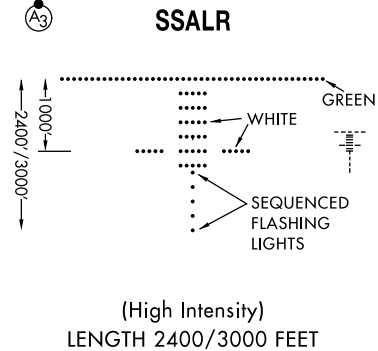


AVAILABILITY of TDZ/CL will be shown by NOTE in SKETCH e.g. "TDZ/CL Rwy 15"

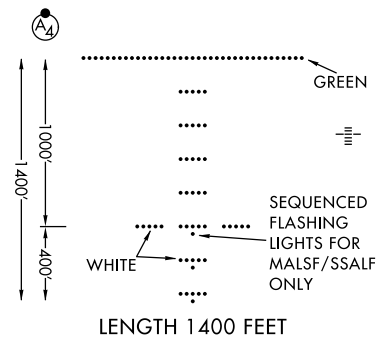
SHORT APPROACH LIGHTING SYSTEM



SIMPLIFIED SHORT APPROACH LIGHTING SYSTEM with Runway Alignment Indicator Lights



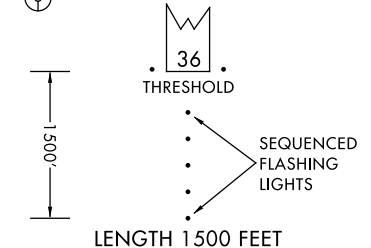
MEDIUM INTENSITY (MALS and MALSF) OR SIMPLIFIED SHORT (SSALS and SSALF) APPROACH LIGHTING SYSTEMS



MEDIUM INTENSITY APPROACH LIGHTING SYSTEM with Runway Alignment Indicator Lights

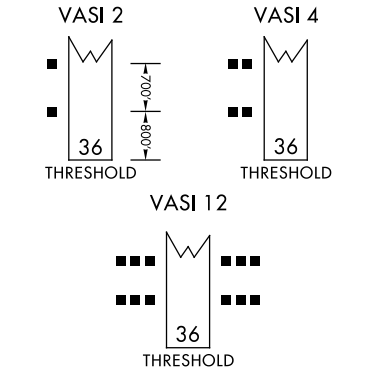


OMNIDIRECTIONAL APPROACH LIGHTING SYSTEM



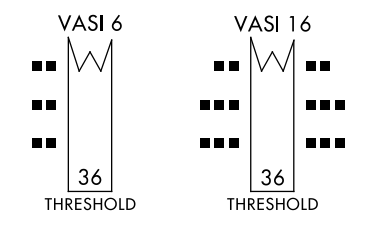
VISUAL APPROACH SLOPE INDICATOR (VASI)

VISUAL APPROACH SLOPE INDICATOR WITH STANDARD THRESHOLD CLEARANCE PROVIDED.
ALL LIGHTS WHITE — TOO HIGH
FAR LIGHTS RED — ON GLIDE SLOPE
NEAR LIGHTS WHITE — ON GLIDE SLOPE
ALL LIGHTS RED — TOO LOW



VISUAL APPROACH SLOPE INDICATOR (VASI)

3-BAR, 6 OR 16 BOX, VISUAL APPROACH SLOPE INDICATOR THAT PROVIDES 2 GLIDE ANGLES AND 2 THRESHOLD CROSSING HEIGHTS.

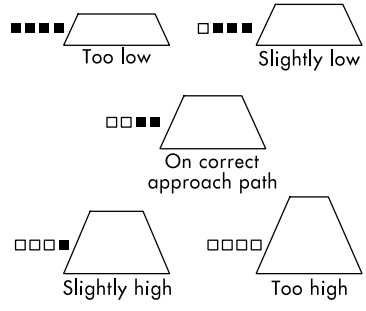
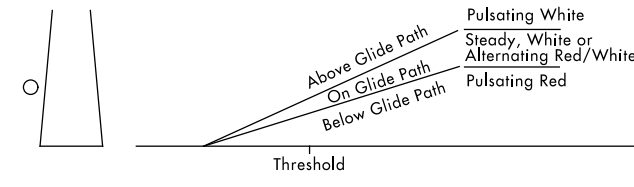
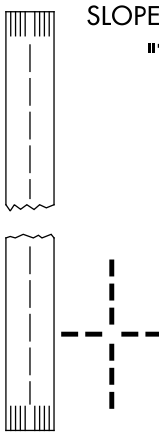
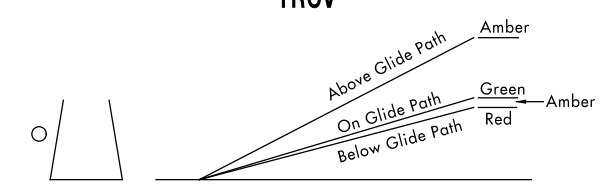
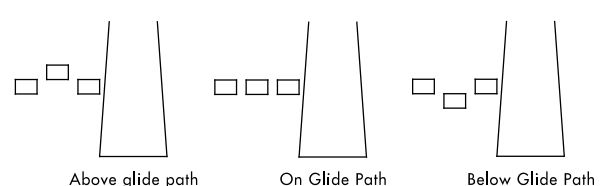


LEGEND 15344

Legend 38. U.S. Terminal Procedures Approach Lighting System.

LEGEND 04330

INSTRUMENT APPROACH PROCEDURES (CHARTS)
APPROACH LIGHTING SYSTEM - UNITED STATES

<p>Approach lighting and visual glide slope systems are indicated on the airport sketch by an identifier, (A₂), (V) etc.</p> <p>A dot "•" portrayed with approach lighting letter identifier indicates sequenced flashing lights (F) installed with the approach lighting system e.g., (A₁). Negative symbology, e.g., (A₁), (V) indicates Pilot Controlled Lighting (PCL).</p>	
<p>(P) PRECISION APPROACH PATH INDICATOR PAPI</p>  <p>Legend: □ White ■ Red</p>	<p>(V₂) PULSATING VISUAL APPROACH SLOPE INDICATOR PVASI</p>  <p>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.</p>
<p>(V₁) "T"-VISUAL APPROACH SLOPE INDICATOR "T"-VASI</p>  <p>"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.</p>	<p>(V₄) TRI-COLOR VISUAL APPROACH SLOPE INDICATOR TRCV</p>  <p>CAUTION: When the aircraft descends from green to red, the pilot may see a dark amber color during the transition from green to red.</p>
<p>(V₅) ALIGNMENT OF ELEMENTS SYSTEMS APAP</p>  <p>Painted panels which may be lighted at night. To use the system the pilot positions the aircraft so the elements are in alignment.</p>	

LEGEND 04330

FREQ PAIRING 15008

FREQUENCY PAIRING TABLE

TACAN CHANNEL	VHF FREQUENCY	TACAN CHANNEL	VHF FREQUENCY	TACAN CHANNEL	VHF FREQUENCY
17Y	108.05	40X	110.30	88Y	114.15
18X	108.10	40Y	110.35	89Y	114.25
18Y	108.15	41Y	110.45	90Y	114.35
19Y	108.25	42X	110.50	91Y	114.45
20X	108.30	42Y	110.55	92Y	114.55
20Y	108.35	43Y	110.65	93Y	114.65
21Y	108.45	44X	110.70	94Y	114.75
22X	108.50	44Y	110.75	95Y	114.85
22Y	108.55	45Y	110.85	96Y	114.95
23Y	108.65	46X	110.90	97Y	115.05
24X	108.70	46Y	110.95	98Y	115.15
24Y	108.75	47Y	111.05	99Y	115.25
25Y	108.85	48X	111.10	100Y	115.35
26X	108.90	48Y	111.15	101Y	115.45
26Y	108.95	49Y	111.25	102Y	115.55
27Y	109.05	50X	111.30	103Y	115.65
28X	109.10	50Y	111.35	104Y	115.75
28Y	109.15	51Y	111.45	105Y	115.85
29Y	109.25	52X	111.50	106Y	115.95
30X	109.30	52Y	111.55	107Y	116.05
30Y	109.35	53Y	111.65	108Y	116.15
31Y	109.45	54X	111.70	109Y	116.25
32X	109.50	54Y	111.75	110Y	116.35
32Y	109.55	55Y	111.85	111Y	116.45
33Y	109.65	56X	111.90	112Y	116.55
34X	109.70	56Y	111.95	113Y	116.65
34Y	109.75	80Y	113.35	114Y	116.75
35Y	109.85	81Y	113.45	115Y	116.85
36X	109.90	82Y	113.55	116Y	116.95
36Y	109.95	83Y	113.65	117Y	117.05
37Y	110.05	84Y	113.75	118Y	117.15
38X	110.10	85Y	113.85	119Y	117.25
38Y	110.15	86Y	113.95		
39Y	110.25	87Y	114.05		

FREQ PAIRING 15008

Legend 40. U.S. Terminal Procedures Frequency Pairing.

EXPLANATION OF IFR ENROUTE TERMS

FAA charts are prepared in accordance with specifications of the Interagency Air Committee (IAC), and are approved by representatives of the Federal Aviation Administration and the Department of Defense (DoD). Some information on these charts may only apply to military pilots.

The explanations of symbols used on Instrument Flight Rule (IFR) Enroute Charts and examples in this section are based primarily on the IFR Enroute Low Altitude Charts. Other IFR products use similar symbols in various colors. The chart legends portray aeronautical symbols with a brief description of what each symbol depicts. This section provides more details of the symbols and how they are used on IFR Enroute charts.

AIRPORTS

Active airports are shown on IFR Enroute Charts.

Low Charts:

- All IAP Airports are shown on the Low Altitude Charts (US and Alaska).
- Non-IAP Airports are shown on the U.S. Low Altitude Charts (Contiguous US) have a minimum hard surface runway of 3,000'.
- Non-IAP airports are shown on the U.S. Low Altitude Alaska Charts are show if the runway is 3000' or longer, hard or soft surface.
- Public heliports with an Instrument Approach Procedure (IAP) or requested by the FAA or DoD are depicted on the IFR Enroute Low Altitude Charts.
- Seaplane bases requested by the FAA or DoD are depicted on the IFR Enroute Low Altitude Charts.

On IFR Enroute Low Altitude Charts, airport tabulation is provided which identifies airport names, IDs and the panels they are located on.

High Charts:

- Airports shown on the U.S. High Enroute Charts (Contiguous US) have a minimum hard surface runway of 5000'.
- Airports shown on the U.S. High Enroute Alaska Charts have a minimum hard surface runway of 4000'.

Chartered airports are classified according to the following criteria:

LOW/HIGH ALTITUDE



Blue - Airports with an Instrument Approach Procedure and/or RADAR MINIMA published in the high altitude DoD Flight Information Publications (FLIPs)

Green - Airports which have an approved Instrument Approach Procedure and/or RADAR MINIMA published in either the U.S. Terminal Procedures Publications (TPPs) or the DoD FLIPs

Brown - Airports without a published Instrument Approach Procedure or RADAR MINIMA

Airports are plotted at their true geographic position.

Airports are identified by the airport name. In the case of military airports, Air Force Base (AFB), Naval Air Station (NAS), Naval Air Facility (NAF), Marine Corps Air Station (MCAS), Army Air Field (AAF), etc., the abbreviated letters appear as part of the airport name.

Airports marked "Pvt" immediately following the airport name are not for public use, but otherwise meet the criteria for charting as specified above.

Runway length is the length of the longest active runway (including displaced thresholds but excluding overruns) and is shown to the nearest 100 feet using 70 feet as the division point; e.g., a runway of 8,070' is labeled 81. The following runway compositions (materials) constitute a hard-surfaced runway: asphalt, bitumen, chip seal, concrete, and tar macadam. Runways that are not hard-surfaced have a small letter "s" following the runway length, indicating a soft surface.

AIRPORT DATA DEPICTION													
<p>Low Altitude</p>													
<p>1. Airport elevation given in feet above or below mean sea level</p> <p>2. Pvt - Private use, not available to general public</p> <p>3. A solid line box enclosed the airport name indicates FAR 93 Special Requirements - see Directory/Supplement</p> <p>4. "NO SVFR" above the airport name indicates FAR 91 fixed-wing special VFR flight is prohibited.</p> <p>5. [C] or [D] following the airport identifier indicates Class C or Class D Airspace</p> <p>High Altitude - U.S.</p>	<p>6. Associated city names for public airports are shown above or preceding the airport name. If airport name and city name are the same, only the airport name is shown. The airport identifier in parentheses follows the airport name. City names for military and private airports are not shown.</p> <p>7. Airport Ident ICAO Location Indicator shown outside contiguous U.S.</p> <p>8. AFIS Alaska only</p> <p>High Altitude - Alaska</p>												
<p>LIGHTING CAPABILITY</p> <table border="0"> <tr> <td>Lighting Available</td> <td>L</td> <td>Part-time or on request</td> <td>★</td> </tr> <tr> <td>Pilot Controlled Airport</td> <td>Ⓛ</td> <td>No lighting available</td> <td>-</td> </tr> <tr> <td></td> <td></td> <td>At private facilities- indicates no lighting information is available</td> <td></td> </tr> </table>		Lighting Available	L	Part-time or on request	★	Pilot Controlled Airport	Ⓛ	No lighting available	-			At private facilities- indicates no lighting information is available	
Lighting Available	L	Part-time or on request	★										
Pilot Controlled Airport	Ⓛ	No lighting available	-										
		At private facilities- indicates no lighting information is available											

FAA Chart User's Guide - IFR Enroute Terms

A **L** symbol between the airport elevation and runway length means that runway lights are in operation sunset to sunrise. A **Ⓛ** symbol indicates there is Pilot Controlled Lighting. A **L★** symbol means the lighting is part-time or on request, the pilot should consult the Chart Supplement for light operating procedures. The Aeronautical Information Manual (AIM) thoroughly explains the types and uses of airport lighting aids.

RADIO AIDS TO NAVIGATION

All IFR radio NAVAIDs that have been flight checked and are operational are shown on all IFR Enroute Charts. Very High Frequency/Ultrahigh Frequency (VHF/UHF) NAVAIDs, Very high frequency Omnidirectional Radio range (VORs), Tactical Air Navigation (TACANs) are shown in black, and Low Frequency/Medium Frequency (LF/MF) NAVAIDs, (Compass Locators and Aeronautical or Marine NDBs) are shown in brown.

On IFR Enroute Charts, information about NAVAIDs is boxed as illustrated below. To avoid duplication of data, when two or more NAVAIDs in a general area have the same name, the name is usually printed only once inside an identification box with the frequencies, TACAN channel numbers, identification letters, or Morse Code Identifications of the different NAVAIDs are shown in appropriate colors.

Legend 42. Explanation of IFR Enroute Terms.

NAVAIDs in a shutdown status have the frequency and channel number crosshatched. Use of the NAVAID status "shutdown" is only used when a facility has been decommissioned but cannot be published as such because of pending airspace actions.

NAVIGATION AND COMMUNICATION BOXES - COMMON ELEMENTS	
<p>LOW ENROUTE CHARTS</p> <p>RCO Frequencies NAVAID Name FREQ, Ident, CH, Morse Code Latitude, Longitude Controlling FSS Name</p> <div style="border: 1px solid black; padding: 5px; width: fit-content; margin: 10px auto;"> <p style="text-align: center;">000.0</p> <p style="text-align: center;">NAME</p> <p style="text-align: center;">000.0 IDT 000 </p> <p style="text-align: center;">N00°00.00' W000°00.00'</p> <p style="text-align: center;">[NAME]</p> </div>	<p>HIGH ENROUTE CHARTS</p> <p>RCO Frequencies NAVAID Name Frequency, Ident, Channel, Latitude, Longitude Controlling FSS Name</p> <div style="border: 1px solid black; padding: 5px; width: fit-content; margin: 10px auto;"> <p style="text-align: center;">000.0</p> <p style="text-align: center;">NAME</p> <p style="text-align: center;">000.0 IDT 000</p> <p style="text-align: center;">N00°00.00' W000°00.00'</p> <p style="text-align: center;">[NAME]</p> </div>
COMMON ELEMENTS (HIGH AND LOW CHARTS)	
<p>RCO FREQUENCY Single Frequency</p> <p>Multiple Frequencies Frequencies transmit and receive except those followed by R and T: R - Receive Only T - Transmit Only</p>	<p>122.6</p> <p>255.4</p> <p>243.0 123.6 122.65</p> <p>122.2 122.1R 121.5</p>
<p>NAVAID BOX</p> <p>Thin line NAVAID boxes without frequency(s) and FSS radio name indicates no FSS frequencies available.</p> <p>Shadow NAVAID box indicates NAVAID and Flight Service Station (FSS) have same name.</p>	<p>VHF/UHF LF/MF</p> <div style="display: flex; justify-content: space-around; align-items: center;"> <div style="border: 1px solid black; width: 60px; height: 20px; margin: 5px;"></div> <div style="border: 1px solid black; width: 60px; height: 20px; margin: 5px;"></div> </div> <div style="display: flex; justify-content: space-around; align-items: center; margin-top: 10px;"> <div style="border: 2px solid black; width: 60px; height: 20px; margin: 5px;"></div> <div style="border: 2px solid black; width: 60px; height: 20px; margin: 5px;"></div> </div>
<p>FREQUENCY PROTECTION</p> <p>Frequency Protection usable range at 18,000' AGL - 40 NM</p> <p>Frequency Protection usable range at 12,000' AGL - 25 NM</p>	<p>(L)</p> <p>(T)</p>
<p>DISTANCE MEASURING EQUIPMENT</p> <p>Facilities that operate in the "Y" mode for DME reception</p>	<p>(Y)</p>
<p>VOICE COMMUNICATIONS VIA NAVAID</p> <p>Voice Transmitted</p> <p>No Voice Transmitted</p>	<p>112.6</p> <p>111.0</p>
<p>NAVAID SHUTDOWN STATUS</p>	<p>VHF/UHF LF/MF</p> <p> </p>
<p>PART TIME OR ON-REQUEST</p>	<p>VHF/UHF LF/MF</p> <p>★ ★</p>
<p>AUTOMATED WEATHER BROADCAST SERVICES ASOS/AWOS - Automated Surface Observing Station/Automated Weather Observing Station</p> <p>HIWAS - Hazardous Inflight Weather Advisory Service</p> <p>TWEB - Transcribed Weather Broadcast</p>	<p>VHF/UHF LF/MF</p> <p> </p> <p> </p> <p> </p> <p>Automated weather, when available, is broadcast on the associated NAVAID frequency.</p>
<p>LATITUDE AND LONGITUDE</p> <p>Latitude and Longitude coordinates are provided for those NAVAIDs that make up part of a route/airway or a holding pattern.</p>	<p>LOW ENROUTE HIGH ENROUTE</p> <p> </p>

FAA Chart User's Guide - IFR Enroute Terms

Legend 43. Explanation of IFR Enroute Terms.

AIRSPACE INFORMATION

CONTROLLED AIRSPACE

Controlled airspace consists of those areas where some or all aircraft are subjected to air traffic control within the following airspace classifications of A, B, C, D, & E.

Air Route Traffic Control Centers (ARTCC) are established to provide Air Traffic Control to aircraft operating on IFR flight plans within controlled airspace, particularly during the enroute phase of flight. Boundaries of the ARTCCs are shown in their entirety using the symbol below.



The responsible ARTCC Center names are shown adjacent and parallel to the boundary line. ARTCC sector frequencies are shown in boxes outlined by the same symbol.



Class A Airspace is depicted as open area (white) on the IFR Enroute High Altitude Charts. It consists of airspace from 18,000 Mean Sea Level (MSL) to 60,000 MSL. In aviation terms those altitudes are written as FL 180 to FL 600, (18,000 MSL, is Flight Level (FL)180, 60,000 MSL, is FL 600).

Class B Airspace is depicted as screened blue area with a solid line encompassing the area.

Class C Airspace is depicted as screened blue area with a dashed line encompassing the area with a following the airport name.

Class B and Class C Airspace consist of controlled airspace extending upward from the surface or a designated floor to specified altitudes, within which all aircraft and pilots are subject to the operating rules and requirements specified in the Federal Aviation Regulations (UHF) 71. Class B and C Airspace are shown in abbreviated forms on IFR Enroute Low Altitude Charts. A general note adjacent to Class B airspace refers the user to the appropriate VFR Terminal Area Chart.

Class D Airspace (airports with an operating control tower) are depicted as open area (white) with a following the airport name.

Class E Airspace is depicted as open area (white) on the IFR Enroute Low Altitude Charts. It consists of airspace below FL180.

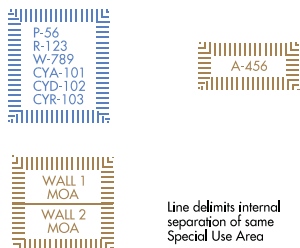
UNCONTROLLED AIRSPACE

Class G Airspace within the United States extends to 14,500' MSL. This uncontrolled airspace is shown as screened brown.

On Area Charts any uncontrolled airspace boundaries are depicted with a .012" brown line and a .060" screen brown band on the uncontrolled side, so as to be seen over the terrain.

SPECIAL USE AIRSPACE

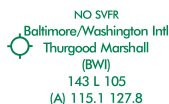
Special Use Airspace (SUA) confines certain flight activities, restricts entry, or cautions other aircraft operating within specific boundaries. SUA areas are shown in their entirety, even when they overlap, adjoin, or when an area is designated within another area. SUA with altitudes from the surface and above are shown on the IFR Enroute Low Altitude Charts. Similarly, SUA that extends above 18,000' MSL are shown on IFR Enroute High Altitude Charts. On IFR Enroute Altitude Charts tabulations, identify the type of SUA, ID, effective altitudes, times of use, controlling agency and the panel it is located on.



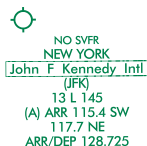
High and Low	Low Altitude Only	Canada Only	Caribbean Only
P - Prohibited Area	MOA - Military Operations Area	CYA - Advisory	D - Danger
R - Restricted Area	A - Alert Area	CYD - Danger Area	
W - Warning Area		CYR - Restricted Area	
See Airspace Tabulation on chart for complete information.			

OTHER AIRSPACE

FAR 91 Special Air Traffic Rules are shown with the type NO SVFR above the airport name.



FAR 93 Special Airspace Traffic Rules are shown with a solid line box around the airport name, indicating FAR 93 Special Requirements see Chart Supplement.



Mode C Required Airspace (from the surface to 10,000' MSL) within 30 NM radius of the primary airport(s) for which a Class B airspace is designated, is depicted on IFR Enroute Low Altitude Charts as a blue circle labeled MODE C 30 NM.



Mode C is also required for operations within and above all Class C airspace up to 10,000' MSL, but not depicted. See FAR 91.215 and the AIM.

INSTRUMENT AIRWAYS

The FAA has established two fixed route systems for air navigation. The VOR and LF/MF system-designated from 1,200' Above Ground Level (AGL) to but not including FL 180 is shown on IFR Enroute Low Altitude Charts, and the Jet Route system designated from FL 180 to FL 450 inclusive is shown on IFR Enroute High Altitude Charts.

VOR LF/MF AIRWAY SYSTEM (IFR LOW ALTITUDE ENROUTE CHARTS)

In this system VOR airways - airways based on VOR or VORTAC NAVAIDs - are depicted in black and identified by a "V" (Victor) followed by the route number (e.g., "V12").

LF/MF airways - airways based on LF/MF NAVAIDs - are sometimes called "colored airways" because they are identified by color name and number (e.g., "Amber One", charted as "A1"). In Alaska Green and Red airways are plotted east and west, and Amber and Blue airways are plotted north and south. Regardless of their color identifier, LF/MF airways are shown in brown.

AIRWAY/ROUTE DATA

On both series of IFR Enroute Charts, airway/route data such as the airway identifications, magnetic courses bearings or radials, mileages, and altitudes (e.g., Minimum Enroute Altitudes (MEAs), Minimum Reception Altitudes (MRAs), Maximum Authorized Altitudes (MAAs), Minimum Obstacle Clearance Altitudes (MOCAs), Minimum Turning Altitudes (MTAs) and Minimum Crossing Altitudes (MCAs)) are shown aligned with the airway.

As a rule the airway/route data is charted and in the same color as the airway, with one exception. Charted in blue, Global Navigation Satellite System (GNSS) MEAs, identified with a "G" suffix, have been added to "V" and "colored airways" for aircraft flying those airways using Global Positioning System (GPS) navigation.

Airways/Routes predicated on VOR or VORTAC NAVAIDs are defined by the outbound radial from the NAVAID. Airways/Routes predicated on LF/MF NAVAIDs are defined by the inbound bearing.

- **Minimum Enroute Altitude (MEA)** - The MEA is the lowest published altitude between radio fixes that assures acceptable navigational signal coverage and meets obstacle clearance requirements between those fixes. The MEA prescribed for a Federal airway or segment, RNAV low or high route, or other direct route applies to the entire width of the airway, segment, or route between the radio fixes defining the airway, segment, or route. MEAs for routes wholly contained within controlled airspace normally provide a buffer above the floor of controlled airspace consisting of at least 300 feet within transition areas and 500 feet within control areas. MEAs are established based upon obstacle clearance over terrain and manmade objects, adequacy of navigation facility performance, and communications requirements.
- **Minimum Reception Altitude (MRA)** - MRAs are determined by FAA flight inspection traversing an entire route of flight to establish the minimum altitude the navigation signal can be received for the route and for off-course NAVAID facilities that determine a fix. When the MRA at the fix is higher than the MEA, an MRA is established for the fix and is the lowest altitude at which an intersection can be determined.
- **Maximum Authorized Altitude (MAA)** - An MAA is a published altitude representing the maximum usable altitude or flight level for an airspace structure or route segment. It is the highest altitude on a Federal airway, jet route, RNAV low or high route, or other direct route for which an MEA is designated at which adequate reception of navigation signals is assured.
- **Minimum Obstruction Clearance Altitude (MOCA)** - The MOCA is the lowest published altitude in effect between fixes on VOR airways, off-airway routes, or route segments that meets obstacle clearance requirements for a VOR. The MOCA seen on the enroute chart may have been computed by adding the required obstacle clearance (ROC) to the controlling obstacle in the primary area or computed by using a TERPS chart if the controlling obstacle is located in the secondary area. This figure is then rounded to the nearest 100 foot increment (i.e., 2,049 feet becomes 2,000, and 2,050 feet becomes 2,100 feet). An extra 1,000 feet is added in mountainous areas, in most cases.
- **Minimum Turning Altitude (MTA)** - Minimum turning altitude (MTA) is a charted altitude providing vertical and lateral obstruction clearance based on turn criteria over certain fixes, NAVAIDs, waypoints, and on charted route segments. When a VHF airway or route terminates at a NAVAID or fix, the primary area extends beyond that

Legend 46. Explanation of IFR Enroute Terms – Instrument Airways.

termination point. When a change of course on VHF airways and routes is necessary, the enroute obstacle clearance turning area extends the primary and secondary obstacle clearance areas to accommodate the turn radius of the aircraft. Since turns at or after fix passage may exceed airway and route boundaries, pilots are expected to adhere to airway and route protected airspace by leading turns early before a fix. The turn area provides obstacle clearance for both turn anticipation (turning prior to the fix) and flyover protection (turning after crossing the fix). Turning fixes requiring a higher MTA are charted with a flag along with accompanying text describing the MTA restriction.

- Minimum Crossing Altitude (MCA)** - An MCA is the lowest altitude at certain fixes at which the aircraft must cross when proceeding in the direction of a higher minimum enroute IFR altitude. MCAs are established in all cases where obstacles intervene to prevent pilots from maintaining obstacle clearance during a normal climb to a higher MEA after passing a point beyond which the higher MEA applies. The same protected enroute area vertical obstacle clearance requirements for the primary and secondary areas are considered in the determination of the MCA.

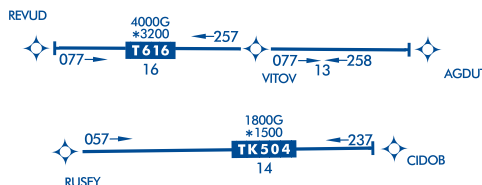


Victor Route (with RNAV/GPS MEA shown in blue)

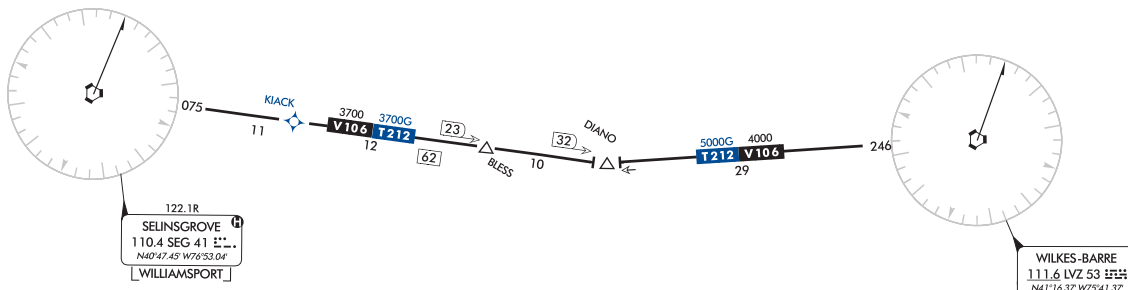
AREA NAVIGATION (RNAV) "T" ROUTE SYSTEM

The FAA has created new low altitude area navigation (RNAV) "T" routes for the enroute and terminal environments. The RNAV routes will provide more direct routing for IFR aircraft and enhance the safety and efficiency of the National Airspace System. To utilize these routes aircraft are required to be equipped with IFR approved GNSS. In Alaska, TSO-145a and 146a equipment is required.

Low altitude RNAV only routes are identified by the prefix "T", and the prefix "TK" for RNAV helicopter routes followed by a three digit number (T-200 to T-500). Routes are depicted in blue on the IFR Enroute Low Altitude Charts. RNAV route data (route line, identification boxes, mileages, waypoints, waypoint names, magnetic reference courses and MEAs) will also be printed in blue. Magnetic reference courses will be shown originating from a waypoint, fix/reporting point or NAVAID. GNSS MEA for each segment is established to ensure obstacle clearance and communications reception. GNSS MEAs are identified with a "G" suffix.



Joint Victor/RNAV routes are charted as outlined above except as noted. The joint Victor route and the RNAV route identification boxes are shown adjacent to each other. Magnetic reference courses are not shown. MEAs are charted above the appropriate identification box or stacked in pairs, GNSS and Victor. On joint routes, RNAV specific information will be printed in blue.



Legend 47. Explanation of IFR Enroute Terms – Instrument Airways.

OFF ROUTE OBSTRUCTION CLEARANCE ALTITUDE (OROCA)

The Off Route Obstruction Clearance Altitude (OROCA) is depicted on IFR Enroute Low Altitude and Pacific charts and is represented in thousands and hundreds of feet above MSL. OROCA's are shown in every 30 x 30 minute quadrant on Area Charts, every one degree by one degree quadrant for IFR Enroute Low Altitude Charts - U.S. and every two degree by two degree quadrant on IFR Enroute Low Altitude Charts - Alaska. The OROCA represents the highest possible obstruction elevation including both terrain and other vertical obstruction data (towers, trees, etc.) bounded by the ticked lines of latitude/longitude including data 4 NM outside the quadrant. In this example the OROCA represents 12,500 feet.

12⁵

OROCA is computed just as the Maximum Elevation Figure (MEF) found on Visual Flight Rule (VFR) Charts except that it provides an additional vertical buffer of 1,000 feet in designated non-mountainous areas and a 2,000 foot vertical buffer in designated mountainous areas within the United States. For areas in Mexico and the Caribbean, located outside the U.S. Air Defense Identification Zone (ADIZ), the OROCA provides obstruction clearance with a 3,000 foot vertical buffer. Evaluating the area around the quadrant provides the chart user the same lateral clearance an airway provides should the line of intended flight follow a ticked line of latitude or longitude. OROCA does not provide for NAVAID signal coverage, communication coverage and would not be consistent with altitudes assigned by Air Traffic Control. OROCA's can be found over all land masses and open water areas containing man-made obstructions (such as oil rigs).

MILITARY TRAINING ROUTES (MTRs)

Military Training Routes (MTRs) are routes established for the conduct of low-altitude, high-speed military flight training (generally below 10,000 feet MSL at airspeeds in excess of 250 knots Indicated Air Speed). These routes are depicted in brown on IFR Enroute Low Altitude Charts, and are not shown on inset charts or on IFR Enroute High Altitude Charts. IFR Enroute Low Altitude Charts depict all IFR Military Training Routes (IRs) and VFR Military Training Routes (VRs), except those VRs that are entirely at or below 1,500 feet AGL.

MTRs are identified by designators (IR-107, VR-134) which are shown in brown on the route centerline. Arrows are shown to indicate the direction of flight along the route. The width of the route determines the width of the line that is plotted on the chart:

Route segments with a width of 5 NM or less, both sides of the centerline, are shown by a .02" line.



Route segments with a width greater than 5 NM, either or both sides of the centerline, are shown by a .035" line.



MTRs for particular chart pairs (ex. L1/2, etc.) are alphabetically, then numerically tabulated. The tabulation includes MTR type and unique identification and altitude range.

JET ROUTE SYSTEM (HIGH ALTITUDE ENROUTE CHARTS)

Jet routes are based on VOR or VORTAC NAVAIDs, and are depicted in black with a "J" identifier followed by the route number (e.g., "J12"). In Alaska, Russia and Canada some segments of jet routes are based on LF/MF NAVAIDs.

AREA NAVIGATION (RNAV) "Q" ROUTE SYSTEM (IFR Enroute HIGH ALTITUDE CHARTS)

The FAA has adopted certain amendments to Title 14, Code of Federal Regulations which paved the way for the development of new area high altitude navigation (RNAV) "Q" routes in the U.S. National Airspace System (NAS). These amendments enable the FAA to take advantage of technological advancements in navigation systems such as the GPS. RNAV "Q" Route MEAs are shown when other than FL 180 MEAs for DME/DME/Inertial Reference Unit (IRU) RNAV aircraft have a "D" suffix.

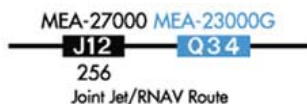


RNAV routes and associated data are charted in blue.

Legend 48. Explanation of IFR Enroute Terms – Instrument Airways.

"Q" Routes on the IFR Gulf of Mexico charts are shown in black. Magnetic reference courses are shown originating from a waypoint, fix/reporting point, or NAVAID.

Joint Jet/RNAV route identification boxes will be located adjacent to each other with the route charted in black. With the exception of Q-Routes in the Gulf of Mexico, GNSS or DME/DME/IRU RNAV are required, unless otherwise indicated. DME/DME/IRU RNAV aircraft should refer to the Chart Supplement for DME information. Q-Routes in Alaska are GNSS Only. Altitude values are stacked highest to lowest.



TERRAIN CONTOURS ON AREA CHARTS

Based on a recommendation of the National Transportation Safety Board, terrain contours have been added to the Enroute Area Charts and are intended to increase pilots' situational awareness for safe flight over changes in terrain. The following Area Charts portray terrain: Anchorage, Denver, Fairbanks, Juneau, Los Angeles, Nome, Phoenix, San Francisco, Vancouver and Washington.

When terrain rises at least a 1,000 feet above the primary airports' elevation, terrain is charted using shades of brown with brown contour lines and values. The initial contour will be 1,000 or 2,000 feet above the airports' elevation. Subsequent intervals will be 2,000 or 3,000 foot increments.

Contours are supplemented with a representative number of spots elevations and are shown in solid black. The highest elevation on an Area Chart is shown with a larger spot and text.

The following boxed note is added to the affected Area Charts.

<p>NOTE: TERRAIN CONTOURS HAVE BEEN ADDED TO THOSE AREA CHARTS WHERE THE TERRAIN ON THE CHART IS 1000 FOOT OR GREATER THAN THE ELEVATION OF THE PRIMARY AIRPORT</p>

IFR ENROUTE LOW / HIGH ALTITUDE SYMBOLS (U.S., PACIFIC AND ALASKA CHARTS)

AIRPORTS

Airport Data - Low/High Altitude

Civil

Charts: High/Low



Seaplane - Civil

Charts: Low



Civil And Military

Charts: High/Low



Heliprot

Charts: Low



Military

Charts: High/Low



Emergency Use Only

Pacific Only



Facilities in BLUE or GREEN have an approved Instrument Approach Procedure and/or RADAR MINIMA published in either the FAA Terminal Procedures Publication or the DoD FLIPs. Those in BLUE have an Instrument Approach Procedure and/or RADAR MINIMA published at least in the High Altitude DoD FLIPs. Facilities in BROWN do not have a published Instrument Procedure or RADAR MINIMA.

All IAP Airports are shown on the Low Altitude Charts.

Non-IAP Airports shown on the U.S. Low Altitude Charts have a minimum hard surface runway of 3000'.

Airports shown on the U.S. High Altitude Charts have a minimum hard surface runway of 5000'.

Airports shown on the Alask High Altitude Charts have a minimum hard or soft surface runway of 4000'.

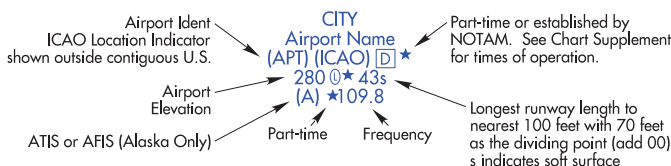
Associated city names for public airports are shown above or preceding the airport name and city name are the same only the airport name is shown. City names for military and private airports are not shown.

The airport identifier in parentheses follows the airport name or Pvt.

Pvt - Private Use

AIRPORT DATA DEPICTION

Low Altitude



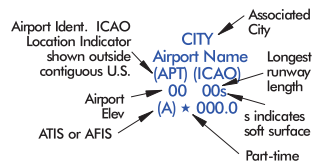
1. Airport elevation given in feet above or below mean sea level
2. Pvt - Private use, not available to general public
3. A solid line box enclosed the airport name indicates FAR 93 Special Requirements - see Directory/Supplement
4. "NO SVFR" above the airport name indicates FAR 91 fixed-wing special VFR flight is prohibited.
5. [C] or [D] following the airport identifier indicates Class C or Class D airspace

6. Associated city names for public airports are shown above or preceding the airport name. If airport name and city name are the same, only the airport name is shown. The airport identifier in parentheses follows the airport name. City names for military and private airports are not shown.

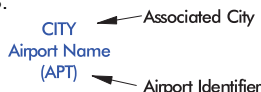
7. Airport Ident ICAO Location Indicator shown outside contiguous U.S.

8. AFIS Alaska only

High Altitude - Alaska



High Altitude - U.S.



Legend 50. IFR Enroute Low/High Altitude Symbols.

Airports (Continued)

LIGHTING CAPABILITY

Lighting Available	L	Part-time or on request	★
Pilot Controlled Airport	⓪	No lighting available At private facilities- indicates no lighting information is available	-

RADIO AIDS TO NAVIGATION

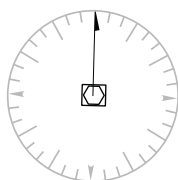
NAVAIDS

VOR	VOR/DME	TACAN	DME	NDB	NDB/DME	Reporting Function
						Non Compulsory Reporting or Off Airway
						Compulsory Reporting

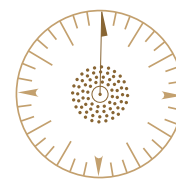
Note: VHF/UHF is depicted in Black. LF/MF is depicted in Brown. RNAV is depicted in Blue

Compass Roses

VHF/UHF



LF/MF



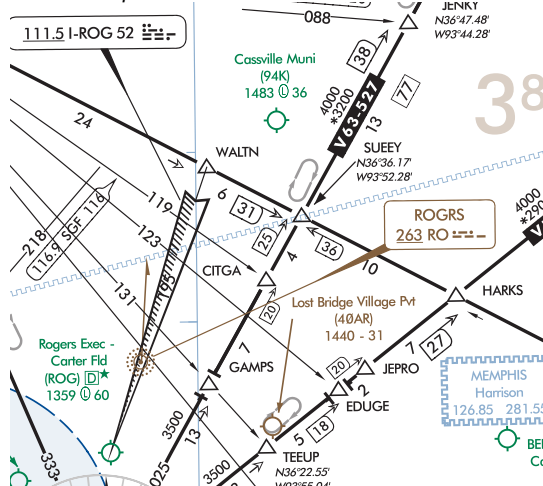
Compass Roses are orientated to Magnetic North of the NAVAID which may not be adjusted to the charted isogonic values.

Compass Locator Beacon

LOW ALTITUDE



Chart Example : Enroute Low L-16 US

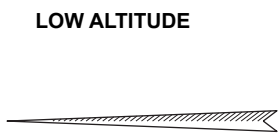


Legend 51. IFR Enroute Low/High Altitude Symbols.

RADIO AIDS TO NAVIGATION (Continued)

ILS LOCALIZER

ILS Localizer Course with additional navigation function

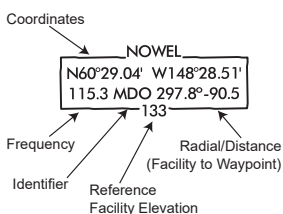


ILS Localizer Back Course with additional navigation function

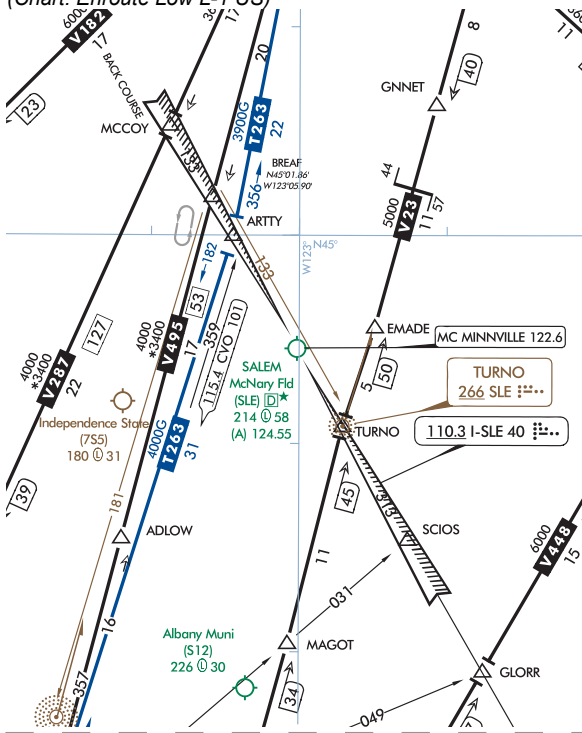


VOR/DME RNAV WAYPOINT DATA

HIGH ALTITUDE - ALASKA



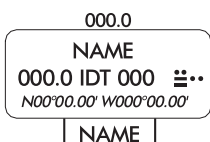
ILS Localizer Example with Back Course
(Chart: Enroute Low L-1 US)



NAVIGATION AND COMMUNICATION BOXES - COMMON ELEMENTS

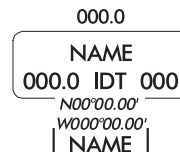
LOW ENROUTE CHARTS

RCO Frequencies
NAVAID Name
FREQ, Ident, CH, Morse Code
Latitude, Longitude
Controlling FSS Name



HIGH ENROUTE CHARTS

RCO Frequencies
NAVAID Name
Frequency, Ident, Channel,
Latitude, Longitude
Controlling FSS Name



COMMON ELEMENTS (HIGH AND LOW CHARTS)

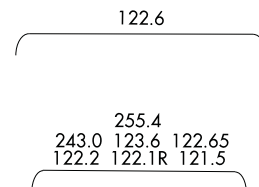
RCO Frequency

Single Frequency

Multiple Frequencies

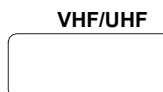
Frequencies transmit and receive except those followed by R and T:

R - Receive Only T - Transmit Only



NAVAID Box

Thin line NAVAIID boxes without frequency(s) and FSS radio name indicates no FSS frequencies available.



Shadow NAVAIID box indicates NAVAIID and Flight Service Station (FSS) have same name.



Legend 52. IFR Enroute Low/High Altitude Symbols.

RADIO AIDS TO NAVIGATION (Continued)

Navigation and Communication Boxes - Common Elements

Frequency Protection

Frequency Protection usable range at 18,000' AGL - 40 NM

(L)

Frequency Protection usable range at 12,000' AGL - 25 NM

(T)

DISTANCE MEASURING EQUIPMENT

Facilities that operate in the "Y" mode for DME reception

(Y)

VOICE COMMUNICATIONS VIA NAVAID

Voice Transmitted

112.6

No Voice Transmitted

111.0

NAVAID SHUTDOWN STATUS

VHF/UHF


LF/MF


PART TIME OR ON-REQUEST

VHF/UHF
★

LF/MF
★

AUTOMATED WEATHER BROADCAST SERVICES

ASOS/AWOS - Automated Surface Observing Station/Automated Weather Observing Station

VHF/UHF
A

LF/MF
A

HIWAS - Hazardous Inflight Weather Advisory Service

H

H

TWEB - Transcribed Weather Broadcast

T

T

LATITUDE AND LONGITUDE

Latitude and Longitude coordinates are provided for those NAVAIDS that make up part of a route/airway or a holding pattern.

LOW ENROUTE

N00°00.00' W000°00.00'

HIGH ENROUTE

N00°00.00'
W000°00.00'


Navigation and Communication Boxes - Examples

LOW ENROUTE CHARTS

VOR

R - Receive only 122.1R

Controlling FSS Name - ANDERSON

122.1R
ALLENDALE
116.7 ALD 
N33°00.75' W81°17.53'
[ANDERSON]

(T) - Service Volume

POLK (T)
108.4 FXU 

Receive & Transmit on 122.35

(T) - Service Volume

Latitude and Longitude

Controlling FSS Name - MACON

122.35
TIFT MYERS (T)
112.5 IFM 
N31°25.72' W83°29.33'
[MACON]

VOR

HIGH ENROUTE CHARTS

CECIL
117.9 VQQ
N30°12.78'
W81°53.45'

Legend 53. IFR Enroute Low/High Altitude Symbols.

Appendix 1

RADIO AIDS TO NAVIGATION (Continued)

Navigation And Communication Boxes - Examples (Continued)

LOW ENROUTE CHARTS

HIGH ENROUTE CHARTS

VOR/DME

No Voice Communications
(Y) Mode DME

R - Receive only 122.1R
Controlling FSS Name - BUFFALO

Shadow NAVAID Box
FSS Associated with NAVAID

TACAN

TACAN Channels are without
voice but not underlined

Part Time NAVAID

VORTAC

H - HIWAS Available

Shutdown status

DME

DME Channel, Ident, Morse Code,
VHF Frequency

NDB

A - ASOS/AWOS Available

Shutdown status

NDB/DME

No Voice Communications
(Y) Mode DME

T- TWEB Available
Shadow NAVAID Box
FSS Associated with NAVAID

Notes:

VOR/DME

Off Route (Greyed NAVAID Box
and NAVAID)

Service Volume - L
DME in Y Mode

Shadow NAVAID Box
FSS Associated with NAVAID

TACAN

Off Route

Off Route - Part Time NAVAID
(Greyed NAVAID Box and NAVAID)
Service Volume - L

VORTAC

H - HIWAS Available

Off Route (Greyed NAVAID Box
and NAVAID)
Service Volume - L

DME

NDB

T - TWEB Available

NDB/DME

No Voice Communications
(Y) Mode DME

T-TWEB Available
Shadow NAVAID Box
FSS Associated with NAVAID

Notes: Morse Code is not shown on High NAVAID Boxes.

RADIO AIDS TO NAVIGATION (Continued)

Stand Alone Flight Services and Communication Outlets

Flight Service Station (FSS)

Shadow NAVAID boxes indicate Flight Service Station (FSS) locations. Frequencies 122.2, 255.4 and emergency 121.5 and 243.0 are available at many FSSs and are not shown. All other frequencies are show above the box.

Certain FSSs provide Local Airport Advisory (LAA) on 123.6.

Frequencies transmit and receive except those followed by R and T:

R - Receive Only

T - Transmit Only

In Canada, shadow boxes indicate FSSs with standard group frequencies of 121.5, 126.7 and 243.0.

Remote Communications Outlet (RCO)

Thin line NAVAID boxes without frequencies and controlling FSS name indicate no FSS frequencies available. Frequencies positioned above the thin line boxes are remoted to the NAVAID sites. Other frequencies at the controlling FSS named are available, however altitude and terrain may determine their reception.

In Canada, a "D" after the frequency indicates a dial-up remote communications outlet.

Stand Alone AWOS & ASOS

LOW CHARTS

HIGH CHARTS

Stand Alone FSS



Stand Alone FSS



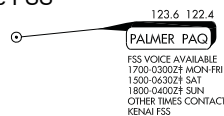
Stand Alone FSS Associated with an Airport



Stand Alone FSS Associated with an Airport



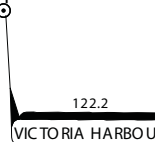
Part-time FSS



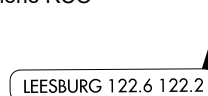
Stand Alone FSS within Canadian Airspace



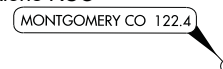
Stand Alone FSS within Canadian Airspace



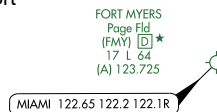
Stand Alone RCO



Stand Alone RCO



RCO Associated/Co-located with an Airport



RCO Associated/Co-located with an Airport



BOONE AWOS 118.525



STAMPEDE PASS ASOS 135.275




AIRSPACE INFORMATION


Airway/Route Types


Low and High Enroute Airway Data:


VHF/UHF Data is depicted in Black.
 LF/MF Data is depicted in Brown.
 RNAV Route data is depicted in Blue

Low Enroute Charts


Victor Airways 

LF/MF Airway 


Uncontrolled LF/MF Airway 


RNAV T Route 


GNSS Required

RNAV TK Helicopter Route 


GNSS Required


Preferred Single Direction Victor Route 

Unusable Route Segment 

Direction of Flight Indicator Canadian Routes Only 

Military Training Routes (Mtr)

MTRs 5NM or less both sides of centerline 

MTRs greater than 5NM either or both sides of centerline 


Arrow indicates direction of route


See MTR tabulation for altitude range information


All IR and VR MTRs are shown except those VRs at or below 1500' AGL


CAUTION: Inset charts do not depict MTRs

High Enroute Charts


Jet Routes 


Atlantic Routes 


Bahama Routes 


RNAV Q Routes 


Alaska Q Routes require GNSS and radar surveillance. Within the CONUS, GNSS or DME/DME/IRU RNAV required, unless otherwise indicated. DME/DME/IRU aircraft require radar surveillance. Refer to Chart Supplement for DME information.

Preferred Single Direction Jet Routes 

Preferred Single Direction RNAV Q Routes 


Single Direction ATS Route 


Unusable Route Segment 

By-Pass Route 

Jet Route Centerline by-passing a facility which is not part of that specific route.

Low and High Enroute Charts

ATS Route 

Oceanic Route 

Substitute Route 

All relative and supporting data shown in brown.

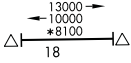
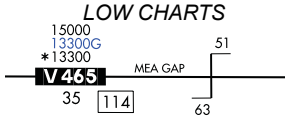
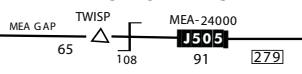










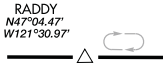


See NOTAMS or appropriate publication for specific information.

Legend 56. IFR Enroute Low/High Altitude Symbols.

Airspace Information (Continued)

FIXES		REPORTING FUNCTION	WAYPOINTS
VHF/UHF	LF/MF	Compulsory Position Reporting	RNAV
		Non-Compulsory Position Reporting	
N25°46.47' W76°16.28'	N29°36.00' W88°01.00'	Fix or Waypoint Coordinates <i>Fix Coordinates are shown for compulsory, offshore and holding fixes.</i> <i>Waypoints Coordinates are shown when waypoint is not part of a RNAV route and when located on or beyond the boundary of the U.S. Continental Control (12 mile limit).</i>	N44°25.36' W64°11.00'
		Off-set arrows indicate facility forming a fix - Arrow points away from the VHF/UHF NAVAID - Arrow points towards the LF/MF NAVAID	N/A
		Distance Measuring Equipment (DME) Fix <i>Denotes DME fix (distance same as airway / route mileage)</i>	N/A
VHF/UHF		Distance Measuring Equipment (DME) Fix <i>Denotes DME fix (encircled mileage shown when not otherwise obvious)</i> Example: <i>First segment, 5NM; second segment 10NM; total mileage provided in encircled DME arrow.</i>	RNAV N/A
			N/A
			N/A
VHF/UHF	LF/MF	Total Mileages between Compulsory Reporting Points or NAVAIDS <i>Note: All mileages are in Nautical Miles</i>	RNAV N/A
229	149		
54	125	MILEAGE BETWEEN OTHER FIXES, NAVAIDS AND/OR MILEAGE BREAKDOWN	125
		Mileage Breakdown or Computer Navigation Fix (CNF) <i>Five letter identifier in parentheses indicates CNF with no ATC function</i>	N/A
		FACILITY LOCATOR BOATS <i>Crosshatch indicates Shutdown status of NAVAID</i>	N/A
	N/A	RADIAL OUTBOUND FROM A VHF/UHF NAVAID <i>All Radials are magnetic.</i>	N/A
N/A		BEARING INBOUND TO AN LF/MF NAVAID <i>All Bearings are magnetic.</i>	N/A
N/A	N/A	MAGNETIC REFERENCE BEARING , outbound from a NAVAID or Fix <i>Note: Not shown on joint Victor/RNAV or Jet/RNAV Routes.</i>	000 →

Legend 57. IFR Enroute Low/High Altitude Symbols.

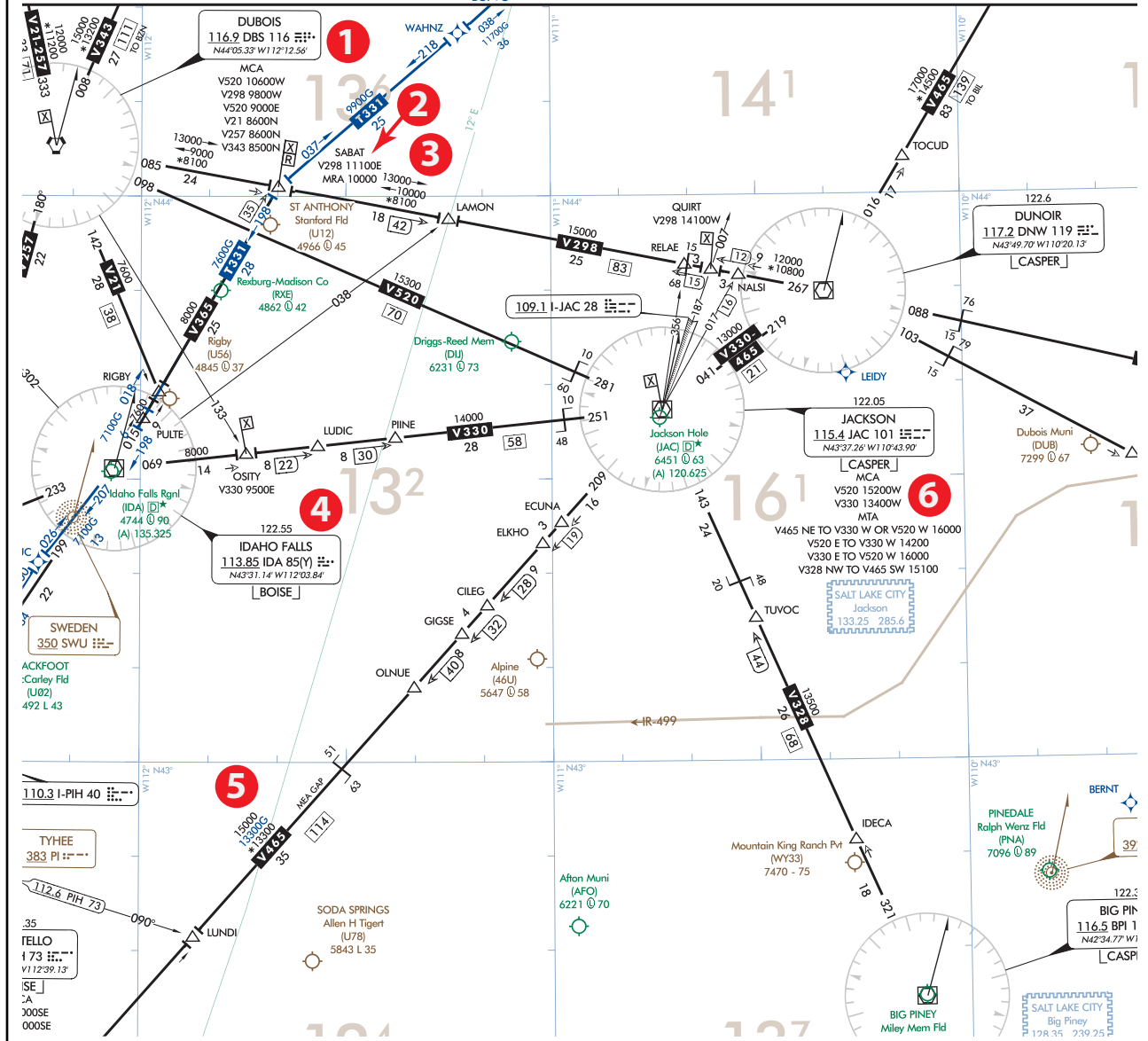
Airspace Information (Continued)			RNAV LOW CHARTS
VHF/UHF LOW CHARTS	LF/MF LOW CHARTS	MINIMUM ENROUTE ALTITUDE (MEA) All Altitudes Are MSL Unless Otherwise Noted.	0000G
0000	0000	Directional MEAs	
		MEAs are shown on IFR High Altitude Charts when MEA is other than 18,000'.	HIGH CHARTS
HIGH CHARTS	HIGH CHARTS		MEA for GNSS RNAV aircraft MEA-24000G
MEA-29000	MEA-FL240		MEA for DME/DME/IRU RNAV aircraft MEA-24000D
<hr/> <p>LOW CHARTS</p>  <p>HIGH CHARTS</p> 		MINIMUM ENROUTE ALTITUDE (MEA) GAP MEA is established when there is a gap in navigation signal coverage.	N/A
LOW / HIGH CHARTS	LOW / HIGH CHARTS	Maximum Authorized Altitude (MAA) All Altitudes Are MSL Unless Otherwise Noted.	LOW / HIGH CHARTS
MAA-00000	MAA-00000	MAAs are shown on IFR High Altitude Charts when MAA is other than 45,000'.	MAA-00000
LOW CHARTS	LOW CHARTS	Minimum Obstruction Clearance Altitude (MOCA) All Altitudes Are MSL Unless Otherwise Noted.	LOW CHARTS
*0000	*0000		*0000
LOW CHARTS	LOW CHARTS	Minimum Turning Altitude (MTA) and Minimum Crossing Altitude (MCA) See Low Enroute Chart Example below for examples of both MTAs and MCAs.	LOW CHARTS
			
		MINIMUM RECEPTION ALTITUDE (MRA)	N/A
		ALTITUDE CHANGE MEA, MOCA and/or MAA change at other than NAVAIDs	
LOW / HIGH CHARTS	LOW / HIGH CHARTS	CHANGEOVER POINT Changeover Point giving mileage to NAVAIDs (Not shown at midpoint locations.)	N/A
			
		HOLDING PATTERNS RNAV Holding Pattern Magnetic Reference Bearing is determined by the isogonic value at the waypoint or fix. Holding Pattern with maximum restriction airspeed 210K applies to altitudes 6000' to and including 14000'. 175K applied to all altitudes. Airspeed depicted is Indicated Airspeed (IAS)	

Legend 58. IFR Enroute Low/High Altitude Symbols.

AIRSPACE INFORMATION (Continued)

Enroute Chart Examples

Low Enroute Chart



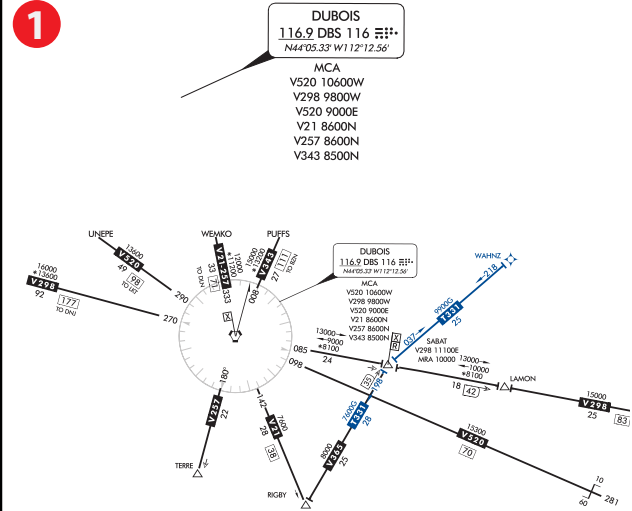
Legend 59. IFR Enroute Low/High Altitude Symbols.

AIRSPACE INFORMATION (Continued)

**Enroute Chart Examples
Low Enroute Chart (Continued)**

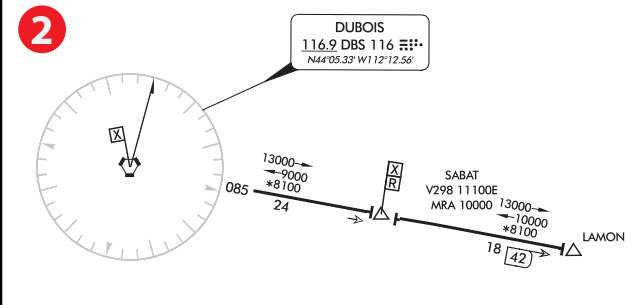
Reference Number

Description



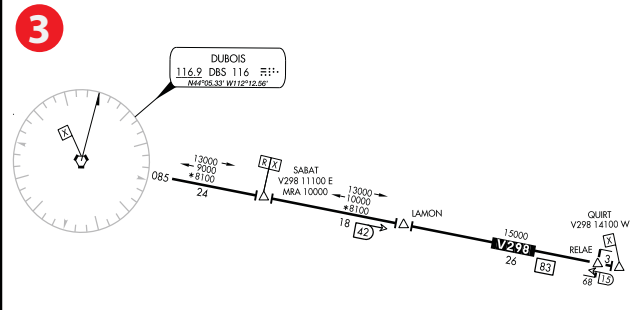
Multiple MCAs at a NAVAID

V21 and V257 - MCA at DBS of 8600' traveling North
 V298 - MCA at DBS of 9800' traveling West
 V343 - MCA at DBS of 8500' traveling North
 V520 - MCA at DBS of 9000' traveling East
 V520 - MCA at DBS of 10600' traveling West



MCA and MRA at a Fix

MCA at SABAT on V298 of 11,100 traveling East.
 MRA at SABAT of 10000.

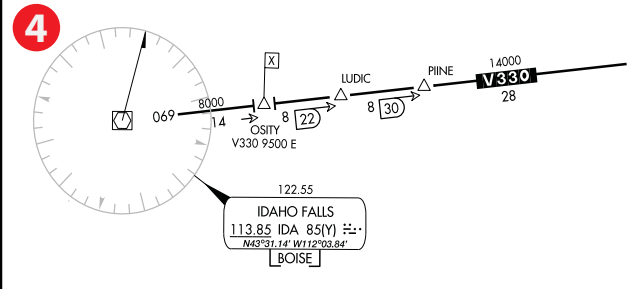


Example of MOCA and directional MEAs along a Victor Route

Traveling East from DBS, MEA 13,000' the first two segments, 15,000 along third segment.

Traveling West from QUIRT, MEA of 15,000' the first segment, MEA of 10,000 the second segment and MEA of 9,000 the third segment.

MOCA for DBS to SABAT and SABAT to LAMON segments of 8100



MCA Example

MCA at OSITY on V330. MCA of 9500' traveling East on V330 from Idaho Falls (IDA) VOR-DME.

AIRSPACE INFORMATION (Continued)

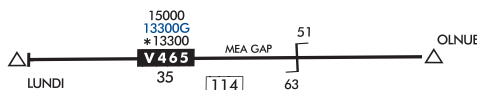
Enroute Chart Examples

Low Enroute Chart (Continued)

Reference Number

Description

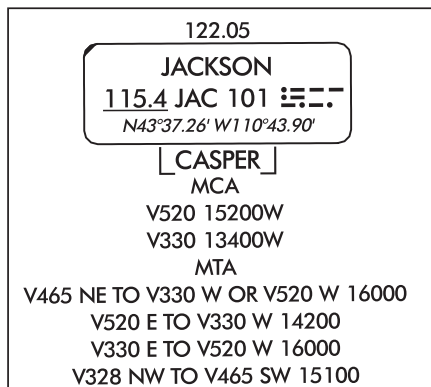
5



MEA VHF and RNAV Example

MEA for aircraft utilizing VHF NAVAID of 15000'
 MEA for aircraft utilizing RNAV of 13300'
 MOCA of 13300'

6



MCA and MTA Example at a NAVAID

MCA for aircraft traveling West along V520 to cross JAC at 15200'
 MCA for aircraft traveling West along V330 to cross JAC at 13400'

MTA for aircraft crossing over and turning at JAC:

Aircraft traveling NE on V465 and turning to V330 on a W heading or turning to V520 on a W heading must turn at altitude of 16000' or higher

Aircraft traveling E on V520 and turning to V330 on a W heading must turn at altitude of 14200'

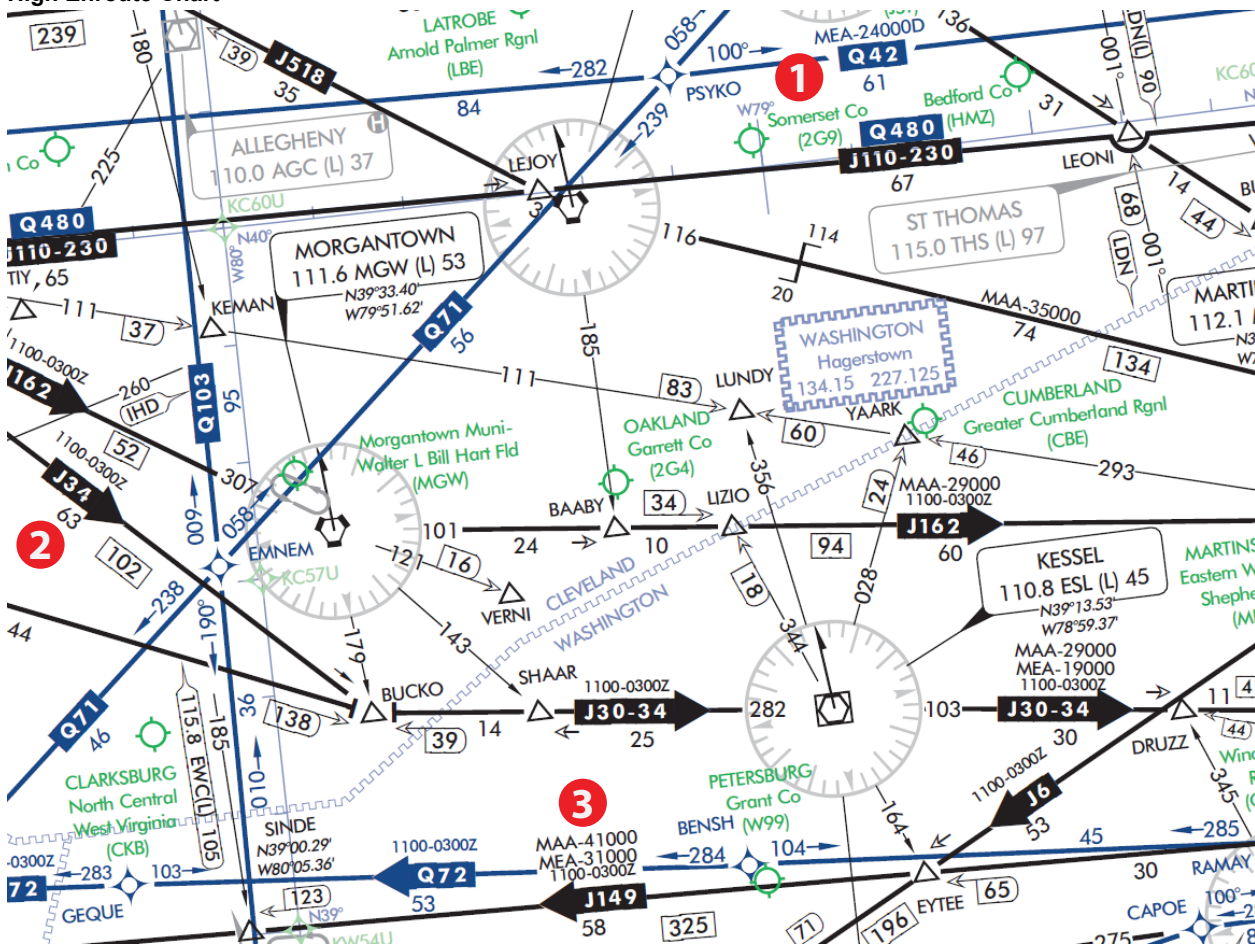
Aircraft traveling E on V330 and turning to V520 on a W heading must turn at altitude of 16000' or higher

Aircraft traveling NW on V328 and turning to V465 on a SW heading must turn at altitude of 15100' or higher.

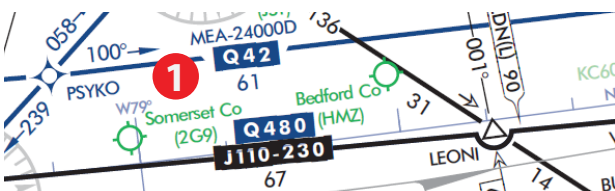
Airspace Information (Continued)

Enroute Chart Examples

High Enroute Chart

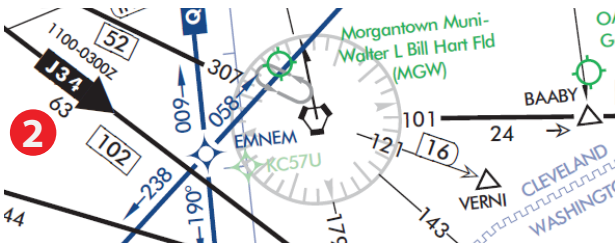


Description



High RNAV Route with MEA for DME/DME/IRU RNAV Aircraft

MEA of 24,000'



Directional Jet Route with Time Restrictions

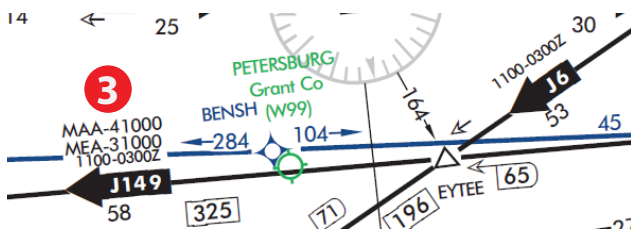
Jet Route 34 available between 1100 - 0300Z

Legend 62. IFR Enroute Low/High Altitude Symbols.

AIRSPACE INFORMATION (Continued)

Enroute Chart Examples High Enroute Chart (Continued)

Reference Number



Description

Directional Jet Route with Time Restrictions, MAA and MEA

Jet Route 149 available between 1100 - 0300Z
 MAA - 41,000'
 MEA - 31,000'

AIRSPACE BOUNDARIES

Air Defense Identification Zone (ADIZ)

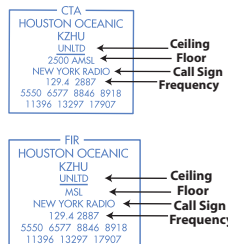
LOW / HIGH CHARTS



Adjoining ADIZ

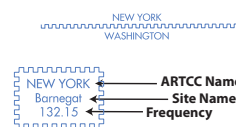
Air Traffic Service Identification Data

LOW / HIGH CHARTS



Air Route Traffic Control Center (ARTCC)

LOW / HIGH CHARTS



ARTCC Remoted Sites with discrete VHF and UHF frequencies

Altimeter Setting Change



Control Areas (CTA)

LOW / HIGH CHARTS



Flight Information Regions (FIR)

LOW / HIGH CHARTS



Additional Control Areas

LOW ALTITUDE

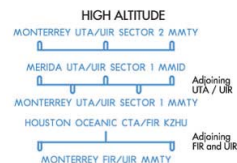


HIGH ALTITUDE



Upper Information Regions (UIR)

Upper Control Areas (UTA)



Legend 63. IFR Enroute Low/High Altitude Symbols.

AIRSPACE INFORMATION (Continued)

Airspace - U.S.

Class A Open Area (White)

High Chart Only That airspace from 18,000' MSL to and including FL 600, including the airspace overlying the waters within 12 NM of the coast of the contiguous United States and Alaska and designated offshore areas, excluding Santa Barbara Island, Farallon Island, the airspace south of latitude 25° 04'00" N, the Alaska peninsula west of longitude 160°00'00" W, and the airspace less than 1,500' AGL.

Controlled Airspace

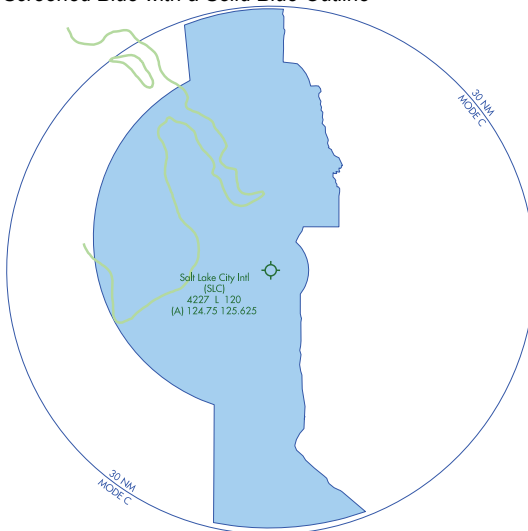
That airspace from 18,000' MSL to and including FL 450, including Santa Barbara Island, Farallon Island, the Alaska peninsula west of longitude 160°00'00" W, and designated offshore areas.

Class B

Screened Blue with a Solid Blue Outline

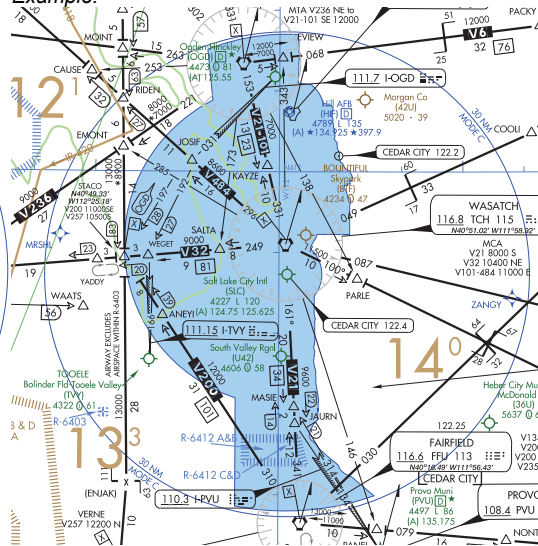
Low Chart Only

Controlled Airspace



That airspace from the surface to 10,000' MSL (unless otherwise designated) surrounding the nation's busiest airports. Each Class B airspace area is individually tailored and consists of a surface area and two or more layers.

Example:



Mode C Area

A Solid Blue Outline

Low Chart Only

Controlled Airspace

That airspace within 30 NM of the primary airports of Class B airspace and within 10 NM of designated airports. Mode-C transponder equipment is required. (See FAR 91.215)

Example:

See Chart example above.

Legend 64. IFR Enroute Low/High Altitude Symbols.

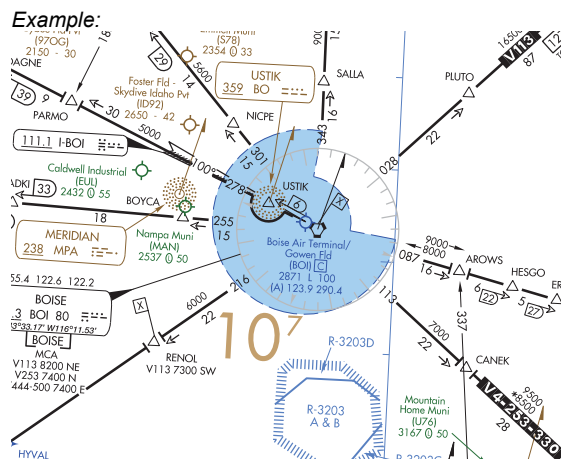
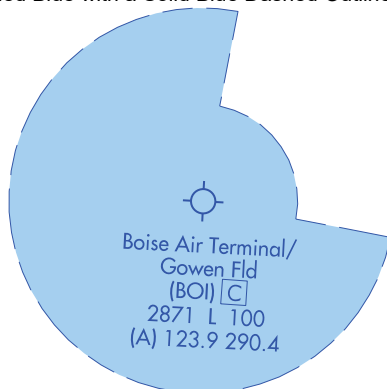
AIRSPACE INFORMATION (Continued)

Airspace - U.S. (Continued)

CLASS C Screened Blue with a Solid Blue Dashed Outline

Low Chart Only

Controlled Air-space

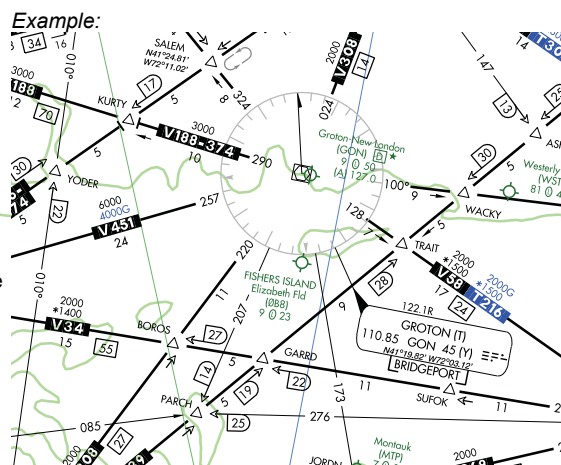
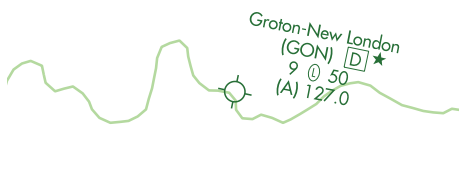


That airspace from the surface to 4,000' (unless otherwise designated) above the elevation of selected airports (charted in MSL). The normal radius of the outer limits of Class C airspace is 10NM. Class C airspace is also indicated by the letter C in a box following the airport name.

CLASS D Open Area (White)

Low Chart Only

Controlled Air-space



That airspace from the surface to 2,500' (unless otherwise designated) above the airport elevation (charted in MSL), surrounding those airports that have an operational control tower. Class D airspace is indicated by the letter D in a box following the airport name.

CLASS E Open Area (White)

Low Chart Only

Controlled Air-space

That controlled airspace below 14,500' MSL which is not Class B, C or D.

Federal Airways from 1,200' AGL to but not including 18,000' MSL (unless otherwise specified).

Other designated control areas below 14,500' MSL.

Not Charted

That airspace from 14,500' MSL to but not including 18,000' MSL, including the airspace overflying the waters within 12 NM of the coast of the contiguous United States and Alaska and designated offshore areas, excluding the Alaska peninsula west of longitude 160°00'00" W, and the airspace less than 1,500' AGL.

Airspace Information (Continued)

AIRSPACE - U.S.

CLASS G Screened Brown Area

High and Low Chart

Uncontrolled Airspace



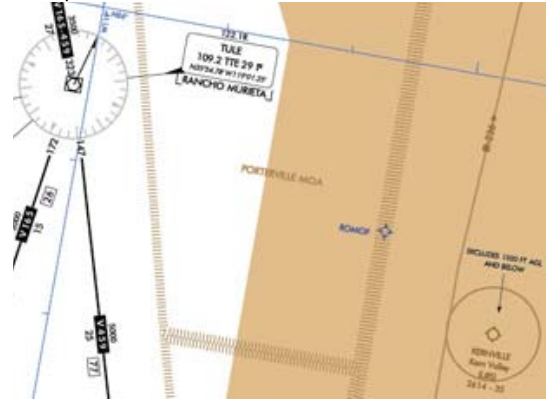
Low Altitude

That portion of the airspace below 14,500' MSL that has not been designated as Class B, C, D or E Airspace.

High Altitude

That portion of the airspace from 18,000' MSL and above that has not been designated as Class A airspace.

Example:

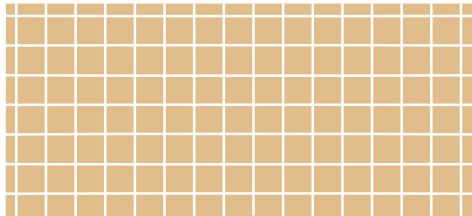


AIRSPACE - CANADIAN

CLASS B Screened Brown Checkered Area

Low Charts Only

Controlled Airspace



Controlled airspace above 12,500' MSL

Example:



AIRSPACE INFORMATION (Continued)

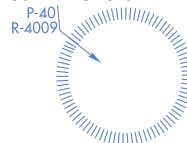
Special Use Airspace - U.S.

Low and High Charts P - Prohibited Area

Example: P-56 - Washington DC, Area A-1 Chart



Example: P-40 and R-4009 - Washington DC, Area A-1 Chart



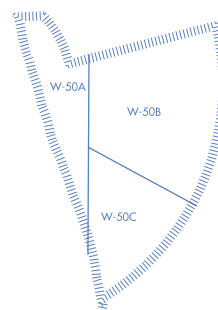
R - Restricted Area

Example: R3601A -



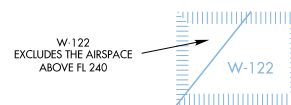
W - Warning Area

Example: W-50



See Airspace Tabulation on each chart for complete documentation information on:

- Area Identification
- Effective Altitude
- Operating Times
- Controlling Agency Voice Call



Low Charts Only

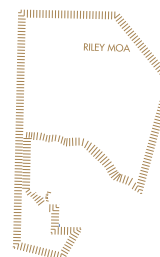
A - Alert Area



MOA - Military Operations Area

See Airspace Tabulation on each chart for complete documentation information on:

- Area Identification
- Effective Altitude
- Operating Times
- Controlling Agency Voice Call



Legend 67. IFR Enroute Low/High Altitude Symbols.

AIRSPACE INFORMATION (Continued)

Off Route Obstruction Clearance Altitude (OROCA)

Low Charts Only OROCA is computed similarly to the Maximum Elevation Figure (MEF) found on Visual charts except that it provides an additional vertical buffer of 1,000 feet in designated non-mountainous areas and a 2,000 foot vertical buffer in designated mountainous areas within the United States.

Example: 12,500 feet

12⁵

Example: Low L-13 Chart



Special Flight Rules Area (SFRA)

Low and High Charts SFRA Symbolry



Example: Low Chart (Washington Area Chart)



Example: High Chart (H-12)

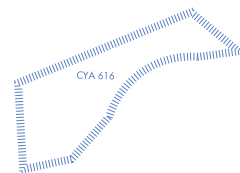


Legend 68. IFR Enroute Low/High Altitude Symbols.

AIRSPACE INFORMATION (Continued)

Special Use Airspace - Canada & Caribbean

Low and High Charts
 Canada Only
 CYA - Advisory Area



CYD - Danger Area

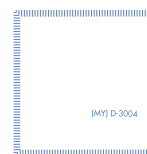


CYR - Restricted Area



Caribbean Only
 D - Danger Area

In the Caribbean, the first two letters represent the country code, i.e. (MY) Bahamas, (MU) Cuba



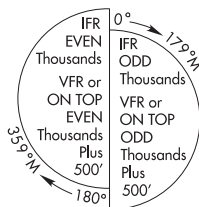
NAVIGATIONAL AND PROCEDURAL INFORMATION

Cruising Altitudes - Low Charts - U.S. Only

IFR outside controlled airspace.

IFR within controlled airspace as assigned by ATC.

ALL courses are magnetic.



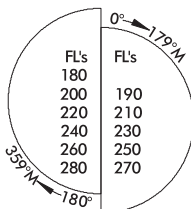
VFR above 3000' AGL unless otherwise authorized by ATC.

Cruising Altitudes - High Charts - U.S. Only

IFR within controlled airspace as assigned by ATC

All courses are magnetic.

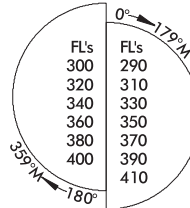
18,000' MSL to FL280



VFR or VFR On Top add 500'

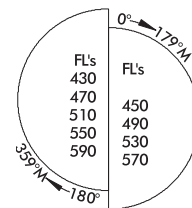
No VFR flights within Class A Airspace above 3000' AGL unless otherwise authorized

RVSM Levels FL290 to FL410



No VFR or VFR On Top authorized above FL285 in RVSM airspace.

FL430 and above



Navigational and Procedural Information (Continued)

ISOGONIC LINE AND VALUE

LOW/HIGH CHARTS

TIME ZONE

All time is Coordinated Universal Time (UTC)

Mountain Std
+7 = UTC

Central Std
+6 = UTC

During periods of Daylights Savings Time (DT), effective hours will be one hour earlier than shown. All states observe DT except Arizona and Hawaii

ENLARGEMENT AREA



MATCH MARK

LOW/HIGH CHARTS



MORSE CODE

A ---	F	K ---	P	U ...	1	6
B	G ---	L	Q	V	2	7
C	H	M ---	R ...	W	3	8
D ...	I ..	N --	S ...	X	4	9
E .	J	O ---	T -	Y	5	0
				Z		

CULTURE

Boundaries

International

LOW/ HIGH ALTITUDE

--- Omitted when coincident with ARTCC or FIR

Date Line

LOW/ HIGH ALTITUDE

..... INTERNATIONAL DATE LINE
..... MONDAY SUNDAY

U.S./Russia Maritime Line

LOW/ HIGH ALTITUDE



HYDROGRAPHY

SHORELINES

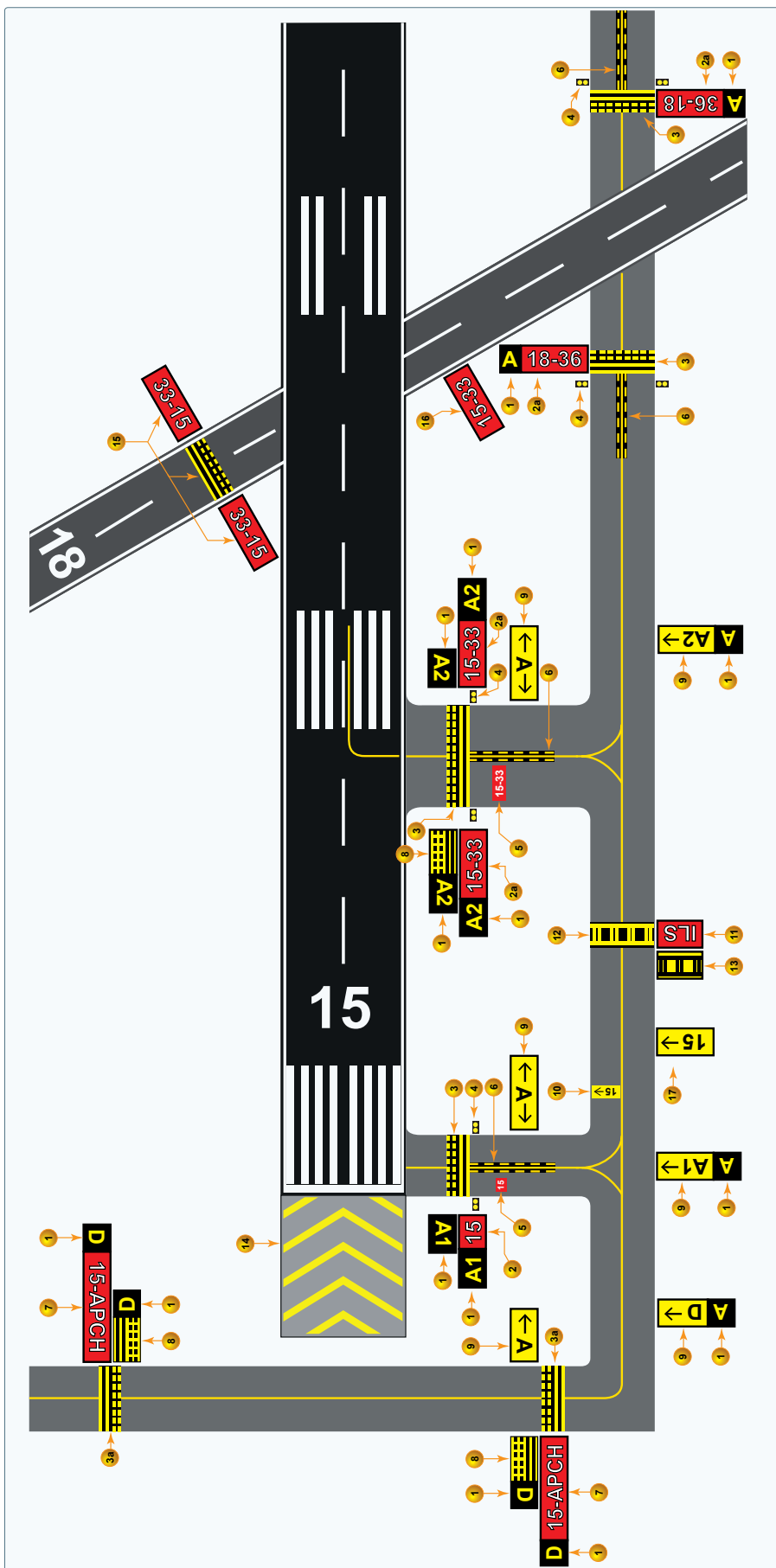


TOPOGRAPHY

TERRAIN
Area Charts



Legend 70. IFR Enroute Low/High Altitude Symbols.



Legend 71. Examples of Airport Signs and Markings.

CLIMB/DESCENT TABLE 10042

INSTRUMENT TAKEOFF OR APPROACH PROCEDURE CHARTS RATE OF CLIMB/DESCENT TABLE (ft. per min)

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

CLIMB/ DESCENT ANGLE (degrees and tenths)	ft/NM	GROUND SPEED (knots)											
		60	90	120	150	180	210	240	270	300	330	360	
2.0	210	210	320	425	530	635	743	850	955	1060	1165	1275	
2.5	265	265	400	530	665	795	930	1060	1195	1325	1460	1590	
VERTICAL PATH ANGLE	2.7	287	287	430	574	717	860	1003	1147	1290	1433	1576	1720
	2.8	297	297	446	595	743	892	1041	1189	1338	1486	1635	1783
	2.9	308	308	462	616	770	924	1078	1232	1386	1539	1693	1847
	3.0	318	318	478	637	797	956	1115	1274	1433	1593	1752	1911
	3.1	329	329	494	659	823	988	1152	1317	1481	1646	1810	1975
	3.2	340	340	510	680	850	1020	1189	1359	1529	1699	1869	2039
	3.3	350	350	526	701	876	1052	1227	1402	1577	1752	1927	2103
	3.4	361	361	542	722	903	1083	1264	1444	1625	1805	1986	2166
3.5	370	370	555	745	930	1115	1300	1485	1670	1860	2045	2230	
4.0	425	425	640	850	1065	1275	1490	1700	1915	2125	2340	2550	
4.5	480	480	715	955	1195	1435	1675	1915	2150	2390	2630	2870	
5.0	530	530	795	1065	1330	1595	1860	2125	2390	2660	2925	3190	
5.5	585	585	880	1170	1465	1755	2050	2340	2635	2925	3220	3510	
6.0	640	640	960	1275	1595	1915	2235	2555	2875	3195	3510	3830	
6.5	690	690	1040	1385	1730	2075	2425	2770	3115	3460	3805	4155	
7.0	745	745	1120	1490	1865	2240	2610	2985	3355	3730	4105	4475	
7.5	800	800	1200	1600	2000	2400	2800	3200	3600	4000	4400	4800	
8.0	855	855	1280	1710	2135	2560	2990	3415	3845	4270	4695	5125	
8.5	910	910	1360	1815	2270	2725	3180	3630	4085	4540	4995	5450	
9.0	960	960	1445	1925	2405	2885	3370	3850	4330	4810	5295	5775	
9.5	1015	1015	1525	2035	2540	3050	3560	4065	4575	5085	5590	6100	
10.0	1070	1070	1605	2145	2680	3215	3750	4285	4820	5355	5890	6430	

CLIMB/DESCENT TABLE 10042

Legend 72. Rate of Climb/Descent Table.

Appendix 2

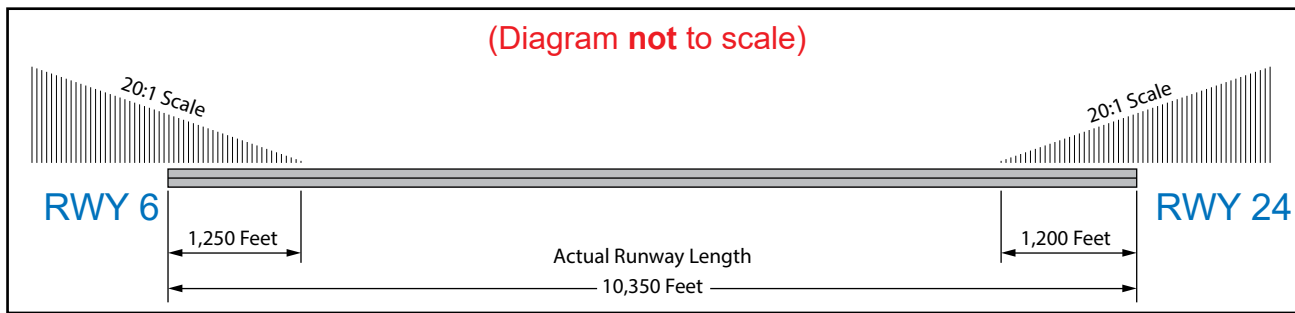


Figure 1. Runway Diagram.

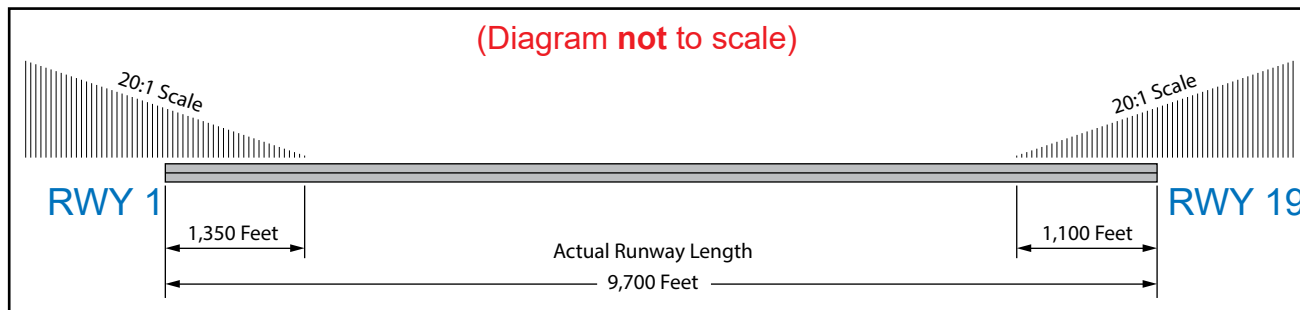


Figure 2. Runway Diagram.

LOADING CONDITIONS		AC-1	AC-2	AC-3	AC-4	AC-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. Commuter Aircraft—Loading Passenger Configuration.

LOADING CONDITIONS		AC-6	AC-7	AC-8	AC-9	AC-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. Commuter Aircraft—Loading Cargo Configuration.

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

Figure 5. Commuter Aircraft—Loading Limitations.

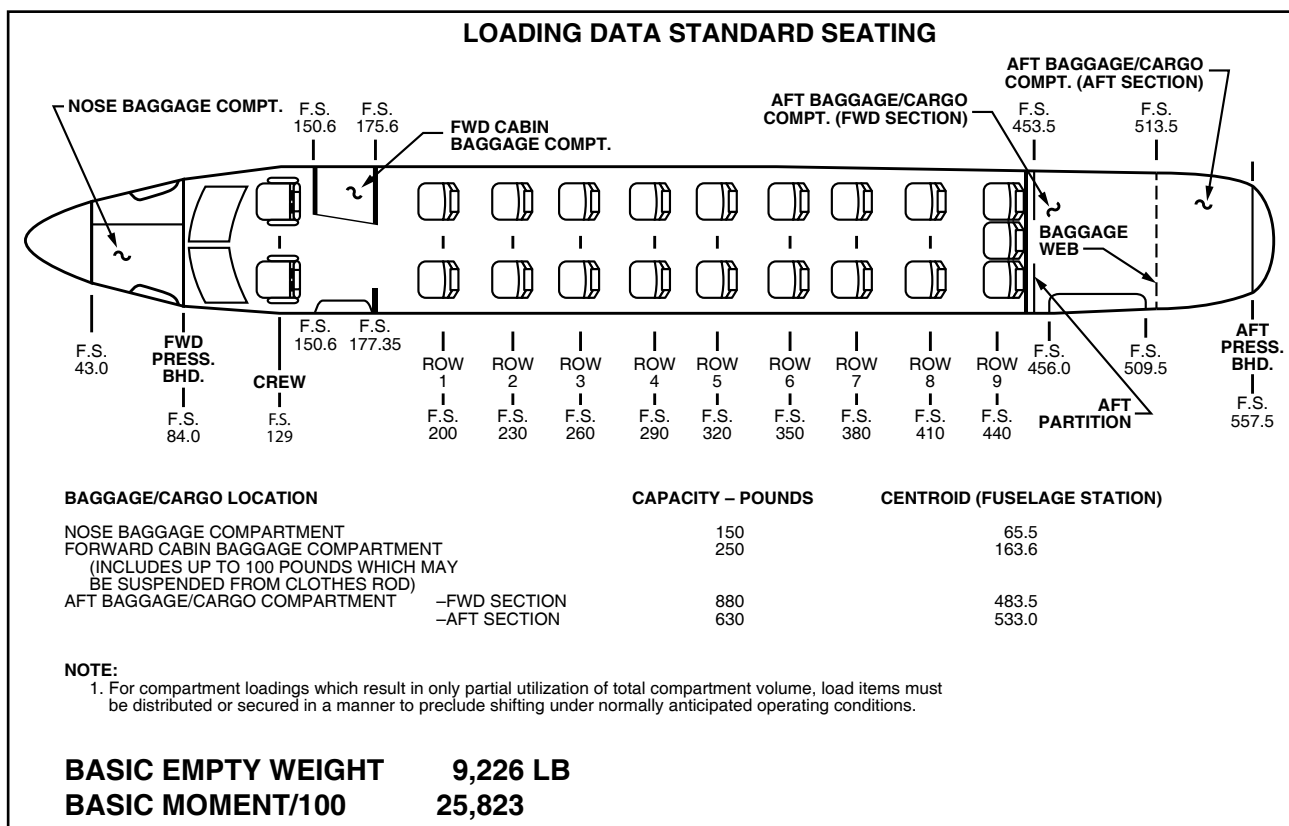


Figure 6. Airplane—Loading Data.

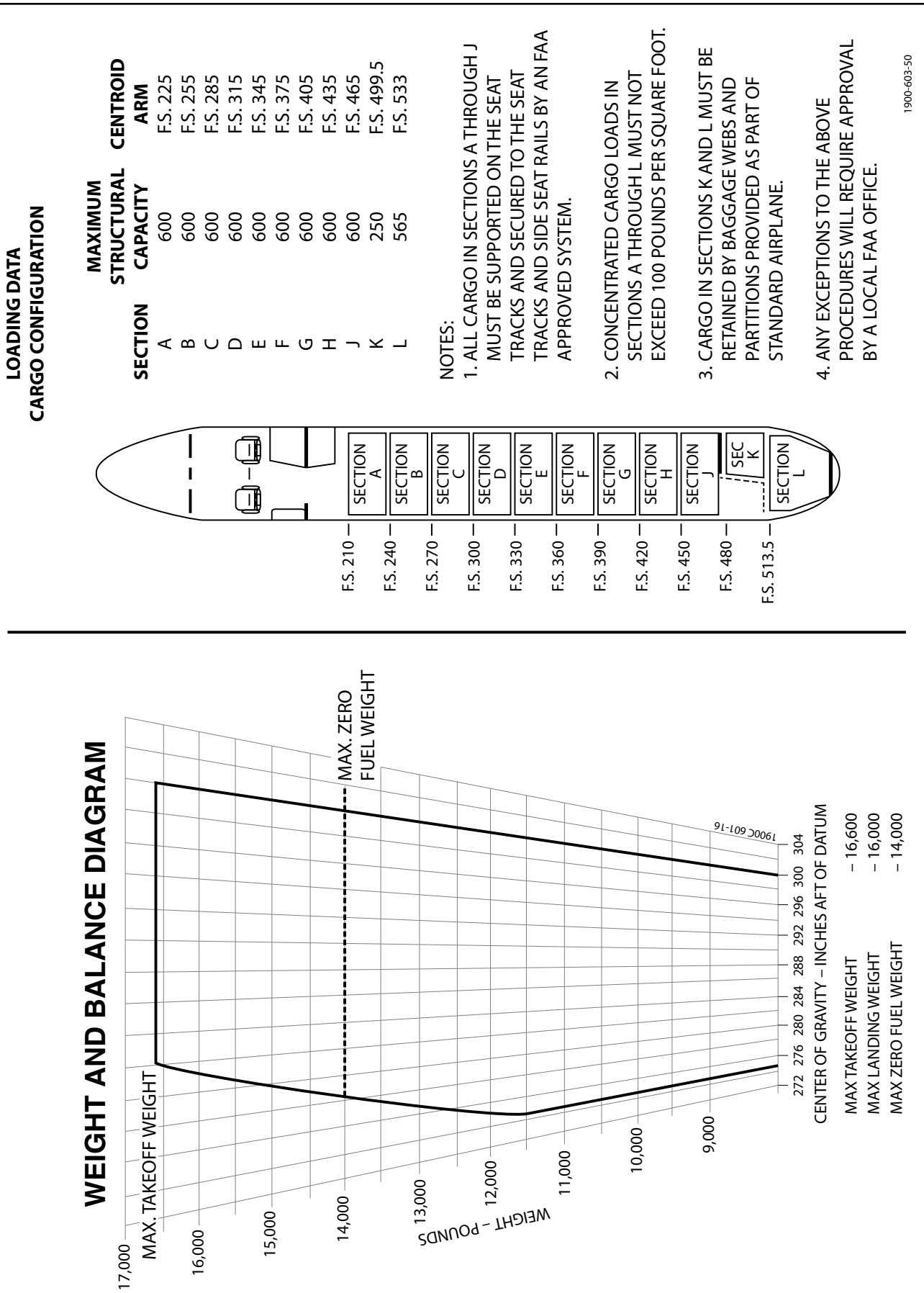


Figure 7. Commuter Aircraft—CG Envelope and Cargo Loading Data.

USEFUL LOAD WEIGHTS AND MOMENTS BAGGAGE

WEIGHT	NOSE BAGGAGE COMPARTMENT F.S. 65.5	FORWARD CABIN BAGGAGE COMPARTMENT F.S. 163.6	AFT BAGGAGE/CARGO COMPARTMENT (FORWARD SECTION) F.S. 483.5	AFT BAGGAGE/CARGO COMPARTMENT (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	1,066
250		409	1,209	1,332
300			1,450	1,599
350			1,692	1,866
400			1,934	2,132
450			2,176	2,398
500			2,418	2,665
550			2,659	2,932
600			2,901	3,198
630			3,046	3,358
650			3,143	
700			3,384	
750			3,626	
800			3,868	
850			4,110	
880			4,255	

Figure 8. Commuter Aircraft—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	1,012
240	310	480	552	624	696	768	840	912	984	1,056
250	323	500	575	650	725	800	875	950	1,025	1,100

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

Figure 9. Commuter Aircraft—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.

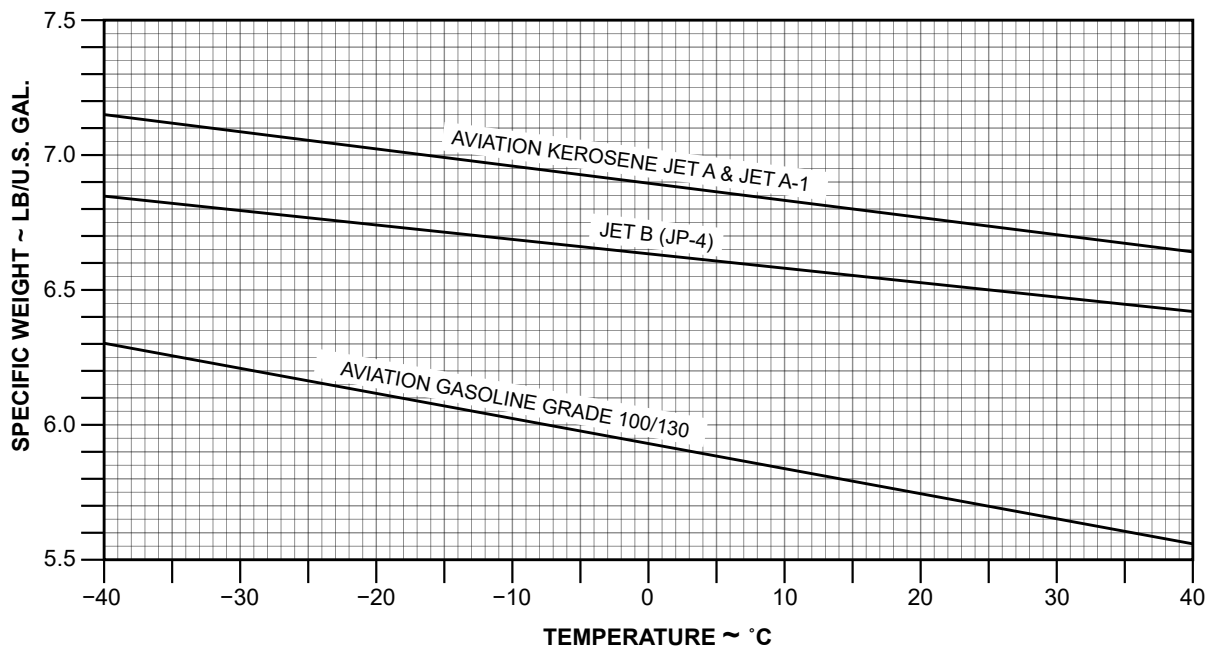


Figure 10. Density Variation of Aviation Fuel.

**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	WEIGHT	MOMENT	WEIGHT	MOMENT	WEIGHT	MOMENT
		100		100		100		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	1,002	335	1,018	340	1,033
60	390	1,185	396	1,203	402	1,222	408	1,240
70	455	1,383	462	1,404	469	1,426	476	1,447
80	520	1,581	528	1,605	536	1,630	544	1,654
90	585	1,779	594	1,806	603	1,834	612	1,861
100	650	1,977	660	2,007	670	2,038	680	2,068
110	715	2,175	726	2,208	737	2,242	748	2,275
120	780	2,372	792	2,409	804	2,445	816	2,482
130	845	2,569	858	2,608	871	2,648	884	2,687
140	910	2,765	924	2,808	938	2,850	952	2,893
150	975	2,962	990	3,007	1,005	3,053	1,020	3,099
160	1,040	3,157	1,056	3,205	1,072	3,254	1,088	3,303
170	1,105	3,351	1,122	3,403	1,139	3,454	1,156	3,506
180	1,170	3,545	1,188	3,600	1,206	3,654	1,224	3,709
190	1,235	3,739	1,254	3,797	1,273	3,854	1,292	3,912
200	1,300	3,932	1,320	3,992	1,340	4,053	1,360	4,113
210	1,365	4,124	1,386	4,187	1,407	4,250	1,428	4,314
220	1,430	4,315	1,452	4,382	1,474	4,448	1,496	4,514
230	1,495	4,507	1,518	4,576	1,541	4,646	1,564	4,715
240	1,560	4,698	1,584	4,770	1,608	4,843	1,632	4,915
250	1,625	4,889	1,650	4,964	1,675	5,040	1,700	5,115
260	1,690	5,080	1,716	5,158	1,742	5,236	1,768	5,315
270	1,755	5,271	1,782	5,352	1,809	5,433	1,836	5,514
280	1,820	5,462	1,848	5,546	1,876	5,630	1,904	5,714
290	1,885	5,651	1,914	5,738	1,943	5,825	1,972	5,912
300	1,950	5,842	1,980	5,932	2,010	6,022	2,040	6,112
310	2,015	6,032	2,046	6,125	2,077	6,218	2,108	6,311
320	2,080	6,225	2,112	6,321	2,144	6,416	2,176	6,512
330	2,145	6,417	2,178	6,516	2,211	6,615	2,244	6,713
340	2,210	6,610	2,244	6,711	2,278	6,813	2,312	6,915
350	2,275	6,802	2,310	6,907	2,345	7,011	2,380	7,116
360	2,340	6,995	2,376	7,103	2,412	7,210	2,448	7,318
370	2,405	7,188	2,442	7,299	2,479	7,409	2,516	7,520
380	2,470	7,381	2,508	7,495	2,546	7,609	2,584	7,722
390	2,535	7,575	2,574	7,691	2,613	7,808	2,652	7,924
400	2,600	7,768	2,640	7,888	2,680	8,007	2,720	8,127
410	2,665	7,962	2,706	8,085	2,747	8,207	2,788	8,330
420	2,730	8,156	2,772	8,282	2,814	8,407	2,856	8,532
425	2,763	8,259	2,805	8,386	2,848	8,513	2,890	8,640

Figure 11. Commuter Aircraft—Weights and Moments—Usable Fuel.

MINIMUM TAKEOFF POWER AT 1700 RPM

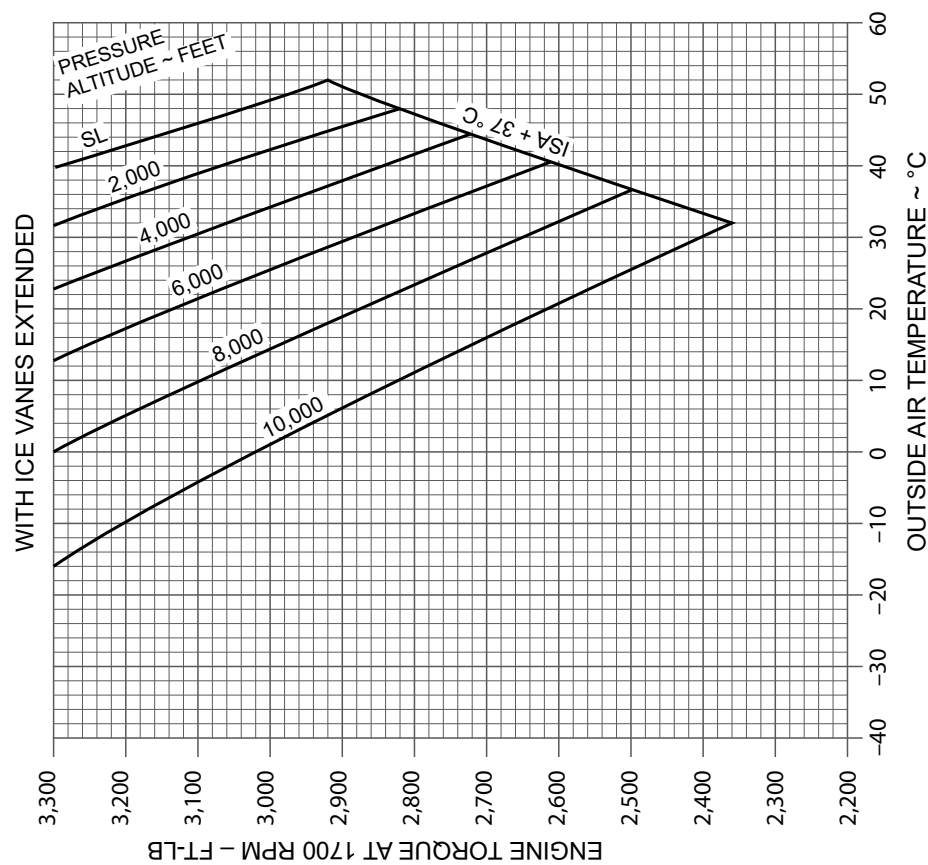
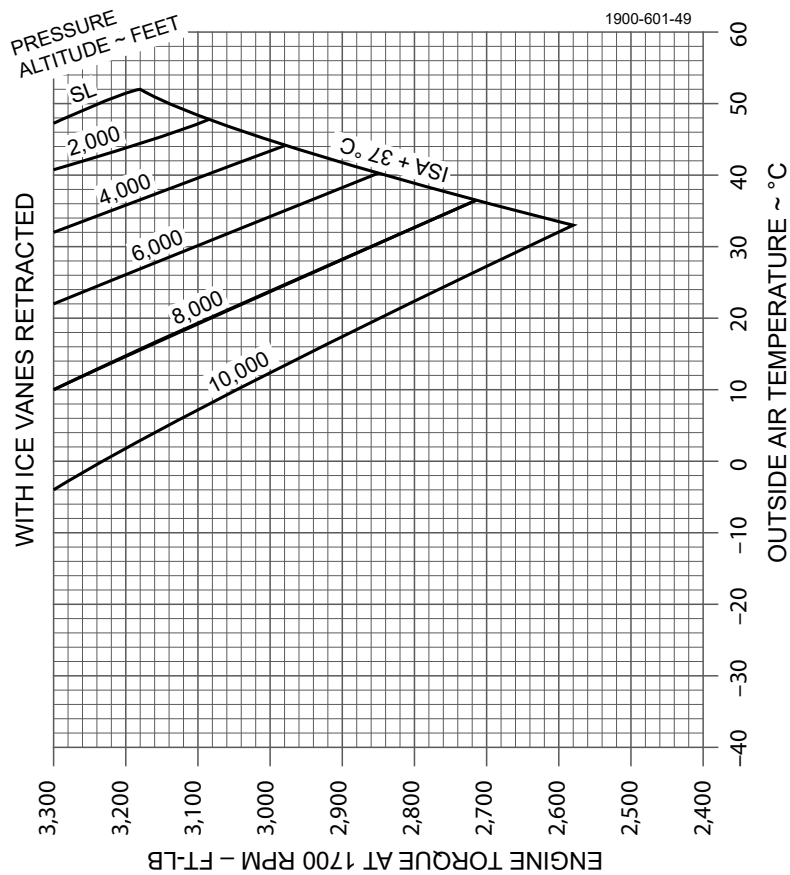


Figure 12. Minimum Takeoff Power at 1700 RPM.

TAKEOFF DISTANCE—FLAPS TAKEOFF

ASSOCIATED CONDITIONS:

- POWER.....TAKEOFF POWER SET BEFORE BREAK RELEASE
- LANDING GEAR.....RETRACT AFTER LIFTOFF
- RUNWAY.....PAVED, LEVEL, DRY SURFACE

NOTE 1: FOR OPERATION WITH ICE VANES EXTENDED
ADD 5 °C TO THE ACTUAL OAT BEFORE ENTERING GRAPH.

WEIGHT ~ POUNDS	TAKEOFF 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

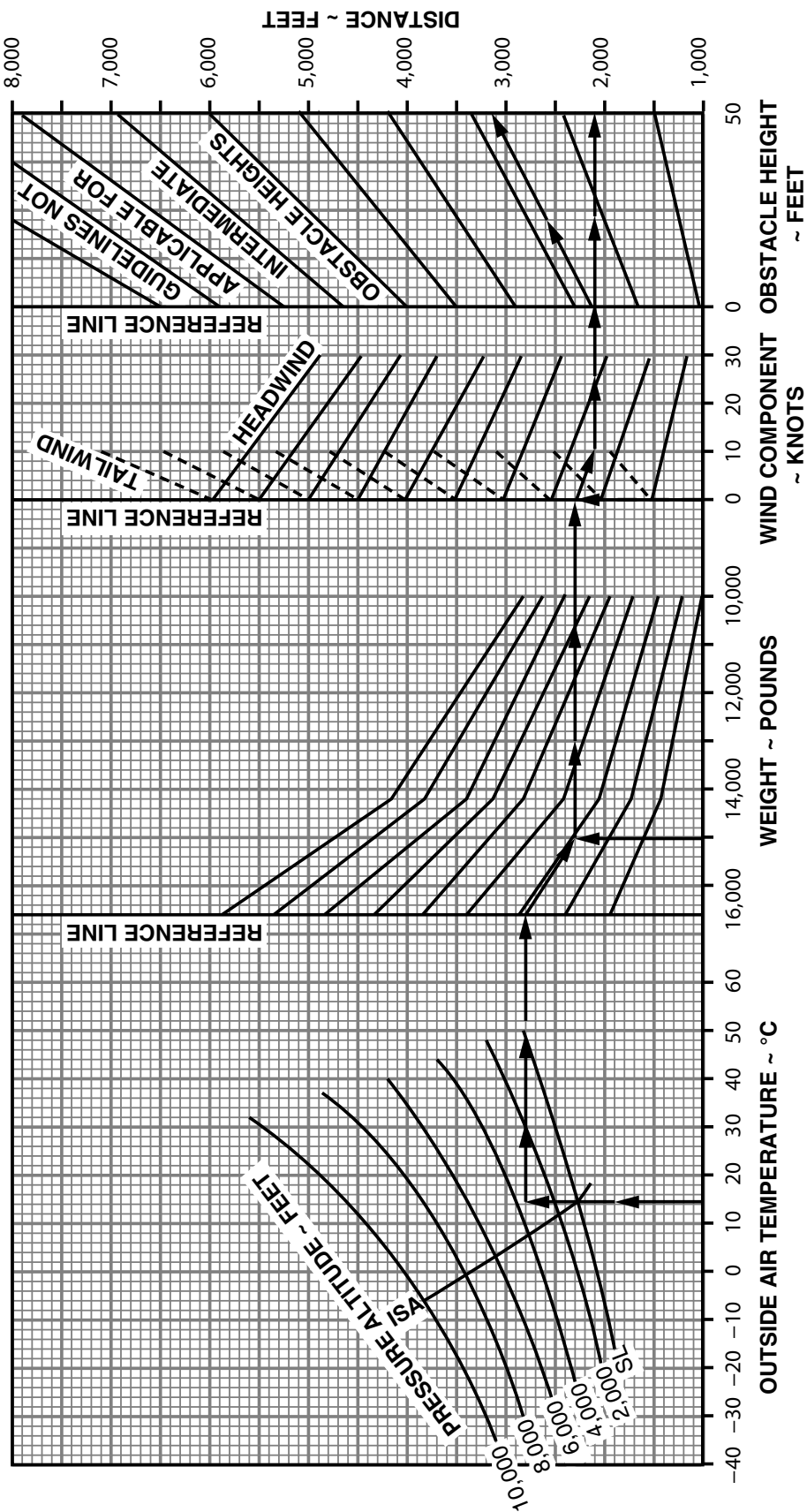


Figure 13. Takeoff Distance—Flaps Takeoff.

CLIMB—ONE ENGINE INOPERATIVE

BLEED AIR ON

ASSOCIATED CONDITIONS:
 POWER MAXIMUM CONTINUOUS
 FLAPS UP
 LANDING GEAR UP
 INOPERATIVE PROPELLER... FEATHERED
 NOTE: DURING OPERATION WITH ICE VANES EXTENDED, RATE OF CLIMB WILL BE REDUCED APPROXIMATELY 115 FEET PER MINUTE.

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

EXAMPLE:
 OAT -4 °C
 PRESSURE ALTITUDE 9,000 FT
 WEIGHT 14,500 LB
 RATE OF CLIMB 450 FT/MIN
 CLIMB GRADIENT 3.1%
 CLIMB SPEED 120 KTS

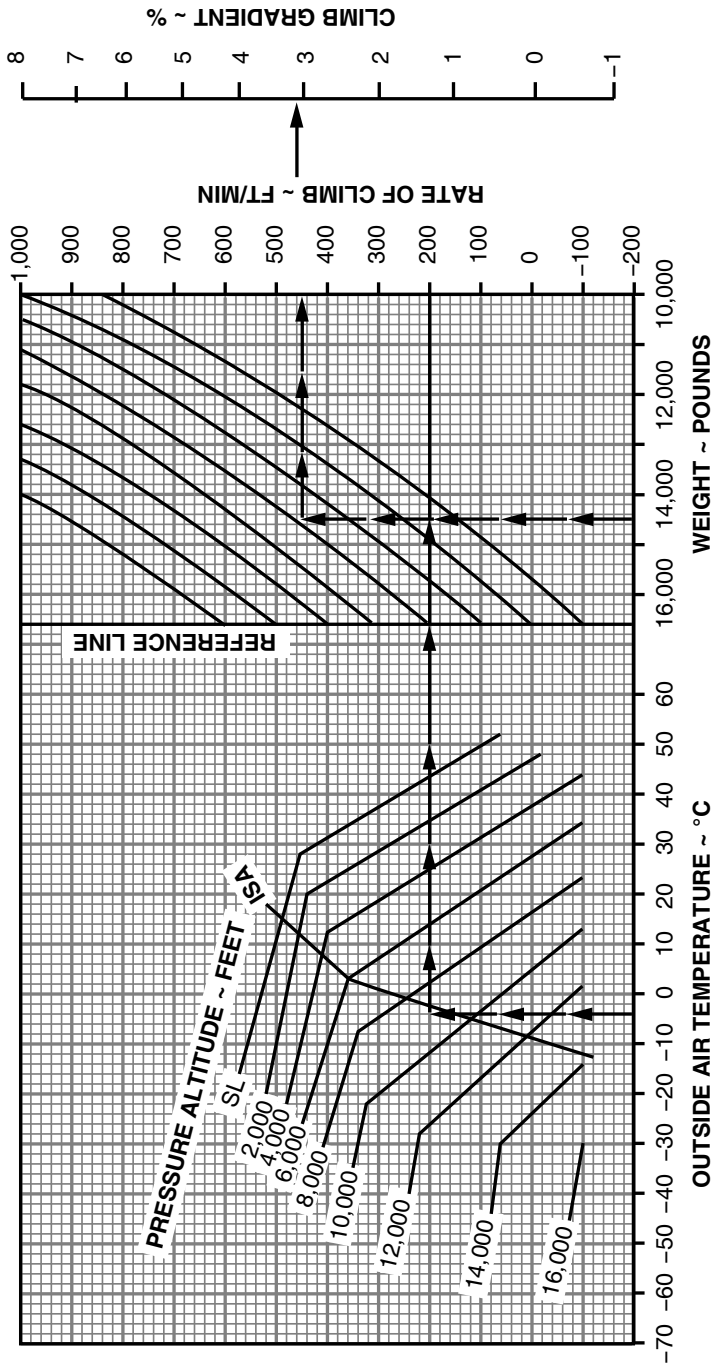


Figure 17. Climb—One Engine Inoperative.

TIME, FUEL, AND DISTANCE TO CRUISE CLIMB

ASSOCIATED CONDITIONS:

PROPELLER SPEED 1,550 RPM
 POWER:
 ITT 750 °C
 OR TORQUE 3,400 FT-LB

NOTE: 1. ADD 110 LB 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 3,499 FT
 CRUISE ALTITUDE 11,000 FT
 INITIAL CLIMB WEIGHT 15,000 LB
 TIME TO CLIMB (4.8-0.8) 4 MIN
 FUEL TO CLIMB (93-25) 68 LB
 DISTANCE TO CLIMB (13-2) 11 NM

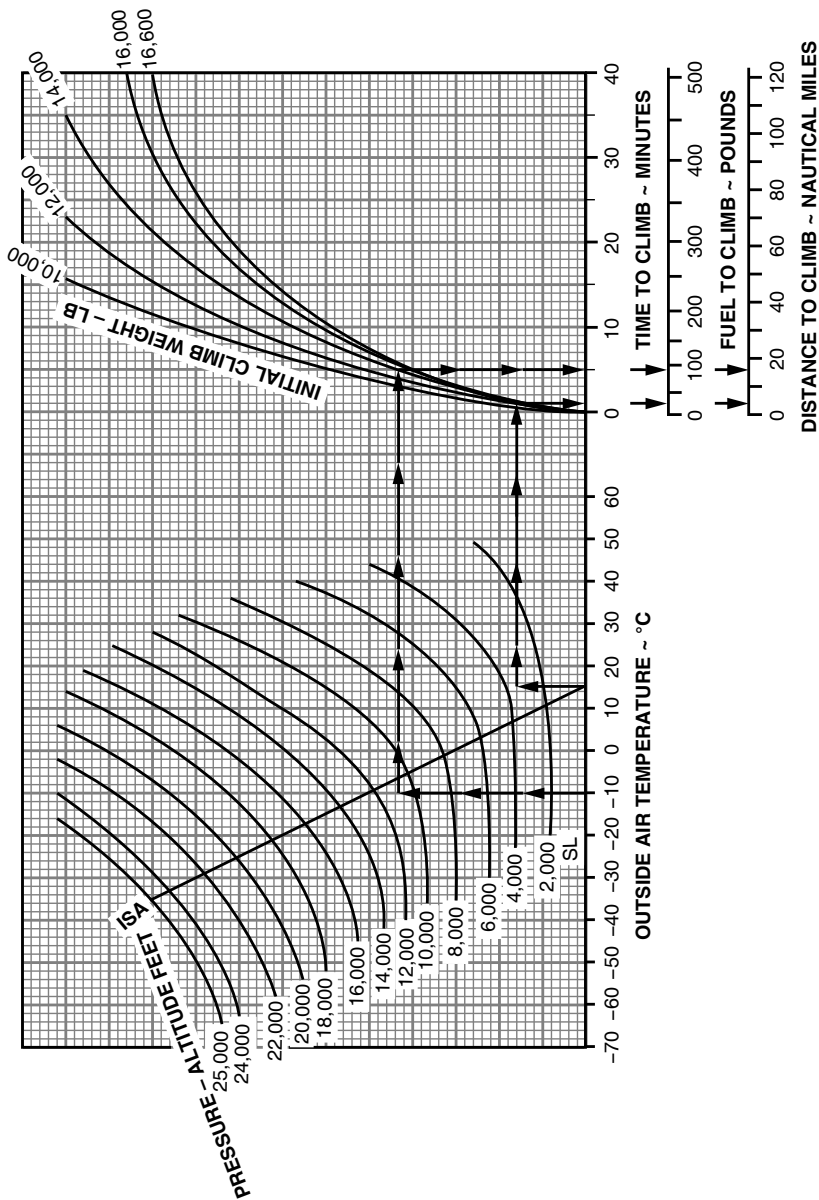


Figure 18. Time, Fuel and Distance to Cruise Climb.

OPERATING CONDITIONS	AC-26	AC-27	AC-28	AC-29	AC-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. Commuter Aircraft—Service Ceiling.

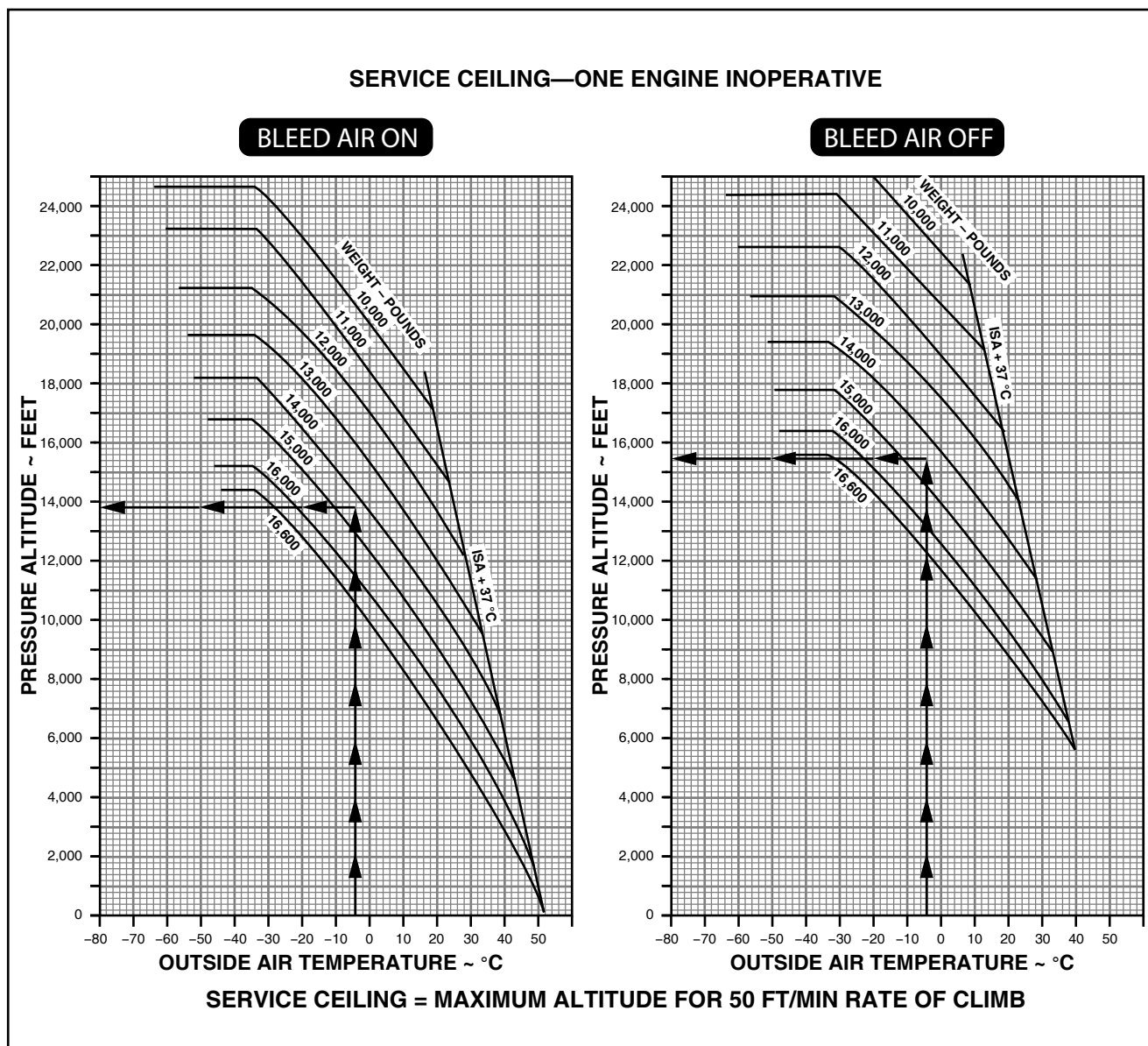


Figure 20. Service Ceiling—One Engine Inoperative.

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. Commuter Aircraft—Cruise.

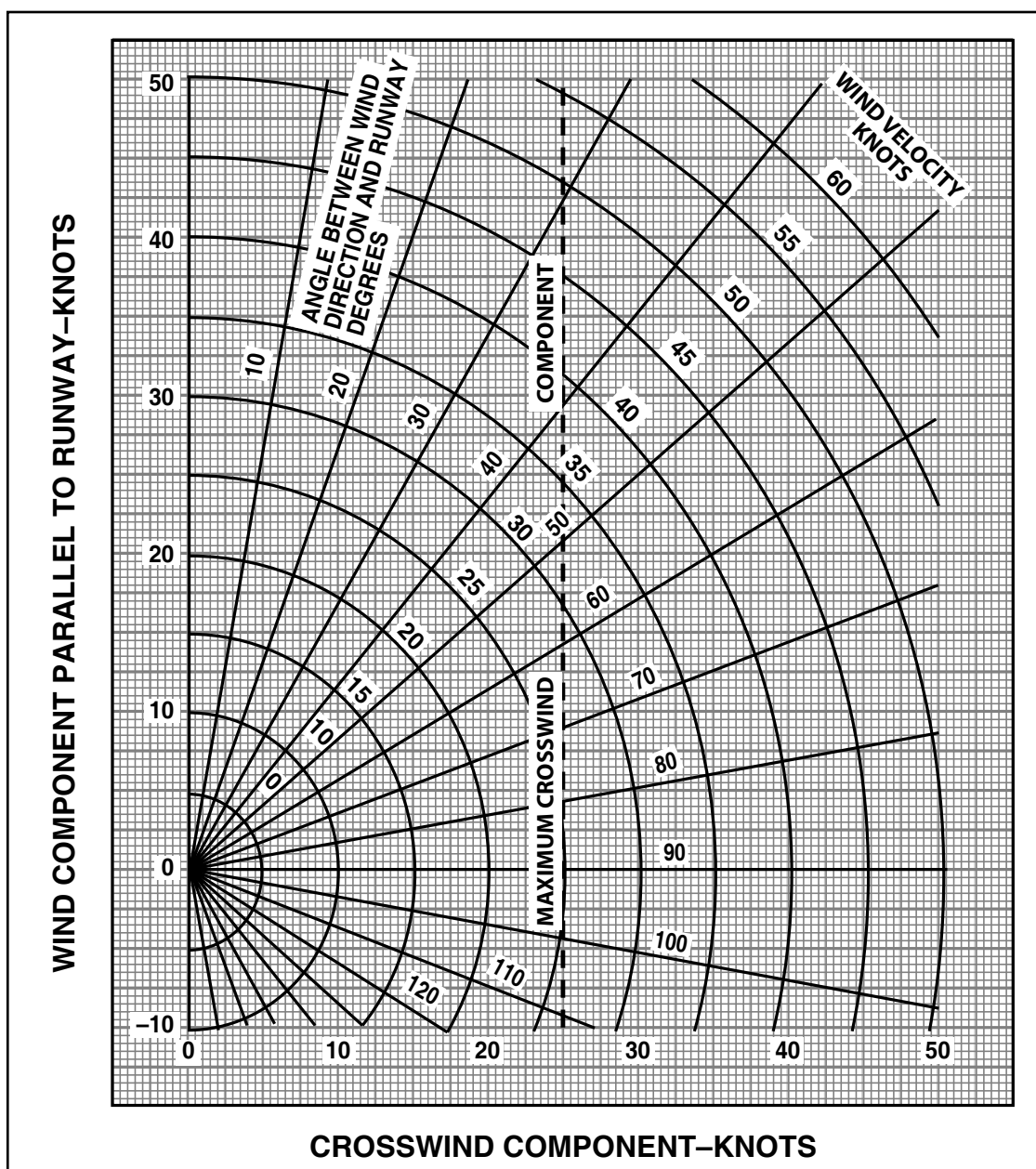


Figure 22. Wind Component Chart.

**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-LB	LB/HR	LB/HR	KTS	KTS	FT-LB	LB/HR	LB/HR	KTS	KTS	FT-LB	LB/HR	LB/HR	KTS	KTS	FT-LB	LB/HR	LB/HR	KTS	KTS
SL	30	25	3,294	577	1,154	232	239	3,301	577	1,154	235	241	3,307	577	1,154	237	243	3,312	577	1,154	238	245
2,000	26	21	3,191	551	1,102	227	240	3,198	551	1,102	230	243	3,204	552	1,104	232	245	3,209	552	1,104	233	247
4,000	22	17	3,092	527	1,054	222	242	3,100	528	1,056	224	244	3,106	528	1,056	227	247	3,111	528	1,056	228	249
6,000	19	13	2,992	504	1,008	216	243	3,000	505	1,010	219	246	3,006	505	1,010	222	249	3,012	505	1,010	224	251
8,000	15	9	2,886	481	962	211	244	2,896	482	964	214	247	2,903	482	964	216	250	2,909	482	964	219	253
10,000	11	5	2,778	458	916	205	244	2,789	458	916	208	248	2,797	459	918	211	252	2,804	459	918	213	254
12,000	7	1	2,636	432	864	198	243	2,648	433	866	202	248	2,657	433	866	205	252	2,664	434	868	207	255
14,000	3	-3	2,495	408	816	190	241	2,508	409	818	195	247	2,518	409	818	198	251	2,525	409	818	201	255
16,000	-1	-7	2,352	384	768	182	239	2,367	385	770	188	246	2,378	385	770	192	251	2,386	386	772	195	255
18,000	-6	-11	2,208	361	722	174	235	2,226	362	724	180	243	2,239	363	726	185	250	2,248	363	726	188	254
20,000	-10	-15	2,063	338	676	164	229	2,085	340	680	172	240	2,100	341	682	177	248	2,111	341	682	181	253
22,000	-14	-19	1,911	316	632	153	221	1,939	317	634	163	235	1,957	319	638	169	245	1,969	319	638	174	252
24,000	-19	-23	1,749	292	584	137	206	1,790	295	590	152	229	1,812	297	594	161	241	1,827	298	596	167	249
25,000	-21	-25	1,649	279	558	122	187	1,714	284	568	147	224	1,739	286	572	156	238	1,756	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-LB	LB/HR	LB/HR	KTS	KTS	FT-LB	LB/HR	LB/HR	KTS	KTS	FT-LB	LB/HR	LB/HR	KTS	KTS	FT-LB	LB/HR	LB/HR	KTS	KTS		
SL	20	15	3,400	586	1,172	237	239	3,400	585	1,170	239	241	3,400	585	1,170	241	243	3,400	585	1,170	241	243	242	244
2,000	17	11	3,400	573	1,146	234	244	3,400	573	1,146	236	246	3,400	572	1,144	238	248	3,400	572	1,144	238	248	240	249
4,000	13	7	3,400	560	1,120	232	248	3,400	559	1,118	234	250	3,400	559	1,118	236	252	3,400	559	1,118	236	252	237	254
6,000	9	3	3,397	548	1,096	229	252	3,400	548	1,096	231	255	3,400	547	1,094	233	257	3,400	547	1,094	233	257	235	259
8,000	5	-1	3,253	521	1,042	223	253	3,260	522	1,044	225	256	3,265	522	1,044	228	258	3,270	522	1,044	228	258	229	260
10,000	1	-5	3,092	494	988	216	252	3,100	494	988	219	256	3,107	495	990	221	258	3,112	495	990	221	258	223	261
12,000	-3	-9	2,929	466	932	208	251	2,937	467	934	212	255	2,945	467	934	214	258	2,950	467	934	214	258	217	261
14,000	-7	-13	2,772	440	880	201	250	2,781	441	882	205	255	2,789	441	882	208	258	2,795	442	884	208	258	210	261
16,000	-11	-17	2,606	414	828	193	248	2,618	414	828	197	253	2,626	415	830	201	258	2,633	415	830	201	258	203	261
18,000	-15	-21	2,435	288	776	184	244	2,449	389	778	189	251	2,459	389	778	193	256	2,467	390	780	193	256	196	260
20,000	-19	-25	2,263	363	726	175	239	2,282	364	728	181	248	2,294	365	730	186	254	2,302	365	730	186	254	189	259
22,000	-24	-29	2,094	338	676	164	233	2,118	340	680	172	244	2,133	341	682	178	251	2,144	342	684	178	251	182	257
24,000	-28	-33	1,931	315	630	152	223	1,960	317	634	163	238	1,979	318	636	169	248	1,991	319	638	169	248	174	255
25,000	-30	-35	1,846	303	606	145	216	1,880	305	610	157	235	1,901	307	614	165	246	1,915	308	616	165	246	170	253

Figure 24. Recommended Cruise Power—ISA.

TIME, FUEL, AND DISTANCE TO DESCEND AT 200 KNOTS

ASSOCIATED CONDITIONS:

POWER: AS REQUIRED TO
DESCEND AT 1,500 FT/MIN
LANDING GEAR UP
FLAPS UP

EXAMPLE:

INITIAL ALTITUDE 11,000 FT
FINAL ALTITUDE 5,998 FT

TIME TO DESCEND (7.4-4.1) 3.3 MIN
FUEL TO DESCEND (74-41) 33 LB
DISTANCE TO DESCEND (26-13) 13 NM

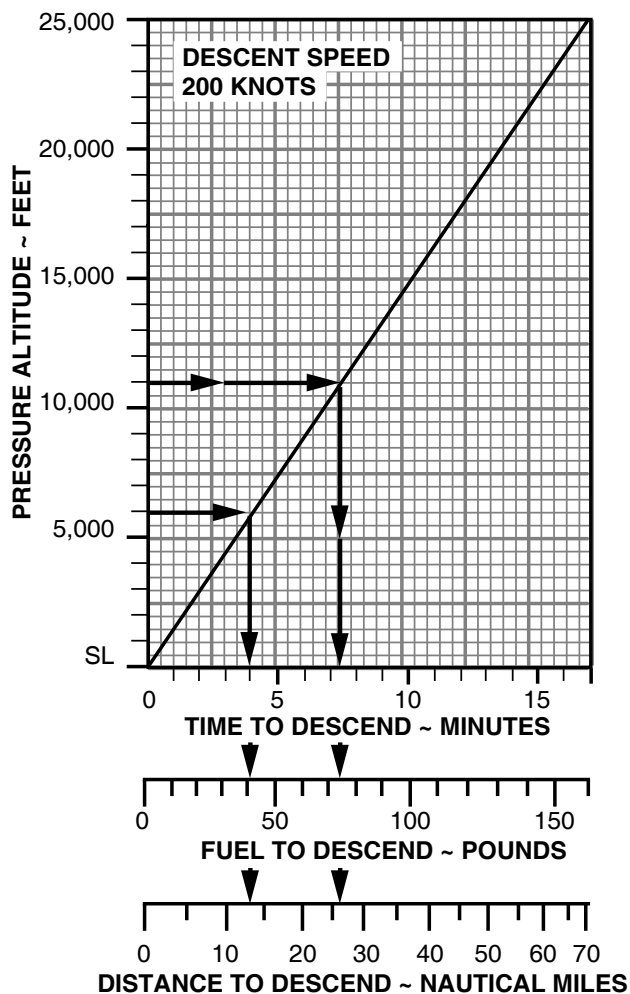


Figure 26. Time, Fuel, and Distance to Descend.

OPERATING CONDITIONS	AC-36	AC-37	AC-38	AC-39	AC-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. Commuter Aircraft—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 5,998 FT
 LANDING WEIGHT 14,182 LB
 HEADWIND COMPONENT 10 KTS
 GROUND ROLL 1,150 FT
 TOTAL OVER 50-FEET OBSTACLE 2,195 FT
 APPROACH SPEED 108 KTS

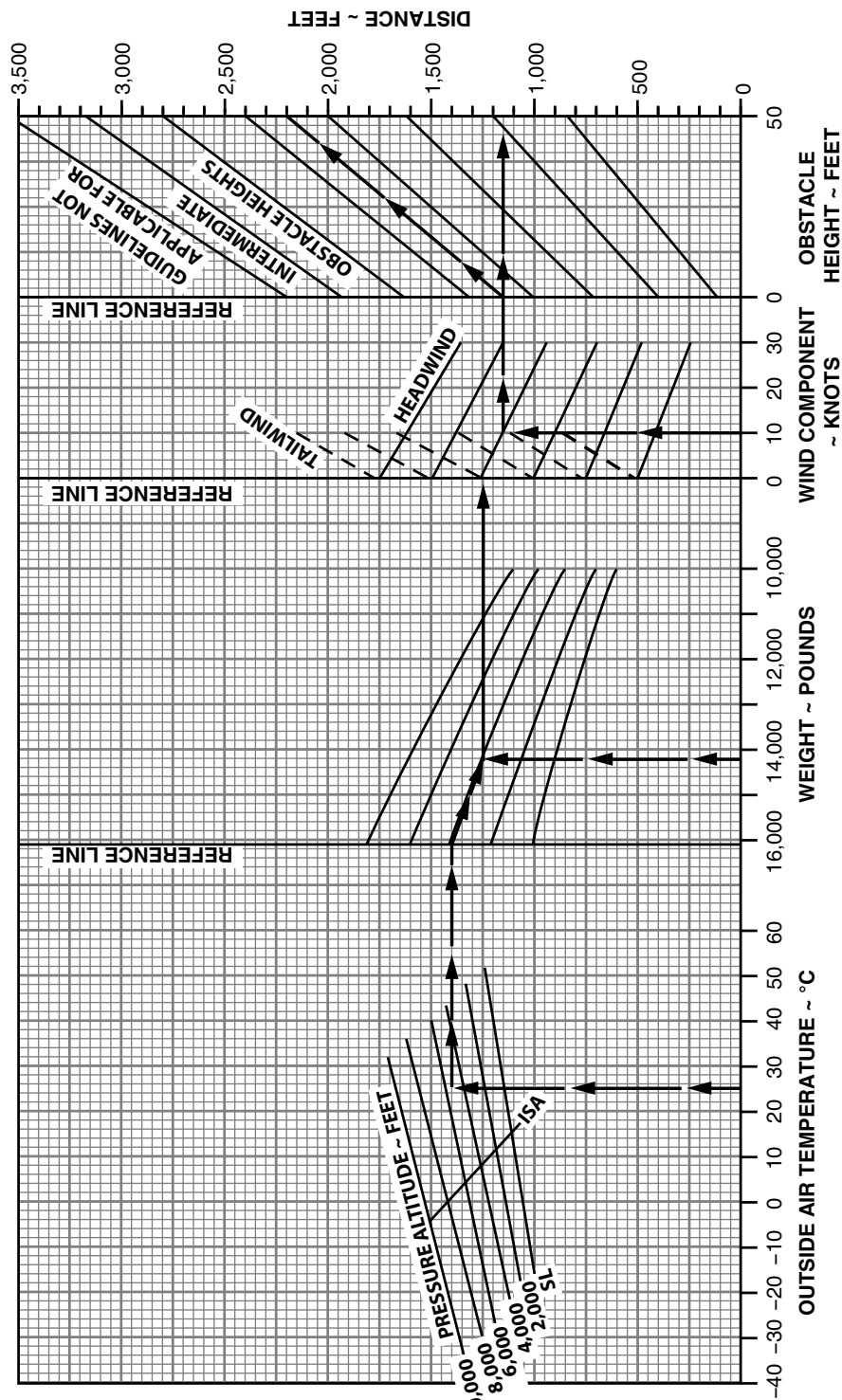


Figure 28. Normal Landing Distance—Flaps Landing.

Operating Conditions	BL-1	BL-2	BL-3	BL-4	BL-5
Crew Weight	340	400	360	380	370
Passenger Weight					
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.

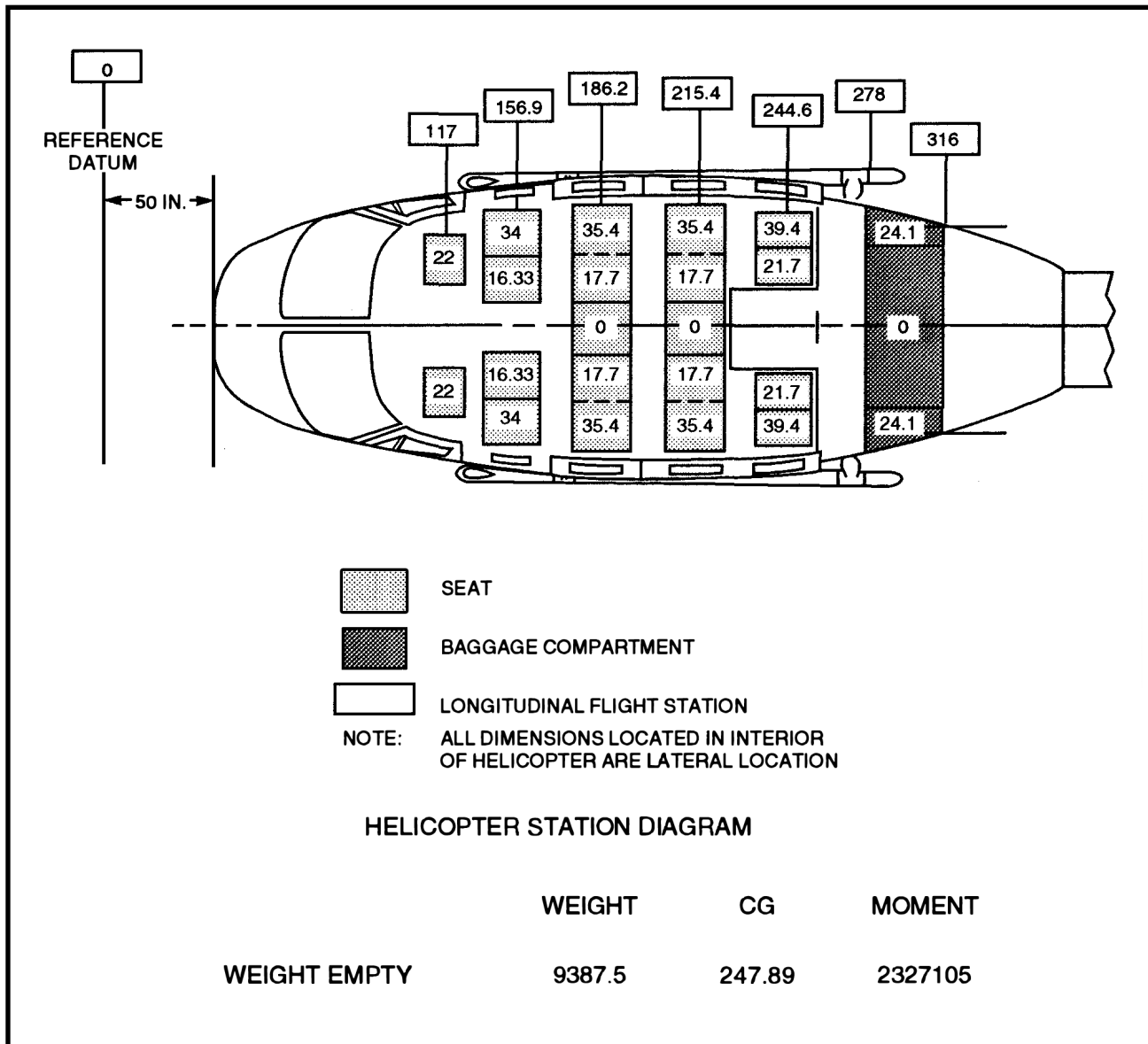


Figure 31. Helicopter - Loading Data.

Crew and Passenger Table of Moments (in-lb)

Weight lbs	Crew Seats F.S. 117	Airline Passenger 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
00	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.

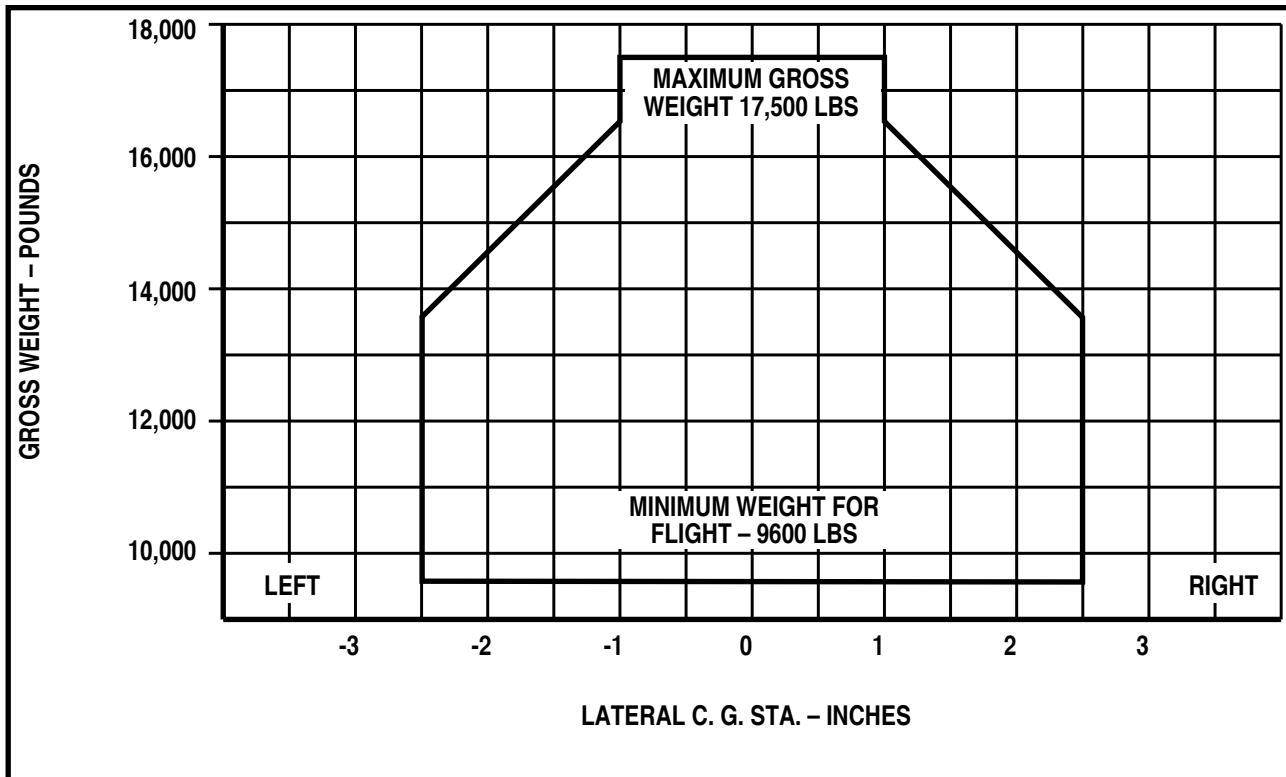


Figure 34. Helicopter - Lateral CG Envelope.

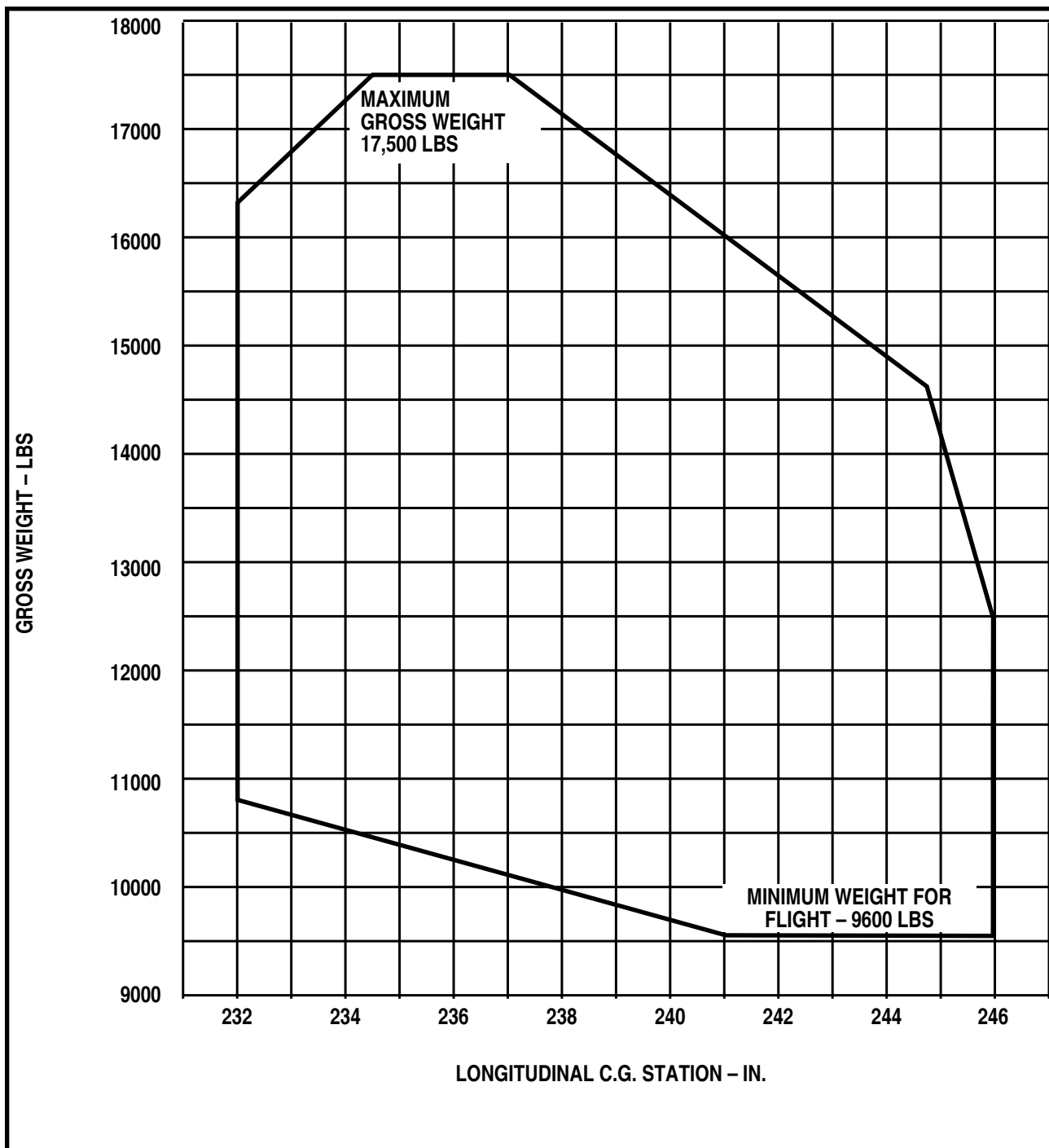


Figure 35. Helicopter - Longitudinal CG Envelope.

**MODEL 214ST
POWER ASSURANCE CHECK
GROUND OPERATION
GENERAL ELECTRIC CT-7-2A ENGINE**

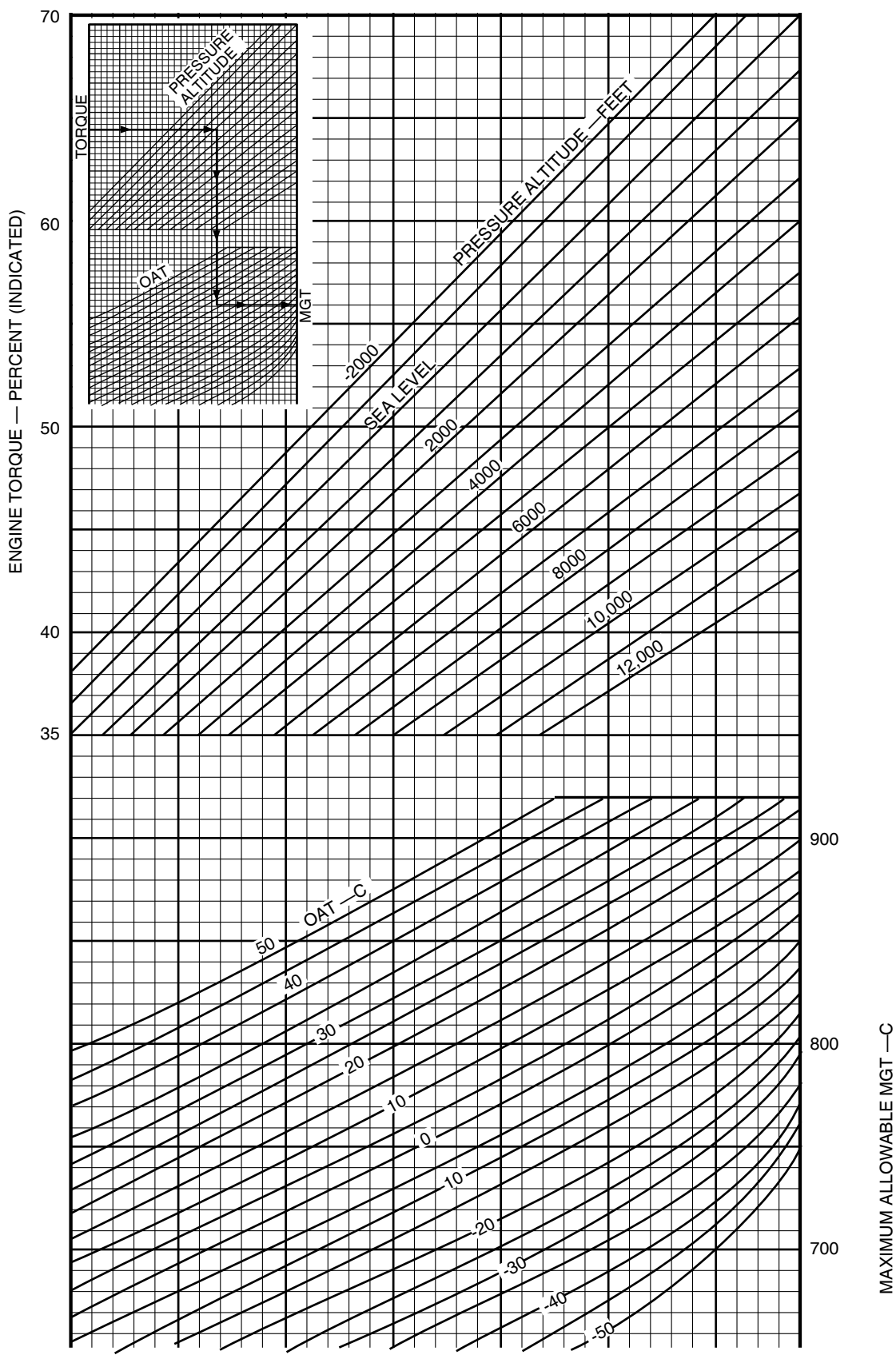


Figure 36. Bell 214 - Power Assurance Check.

HOVER CEILING — IN GROUND EFFECT

0° TO 52 °C

MAXIMUM CONTINUOUS POWER
ENGINE RPM 100%
GENERATOR 400 AMPS

SKID HEIGHT 5 FEET
HEATER OFF
ENGINE AND ENGINE INLET ANTI-ICE OFF

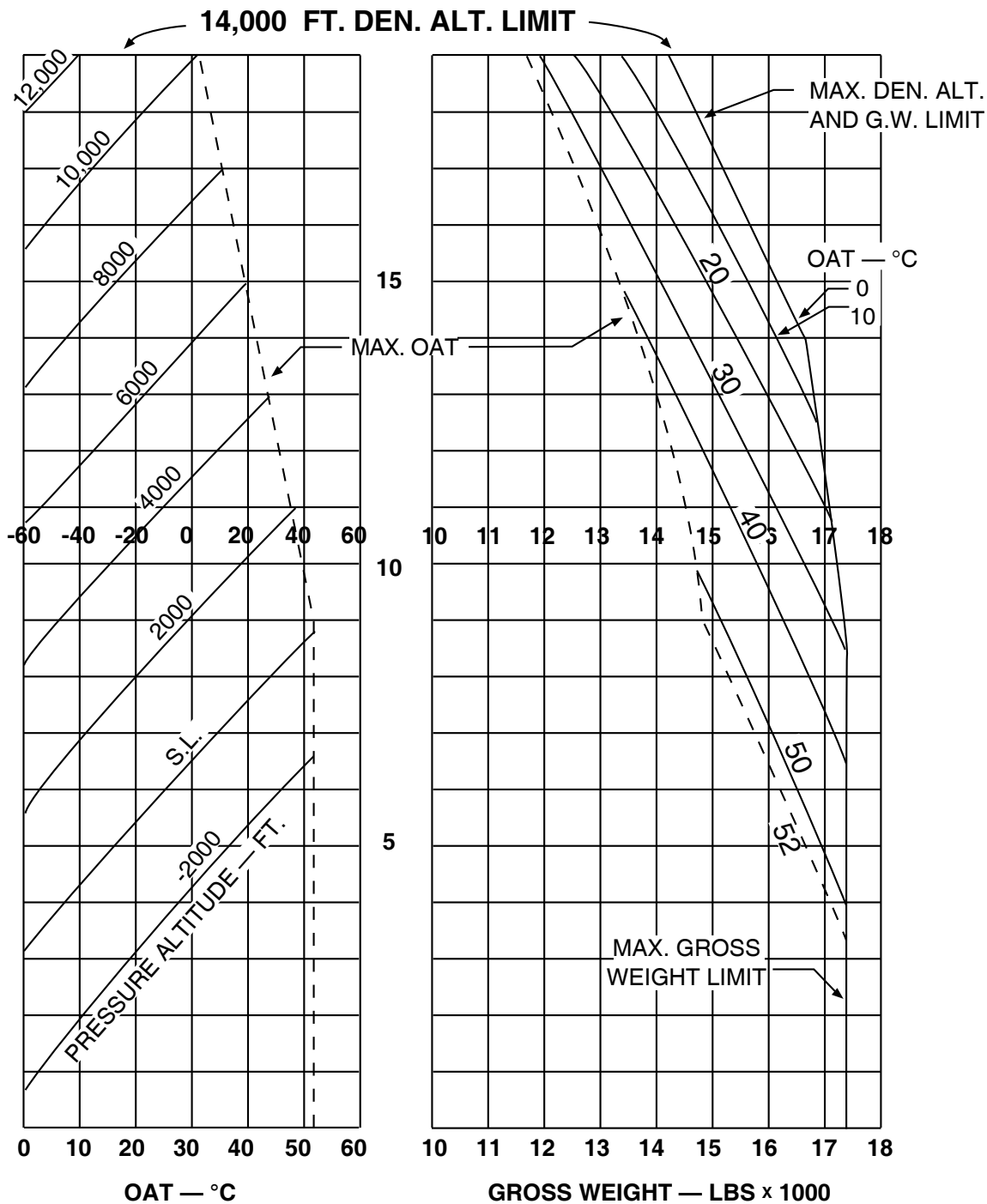


Figure 37. Hovering Ceiling - In Ground Effect.

HOVER CEILING — OUT OF GROUND EFFECT

0° TO 52 °C

MAXIMUM CONTINUOUS POWER

ENGINE RPM 100%

GENERATOR 400 AMPS

SKID HEIGHT 100 FEET

HEATER OFF

ENGINE AND ENGINE INLET ANTI-ICE OFF

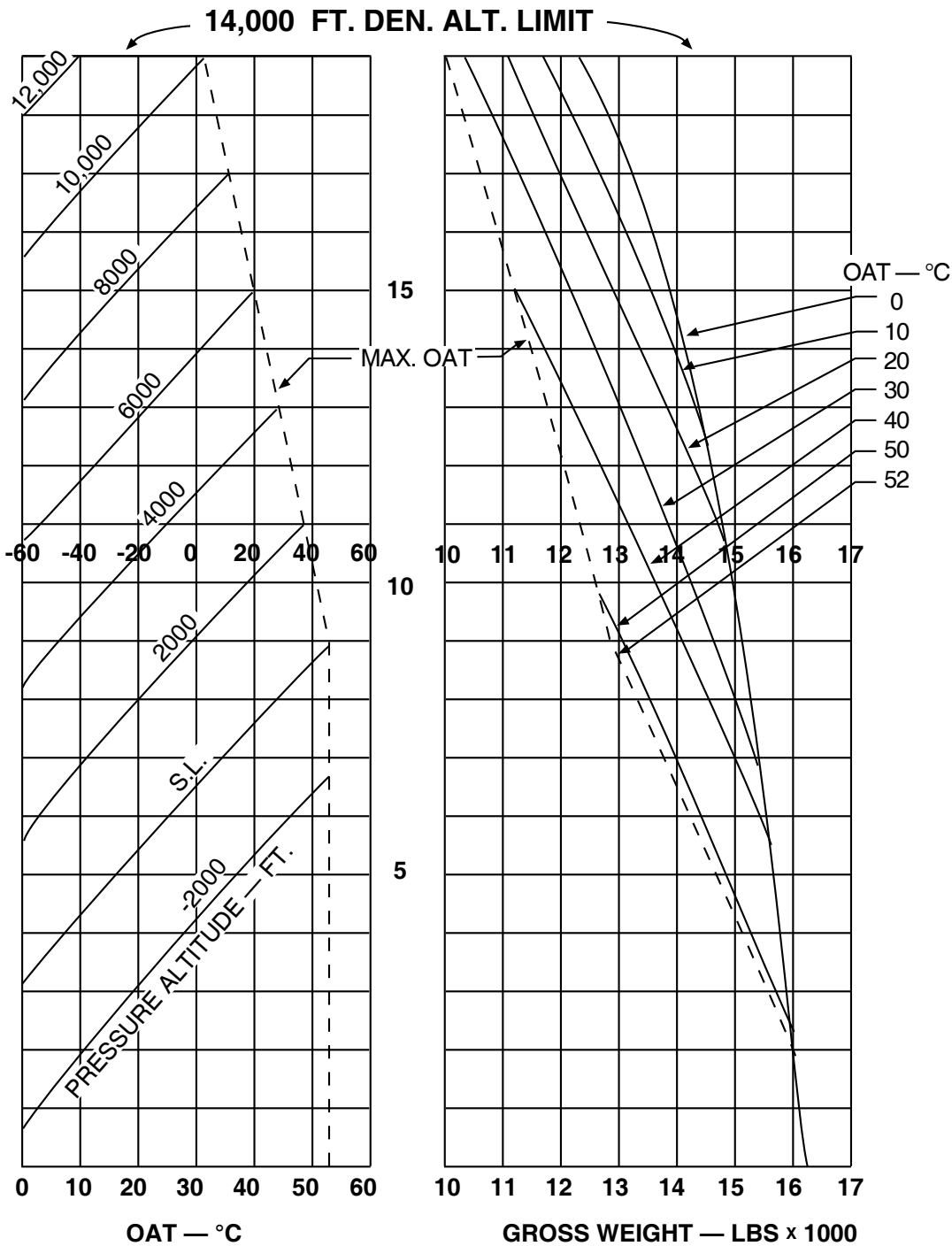


Figure 38. Hovering Ceiling - Out of Ground Effect.

TAKE-OFF DISTANCE OVER 50 FOOT OBSTACLE

52° TO -35°C

HOVER POWER + 10% TORQUE

ENGINE RPM 100%

GENERATOR 400 AMPS

INITIATED FROM 5 FT. SKID HEIGHT

VTOCS = 50 KIAS

HEATER ON OR OFF

ENGINE AND ENGINE INLET ANTI-ICE OFF

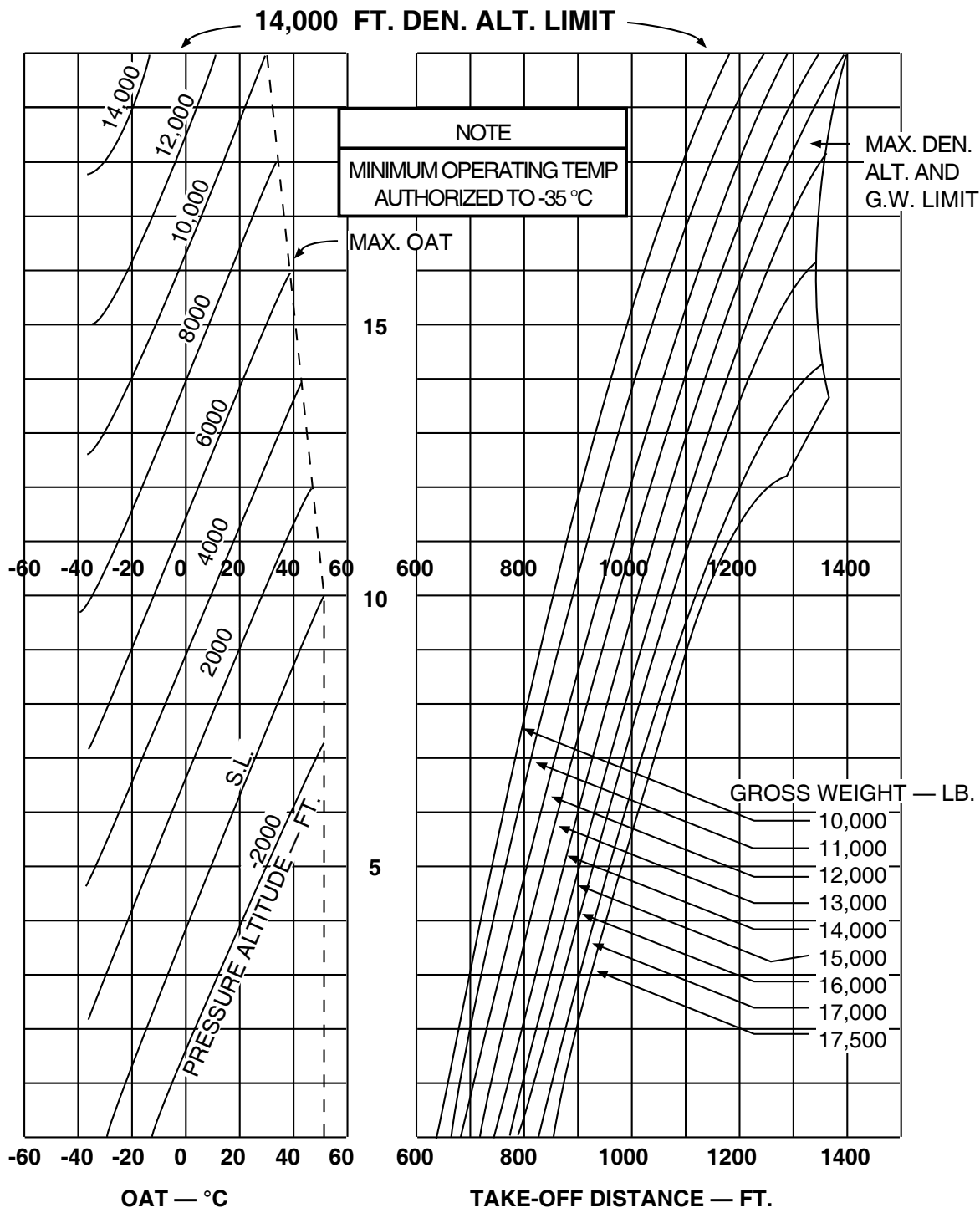


Figure 39. Takeoff Distance Over 50-foot Obstacle.

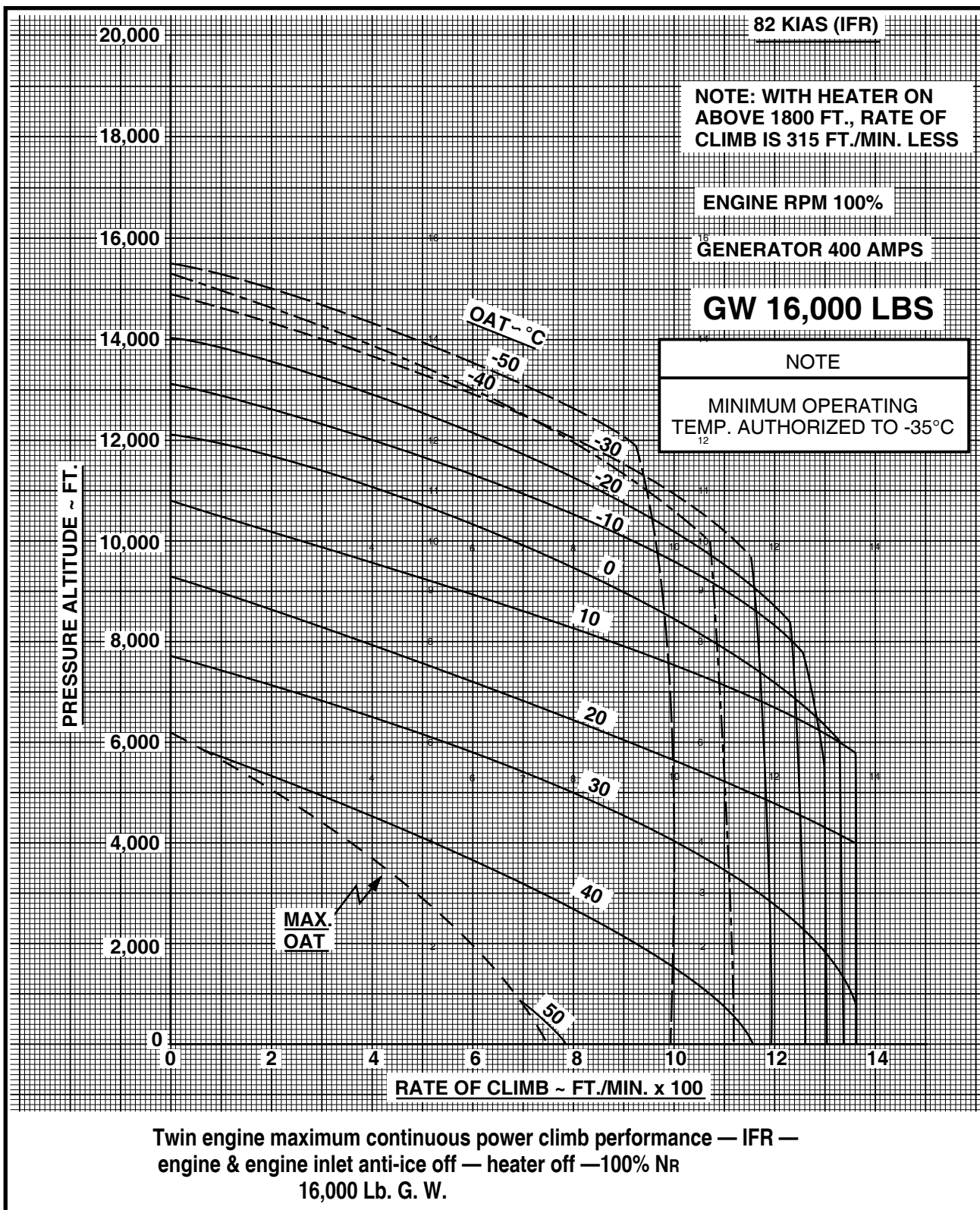


Figure 40. Twin-Engine Climb Performance.

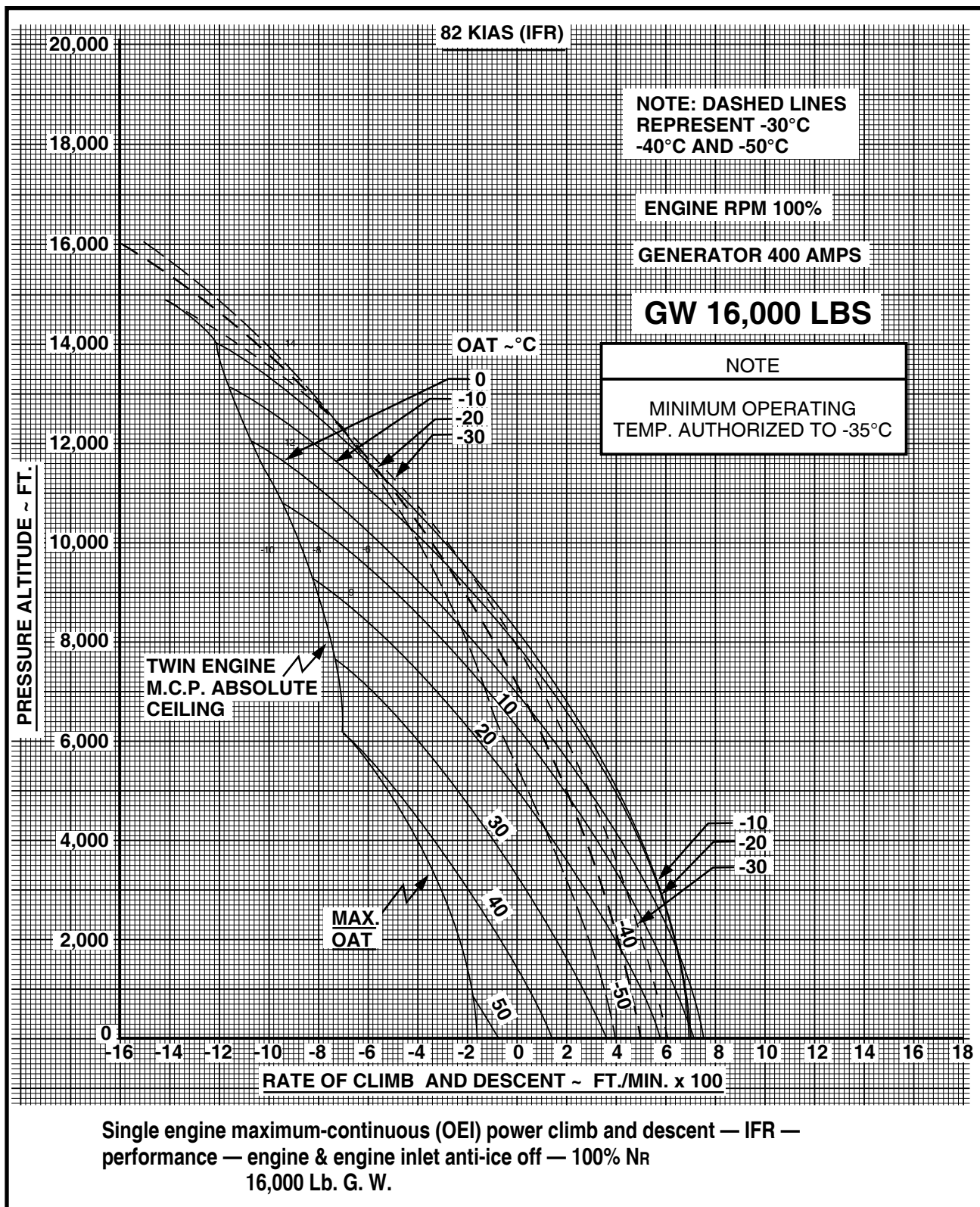


Figure 41. Single-Engine Climb Performance.

Appendix 2

12500 LB		Airspeed Limit (V_{NE}) - KIAS									
OAT °C		Press Alt - FT x1,000									
°C	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 (V_{NE}) - KIAS									
OAT °C		Press Alt - FT x1,000									
°C	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	105	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 (V_{NE}) - KIAS									
OAT °C		Press Alt - FT x1,000									
°C	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 (V_{NE}) - KIAS									
OAT °C		Press Alt - FT x1,000									
°C	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 (V_{NE}) - KIAS									
OAT °C		Press Alt - FT x1,000									
°C	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 (V_{NE}) - KIAS									
OAT °C		Press Alt - FT x1,000									
°C	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

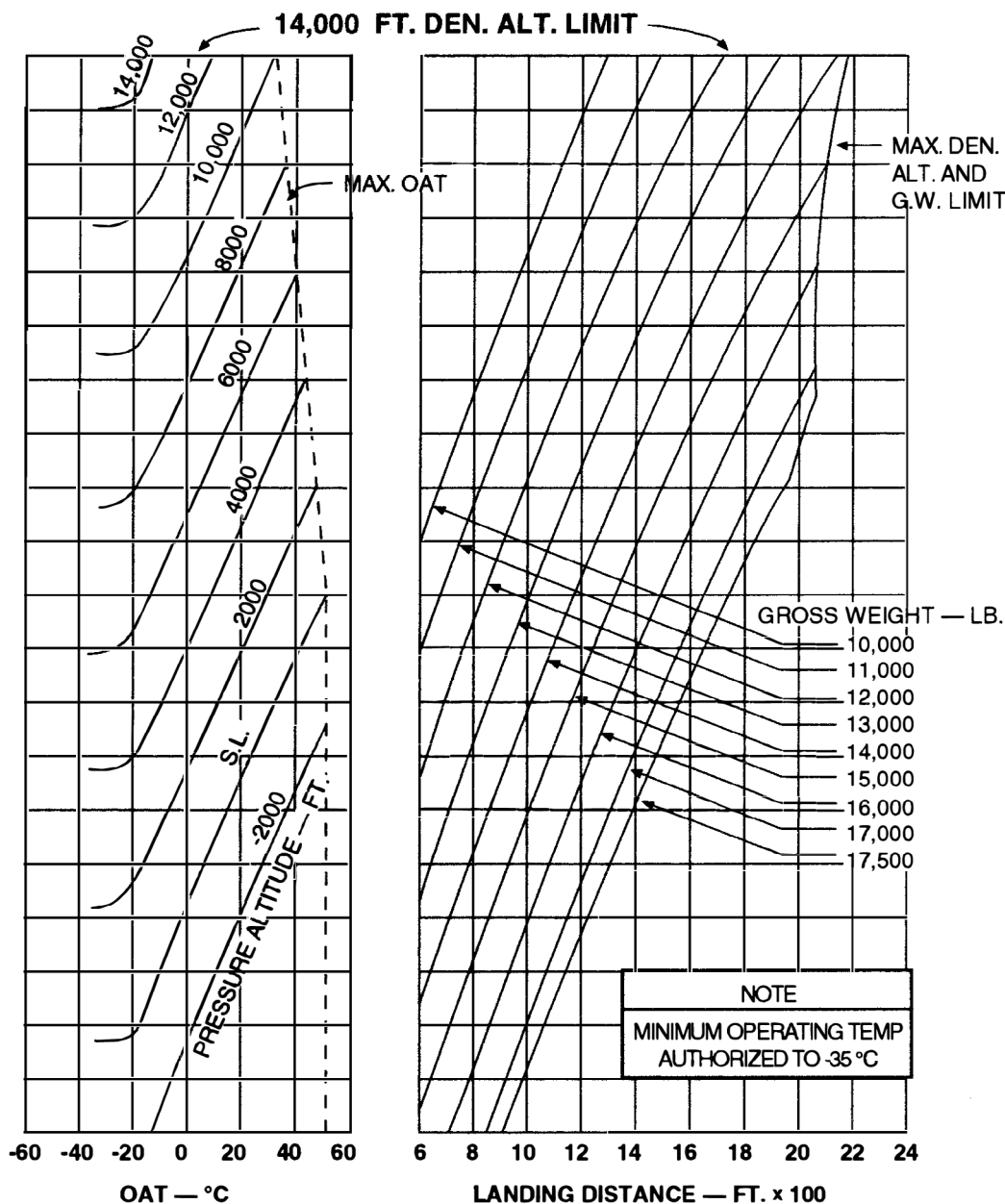


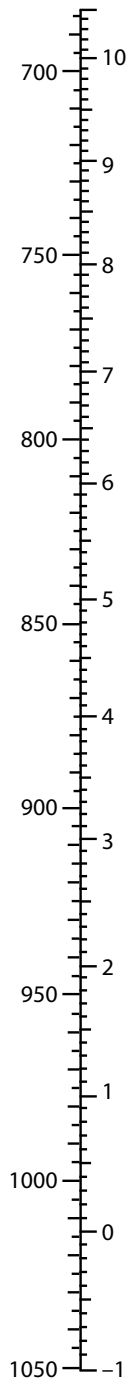
Figure 43. Single-engine Landing Distance Over 50-foot Obstacle.

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. Transport Aircraft 1—Weight Shift.

**ALTIMETER SETTING
TO
STATION PRESSURE**

**QFE
STATION
PRESSURE
MBS 1000 FT**



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

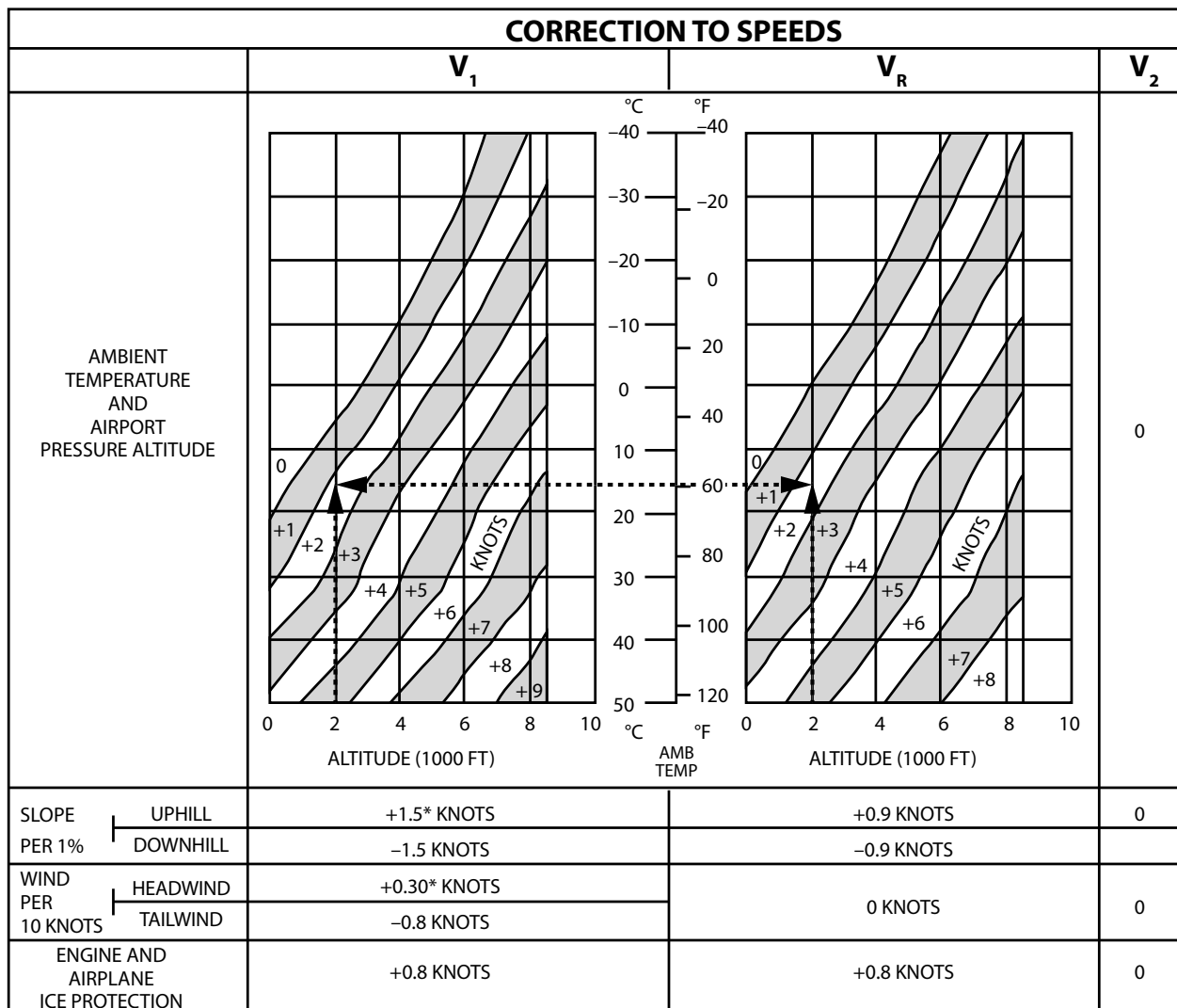
**EXAMPLE: ELEVATION - 2500 FT
QNH = 29.48 IN. HG
CORRECTION = 400 FT.
PRESS ALT = 2900 FT**

Figure 46. Altimeter Setting to Pressure Altitude.

TRANSPORT AIRCRAFT 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



* IF V₁ EXCEEDS V_R, SET V₁ EQUAL TO V_R

Figure 47. Transport Aircraft 1—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. Transport Aircraft 1—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				INITIAL WEIGHT = 90000. POUNDS			
PRES. ALT. FEET	TIME MIN.	FUEL BURNED LB.	DIST. N. MI.	PRES. ALT. FEET	TIME MIN.	FUEL BURNED LB.	DIST. N. MI.
0.	0.	0.	0.	0.	0.	0.	0.
2000.	0.5	133.	2.8	2000.	0.6	140.	3.0
4000.	1.1	267.	5.9	4000.	1.1	282.	6.3
6000.	1.7	403.	9.3	6000.	1.8	426.	9.8
8000.	2.3	541.	13.0	8000.	2.5	573.	13.8
10000.	3.0	684.	17.2	10000.	3.2	724.	18.2
12000.	3.8	830.	21.3	12000.	4.0	879.	23.1
14000.	4.6	982.	27.0	14000.	4.8	1041.	28.6
16000.	5.5	1141.	32.9	16000.	5.8	1211.	34.9
18000.	6.4	1309.	39.6	18000.	6.9	1390.	42.1
20000.	7.6	1489.	47.4	20000.	8.0	1583.	50.4
22000.	8.8	1684.	56.6	22000.	9.4	1793.	60.3
23500.	9.9	1845.	64.7	23500.	10.6	1968.	69.1
23500.	9.9	1845.	64.7	23500.	10.6	1968.	69.1
24000.	10.2	1886.	66.8	24000.	10.9	2013.	71.5
26000.	11.4	2052.	75.9	26000.	12.3	2196.	81.5
28000.	12.8	2225.	85.8	28000.	13.8	2389.	92.6
30000.	14.3	2410.	97.1	30000.	15.5	2598.	105.4
32000.	16.2	2613.	110.3	32000.	17.6	2833.	120.6
34000.	18.4	2844.	126.3	34000.	20.3	3110.	139.8
36000.	21.4	3136.	147.8	36000.	24.3	3494.	168.0
INITIAL WEIGHT = 88000. POUNDS				INITIAL WEIGHT = 92000. POUNDS			
0.	0.	0.	0.	0.	0.	0.	0.
2000.	0.5	136.	2.9	2000.	0.6	144.	3.1
4000.	1.1	274.	6.1	4000.	1.2	290.	6.4
6000.	1.7	414.	9.6	6000.	1.8	438.	10.1
8000.	2.4	557.	13.4	8000.	2.5	589.	14.2
10000.	3.1	703.	17.7	10000.	3.3	744.	18.7
12000.	3.9	855.	22.5	12000.	4.1	905.	23.8
14000.	4.7	1012.	27.8	14000.	5.0	1072.	29.5
16000.	5.6	1176.	33.9	16000.	6.0	1247.	36.0
18000.	6.6	1349.	40.8	18000.	7.1	1432.	43.4
20000.	7.8	1535.	48.9	20000.	8.3	1631.	52.0
22000.	9.1	1738.	58.4	22000.	9.7	1850.	62.3
23500.	10.3	1906.	66.9	23500.	11.0	2032.	71.5
23500.	10.3	1906.	66.9	23500.	11.0	2032.	71.5
24000.	10.6	1949.	69.1	24000.	11.3	2079.	73.9
26000.	11.9	2123.	78.6	26000.	12.7	2272.	84.4
28000.	13.3	2306.	89.1	28000.	14.3	2476.	96.2
30000.	14.9	2502.	101.2	30000.	16.2	2693.	109.8
32000.	16.9	2720.	115.3	32000.	18.4	2951.	126.2
34000.	19.3	2973.	132.8	34000.	21.4	3258.	147.4
36000.	22.7	3304.	157.2	36000.	26.1	3713.	181.0

Figure 49. High-Speed Climb Schedule.

TIME, FUEL, AND DISTANCE TO CLIMB							
ENGINES - NORMAL BLEED							
LONG RANGE CLIMB SCHEDULE							
CLIMB AT 290 KNOTS IAS TO 26860 FT ALTITUDE THEN CLIMB AT M .72							
INITIAL WEIGHT = 78000. POUNDS				INITIAL WEIGHT = 82000. POUNDS			
PRES. ALT. FEET	TIME MIN.	FUEL BURNED LB.	DIST. N. MI.	PRES. ALT. FEET	TIME MIN.	FUEL BURNED LB.	DIST. N. MI.
0.	0.	0.	0.	0.	0.	0.	0.
2000.	0.5	113.	2.2	2000.	0.5	120.	2.4
4000.	0.9	227.	4.6	4000.	1.0	241.	4.9
6000.	1.5	342.	7.3	6000.	1.5	363.	7.7
8000.	2.0	457.	10.2	8000.	2.1	486.	10.8
10000.	2.6	574.	13.3	10000.	2.7	610.	14.2
12000.	3.2	693.	16.8	12000.	3.4	737.	17.9
14000.	3.9	815.	20.7	14000.	4.1	868.	22.1
16000.	4.6	941.	25.0	16000.	4.9	1002.	26.7
18000.	5.4	1070.	29.9	18000.	5.7	1141.	31.9
20000.	6.3	1205.	35.4	20000.	6.7	1286.	37.9
22000.	7.2	1347.	41.7	22000.	7.7	1439.	44.6
24000.	8.3	1498.	49.0	24000.	8.9	1602.	52.5
26000.	9.5	1661.	57.6	26000.	10.2	1780.	61.9
26860.	10.1	1736.	61.8	26860.	10.9	1863.	66.5
26860.	10.1	1736.	61.8	26860.	10.9	1863.	66.5
28000.	10.7	1813.	66.2	28000.	11.6	1948.	71.4
30000.	11.9	1953.	74.6	30000.	12.9	2104.	80.8
32000.	13.3	2102.	84.2	32000.	14.4	2274.	91.7
34000.	14.9	2267.	95.4	34000.	16.3	2464.	104.6
36000.	16.9	2456.	109.2	36000.	18.7	2693.	121.3
INITIAL WEIGHT = 80000. POUNDS				INITIAL WEIGHT = 84000. POUNDS			
0.	0.	0.	0.	0.	0.	0.	0.
2000.	0.5	117.	2.3	2000.	0.5	124.	2.4
4000.	1.0	234.	4.8	4000.	1.0	248.	5.1
6000.	1.5	352.	7.5	6000.	1.6	374.	8.0
8000.	2.1	471.	10.5	8000.	2.2	500.	11.1
10000.	2.7	592.	13.7	10000.	2.8	629.	14.6
12000.	3.3	715.	17.4	12000.	3.5	760.	18.5
14000.	4.0	841.	21.4	14000.	4.2	894.	22.8
16000.	4.7	971.	25.9	16000.	5.1	1033.	27.6
18000.	5.6	1105.	30.9	18000.	5.9	1177.	33.0
20000.	6.5	1245.	36.6	20000.	6.9	1327.	39.1
22000.	7.5	1392.	43.2	22000.	8.0	1486.	46.2
24000.	8.6	1549.	50.7	24000.	9.2	1656.	54.4
26000.	9.9	1719.	59.7	26000.	10.6	1841.	64.1
26860.	10.5	1798.	64.1	26860.	11.3	1928.	69.0
26860.	10.5	1798.	64.1	26860.	11.3	1928.	69.0
28000.	11.1	1879.	68.7	28000.	12.0	2018.	74.1
30000.	12.4	2027.	77.7	30000.	13.4	2183.	84.1
32000.	13.8	2186.	87.8	32000.	15.0	2364.	95.7
34000.	15.6	2362.	99.8	34000.	17.1	2570.	109.7
36000.	17.7	2570.	114.9	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. Transport Aircraft 1—Alternate Planning.

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 °C
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. Transport Aircraft 2—Takeoff.

0 TO 60 KTS																					
TAKEOFF EPR																EPR BLEED CORRECTIONS		Δ EPR			
																AIR CONDITIONING OFF		+ .03			
																ENGINE ANTI-ICE		ZERO			
A/C ON																					
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		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
LIMIT EPR		← 2.31			← 2.22			← 2.16		← 2.11		← 2.06		← 2.01		← 1.96					
PRESS		ALT 5660 AND ABOVE			4000			3000		2000		1000		S.L.		1000					
<ol style="list-style-type: none"> 1 FIND TEMP LIMIT EPR 2 FIND PRESS LIMIT EPR 3 USE THE SMALLER OF THE TWO LIMITS 																					

V ₁ , V _R , V ₂	PRESSURE ALTITUDE 1000 FT	OAT											
		F°	C°	F°	C°	F°	C°	F°	C°				
ANTI-SKID ON	9 to 10					-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					-65 to -21	-54 to -29	-20 to 10	-28 to -23	11 to 39	-22 to 4	40 to 87	5 to 31
	5 to 7					-65 to -15	-54 to -26	-14 to 15	-27 to -9	16 to 40	-8 to 4	41 to 87	5 to 31
	3 to 5					-65 to 20	-54 to -8	21 to 42	-7 to 6	43 to 88	7 to 31	89 to 103	32 to 39
	1 to 3					-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					-65 to 91	-54 to 33	92 to 105	34 to 40	106 to 120	41 to 49		

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

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	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	152	154	155						
	110	150	152	155	151	153	155	142	144	147						
	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
	80	122	124	130	122	125	130	123	126	130	124	126	130	125	127	130
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
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
	80	111	112	119	112	113	119	113	114	119	114	115	119	115	116	119
	70	105	105	112	101	103	112	102	105	112	103	106	112	105	107	112
	25	100	124	126	132	126	127	132								
90		115	117	124	116	118	124	117	119	124	118	120	124	110	112	116
80		105	108	116	107	109	116	108	110	116	109	111	116	100	103	108
70		105	105	108	104	104	108	101	101	108						
SHADED AREA INDICATES PERFORMANCE AFFECTED BY MINIMUM CONTROL SPEED. MINIMUM FIELD LENGTH FOR LIGHTEST WEIGHT ABOVE SHADED AREA IS REQUIRED.																

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

*V₁ MUST NOT EXCEED V_R

Figure 55. Transport Aircraft 2—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. Transport Aircraft 2—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 MIN/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. Transport Aircraft 2—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	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. Transport Aircraft 2—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.

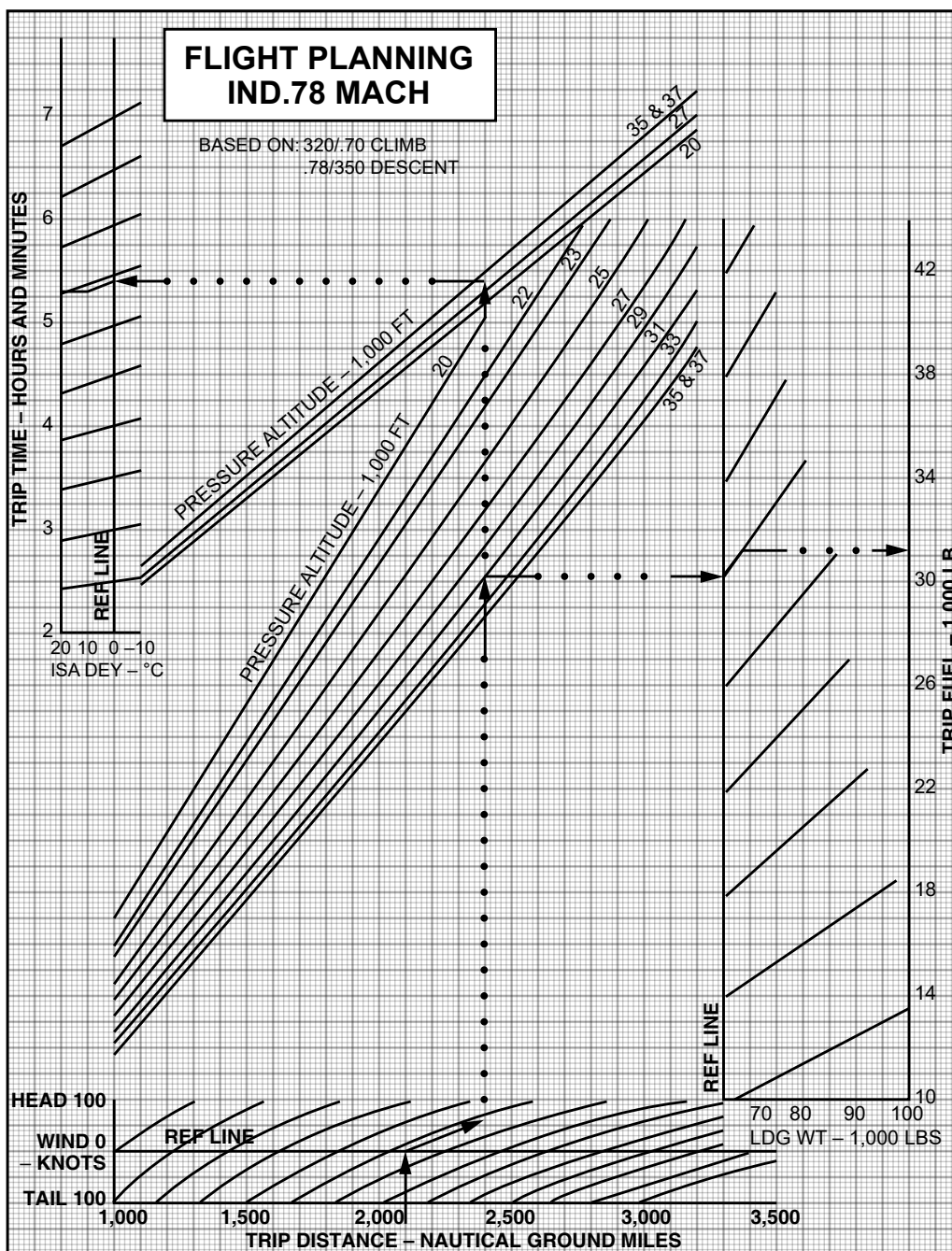


Figure 62. Transport Aircraft 2—Flight Planning at .78 Mach Indicated.

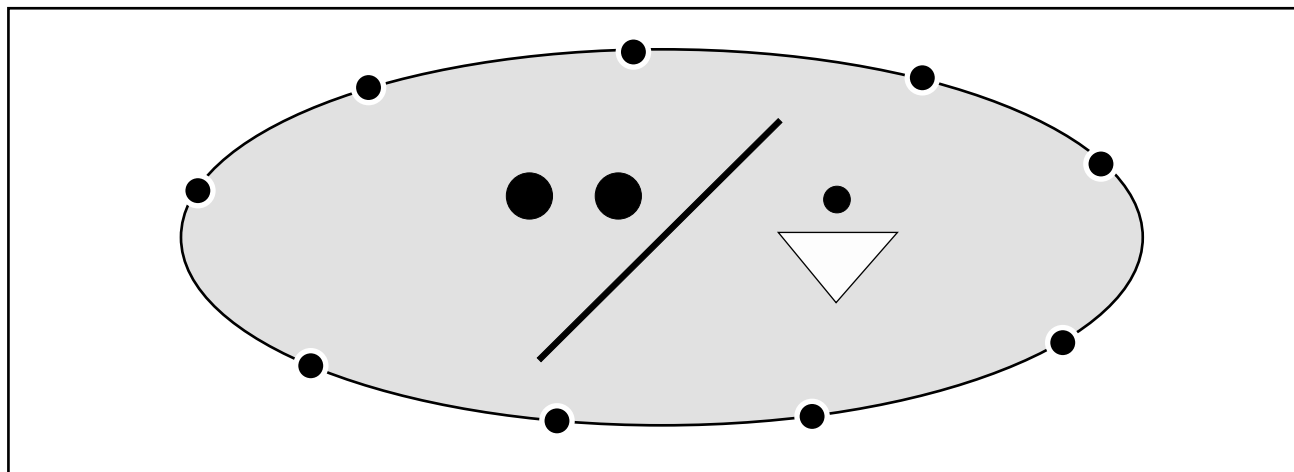


Figure 65. Symbol Used on U.S. Low Level Significant Weather Prog Chart.

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

△ TIME = TIME X WIND COMPONENT ÷ TAS

△ FUEL = FUEL X WIND COMPONENT ÷ TAS

EXAMPLE: DIST. = 250
 STILL AIR TIME = 43 MIN.
 STILL AIR FUEL = 4500 LBS
 WIND COMPONENT = 20 KTS.

△ TIME = 43 X 20 ÷ 449 = MIN.

△ FUEL = 4500 X 20 ÷ 449 = 200 LBS.

ADD △ TIME AND △ 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. Transport Aircraft 2—Holding.

HOLDING

EPR
ISA KNOTS
FF PER ENGINE LB/HR

FLIGHT LEVEL	GROSS WEIGHT 1000 LB										
	115	110	105	100	95	90	85	80	75	70	65
350	2.13 234 2830	2.07 228 2810	2.01 223 2630	1.95 217 2460	1.90 211 2290	1.85 210 2180	1.80 210 2070	1.76 210 1960	1.71 210 1870	1.67 210 1780	1.64 210 1700
300	1.86 231 2740	1.82 226 2600	1.79 220 2470	1.75 215 2370	1.71 210 2250	1.67 210 2140	1.64 210 2050	1.60 210 1960	1.57 210 1880	1.54 210 1790	1.51 210 1720
250	1.69 229 2710	1.66 224 2610	1.63 218 2490	1.60 213 2370	1.57 210 2260	1.54 210 2180	1.51 210 2080	1.48 210 1980	1.45 210 1920	1.43 210 1840	1.41 210 1780
200	1.56 227 2716	1.53 222 2590	1.50 217 2490	1.48 211 2390	1.45 210 2310	1.43 210 2230	1.40 210 2130	1.38 210 2060	1.36 210 2000	1.34 210 1920	1.32 210 1860
150	1.45 226 2790	1.43 221 2668	1.40 216 2570	1.38 210 2470	1.36 210 2380	1.34 210 2290	1.32 210 2220	1.31 210 2140	1.29 210 2070	1.27 210 2000	1.26 210 1990
100	1.36 225 2860	1.34 220 2780	1.33 215 2670	1.31 210 2560	1.29 210 2470	1.28 210 2390	1.26 210 2310	1.25 210 2240	1.24 210 2170	1.22 210 2100	1.21 210 2030
050	1.29 224 2960	1.28 219 2870	1.27 214 2770	1.25 210 2670	1.24 210 2580	1.23 210 2500	1.21 210 2420	1.20 210 2350	1.19 210 2290	1.18 210 2230	1.17 210 2150
015	1.25 224 3050	1.24 219 2950	1.23 214 2850	1.22 210 2790	1.21 210 2670	1.20 210 2590	1.19 210 2510	1.18 210 2430	1.17 210 2370	1.16 210 2300	1.15 210 2240

Figure 69. Transport Aircraft 2—Holding Performance Chart.

Appendix 2

INITIAL FUEL WEIGHT 1000 LB	ENDING FUEL WEIGHT - 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. Transport Aircraft 2—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.

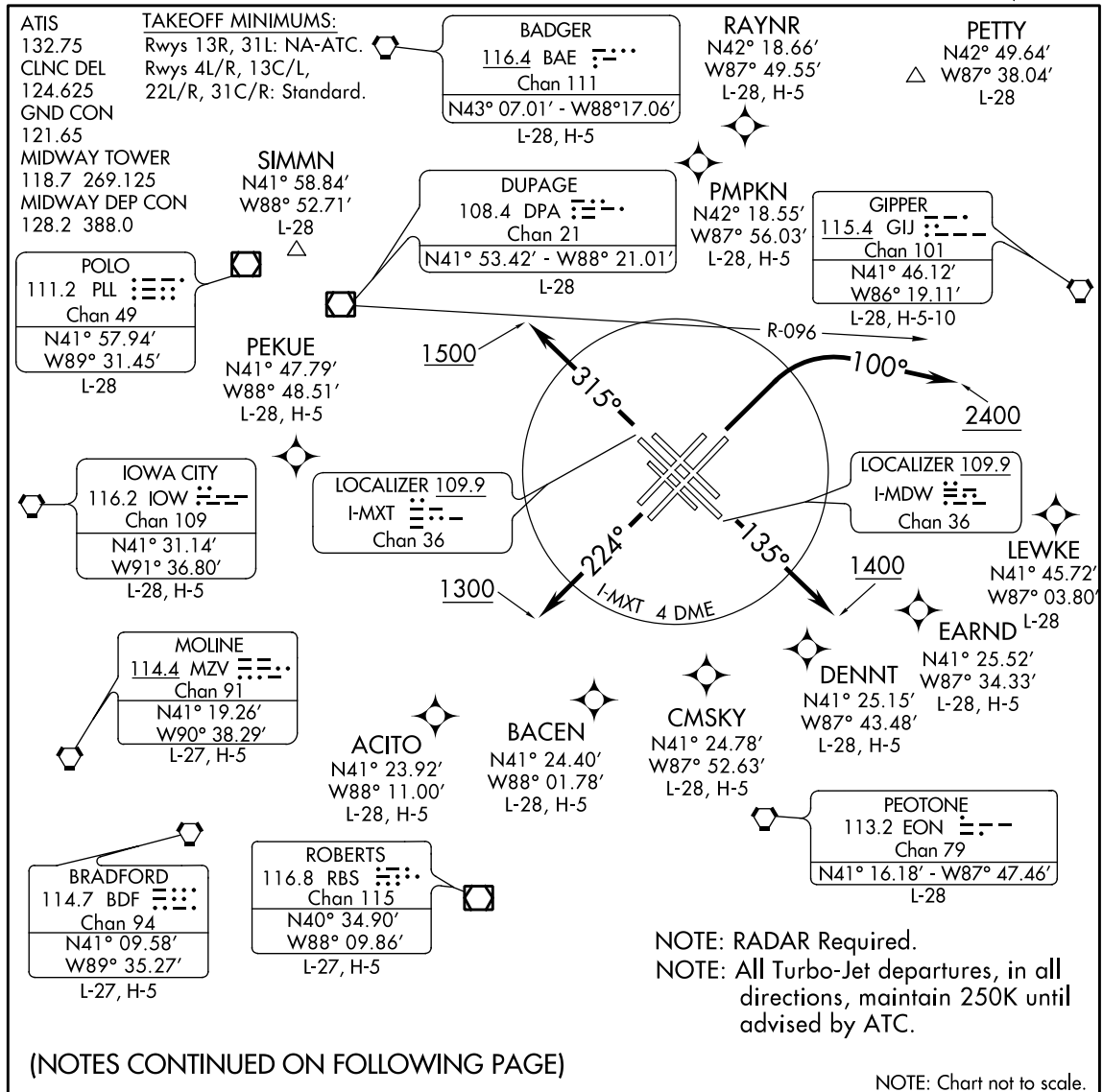
(MDWAY9.MDW) 14149

MIDWAY NINE DEPARTURE

SL-81 (FAA)

CHICAGO MIDWAY INTL (MDW)

CHICAGO, ILLINOIS



(NOTES CONTINUED ON FOLLOWING PAGE)

NOTE: Chart not to scale.



DEPARTURE ROUTE DESCRIPTION

ALL AIRCRAFT:

TAKEOFF RWYS 4L/R: Northbound departures assigned headings 360° (CW) thru 080°, climbing right turn to 2400' heading 100° before proceeding on course, thence. . . .

TAKEOFF RWY 13C/13L: Climb heading 135° to 1400' before turning, thence. . . .

TAKEOFF RWY 22L/22R: Climb heading 224° to 1300' before turning, thence. . . .

TAKEOFF RWY 31C/31R: Climb heading 315° to 1500' before turning, thence. . . .

DME EQUIPPED AIRCRAFT: Complete initially assigned turn within I-MXT 4 DME.

Maintain 3000' or assigned lower altitude, thence. . . .

NON-DME EQUIPPED AIRCRAFT: Complete initially assigned turn south of DPA R-096,

maintain 3000' or assigned lower altitude, thence. . . .

. . . . Expect radar vectors to first enroute fix. Expect clearance to requested altitude/flight level 10 (ten) minutes after departure.

MIDWAY NINE DEPARTURE

(MDWAY9.MDW) 14149

CHICAGO, ILLINOIS

CHICAGO MIDWAY INTL (MDW)

Figure 95. MIDWAY NINE Departure (MDWAY9.MDW).

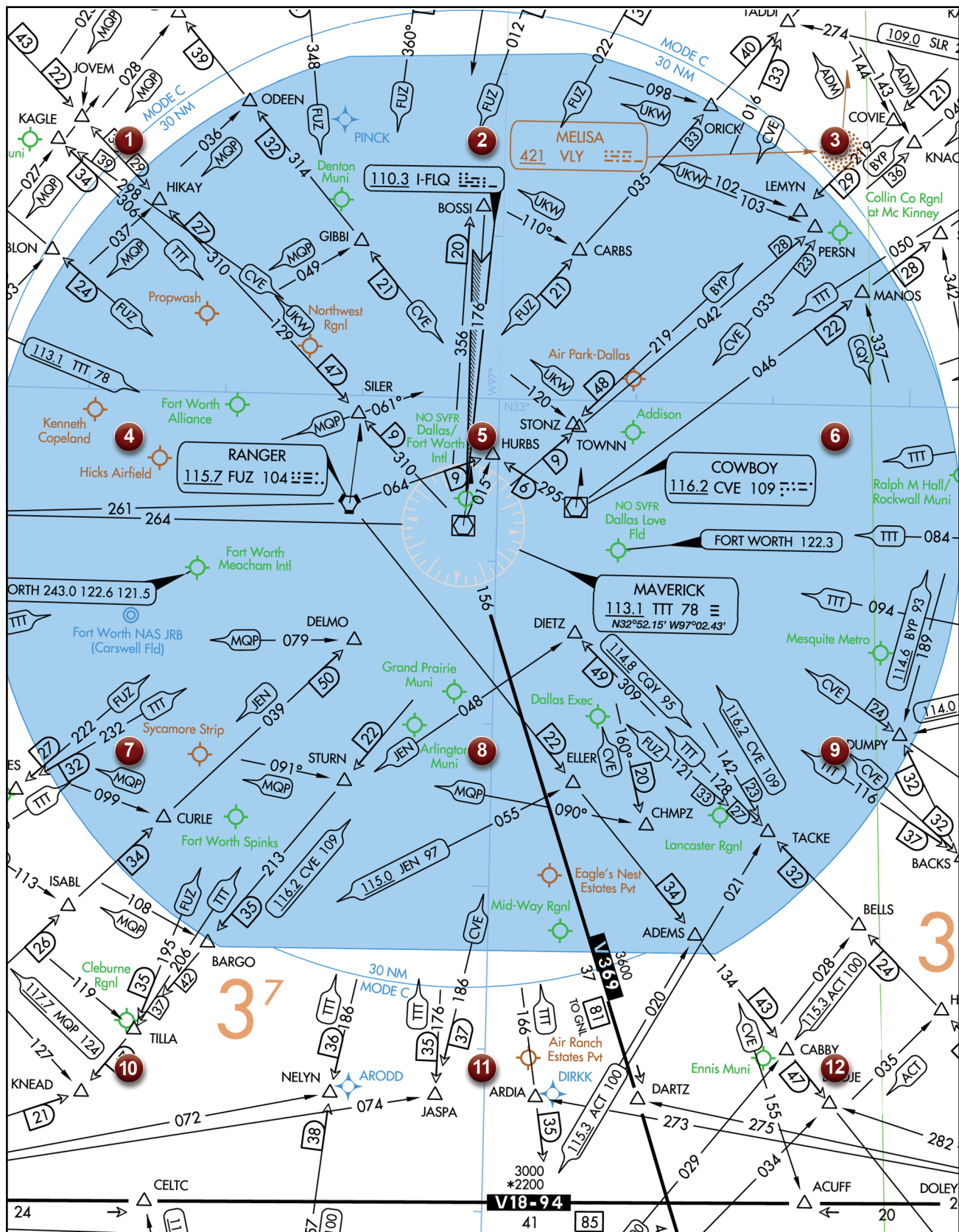
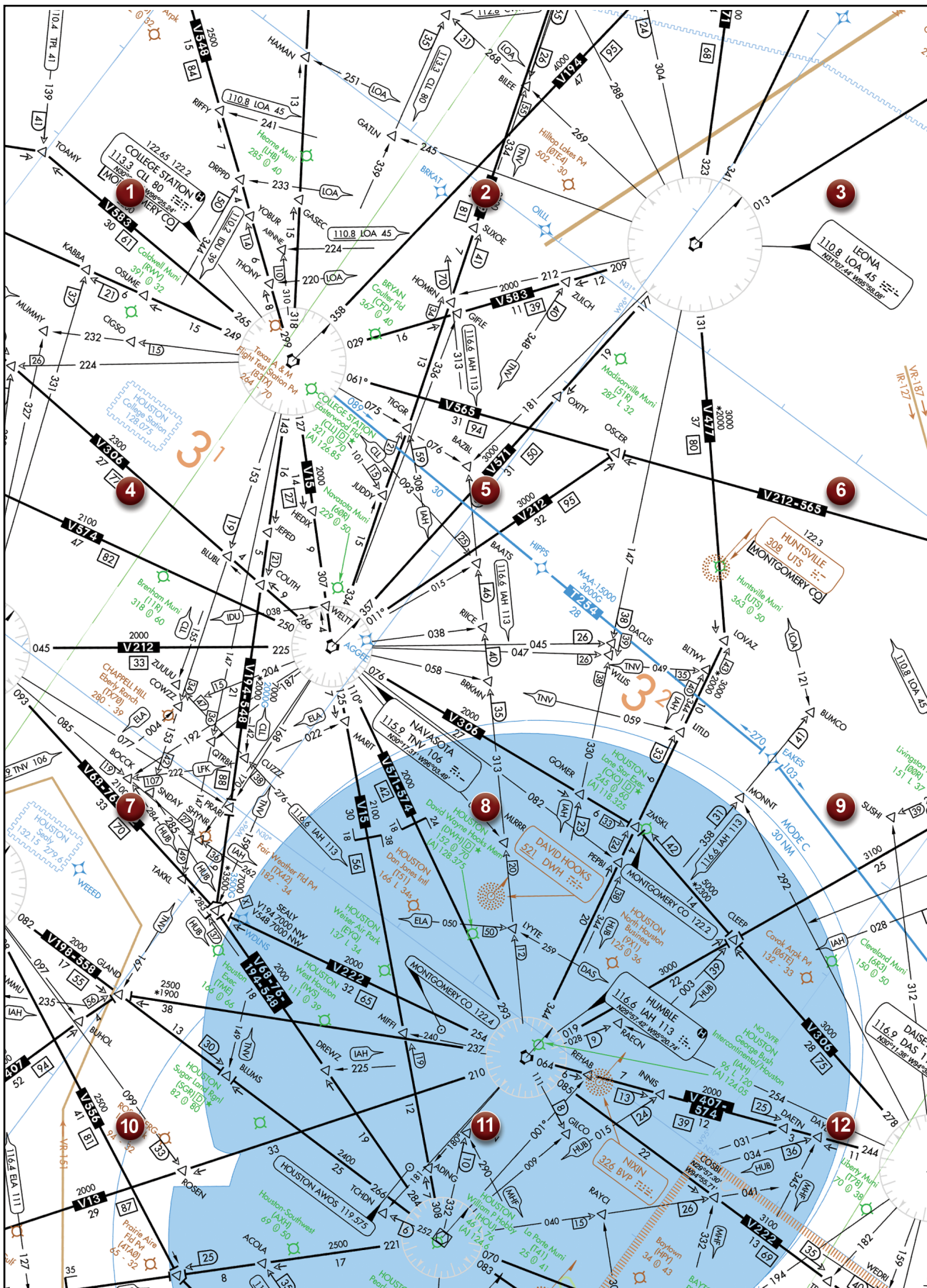


Figure 99. IFR Area Chart Segment.



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TEXAS

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DALLAS-FORT WORTH INTL (DFW)(KDFW) 12 NW UTC-6(-5DT) N32°53.83' W97°02.26' **DALLAS-FT WORTH**
 607 B AOE Class I, ARFF Index E NOTAM FILE DFW **COPTER**
RWY 17C-35C: H13401X150 (CONC-GRVD) S-120, D-200, 2S-175, 2D-600, 2D/2D2-850 **H-6H, L-17C, A**
 PCN 82 R/B/W/T HIRL CL **IAP, AD**
RWY 17C: ALSF2. TDZL. PAPI(P4L)—GA 3.0° TCH 74'. RVR-TMR
RWY 35C: ALSF2. TDZL. PAPI(P4L)—GA 3.0° TCH 76'. RVR-TMR
RWY 17R-35L: H13401X200 (CONC-GRVD) S-120, D-200, 2S-175, 2D-600, 2D/2D2-850 PCN 78 R/B/W/T HIRL
 CL
RWY 17R: MALSR. TDZL. PAPI(P4L)—GA 3.0° TCH 68'. RVR-TMR
RWY 35L: MALSR. TDZL. PAPI(P4L)—GA 3.0° TCH 63'. RVR-TMR
RWY 18L-36R: H13400X200 (CONC-GRVD) S-120, D-200, 2S-175, 2D-600, 2D/2D2-850 PCN 83 R/B/W/T HIRL
 CL
RWY 18L: MALSR. TDZL. PAPI(P4L)—GA 3.0° TCH 70'. RVR-TMR
RWY 36R: MALSR. TDZL. PAPI(P4L)—GA 3.0° TCH 66'. RVR-TMR
RWY 18R-36L: H13400X150 (CONC-GRVD) S-120, D-200, 2S-175, 2D-600, 2D/2D2-850 PCN 82 R/B/W/T HIRL
 CL
RWY 18R: ALSF2. TDZL. PAPI(P4L)—GA 3.0° TCH 74'. RVR-TMR
RWY 36L: MALSR. TDZL. PAPI(P4L)—GA 3.0° TCH 72'. RVR-TMR
RWY 13R-31L: H9301X150 (CONC-GRVD) S-120, D-200, 2S-175, 2D-600, 2D/2D2-850 PCN 83 R/B/W/T HIRL CL
RWY 13R: MALSR. TDZL. PAPI(P4L)—GA 3.0° TCH 71'. RVR-TR
RWY 31L: REIL. PAPI(P4L)—GA 3.13° TCH 72'. RVR-TR
RWY 13L-31R: H9000X200 (CONC-GRVD) S-120, D-200, 2S-175, 2D-600, 2D/2D2-850 PCN 97 R/B/W/T HIRL CL
RWY 13L: REIL. PAPI(P4L)—GA 3.0° TCH 82'. RVR-TMR Thld dspcd 625'. 0.5% down.
RWY 31R: MALSR. TDZL. PAPI(P4L)—GA 3.0° TCH 69'. RVR-TMR 0.5% up.
RWY 17L-35R: H8500X150 (CONC-GRVD) S-120, D-200, 2S-175, 2D-600, 2D/2D2-850 PCN 97 R/B/W/T HIRL CL
RWY 17L: ALSF2. TDZL. PAPI(P4L)—GA 3.0° TCH 77'. RVR-TMR Antenna. 0.6% up.
RWY 35R: ALSF2. TDZL. PAPI(P4R)—GA 3.0° TCH 73'. RVR-TMR 0.6% down.

LAND AND HOLD-SHORT OPERATIONS

LDG RWY	HOLD-SHORT POINT	AVBL LDG DIST
RWY 17C	TWY B	10460
RWY 18R	TWY B	10100
RWY 35C	TWY EJ	9050
RWY 36L	TWY Z	10650

RUNWAY DECLARED DISTANCE INFORMATION

RWY 13L:TORA-9000 TODA-9000 ASDA-9000 LDA-8375
RWY 13R:TORA-9301 TODA-9301 ASDA-9301 LDA-9301
RWY 17C:TORA-13401 TODA-13401 ASDA-13401 LDA-13401
RWY 17L:TORA-8500 TODA-8500 ASDA-8500 LDA-8500
RWY 17R:TORA-13401 TODA-13401 ASDA-13401 LDA-13401
RWY 18L:TORA-13400 TODA-13400 ASDA-13400 LDA-13400
RWY 18R:TORA-13400 TODA-13400 ASDA-13400 LDA-13400
RWY 31L:TORA-9301 TODA-9301 ASDA-9301 LDA-9301
RWY 31R:TORA-8375 TODA-8375 ASDA-8375 LDA-8375
RWY 35C:TORA-13401 TODA-13401 ASDA-13401 LDA-13401
RWY 35L:TORA-13401 TODA-13401 ASDA-13401 LDA-13401
RWY 35R:TORA-8500 TODA-8500 ASDA-8500 LDA-8500
RWY 36L:TORA-13400 TODA-13400 ASDA-13400 LDA-13400
RWY 36R:TORA-13400 TODA-13400 ASDA-13400 LDA-13400

SERVICE: FUEL 100LL, JET A OX 1, 3 LGT PAPI unusable byd 7° right of centerline.

CONTINUED ON NEXT PAGE

Figure 101. Chart Supplement.

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TEXAS

CONTINUED FROM PRECEDING PAGE

AIRPORT REMARKS: Attended continuously. Rwy 17L-35R CLOSED 0400-1200Z± exc PPR. Rwy 13R-31L CLOSED 0400-1200Z± except PPR. Rwy 13L-31R CLOSED 0400-1200Z± exc PPR. Visual screen 20' AGL 1180' south AER 35C. Visual screen 22' AGL 1179' south AER 35L. ASDE-X in use. Opr transponders with altitude reporting mode and ADS-B (if equipped) enabled on all airport surfaces. Runway Status Lights in operation. Acft at East Air Freight must contact DFW Twr at 127.5 prior to taxi out. PPR for acft with wingspan 215' or greater (GROUP VI), call arpt ops 972-973-3112 for flw-me svcs while taxiing to and from ramp and rwys. Arpt under const, PAEW in movement areas. Birds on and invof arpt. B747-8 and A380 ops only authorized on Rwy 18R-36L and Rwy 18L-36R, contact arpt ops for additional info. Tkf distance for Rwy 17L from Twy Q2 is 8196'. Tkf distance for Rwy 35R from Twy Q9 is 8196'. Tkf distance for Rwy 17R from Twy EG is 13082' and from Twy EH is 12816'. Tkf distance for Rwy 35L from Twy EQ is 13084' and from Twy EP is 12811'. Tkf distance for Rwy 36R from Twy WP is 12815', from Twy WQ is 13082'. Tkf distance for Rwy 18L from Twy WG is 13082', from Twy WH is 12815'. Tkf distance for Rwy 17C from Twy EG is 13,082'. Tkf distance for Rwy 18R from Twy WG is 13,082'. Land And Hold Short signs on Rwy 17C at Twy B 10,460' south of Rwy 17C thld, Rwy 18R at Twy B 10,100' south of Rwy 18R thld, Rwy 35C at Twy EJ 9050' north of Rwy 35C thld, Rwy 36L at Twy Z 10,650' north of Rwy 36L thld, lgtd and marked with in-pavement pulsating white lgts. Acft using Terminal D gates D6-17 must obtain approval from DFW ramp tower 129.95 prior to entering ramp and prior to pushback 0600L-2200L(1200-0400Z±). Use extreme care at other times. Acft using terminal E gates must obtain approval from DFW ramp 131.0 prior to entering ramp and prior to pushback 1030-0730Z± during time change only. Apron entrance/exit points 1 and 2 clsd to acft with wingspan greater than 89' except PPR. Apron entrance/exit points 3 and 4 clsd to acft with wingspan greater than 118' except PPR. Apron entrance/exit points 5, 7, 42, 44, 49, 51, 52, and 122 clsd to acft with wingspan greater than 118'. Apron entrance/exit points 22, 24, 105, and 107 clsd to acft with wingspan 125' and greater. Apron entrance/exit points 31 and 39 clsd to acft with wingspan greater than 167'. Apron entrance/exit points 9, 32, 33, 34, 35, 36, 37, 38, and 53 clsd to acft with wingspan greater than 135'. Apron entrance/exit point 48 clsd to acft with wingspan greater than 195'. Apron entrance/exit point 124 clsd to acft with wingspan greater than 213'. Unless otherwise specified, all apron entrance/exit points clsd to acft with wingspan greater than 214' except PPR. Terminal B apron taxilane btn apron entrance/exit point taxilanes 107 and 115 clsd to acft with wingspan 118' and greater. Twy A5 clsd to acft with wingspan 171' and greater. Twys may rqr judgemental oversteering for large acft. PPR general aviation ops 0600-1100Z±, call arpt ops 972-973-3112. PPR from arpt ops for general aviation acft to proceed to airline terminal gate exc to general aviation fac. PPR from the primary tenant airlines to opr within the central terminal area. Proper minimum object free area distances may not be maintained for ramp/apron taxi lanes. Twy edge reflectors along all twys. Ldg fee. Flight Notification Service (ADCUS) available. NOTE: See Land and Hold Short Operations, Intersection Departures During Periods of Darkness, Noise Abatement Procedures and Continuous Power Facilities.

AIRPORT MANAGER: 972-973-3112

WEATHER DATA SOURCES: ASOS (972) 615-2608 LLWAS.

COMMUNICATIONS: D-ATIS ARR 123.775 (972) 615-2701 D-ATIS DEP 135.925 (972) 615-2701 UNICOM 122.95

Ⓡ RGNL APP CON 118.1 135.975 124.3(North) 125.2 135.975(South) 119.875(West) 125.025(East)

DFW TOWER 126.55 127.5 (E) 124.15 134.9 (W) GND CON 121.65 121.8 (E) 121.85 (W)

CLNC DEL 128.25

Ⓡ RGNL DEP CON 118.1 135.975 124.825(North) 125.125 135.975(South) 126.475(West) 118.55(East)

CPDLC (LOGON KUSA)

AIRSPACE: CLASS B See VFR Terminal Area Chart

RADIO AIDS TO NAVIGATION: NOTAM FILE FTW.

MAVERICK (H) VORW/DME 113.1 TTT Chan 78 N32°52.15' W97°02.43' 359° 1.7 NM to fld. 540/6E.

All acft arriving DFW are requested to turn DME off until departure due to traffic overload of Maverick DME DME unusable:

180°-190°

ILS/DME 109.5 I-LWN Chan 32 Rwy 13R. Class IIE. DME unusable wi 2.5 NM (4.2 DME).

ILS/DME 110.3 I-FLQ Chan 40 Rwy 17C. Class IIIE. DME also serves Rwy 35C.

ILS/DME 111.75 I-PPZ Chan 54(Y) Rwy 17L. Class IIIE. DME also serves Rwy 35R.

ILS/DME 111.35 I-JHZ Chan 50(Y) Rwy 17R. Class IE. DME also serves Rwy 35L.

ILS/DME 110.55 I-CIX Chan 42(Y) Rwy 18L. Class IE. DME also serves Rwy 36R.

ILS/DME 111.9 I-VYN Chan 56 Rwy 18R. Class IIIE. DME also serves Rwy 36L.

ILS/DME 110.9 I-RRA Chan 46 Rwy 31R. Class IE.

ILS/DME 110.3 I-PKQ Chan 40 Rwy 35C. Class IIIE. DME also serves Rwy 17C.

ILS/DME 111.35 I-UWX Chan 50(Y) Rwy 35L. Class IE. LOC unusable byd 14 NM blo 3,400'. DME also serves Rwy 17R.

ILS/DME 111.75 I-AJQ Chan 54(Y) Rwy 35R. Class IIIE. DME also serves Rwy 17L. LOC unusable byd 16 NM 5° right of course.

ILS/DME 111.9 I-BXN Chan 56 Rwy 36L. Class ID. DME also serves Rwy 18R. LOC unusable byd 15 NM 5° right of course.

ILS/DME 110.55 I-FJN Chan 42(Y) Rwy 36R. Class IE. DME also serves Rwy 18L.

DAN E RICHARDS MUNI (See PADUCAH on page 358)

Figure 101A. Chart Supplement.

GEORGE BUSH INTERCONTINENTAL/HOUSTON (IAH)(KIAH) 15 N UTC-6(-5DT)

HOUSTON

N29°59.07' W95°20.49'

96 B LRA Class I, ARFF Index E NOTAM FILE IAH

COPTER

RWY 15L-33R: H12001X150 (CONC-GRVD) S-100, D-200, 2S-175, 2D-400, 2D/2D2-800 PCN 72 R/A/W/T HIRL CL

H-7C, L-19E, 21A, GOMW

RWY 15L: PAPI(P4R)—GA 3.0° TCH 58'. RVR-TMR

IAP, AD

RWY 33R: MALSR. RVR-TMR

RWY 09-27: H10000X150 (CONC-GRVD) D-210, 2S-175, 2D-560 PCN 67 R/A/W/T HIRL CL

RWY 09: MALSR. PAPI(P4R)—GA 3.0° TCH 71'. RVR-TMR

RWY 27: ALSF2. TDZL. PAPI(P4L)—GA 3.0° TCH 70'. RVR-TMR

RWY 15R-33L: H10000X150 (CONC-GRVD) S-75, D-200, 2S-175, 2D-400, 2D/2D2-873 PCN 94 R/B/W/T HIRL CL

RWY 15R: MALSR. TDZL. PAPI(P4L)—GA 3.0° TCH 71'. RVR-TMR

RWY 33L: TDZL. PAPI(P4R)—GA 3.0° TCH 59'. RVR-TMR

RWY 08R-26L: H9402X150 (CONC-GRVD) S-75, D-210, 2S-175, 2D-498, 2D/2D2-873 PCN 72 R/A/W/T HIRL CL

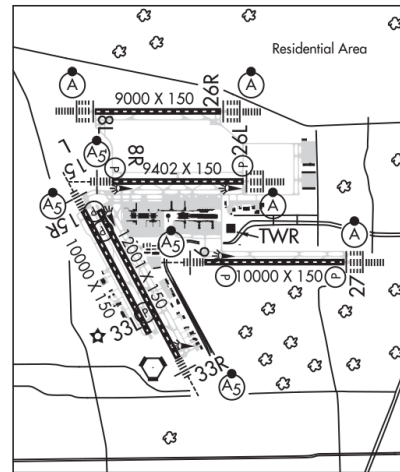
RWY 08R: MALSR. TDZL. PAPI(P4L)—GA 3.0° TCH 72'. RVR-TMR

RWY 26L: ALSF2. TDZL. PAPI(P4R)—GA 3.0° TCH 71'. RVR-TMR

RWY 08L-26R: H9000X150 (CONC-GRVD) S-75, D-210, 2S-175, 2D-409, 2D/2D2-873 PCN 72 R/A/W/T HIRL CL

RWY 08L: ALSF2. TDZL. RVR-TMR

RWY 26R: ALSF2. TDZL. RVR-TMR



LAND AND HOLD-SHORT OPERATIONS

LDG RWY	HOLD-SHORT POINT	AVBL LDG DIST
RWY 08R	TWY NP	9019
RWY 26L	TWY NE	9010

RUNWAY DECLARED DISTANCE INFORMATION

RWY 08L: TORA-9000 TODA-9000 ASDA-9000 LDA-9000
RWY 08R: TORA-9402 TODA-9402 ASDA-9402 LDA-9402
RWY 09: TORA-10000 TODA-10000 ASDA-10000 LDA-10000
RWY 15L: TORA-12001 TODA-12001 ASDA-12001 LDA-12001
RWY 15R: TORA-9999 TODA-9999 ASDA-9999 LDA-9999
RWY 26L: TORA-9402 TODA-9402 ASDA-9402 LDA-9402
RWY 26R: TORA-9000 TODA-9000 ASDA-9000 LDA-9000
RWY 27: TORA-10000 TODA-10000 ASDA-10000 LDA-10000
RWY 33L: TORA-9999 TODA-9999 ASDA-9999 LDA-9999
RWY 33R: TORA-12001 TODA-12001 ASDA-12001 LDA-12001

SERVICE: S4 FUEL 100LL, JET A OX 2

AIRPORT REMARKS: Attended continuously. Rwy 09-27 CLOSED to acft with wingspan 215' and abv. Birds on and in/ovf arpt. ASDE-X in use. Opr transponders with altitude reporting mode and ADS-B (if equipped) enabled on all airport surfaces. Acft equipped with dual antennas should use top antenna. Rwy status lgts are in opr. Pilots/crews should be aware of dep turns on crs in excess of 180°. Pilot read-back of direction of turns is highly encouraged. Rwy 15L-33R magnetic anomalies may affect compass hgd for tkf. Noise sensitive area north, east and west of arpt. North ramp north and south taxilanes clsd to acft with wing spans greater than 125'. Taxilane RC clsd to acft with wingspan greater than 135'. Twy NR clsd to acft with wing spans greater than 125' between Twy WD and Twy WB. Twy NR btn Twy NC and Twy WW clsd to acft wingspan more than 214'. Apron taxilane RA btn Twy SC and taxilane R2 irregular sfc steel plate over centerline lgt. Twy SC btn taxilane RA and taxilane RB steel plate over centerline lgt fixture. Twy SF between Rwy 09-27 up to and including the east bridge clsd to acft with wingspan 215' and over. Twy WA clsd indef btn Twy WG and Twy WL barricaded and lgtd. Twy WA clsd indef btn Twy WL and Twy WN barricaded and lgtd. Twy WG clsd indef btn Rwy 15L-33R and Twy WA. Twy WH clsd indef btn Rwy 15L-33R and Twy WB; barricaded and lgtd. Twy WJ clsd indef btn Rwy 15L-33R and Twy WA barricaded and lgtd. Twy WK clsd indef btn Rwy 15L-33R and Twy WB barricaded and lgtd. Twy WL lgts btn Rwy 15L-33R and Twy WB OTS indef. Twy WM clsd indef btn Rwy 15L-33R and Twy WB barricaded and lgtd. Twy WW run-up pad for Rwy 15L clsd acft with wingspan 135' and over. Twy WW btn Twy NR and Twy WB clsd to acft wingspan more than 214'. Twy WZ clsd indef btn Rwy 15L-33R and Twy WB barricaded and lgtd. The following movement areas are not visible from the twr: portions of Twys WA and WB from Twy WH to the AER 33R, Twys WA and WB from Twy WD north for 400', Twy WD from Twy WA to Twy NR, Twy NR, Twy WL from Rwy 15L to Twy WB and Twy WM. Taxilane RA, RB, RC, R2, and Twy SC north of Twy SB are designated non-movement areas operated by UAL ramp ctl. Twy SF btn Twy NB and Taxilane RA is designated non-movement area. Dual twy ops Twy NK btn Twy NB and North Ramp, west cntrln rstd to acft max wing spans 125' and east cntrln max wing spans 214'. Twy NR btn Twy WW and WB is designated non-movement area. Twy NK btn Twy NB and terminal D ramp simultaneous acft ops prohibited when middle taxilane in use. Twy WC west of Rwy 15R-33L rstd to acft with 118' wingspan and blo. Twy WA and Twy WB magnetic anomalies may affect compass hgd. North Ramp taxilane btn Twys NF and NR rstd to acft with wing span 125' and blo. 9' AGL unmarked security fence adjacent to FBO and corporate base operator ramps and non-movement area taxilanes. Helicopter hover/taxi rstd to hard sfc movement areas only. Ldg fee. Flight Notification Service (ADCUS) available. NOTE: See Special Notices-Continuous Power Facilities.

Figure 102. Chart Supplement.

TEXAS

CONTINUED FROM PRECEDING PAGE

AIRPORT MANAGER: 281-230-3100
WEATHER DATA SOURCES: ASOS (281) 443-6397 HIWAS 116.6 IAH. TDWR.
COMMUNICATIONS: D-ATIS 124.05 (281-209-8665) UNICOM 122.95
 RCO 122.4 (MONTGOMERY COUNTY RADIO)
 (R) HOUSTON APP CON 124.35 (West) 120.05 (East)
 (R) HOUSTON DEP CON 123.8 (West) 119.7 (North) 133.6 (East) 127.125
TOWER 135.15 (Rwy 09 and Rwy 27) 127.3 (Rwy 15R-33L and Rwy 15L-33R) 125.35 (Rwy 08R and Rwy 26L)
 120.725 (Rwy 08L and Rwy 26R) **GND CON** 121.7 (Rwy 15L-33R, and Rwy 15R-33L) 118.575 (Rwy 08L-26R, Rwy
 08R-26L and Rwy 09-27)
GND METERING 119.95 **CLNC DEL** 128.1
CPDLC (LOGON KUSA)
AIRSPACE: CLASS B See VFR Terminal Area Chart
RADIO AIDS TO NAVIGATION: NOTAM FILE IAH.
HUMBLE (H) VORTACW 116.6 IAH Chan 113 N29°57.42' W95°20.74' 003° 1.7 NM to fld. 81/5E. HIWAS.
 VORTAC Monitored by ATCT
 VOR portion unusable:
 060°-070° byd 35 NM
 175°-185° byd 20 NM blo 3,000'
 Byd 30 NM blo 2,000'
 DME unusable:
 015°-090° byd 30 NM blo 2,000'
 130°-320° byd 30 NM blo 2,000'
 175°-185° byd 20 NM blo 3,000'
 230°-250°
 Byd 25° left of course
 TACAN AZIMUTH unusable:
 040°-055° blo 5,000'
 150°-320° blo 4,500'
 150°-320° byd 10 NM
NIXIN NDB (MHW) 326 BVP N29°59.60' W95°12.90' 260° 6.6 NM to fld. 72/5E. NOTAM FILE CXO.
ILS/DME 111.55 I-BZU Chan 52(Y) Rwy 08L. Class IIIE.
ILS/DME 109.7 I-IAH Chan 34 Rwy 08R. Class IE. DME also serves Rwy 26.
ILS/DME 110.9 I-UYO Chan 46 Rwy 09. DME also serves Rwy 27.
ILS 111.15 I-LKM Rwy 15R. Class IE. LOC unusable byd 30° right of course. DME unusable byd 25° left of course.
ILS/DME 109.7 I-JYV Chan 34 Rwy 26L. Class IIIE. DME also serves Rwy 08.
ILS/DME 111.55 I-OND Chan 52(Y) Rwy 26R. Class IIIE.
ILS/DME 110.9 I-GHI Chan 46 Rwy 27. Class IIIE. DME also serves Rwy 09.
ILS 111.9 I-CDG Rwy 33R. Class IE.
COMM/NAV/WEATHER REMARKS: Ground Based Augmentation System (GBAS) approach service volume 20 NM from threshold for
 all GLS approaches.

HOUSTON EXECUTIVE (TME)(KTME) 28 W UTC-6(-5DT) N29°48.30' W95°53.87' **HOUSTON**
 166 B NOTAM FILE CXO H-7C, L-19D, 21A, GOMW
 IAP, AD

RWY 18-36: H6610X100 (ASPH) D-101 MIRL
RWY 18: REIL. PAPI(P4L)—GA 3.0° TCH 40'. P-line.
RWY 36: REIL. PAPI(P4L)—GA 3.0° TCH 40'. Rgt tfc.
SERVICE: S4 FUEL 100LL, JET A OX 3, 4 LGT ACTIVATE MIRL Rwy
 18-36, REIL Rwy 18 and REIL Rwy 36—CTAF.
AIRPORT REMARKS: Attended continuously. Birds on and invof arpt. Noise
 sensitive area east of arpt in effect, avoid housing area. Touch and go
 ldgs prohibited.
AIRPORT MANAGER: 281-945-5000
WEATHER DATA SOURCES: AWOS-3 119.525 (281) 945-5451. or
 713-932-8437. TDWR.
COMMUNICATIONS: CTAF 126.975 UNICOM 122.975 ATIS 119.525 (24 hr
 281-945-5451)
 (R) HOUSTON APP/DEP CON 123.8
TOWER 126.975 (1200-0400Z‡)
GND CON 132.075 **CLNC DEL** 132.075
AIRSPACE: CLASS D svc 1200-0400Z‡ other times CLASS E.
RADIO AIDS TO NAVIGATION: NOTAM FILE ELA.
EAGLE LAKE (H) VORW/DME 116.4 ELA Chan 111 N29°39.75'
 W96°19.03' 061° 23.5 NM to fld. 193/8E.
COMM/NAV/WEATHER REMARKS: For Clnc Del when ATCT is clsd ctc Houston Apch at 281-443-5844, to cancel IFR call
 281-443-5888.

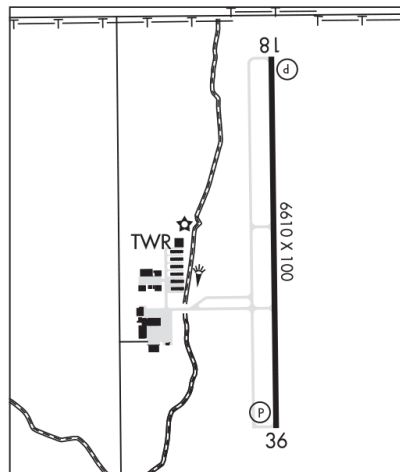


Figure 102A. Chart Supplement.

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CALIFORNIA

BAKERSFIELD**BAKERSFIELD MUNI** (L45) 3 S UTC-8(-7DT) N35°19.49' W118°59.76'

378 B S4 FUEL 100LL TPA-1178(800) NOTAM FILE RIU

RWY 16-34: H4000X75 (ASPH) S-20 MIRL

RWY 16: Road. Rgt tfc.

RWY 34: REIL. PAPI(P2L)—GA 4.1° TCH 53'. P-line.

AIRPORT REMARKS: Attended 1500-0100Z±. 100' pole line 1/2 mile south of arpt. Rwy lghts are pilot controlled frequency 122.8, three clicks for on. Lghts go out after 15 minutes.**AIRPORT MANAGER:** 661-326-3781**COMMUNICATIONS: CTAF/UNICOM 122.8**

RCO 122.45 (RANCHO MURIETA RADIO)

Ⓡ 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.

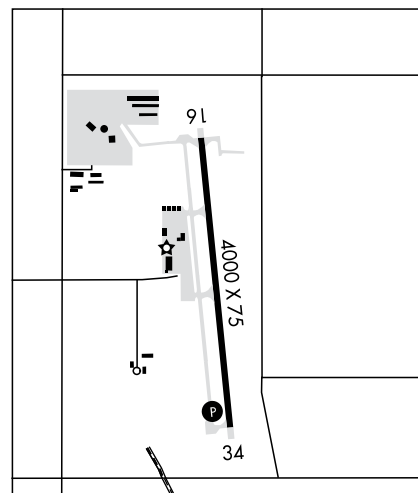
SHAFTER (H) VORTACW 115.4 EHF Chan 101 N35°29.07'

W119°05.84' 139° 10.8 NM to fld. 548/14E. HIWAS.

LOS ANGELES

L-3D, 7B

IAP

**MEADOWS FLD** (BFL)(KBFL) 3 NW UTC-8(-7DT) N35°26.03' W119°03.46'

510 B S4 FUEL 100, 100LL, JET A OX 4 ARFF Index—See Remarks NOTAM FILE BFL

LOS ANGELES

H-4H, L-3D, 7B

IAP, AD

RWY 12L-30R: H10855X150 (ASPH-GRVD) S-110, D-200, 2S-175, 2D-500, 2D/2D2-850 HIRL CL

RWY 12L: VASI(V4L)—GA 3.0° TCH 52'. 0.4% down.

RWY 30R: MALSR. TDZL. PAPI(P4L)—GA 3.0° TCH 64'. Thld dspcd 3426'. Rgt tfc. 0.3% up.

RWY 12R-30L: H7703X100 (ASPH) S-18 MIRL 0.3% up NW

RWY 12R: PAPI(P4L)—GA 3.0° TCH 25'. Rgt tfc.

RWY 30L: PAPI(P4L)—GA 3.0° TCH 25'. Thld dspcd 3382'. Tree.

AIRPORT REMARKS: Attended continuously. Rwy 12R-30L CLOSED when twr clsd. Right base ops for Rwy 30R establish wings level on final apch no lower than 300' AGL. Arpt ops not authorized below 1200 RVR without Surface Movement Guidance & Control System (SMGCS). Arpt ops not authorized below 600 RVR. Noise sensitive areas S and E of arpt recommended turbojet training hrs weekdays 1600-0600Z±, weekends 2000-0600Z± no more than ten practice approaches per hour. Rwy 12R-30L NSTD holding position markings/sign locations. Rwy 30R 50:1 to dspld thld. Class I, ARFF Index B. Index C ARFF avbl. Centerline lghts Rwy 30R only. Rwy pilot control lighting avbl. When twr clsd ACTIVATE HIRL Rwy 12L-30R, PAPI and MALSR Rwy 30R—CTAF. PAPI Rwy 12R and PAPI Rwy 30L not opr when twr clsd.**AIRPORT MANAGER:** 661-391-1870**WEATHER DATA SOURCES: ASOS** (661) 393-3766**COMMUNICATIONS: CTAF 118.1 ATIS 118.6 661-399-9425 UNICOM 122.95**

BAKERSFIELD RCO 122.45 (RANCHO MURIETA RADIO)

Ⓡ 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 1400-2300Z±, other times CLASS E.**VOR TEST FACILITY (VOT) 111.2****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. 548/14E. HIWAS.

ILS/DME 111.9 I-BFL Chan 56 Rwy 30R. Unmonitored when ATCT clsd.

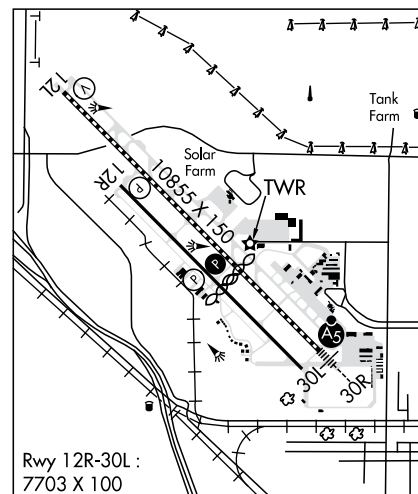


Figure 113B. Data from Southwest U.S. Chart Supplement.

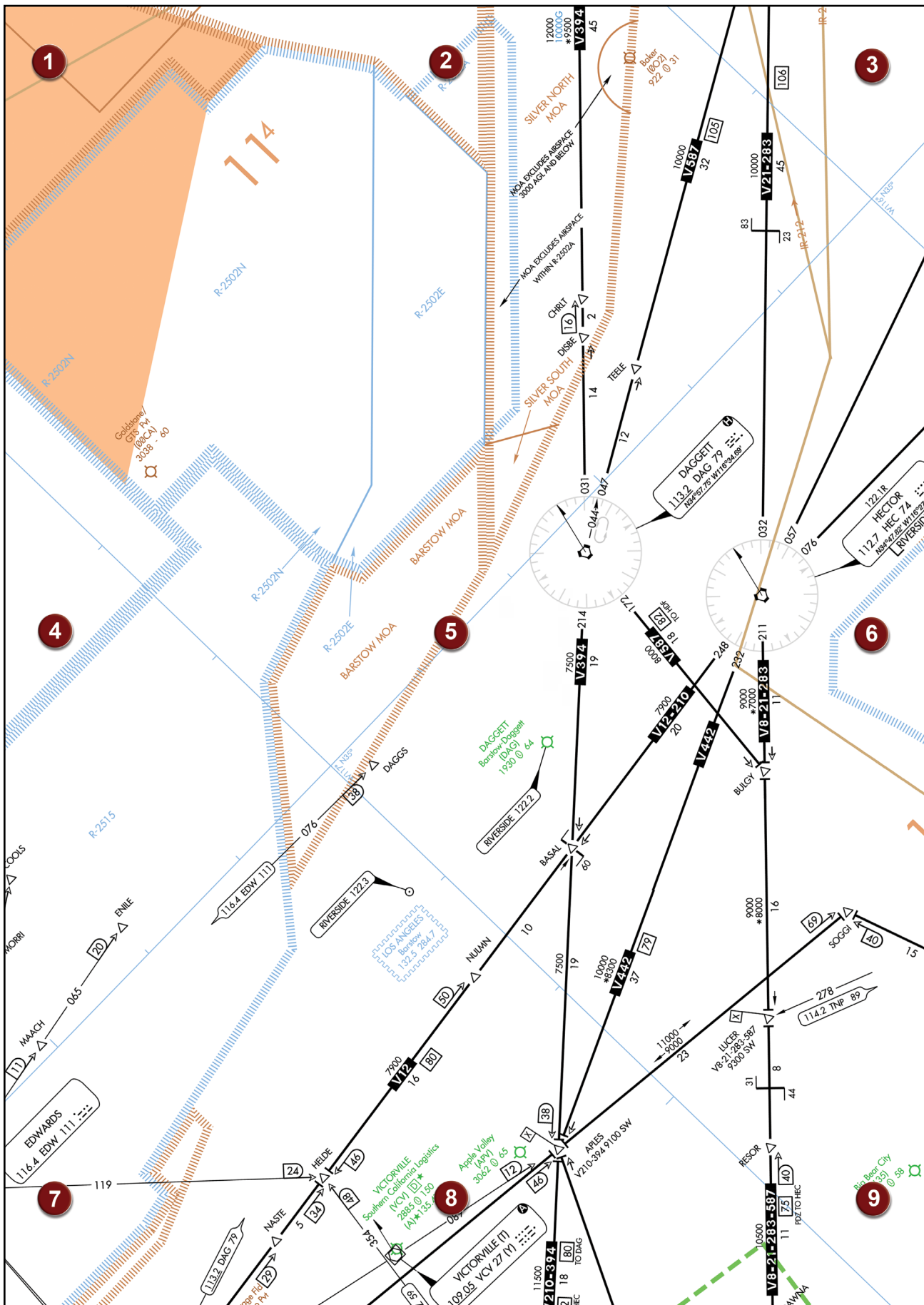


Figure 114. En Route Low Altitude Chart Segment.

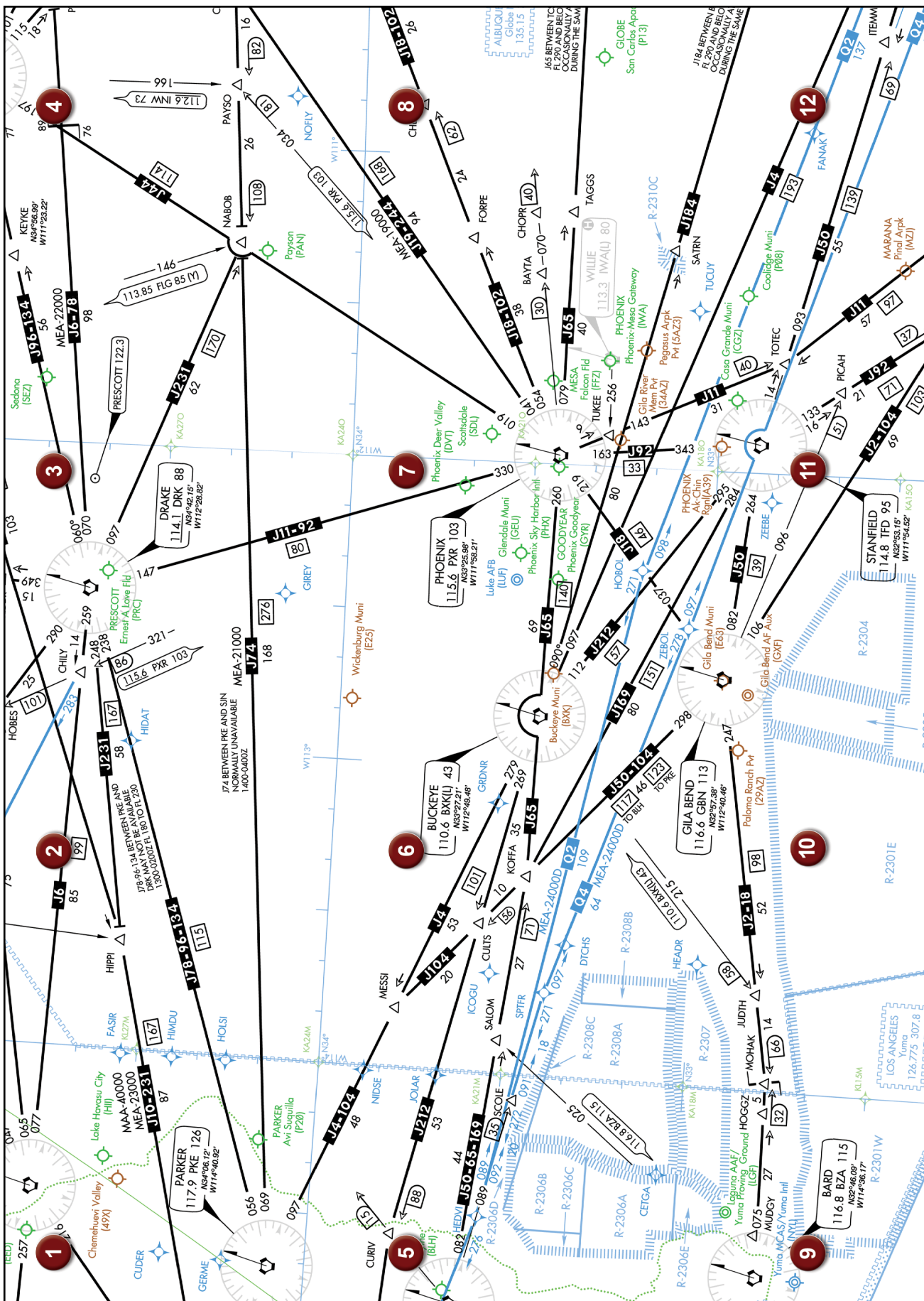


Figure 117. IFR En Route High Altitude Chart Segment.

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ARIZONA

PHOENIX SKY HARBOR INTL (PHX)(KPHX) P (ANG) 3 E UTC-7 N33°26.06' W112°00.70' **PHOENIX**
 1135 B S4 **FUEL** 100LL, JET A OX 1, 2, 3, 4 TPA—See Remarks LRA Class I, ARFF Index D **H-4J, L-5B, A**
 NOTAM FILE PHX **IAP, AD**

RWY 08-26: H11489X150 (CONC-GRVD) S-30, D-200, 2S-175,
 2D-400, 2D/2D2-620 PCN 74 R/B/W/T HIRL

RWY 08: MALSF. PAPI(P4L)—GA 3.0° TCH 69'. Thld displcd 898'.
 Bldg.

RWY 26: REIL. PAPI(P4L)—GA 3.0° TCH 60'. Road. Rgt tfc.

RWY 07L-25R: H10300X150 (CONC-GRVD) S-30, D-200, 2S-175,
 2D-400, 2D/2D2-620 PCN 70 R/B/W/T HIRL

RWY 07L: MALSR. PAPI(P4L)—GA 3.0° TCH 73'. Pole. Rgt tfc.

RWY 25R: PAPI(P4L)—GA 3.0° TCH 70'. Antenna.

RWY 07R-25L: H7800X150 (CONC-GRVD) S-30, D-200, 2S-175,
 2D-400, 2D/2D2-620 PCN 79 R/B/W/T HIRL

RWY 07R: MALSR. PAPI(P4L)—GA 3.0° TCH 70'. Pole.

RWY 25L: MALSR. PAPI(P4L)—GA 3.0° TCH 66'. Antenna.

RUNWAY DECLARED DISTANCE INFORMATION

RWY 08: TORA-11489 TODA-11489 ASDA-11489 LDA-10591

RWY 26: TORA-11489 TODA-11489 ASDA-11489 LDA-11489

MILITARY SERVICE: JASU 1(MD-3M) 1(MA-1A) **FUEL** J4-Ltd supply (MIL),
 A+ (C602-273-3770.) (NC-100LL, A) **FLUID** LPOX LOX **OIL**
 O-148 (Mil)

AIRPORT REMARKS: Attended continuously. Bird activity within 10 miles of arpt up to 10,000' MSL. ASDE-X Surveillance System in use. Opr transponders with Mode C on all twys and rwys. TPA—2135(1000) lgt acft and non-turbo jets; 2635(1500) heavy acft and turbojets. Noise abatement procedures are in effect at all times ctc 602-273-4300 for more information. Rwy 07L touchdown and Rwy 25R rollout rwy visual range avbl. Twy R and portions of Twy S and Twy T directly blo the twr are non-visible areas from the twr. Phoenix Twr unable to provide ATC services to acft while on Twr R, and portions of Twy S and Twy T. Twy D between intersections Twy D8 and Twy D9 rstd to acft with wingspan 135' or less. Twy R overhead train bridge at midpoint provides 82' -4" clnc. Tran acft use FBO for svc 602-273-3770, 132.0. FAA navigational antennas located 114' north and south of Twy F centerline, 525' west of Twy G3 intersection. FAA navigation equipment shacks located 117' north and 117' south of Twy F centerline between Twys G2 and G3 intersections. No experimental flt of ground demonstration on arpt without prior written consent from the arpt. This arpt has been surveyed by the National Geodetic Survey. National guard has ltd tran maintenance and parking RON by prior permission. Acft design group VI opr with PPR. No touch and go or stop and go ops allowed between 1300 and 0600Z without prior written consent from arpt. No engine runs on arpt without prior coordination with arpt ops 48 hrs prior to arrival. International ldg rights rqr US CSTMS and Border Protection notification 48 hrs prior to ldg. GA should review arpt safety video <http://skyharbor.com/about/forpilots.html>. General aviation should ctc arpt manager 602-273-3300 as to how to view/review arpt video. Rwy status lghts are in opr. Landing fee. Overnight parking fee. Fee for all charters, travel clubs and certain revenue producing aircraft. Flight Notification Service (ADCUS) available. NOTE: See Special Notices—Continuous Power Facilities.

AIRPORT MANAGER: 602-273-3300

WEATHER DATA SOURCES: ASOS (602) 231-8557 TDWR.

COMMUNICATIONS: D-ATIS 127.575

RCO 122.6 122.2 (PRESCOTT RADIO)

Ⓡ **APP/DEP CON** 124.1 (119°-138° 7500'-14,500') (192°-263° 7500'-12,500') 119.2 (319°-057° 7500' and abv)
 120.7 (319°-057° blo 7500') 123.7 (119°-138° blo 7500') (139°-191° blo 8500') 124.9 (058°-118° blo 10,500')
 126.8 (058°-118° 10,500' and abv) (119°-138° abv 14,500') (139°-191° 8500' and above) (192°-263° abv
 12,500') 126.375

TOWER 118.7 (Rwy 08-26) 120.9 (Rwy 07R-25L and Rwy 07L-25R) **GND CON** 119.75 (North) 132.55 (South)

CLNC DEL 118.1

AIRSPACE: CLASS B See VFR Terminal Area Chart

VOR TEST FACILITY (VOT) 109.0

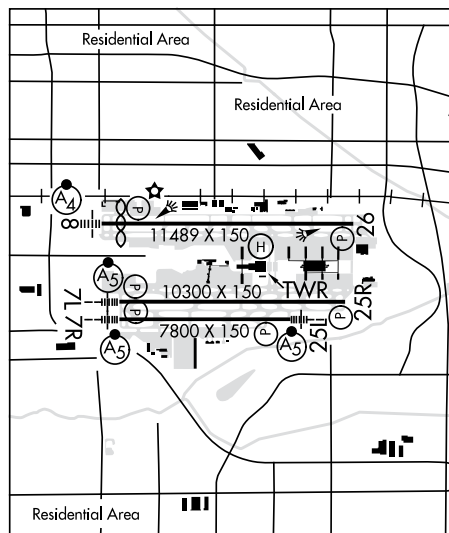


Figure 118. Excerpt from Chart Supplement.

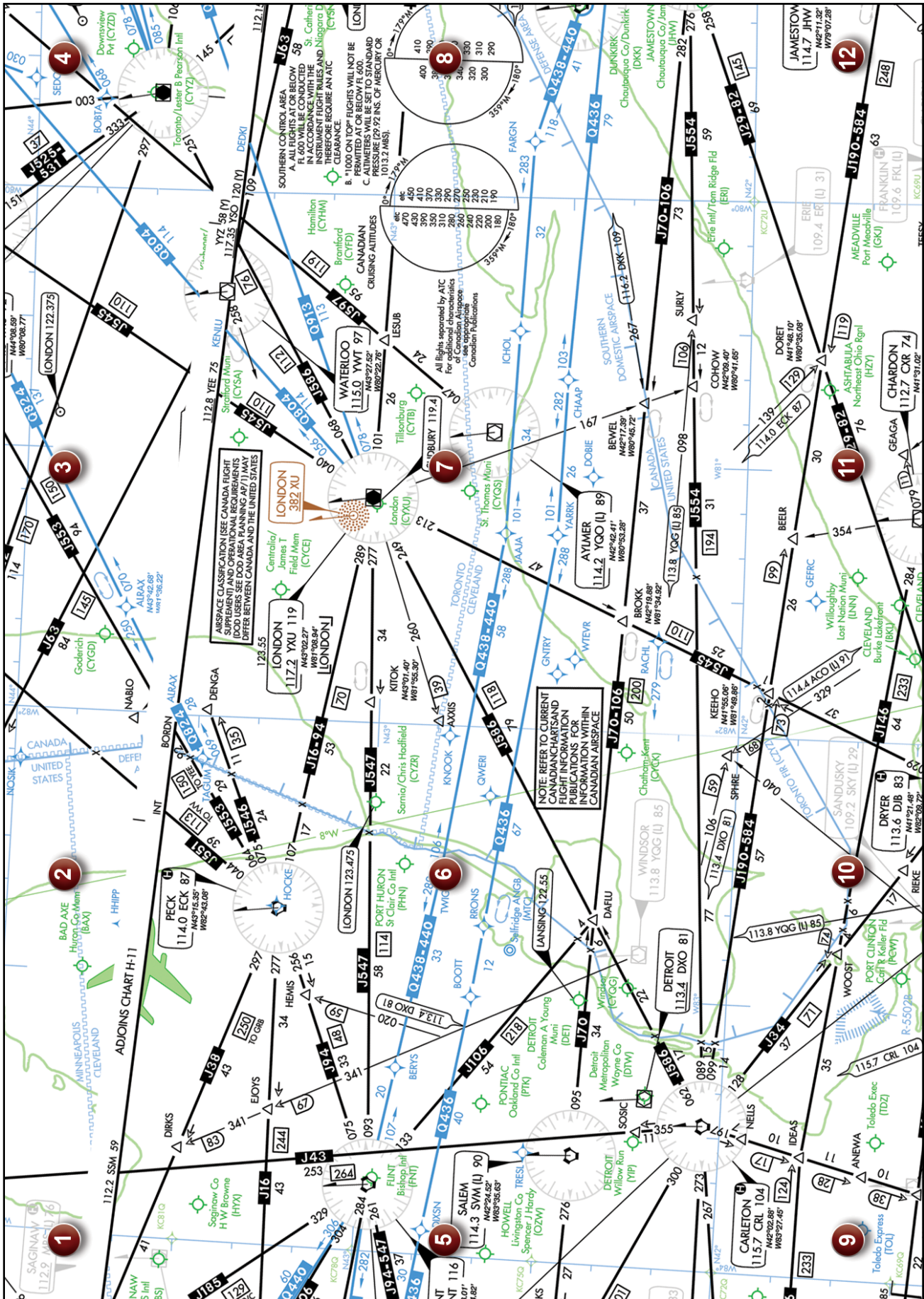


Figure 121. IFR En Route High Altitude Chart Segment.



Figure 123. Aircraft Course and DME Indicator.



Figure 124. Aircraft Course and DME Indicator.

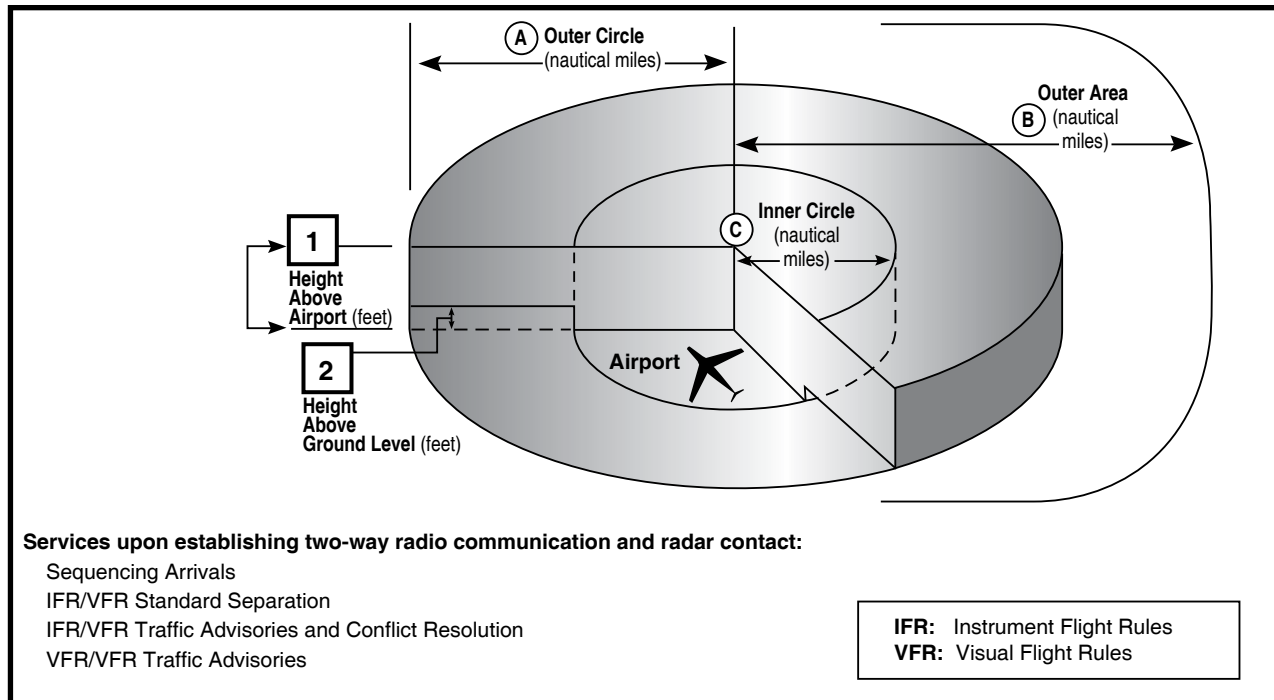


Figure 126. Class C Airspace.

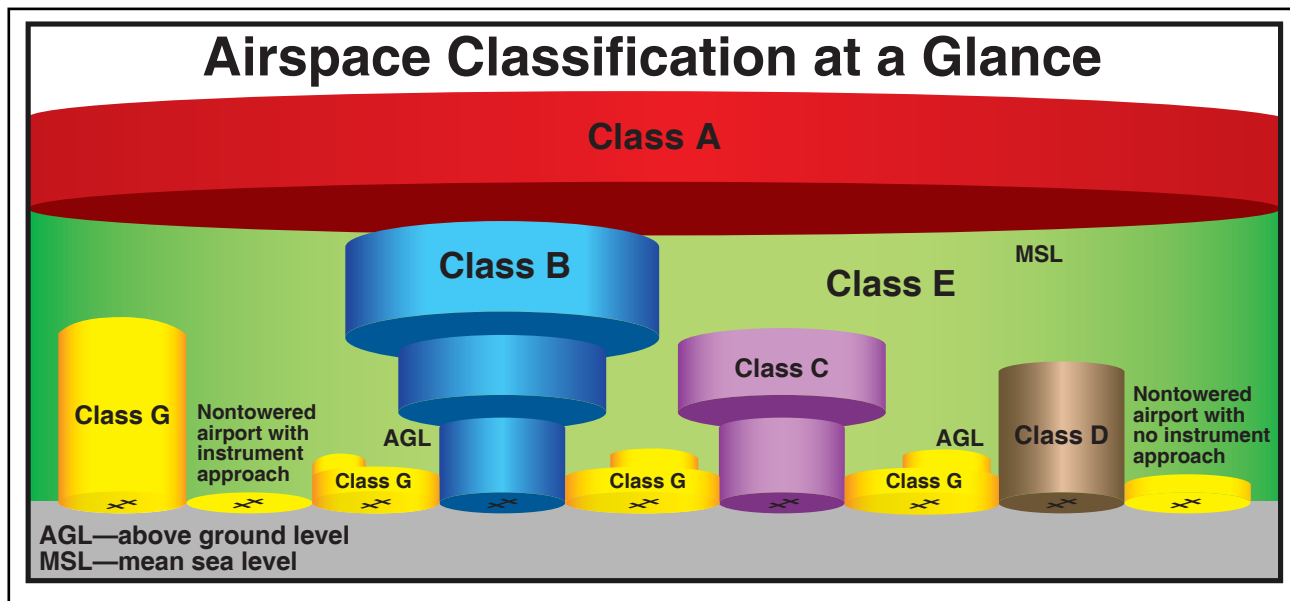


Figure 127. Airspace Classification.

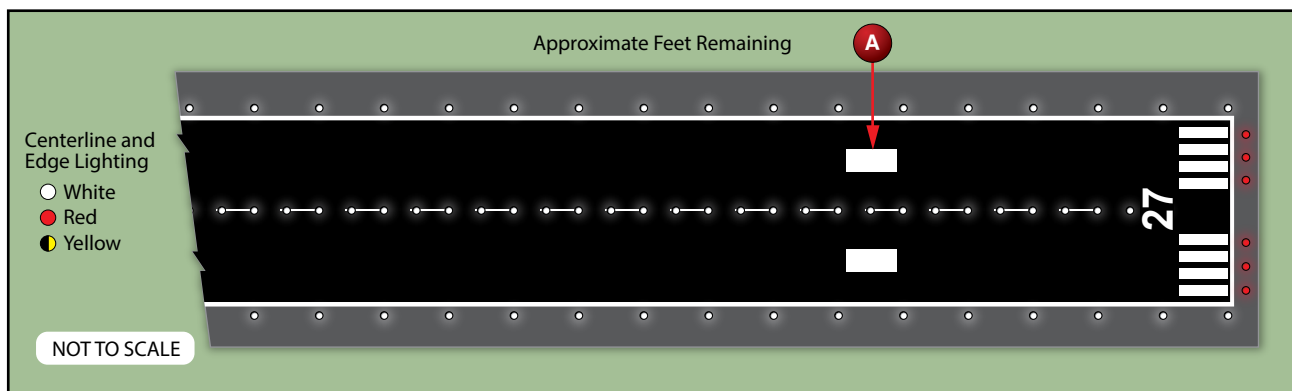


Figure 129. FAA Nonprecision Approach Runway Markings and Lighting.

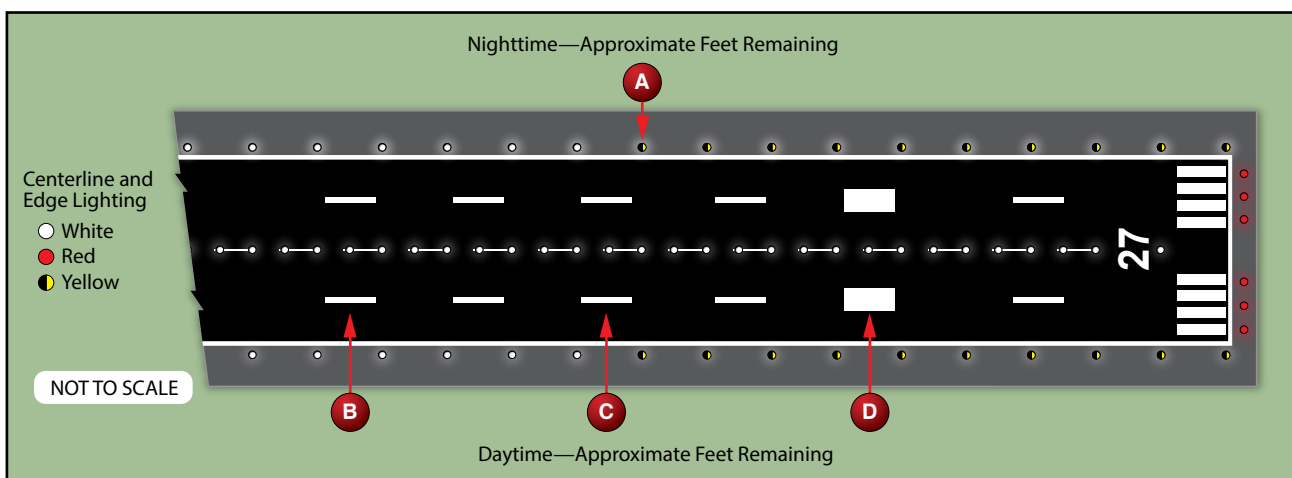


Figure 130. ICAO Nonprecision Approach Runway Markings and Lighting.

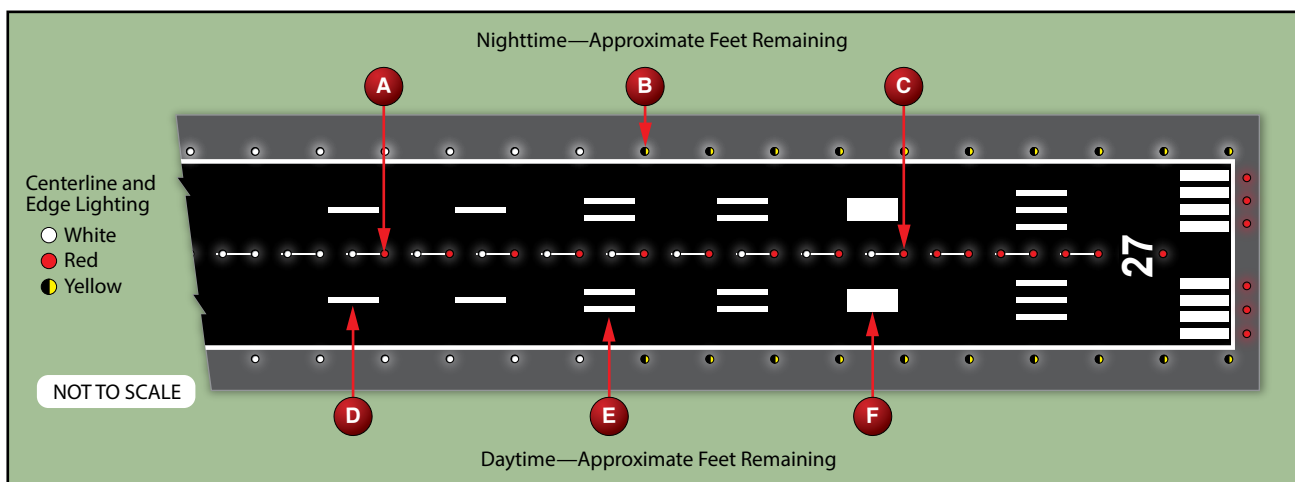


Figure 131. FAA ICAO Precision Approach Runway Markings and Lighting.



Figure 135. OBS, ILS, and GS Displacement.



Figure 136. OBS, ILS, and GS Displacement.



Figure 137. OBS, ILS, and GS Displacement.

FREQ	N.M.	KNOTS	MIN
115.0	60.0	180	20.0

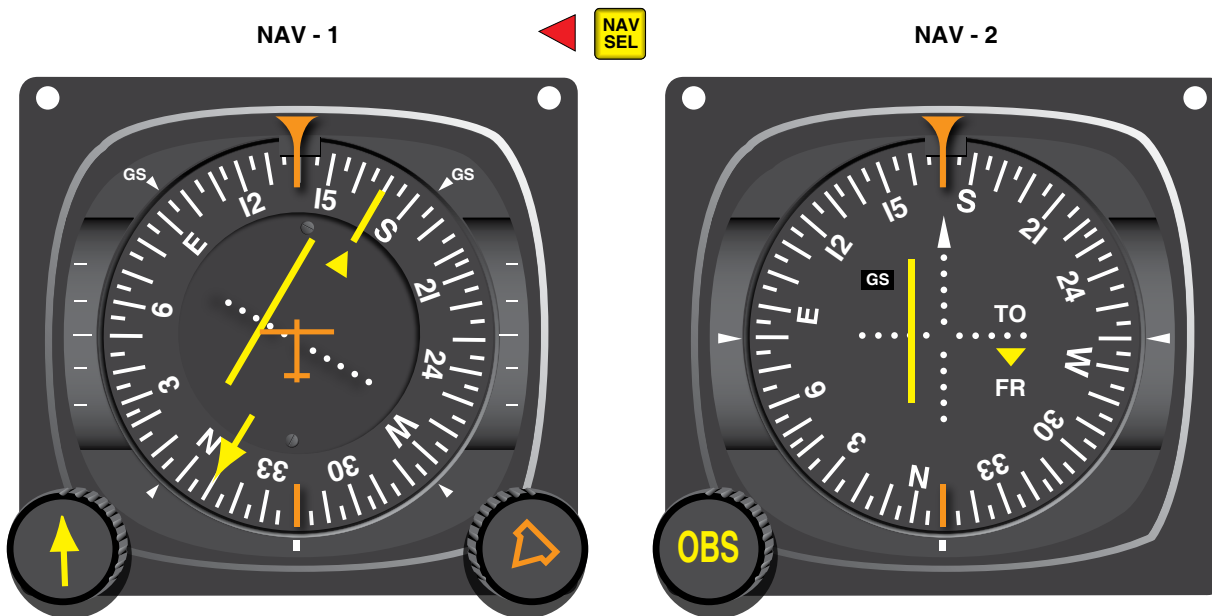


Figure 139. No. 1 and No. 2 NAV Presentation.



Figure 140. HSI Presentation.

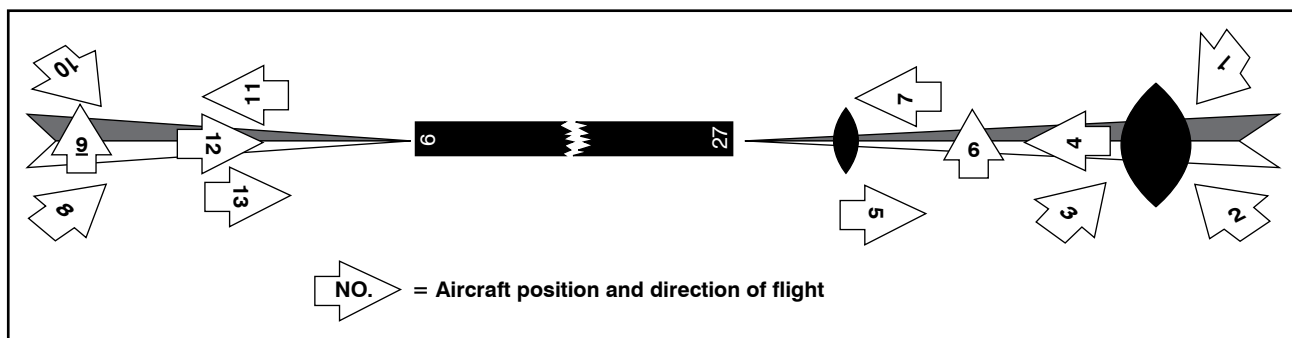


Figure 141. Aircraft Position and Direction of Flight.

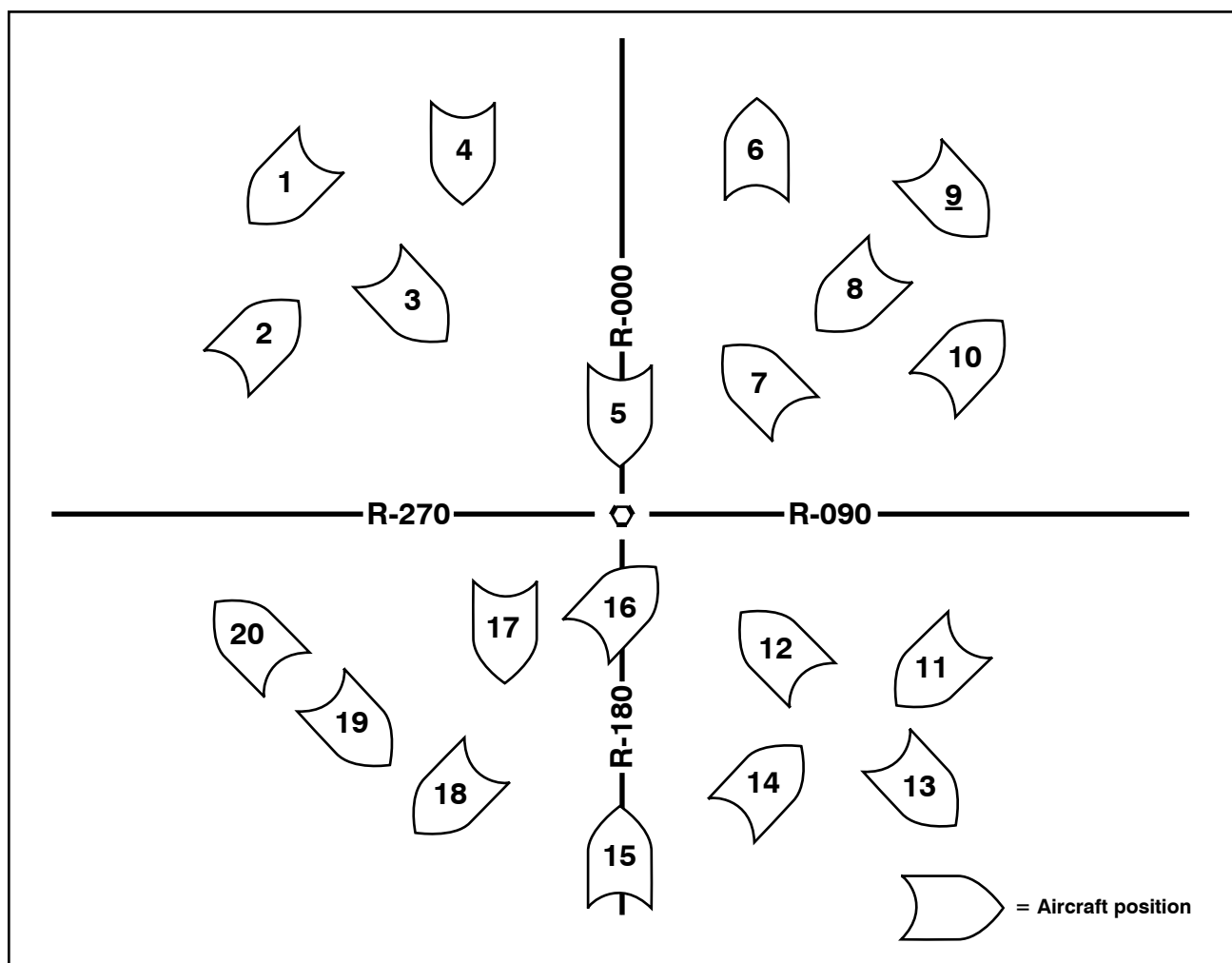


Figure 142. Aircraft Position.



Figure 143. HSI Presentation.

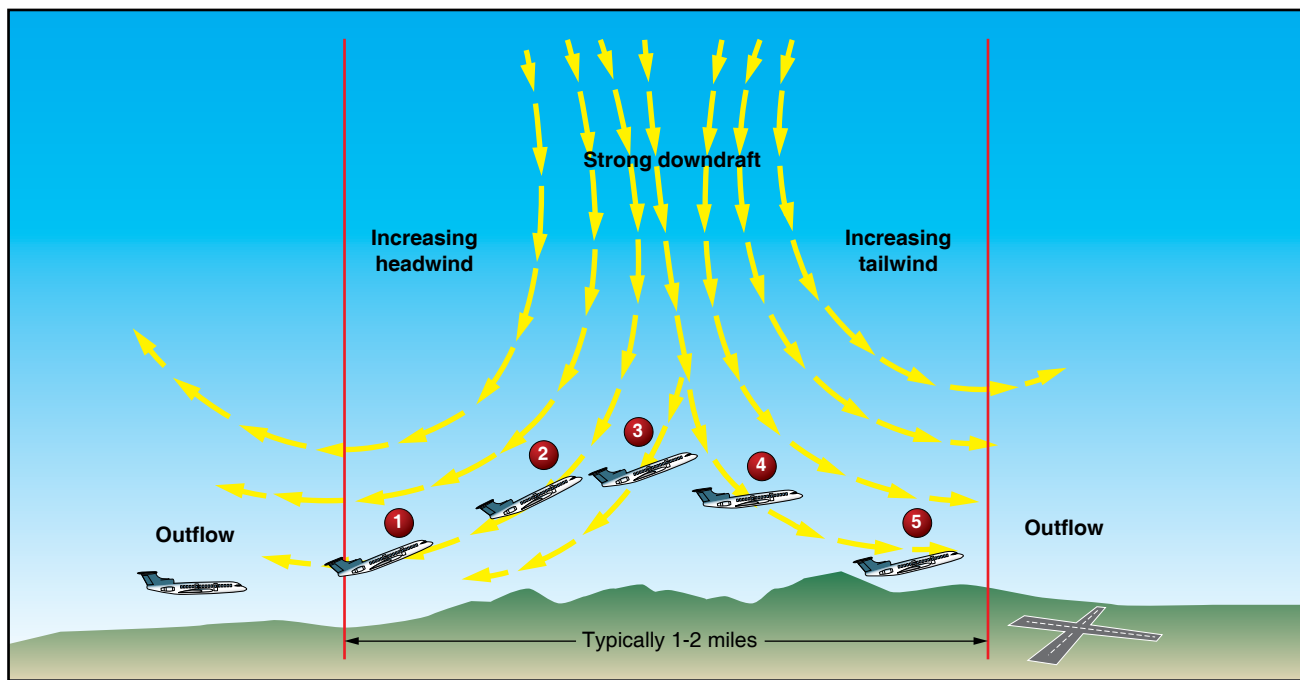


Figure 144. Microburst Section Chart.

Aviation Routine Weather Reports (METAR)

TX

METAR KAMA 131755Z 33025G35KT 3/4SM IC OVC003 M02/M01 A2952 RMK PK WND 32039/43 WSHFT 1735 PRESFER 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 UUA/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 13180ZZ 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 36LBB.

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

LBB 131821Z UUA/OV LBB/TM1817/FL011/TPB727/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 KMFF 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).

METARs & PIREPs

TX

METAR KABI 131755Z AUTO 21016G24KT 180V240 1SM R11/P6000FT -RA BR BKN015 OVC025 19/15 A2900 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 KSIT 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 CV 440/RM WS LND RWY16FYV.

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. METARs & PIREPs.

Terminal Aerodrome Forecasts (TAF)

TX

TAF

KAMA 091120Z 0912/1012 15010KT P6SM SKC
 TEMPO 0912/0914 09010KT
 FM091900 16015KT P6SM SKC

TAF

KAUS 091322Z 0913/1018 20007KT P6SM SCT005 BKN015
 TEMPO 0913/0915 BKN005
 FM091600 18012G22KT P6SM FEW250
 FM100100 16011KT P6SM SCT250
 FM100900 18007KT P6SM BKN015

TAF

KCRP 091120Z 0912/1012 15004KT P6SM FEW015 BKN250
 FM091500 16014KT P6SM SCT035
 FM091900 14017G24KT P6SM FEW040
 FM100200 15010KT P6SM FEW250

TAF

KDFW 091125Z 0912/1018 18016KT P6SM SCT150 BKN300

TAF

KELP 091130Z 0912/1012 25009KT P6SM SKC
 FM100400 25006KT P6SM FEW250

TAF

KIAH 091120Z 0912/1018 00000KT P6SM SCT250
 FM091300 19006KT P6SM SCT250
 FM092000 17010KT P6SM FEW070 SCT200
 FM100400 17005KT P6SM SKC
 FM101000 18002KT 6SM MIFG FEW250
 FM101300 18007KT P6SM FEW015 SCT250

TAF

KLBB 091120Z 0912/1012 16010KT P6SM FEW250
 FM091700 18015KT P6SM FEW250

TAF

KSAT 091434Z 0915/1018 17008KT P6SM BKN020 BKN250
 FM091600 16012G22KT P6SM FEW250
 FM100100 15011KT P6SM SCT250
 FM100900 18006KT P6SM BKN015

TAF

KSPS 091121Z 0912/1012 VRB10G15KT P6SM VCSH BKN150 WS015/23035KT
 FM091400 18014G20KT P6SM SCT150
 FM100100 17012KT P6SM BKN250

Figure 147. Terminal Aerodrome Forecasts (TAF).

Convective SIGMET

MKCC WST 031755
CONVECTIVE SIGMET 42C
VALID UNTIL 1955Z
TX OK
FROM 5W MLC-PEQ-SJT-5W MLC
AREA SCT EMBDD TSTMS MOVG LTL. TOPS 300.

CONVECTIVE SIGMET 43C
VALID UNTIL 1955Z
CO KS OK
FROM AKO-OSW-30WNW OKC-AKO
AREA SCT TSTMS OCNLY EMBDD MOVG FROM 3220. TOPS 380.

CONVECTIVE SIGMET 44C
VALID UNTIL 1955Z
50NE MEM
ISOLD INSTD LVL5 TSTM DIAM 10 MOVG FROM 2625. TOP ABV 450.

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 20 KTS.
TSTM OVR TN WL CONT MOVG EWD 25 KTS.

Figure 148. Convective SIGMET.

Winds and Temperatures Aloft Forecasts

DATA BASED ON 031200Z
 VALID 040000Z FOR USE 1800-0300Z. TEMPS NEG ABV 24000

FT	3000	6000	9000	12000	18000	24000	30000	34000	39000
ABI		1306+16	1607+11	1807+06	2108-07	2208-18	240833	250942	300753
ABO			0810+14	0511+08	3415-06	3220-18	312333	312543	302554
AMA		0614	0814+10	0709+05	3210-07	2914-19	281934	282243	292554
ATL	0906	9900+17	9900+12	0205+07	3507-07	3305-19	290534	280543	990054
BNA	9900	9900+17	3205+12	3109+07	3018-07	2918-19	272134	262444	262855
BRO	1510	1614+20	1611+14	1708+08	9900-07	9900-19	990034	990043	990055
DAL	0910	1706+17	2009+11	2011+06	2015-08	2214-19	231333	241342	271153
DEN			9900+09	9900+04	3020-10	3029-21	303636	304145	294756
DSM	3615	3315+07	3118+04	3022+00	2835-12	2748-24	276438	277348	277957
ELP		0610	0614+13	0615+08	0113-05	3614-17	361433	361442	251354
GCK		0611+11	0809+08	9900+03	2817-09	2823-20	273135	273644	284155
HLC		0409+09	0405+07	3106+02	2822-10	2730-21	273936	274545	275256
HOU	0909	1607+19	1606+13	1606+07	1605-08	9900-20	990034	990043	990054
ICT	0516	0613+12	0607+08	9900+04	2718-09	2626-20	263635	264144	274655
IND	3611	3207+12	2912+08	2818+03	2733-09	2643-21	265635	265944	256255
INK		0609+16	0709+12	0608+07	0107-06	3607-18	350833	340842	350855
JAN	3612	3613+18	3611+13	3609+07	0105-08	9900-19	990034	990043	230854
LIT	0310	3608+16	3206+11	2808+06	2517-08	2518-19	252034	252243	262454
LOU	0105	9900+15	2908+10	2913+05	2825-08	2731-20	263834	264143	254454
MEM	0109	0108+17	3408+12	3110+06	2916-07	2717-19	261934	262144	262555
MKC	0316	0211+11	3409+07	3013+03	2728-10	2638-21	265036	265645	276356
MSY	0315	0216+19	0315+13	0414+07	0510-08	0605-20	990034	990043	210854
OKC	0715	0810+14	1106+10	9900+05	2414-08	2419-19	252534	252743	272754
SAT	1107	1713+18	1813+13	1911+07	2006-07	1906-19	180734	170743	990054
SGF	0414	0410+14	3605+09	2908+04	2624-09	2632-20	254135	264444	264655
SHV	0509	9900+18	9900+12	2106+06	2012-08	2109-19	220734	240743	260754
STL	0314	0110+12	3210+08	2915+03	2730-09	2741-21	265435	265744	266055
TUS		0807+23	0814+16	0814+10	0810-05	0505-17	330533	310842	290954

Figure 149. Winds and Temperatures Aloft Forecasts.

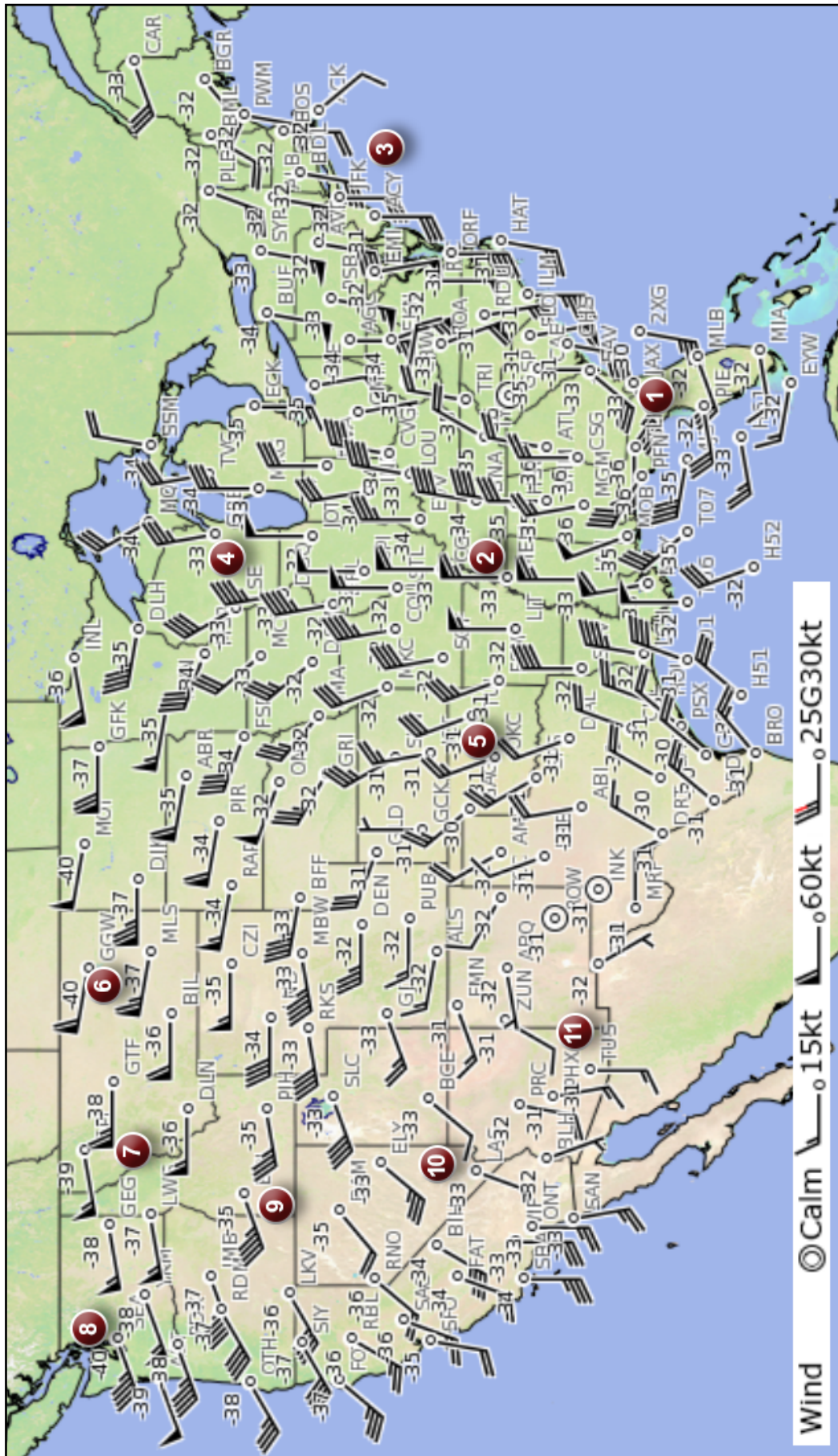


Figure 149A. Winds and Temperatures Aloft Forecast.

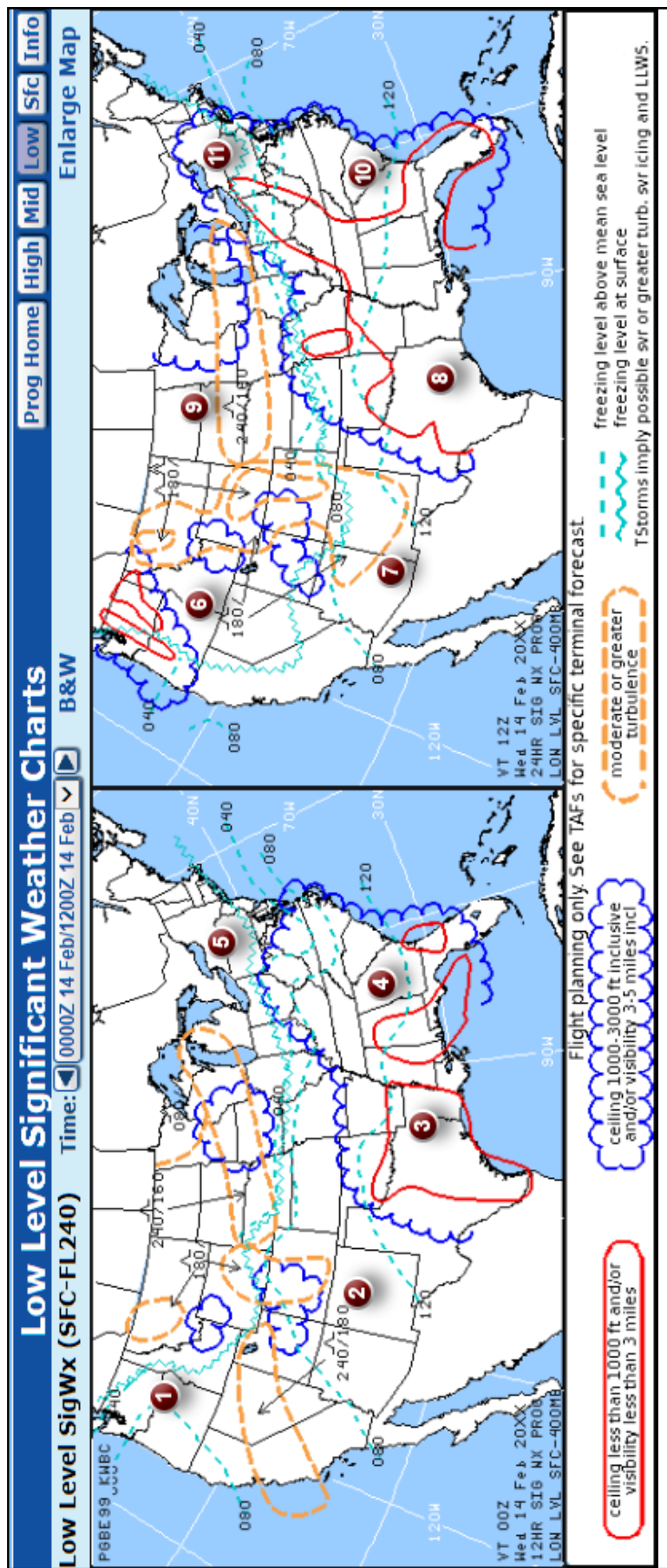


Figure 151. Low-Level Significant Weather Chart.

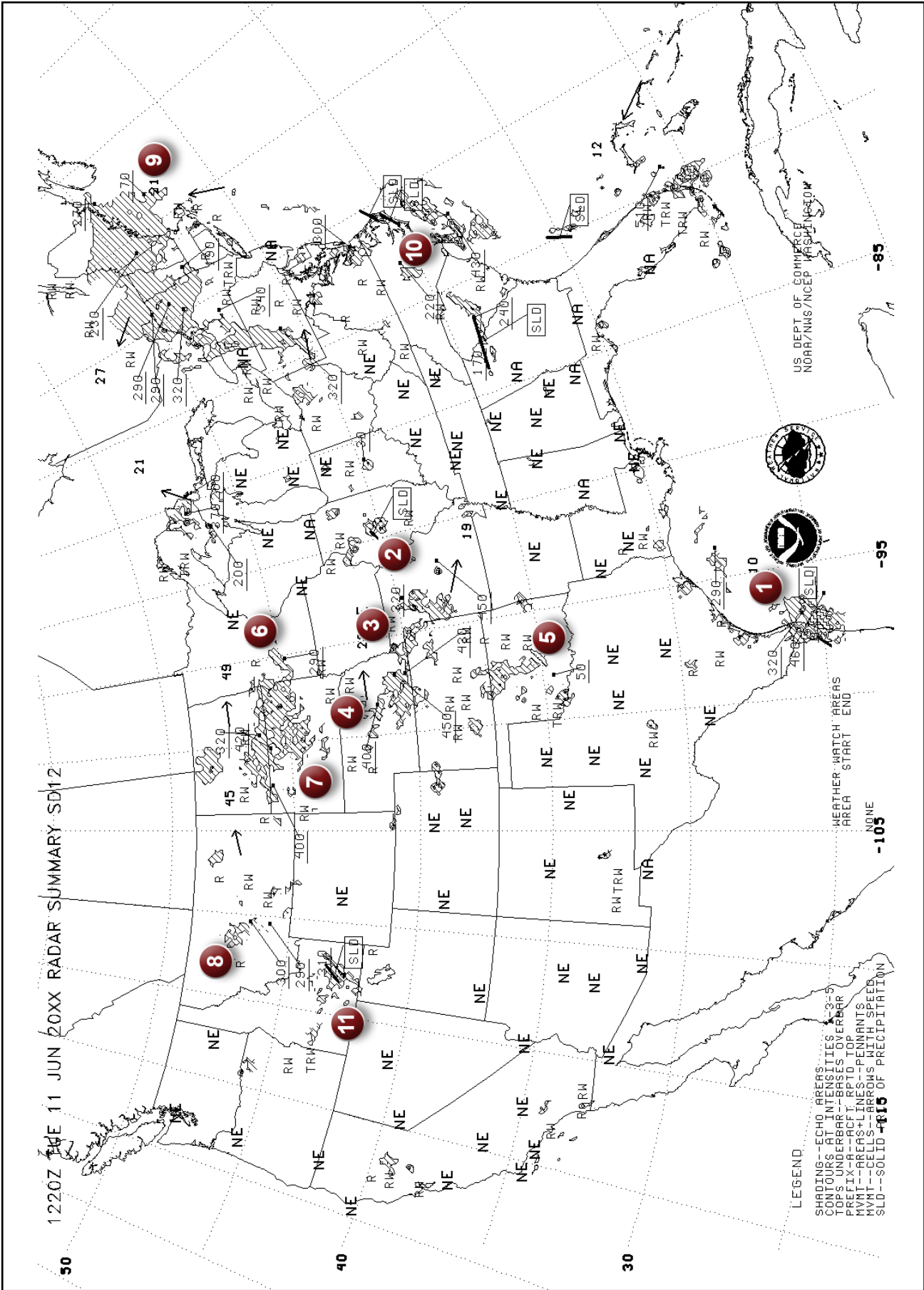


Figure 152. Radar Summary Chart.

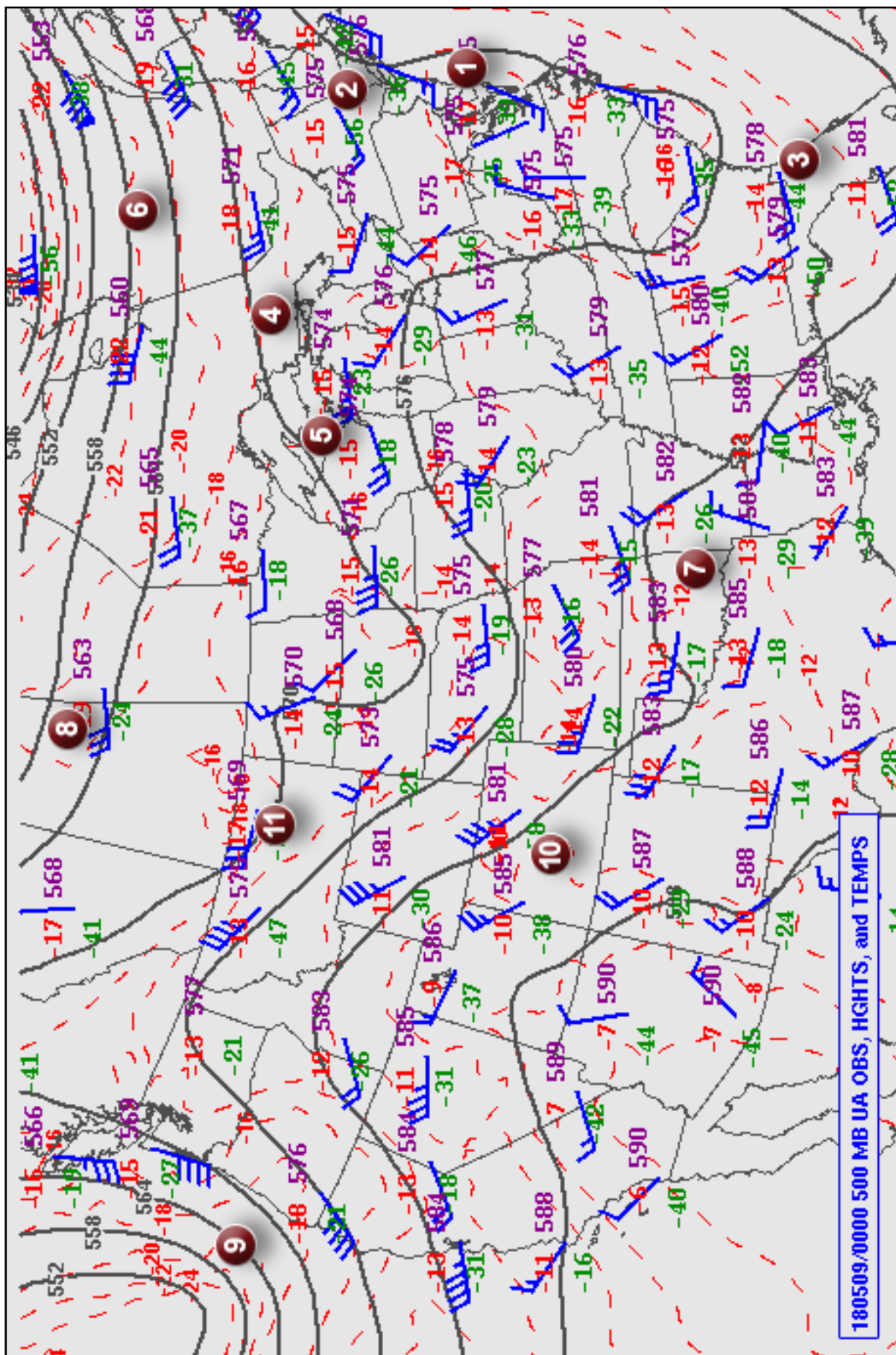


Figure 153. 500 MB Analysis Heights/Temperature Chart.

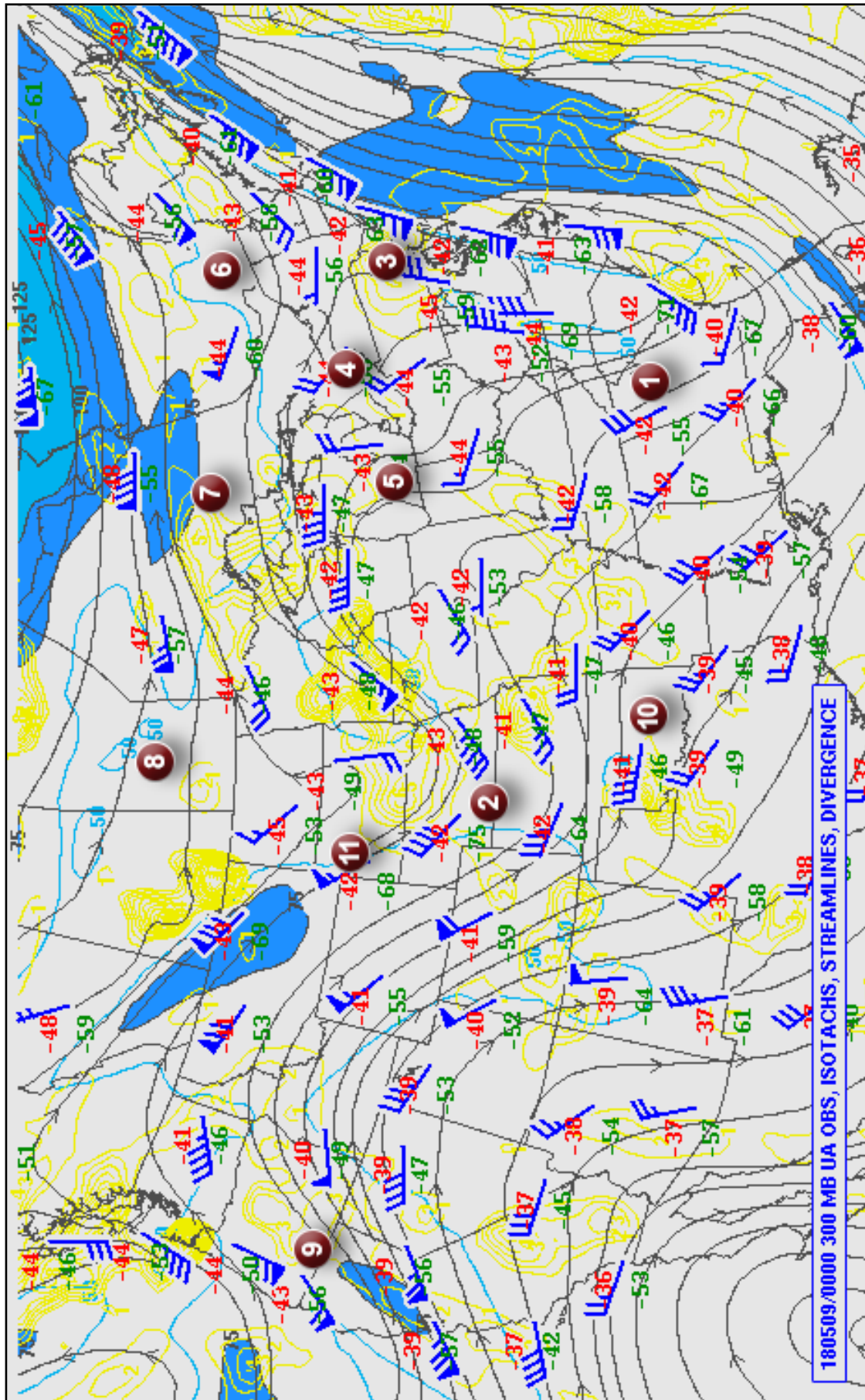


Figure 154. 300 MB Analysis Heights/Isotachs Chart.

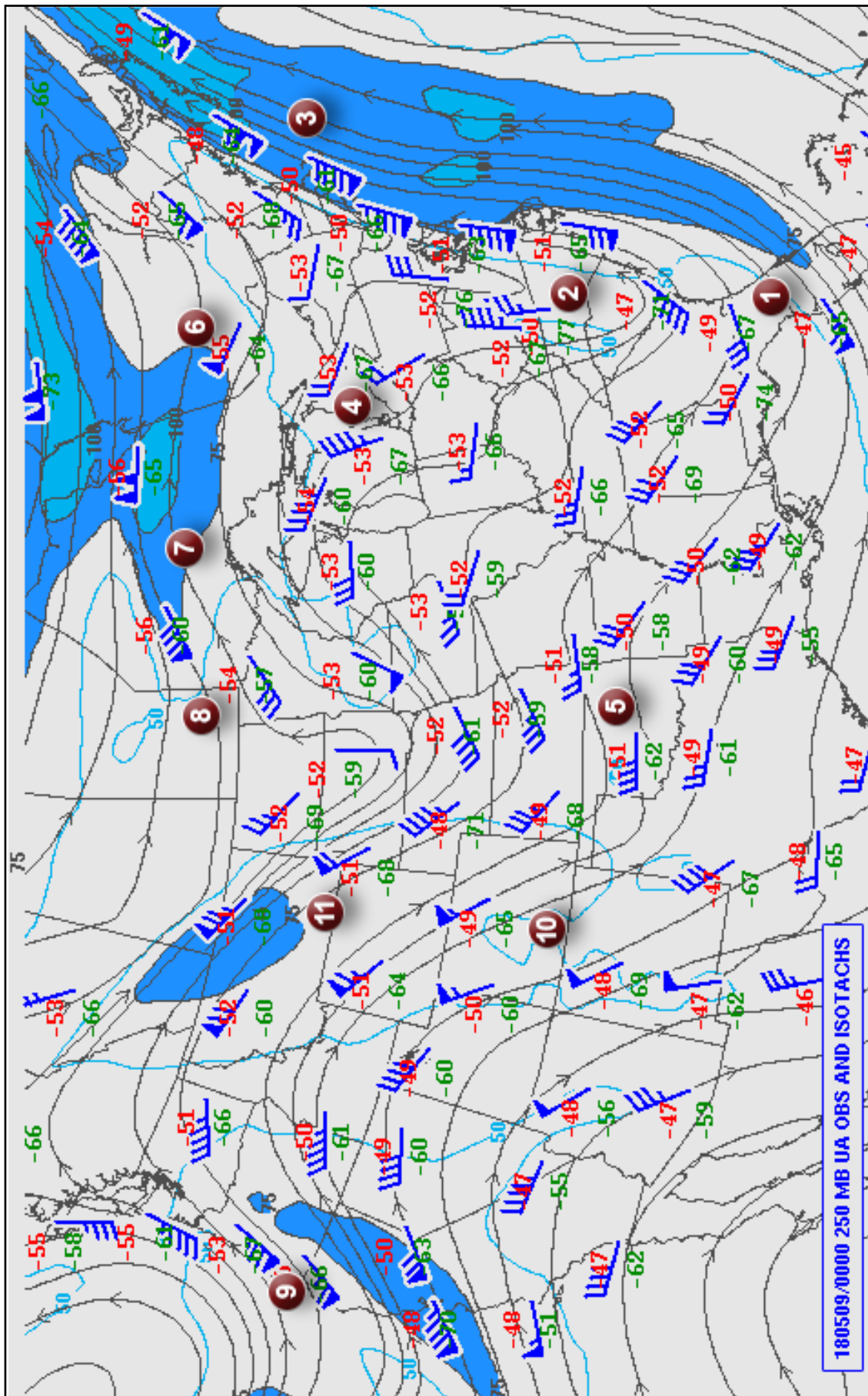


Figure 155. 200 MB Analysis Heights/Isotachs Chart.

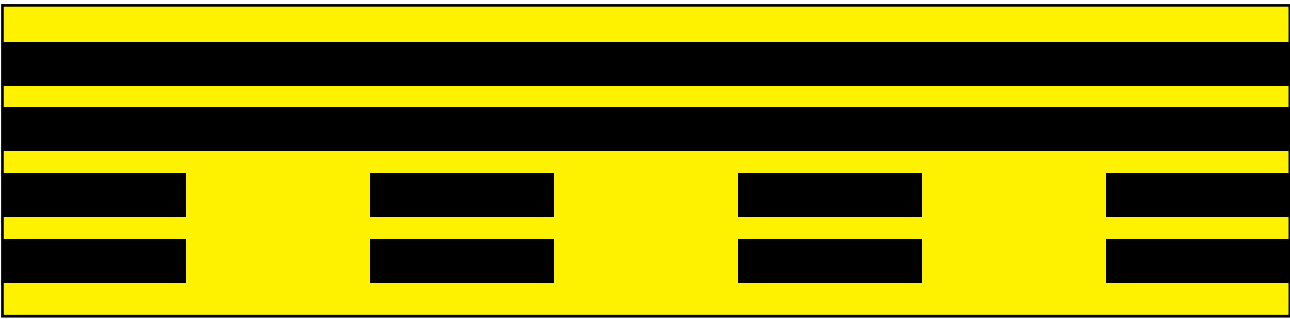


Figure 156. Airport Sign.

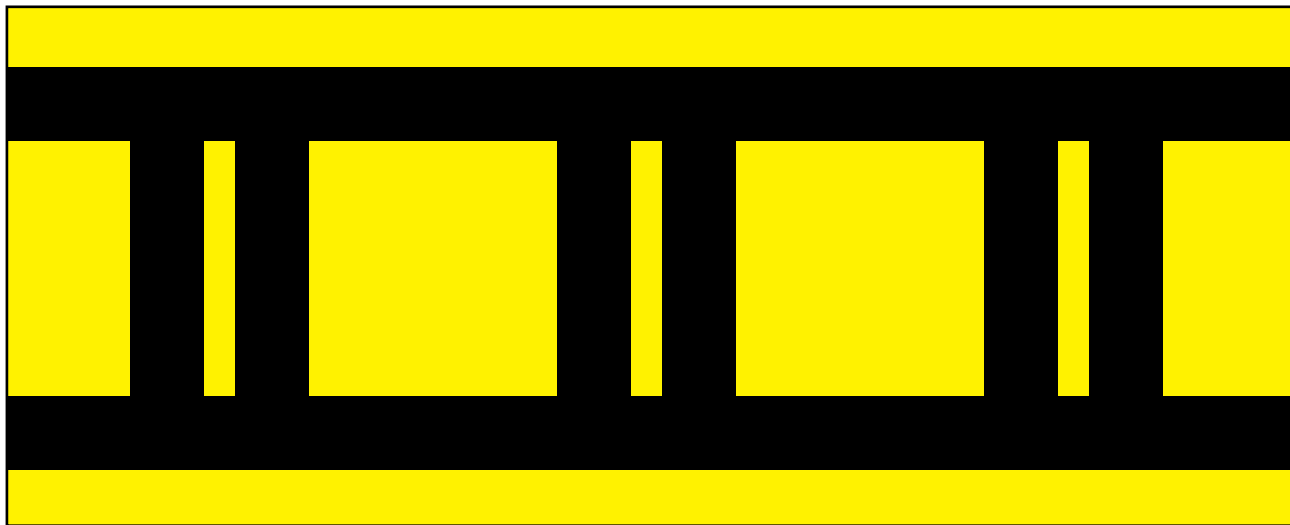


Figure 157. Airport Sign.

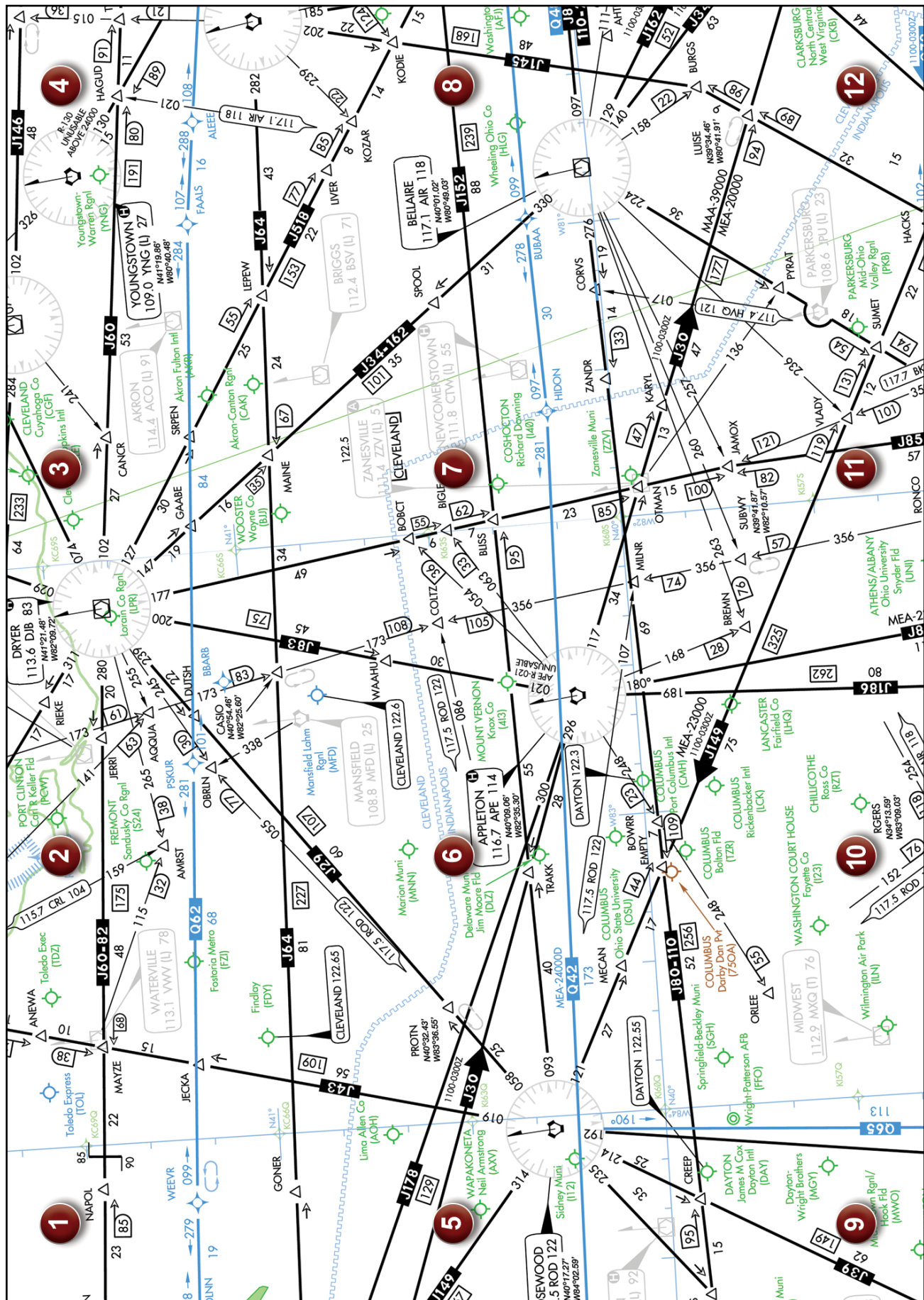


Figure 159. High Altitude Airways.

68

ARIZONA

TUBA CITY (TØ3) 5 W UTC-7 N36°05.56' W111°22.99'

4513 B NOTAM FILE PRC

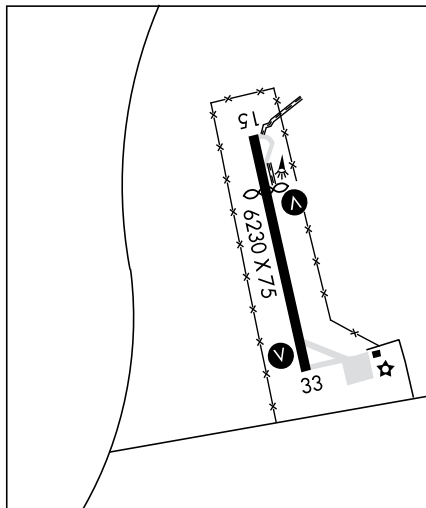
RWY 15-33: H6230X75 (ASPH) S-12.5 MIRL**RWY 15:** VASI(V2L)—GA 3.0° TCH 40'. Thld dspcd 1520'. Hill.**RWY 33:** VASI(V2L)—GA 3.0° TCH 40'.**AIRPORT REMARKS:** Unattended. Rwy 15-33 uneven and rough 1500-2400' from thld of Rwy 15 and cracked. Livestock on airport.

ACTIVATE MIRL Rwy 15-33, VASI Rwy 15 and Rwy 33—CTAF.

AIRPORT MANAGER: 505-371-8327**COMMUNICATIONS:** CTAF 122.9**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. 5045/15E.

LAS VEGAS

H-4J, L-8G



TUCSON

RYAN FLD (RYN)(KRYN) 10 SW UTC-7 N32°08.53' W111°10.48'2419 B S4 **FUEL** 100LL, JET A TPA—3219(800) NOTAM FILE PRC**RWY 06R-24L:** H5503X75 (ASPH) S-12.5, D-30 MIRL**RWY 06R:** REIL. Brush.**RWY 24L:** VASI(V4L)—GA 3.0° TCH 26'. Brush.**RWY 06L-24R:** H4900X75 (ASPH) S-12.5, D-30**RWY 06L:** Tree.**RWY 15-33:** H4000X75 (ASPH) 0.8% up S**RWY 33:** Brush.**AIRPORT REMARKS:** Attended Mon-Fri 1500-0000Z, Sat 1500-2200Z. After hrs, Jet A avbl as an on-call svc, and a \$100 fee applies. Prior arrangements can be made by calling 520-744-7474, self serve 100LL avbl 24 hrs with major credit card. Rwy 15-33 CLOSED between SS-SR. Frequent practice of ILS approaches to Rwy 06R. Rwy 06R and Rwy 06L preferential rwy up to 10 knot tailwind. Afternoon winds usually favor Rwy 24L and Rwy 24R. Use landing lights in pattern. When twr clsd ACTIVATE MIRL Rwy 06R-24L—CTAF. VASI Rwy 24L opr continuously. REIL Rwy 06R opr dalgt hrs only. Note: See Special Notices—Glider Operations Northwest of Tucson, Arizona.**AIRPORT MANAGER:** 520-573-8182**WEATHER DATA SOURCES:** AWOS-3 133.35 (520) 578-0269.**COMMUNICATIONS:** CTAF 125.8Ⓡ **TUCSON APP/DEP CON** 128.5**TOWER** 125.8 (1300-0300Z) **GND CON** 118.2**AIRSPACE:** CLASS D svc 1300-0300Z other times CLASS E.**RADIO AIDS TO NAVIGATION:** NOTAM FILE TUS.**TUCSON (H) VORTACW** 116.0 TUS Chan 107 N32°05.71' W110°54.89' 270° 13.5 NM to fld. 2671/12E.**HIWAS.**

VORTAC unusable:

050°-080° byd 30 NM blo 11,500'

350°-020° byd 30 NM blo 13,000'

DME unusable:

155°-165° byd 35 NM blo 13,000'

NDB (HW) 338 RYN N32°08.33' W111°09.69' at fld. NOTAM FILE PRC. NDB unmonitored.

NDB unusable:

025°-050° byd 25 NM blo 14,500'

ILS/DME 111.1 I-IVI Chan 48 Rwy 06R. Unmonitored when ATCT clsd.

PHOENIX

H-4J, L-5C

IAP, AD

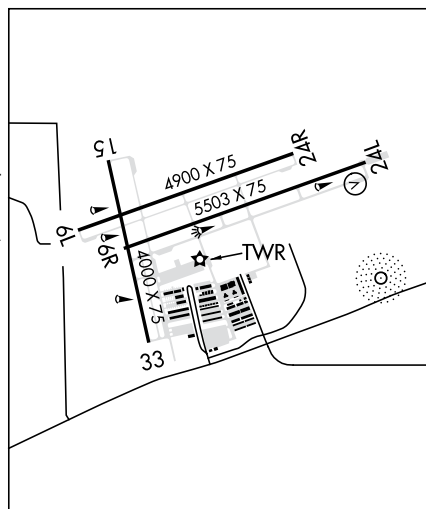


Figure 163A. Excerpt from Chart Supplement.

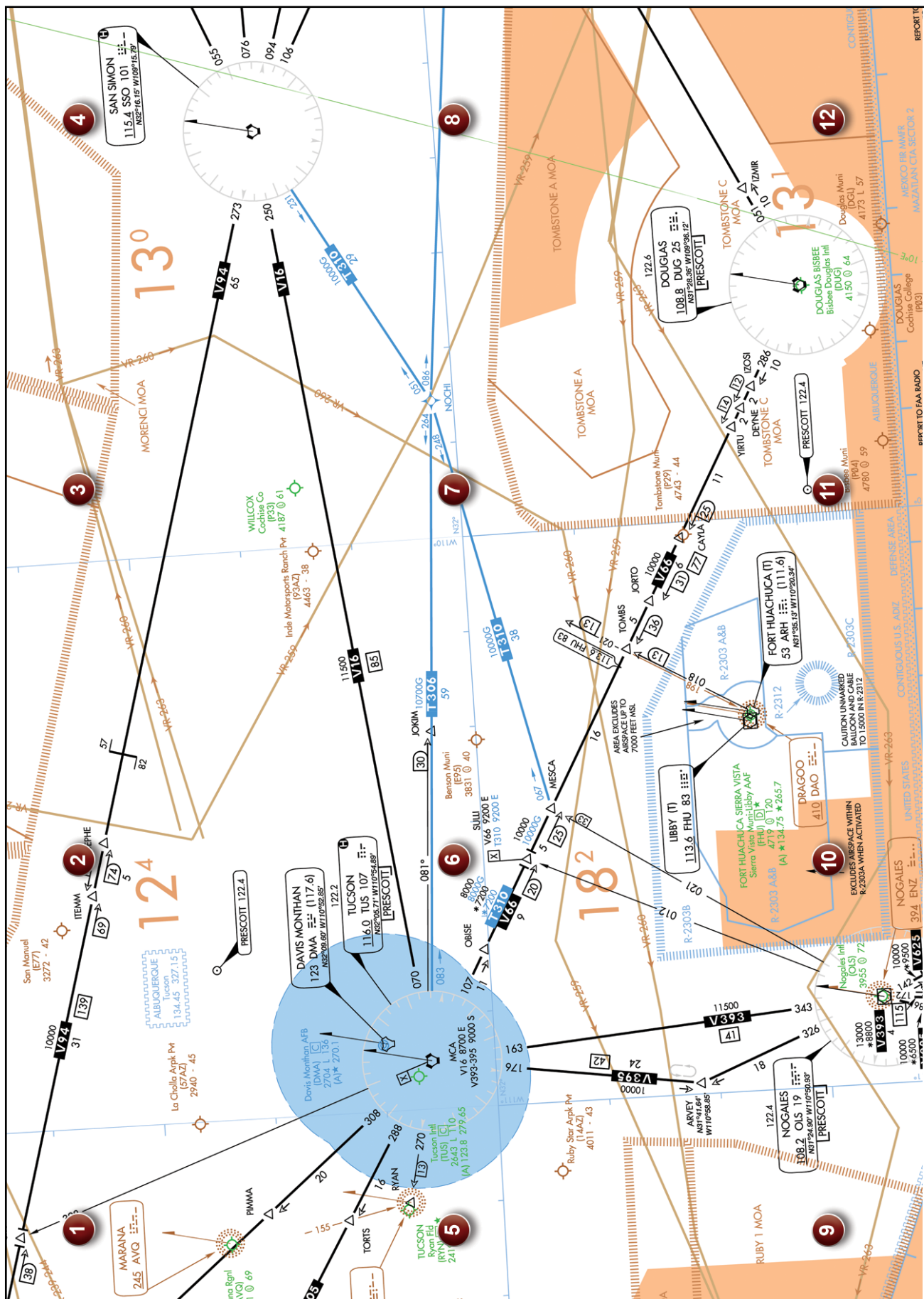


Figure 164. Low Altitude Airways.

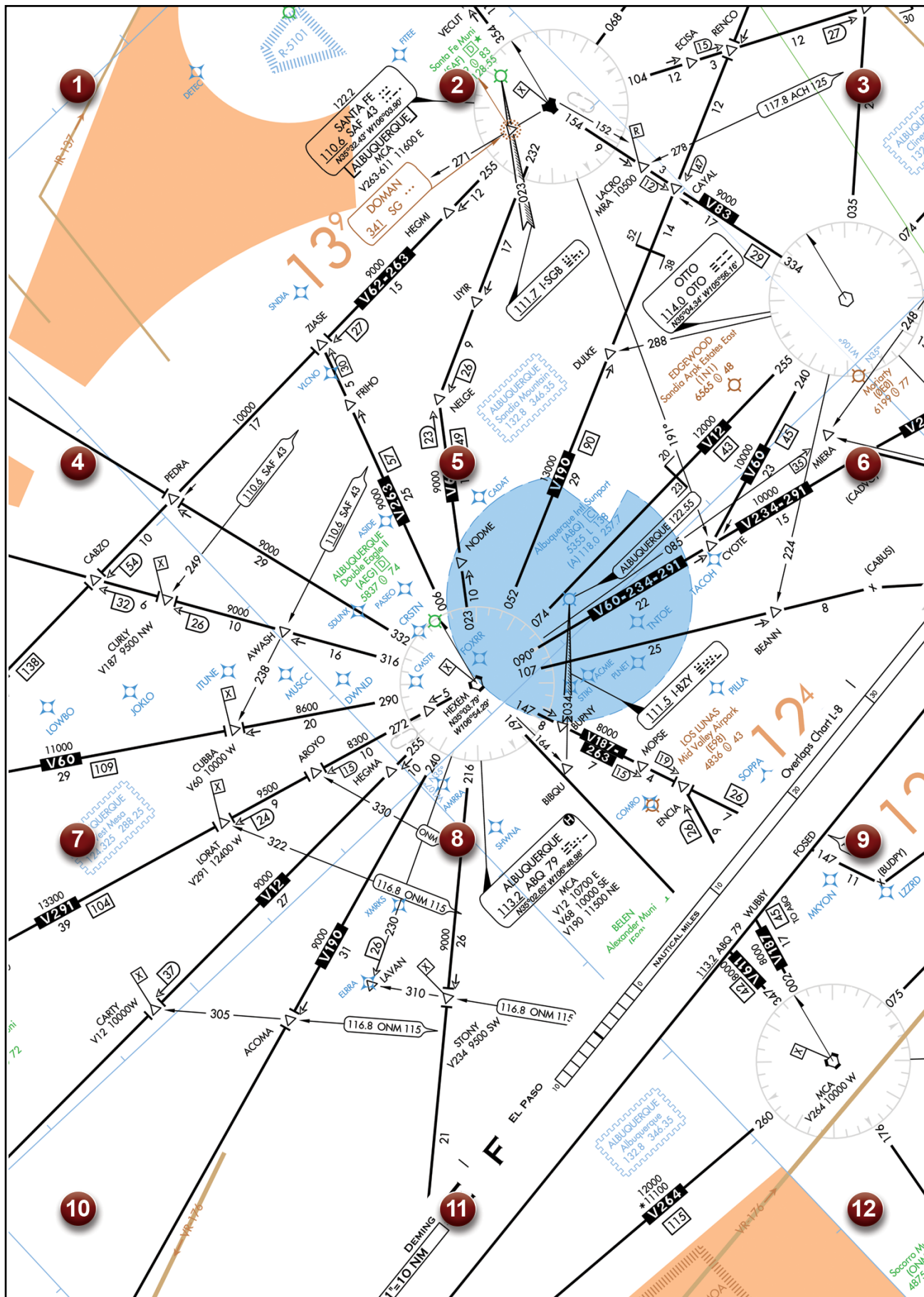


Figure 165. Low Altitude Airways.

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NEW MEXICO

ALBUQUERQUE

ALBUQUERQUE INTL SUNPORT (ABQ)(KABQ) 3 SE UTC-7(-6DT) N35°02.34' W106°36.50'

ALBUQUERQUE

5355 B S4 FUEL 100LL, JET A, A1, A1+ OX 1, 2, 3, 4 LRA ARFF Index—See Remarks

H-4L, L-8I

NOTAM FILE ABQ

IAP, AD

RWY 08-26: H13793X150 (CONC-GRVD) S-100, D-210, 2S-175,
2D-360, 2D/2D2-720 HIRL CL

RWY 08: MALSR. TDZL. VASI(V6L)—GA 2.95° TCH 54'. Thld dsplcd
1000'. Rgt tfc.

RWY 26: REIL. PAPI(P4L)—GA 3.0° TCH 83'. 0.5% down.

RWY 03-21: H10000X150 (CONC-GRVD) S-100, D-210, 2S-175,
2D-360, 2D/2D2-720 HIRL CL

RWY 03: MALSR. TDZL. REIL. PAPI(P4L)—GA 3.0° TCH 62'. Rgt tfc.

RWY 21: REIL. PAPI(P4L).

RWY 12-30: H6000X150 (CONC-GRVD) S-65, D-120, 2S-155,
2D-155 MIRL

RWY 12: Rgt tfc.

RWY 30: REIL. PAPI(P4L)—GA 3.0° TCH 40'.

RUNWAY DECLARED DISTANCE INFORMATION

RWY 03: TORA-10000 TODA-10000 ASDA-10000 LDA-10000

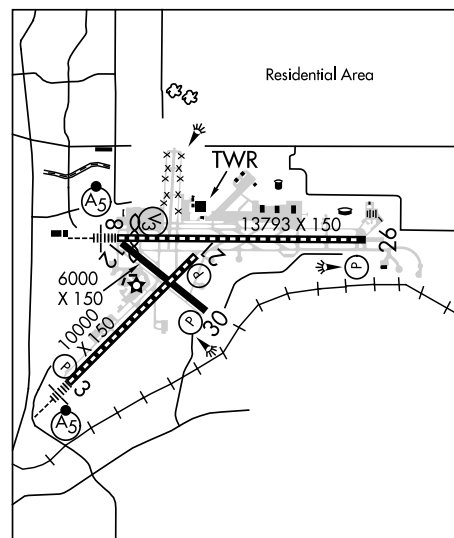
RWY 08: TORA-13793 TODA-13793 ASDA-13793 LDA-12793

RWY 12: TORA-6000 TODA-6000 ASDA-6000 LDA-6000

RWY 21: TORA-10000 TODA-10000 ASDA-10000 LDA-10000

RWY 26: TORA-13793 TODA-13793 ASDA-13793 LDA-13793

RWY 30: TORA-6000 TODA-6000 ASDA-6000 LDA-6000



AIRPORT REMARKS: Attended continuously. Bird hazard Oct-Dec, and Mar-May. Heavy student copter tfc, ctl firing area south of arpt. Departures on Rwy 03 are rstd and rqr prior coordination. Rwy 03 and Rwy 08 touchdown rwy visual range avbl. Rwy 08-26, Rwy 03-21 and Rwy 12-30 grooved 130' wide. Use extreme care taxiing north on Twy E-1 to Rwy 08, holding position for Rwy 08-26 collocated with Rwy 12-30 holding position prior to Rwy 12 thld. Ramp north of Rwy 08-26 clsd to helicopters and general aviation acft. Class I, ARFF Index C. ARFF protection provided by USAF. Fighter acft depart south only. Air carrier ground handling not avbl btn the hrs of 0800-1130Z†. Twy D north of Twy B clsd indef. Twy H military use only. Flight Notification Service (ADCUS) available. NOTE: See Special Notices—Continuous Power Facilities.

AIRPORT MANAGER: 505-244-7778

WEATHER DATA SOURCES: ASOS (505) 242-4044 HIWAS 113.2 ABQ. LLWAS. WSP.

COMMUNICATIONS: D-ATIS 118.0 505-856-4928 UNICOM 122.95

RCO 122.55 (ALBUQUERQUE RADIO)

Ⓡ APP CON 123.9 (S of V12) 127.4 (on or N of V12) 126.3

Ⓡ DEP CON 127.4 (on or N of V12) 123.9 (S of V12)

TOWER 120.3 123.775 GND CON 121.9 CLNC DEL 119.2

AIRSPACE: CLASS C svc ctc APP CON

VOR TEST FACILITY (VOT) 111.0

RADIO AIDS TO NAVIGATION: NOTAM FILE ABQ.

(H) VORTACW 113.2 ABQ Chan 79 N35°02.63' W106°48.98' 079° 10.3 NM to fld. 5749/13E. HIWAS.

TACAN AZIMUTH unusable:

040°-055° byd 30 NM blo 15,000'

ILS 111.5 I-BZY Rwy 03. Class IE.

ILS/DME 111.9 I-SPT Chan 56 Rwy 08. Class IE.

ASR

Figure 166A. Excerpt from Chart Supplement.

NEW MEXICO

295

DOUBLE EAGLE II (AEG)(KAEG) 7 NW UTC-7(-6DT) N35°08.71' W106°47.71'

ALBUQUERQUE

5837 B S4 **FUEL** 100LL, JET A, A1 OX 3 NOTAM FILE AEG

H-4K, L-8I

RWY 04-22: H7398X100 (ASPH-PFC) S-30 MIRL 0.4% up SW

IAP, AD

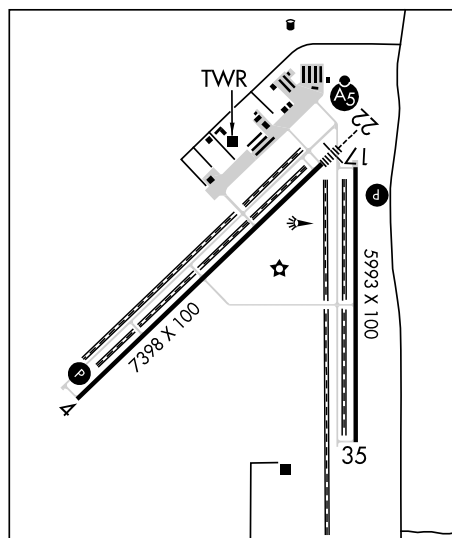
RWY 04: PAPI(P4L)—GA 3.0° TCH 44'.**RWY 22:** MALSR. Rgt tfc.**RWY 17-35:** H5993X100 (ASPH-PFC) S-30 MIRL**RWY 17:** REIL. PAPI(P4L)—GA 3.0° TCH 44'.**RWY 35:** REIL. Rgt tfc.

AIRPORT REMARKS: Attended 1300-0100Z†. 100LL avbl 24 hrs self svc with major credit card. For attendant after hrs call 505-884-4530. Wildlife on and invof arpt. Twy A clsd between Twy A1 and Twy B 0500-1300Z†. Twy B1 and Twy B between main ramp and Twy B2 clsd 0500-1300Z†. When twr clsd ACTIVATE MIRL Rwy 04-22 and Rwy 17-35, REIL Rwy 17 and Rwy 35, MALSR Rwy 22, PAPI Rwy 04 and Rwy 17—CTAF.

AIRPORT MANAGER: 505-244-7888**WEATHER DATA SOURCES:** AWOS-3PT 119.025 (505) 842-2009.**COMMUNICATIONS:** CTAF 120.15Ⓡ **ALBUQUERQUE APP/DEP CON** 127.4**TOWER** 120.15 (1300-0500Z†) **GND CON** 121.625**CLNC DEL** 124.8 (when twr clsd)**AIRSPACE:** CLASS D svc airport 1300-0500Z† other times CLASS G.**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. 5749/13E. HIWAS.

TACAN AZIMUTH unusable:

040°-055° byd 30 NM blo 15,000'

DUDLE NDB (LOM) 351 AE N35°13.04' W106°42.77' 212° 5.9 NM to fld. LOM unmonitored.**ILS** 110.1 I-AEG Rwy 22. LOM DUDLE NDB. Unmonitored when ATCT clsd. LOM unmonitored.**ALEXANDER MUNI** (See BELEN on page 297)**ANGEL FIRE** (AXX)(KAXX) 1 N UTC-7(-6DT) N36°25.32' W105°17.39'

DENVER

8380 B **FUEL** 100LL, JET A NOTAM FILE ABQ

H-4L, 6F, L-8J

RWY 17-35: H8900X100 (ASPH) S-30, D-45 MIRL

IAP

RWY 17: PVASI(PSIL). Ground. 0.6% up.**RWY 35:** Road.

AIRPORT REMARKS: Attended 1500-0000Z†. Arpt located in mountain valley, rising terrain in all directions. Strong gusty crosswinds possible. High density altitude probable. Deer and elk invof arpt. 6-8 inch drop offs east side of rwy. Avoid overflight of Taos Pueblo World Heritage site west of arpt. ACTIVATE rotating bcn, MIRL Rwy 17-35—CTAF.

AIRPORT MANAGER: 575-643-8066**WEATHER DATA SOURCES:** AWOS-3 118.025 (575) 377-0526.**COMMUNICATIONS:** CTAF/UNICOM 122.8**ALBUQUERQUE CENTER APP/DEP CON** 132.8**RADIO AIDS TO NAVIGATION:** NOTAM FILE SKX.**TAOS (L) VORTAC** 117.6 TAS Chan 123 N36°36.53' W105°54.38' 097° 31.8 NM to fld. 7860/13E.

DME portion unusable:

020°-100° byd 30 NM blo 18,000'

260°-330° byd 30 NM blo 17,000'

ANTON CHICO N35°06.70' W105°02.40' NOTAM FILE ABQ.

ALBUQUERQUE

(H) VORTAC 117.8 ACH Chan 125 106° 22.2 NM to Santa Rosa Route 66. 5450/12E.

H-4L, 6F, L-8J

TACAN AZM unusable:

Wi 20 NM blo 20,000'

RCO 122.1R 117.8T (ALBUQUERQUE RADIO)

Figure 167A. Excerpt from Chart Supplement.



TAKEOFF MINIMUMS AND (OBSTACLE) DEPARTURE PROCEDURES

14205

CENTRALIA, IL

CENTRALIA MUNI (ENL)
AMDT 2 12152 (FAA)

NOTE: **Rwy 9**, trees beginning 208' from DER, 494' right of centerline, up to 100' AGL/624' MSL. Trees beginning 528' from DER, 653' left of centerline, up to 100' AGL/624' MSL. **Rwy 18**, trees beginning 60' from DER, 265' left of centerline, up to 100' AGL/562' MSL. Trees beginning 77' from DER, 207' right of centerline, up to 100' AGL/603' MSL. Silo 1115' from DER, 755' right of centerline, 73' AGL/608' MSL. **Rwy 27**, trees beginning 1169' from DER, 493' left of centerline, up to 100' AGL/624' MSL. Trees beginning 1793' from DER, 377' right of centerline, up to 100' AGL/619' MSL. **Rwy 36**, trees and poles beginning 37' from DER, 5' right of centerline, up to 100' AGL/604' MSL. Trees, poles, and buildings beginning 203' from DER, 363' left of centerline, up to 100' AGL/610' MSL.

CHAMPAIGN/URBANA, IL

UNIVERSITY OF ILLINOIS-WILLARD (CMI)
ORIG 09015 (FAA)

DEPARTURE PROCEDURE: **Rwy 4**, climb heading 041° to 1300 before turning left.

NOTE: **Rwy 4**, trees beginning 56' from DER, 23' left of centerline, up to 63' AGL/808' MSL. Trees beginning 56' from DER, 89' right of centerline, up to 98' AGL/843' MSL. **Rwy 14R**, rod on obstruction light 520' from DER, 383' left of centerline, 17' AGL/760' MSL. Glide slope 541' from DER, 439' left of centerline, 36' AGL/779' MSL. Rod on obstruction light 543' from DER, 439' left of centerline, 37' AGL/780' MSL. **Rwy 18**, Terrain beginning 2' from DER, from left to right of centerline, up to 0' AGL/749' MSL. **Rwy 32L**, terrain 20' from DER, 152' right of centerline, 0' AGL/752' MSL. Antenna on ASR 1920' from DER, 331' left of centerline, 82' AGL/831' MSL.

CHETEK, WI

CHETEK MUNI-SOUTHWORTH (Y23)
ORIG-A 14065 (FAA)

NOTE: **Rwy 17**, trees beginning 44' from DER, 13' left of centerline, up to 100' AGL/1120' MSL. Vehicle on road 355' from DER, across centerline, 15' AGL/1070' MSL. Multiple poles beginning 338' from DER, 278' left of centerline, up to 29' AGL/1079' MSL. AG equipment beginning 27' from DER, 451' right of centerline, 19' AGL/1073' MSL. Pole 294' from DER, 299' right of centerline, 16' AGL/1070' MSL. Trees beginning 343' from DER, 7' right of centerline, up to 100' AGL/1137' MSL. **Rwy 35**, beacon 79' from DER, 448' left of centerline, 48' AGL/1103' MSL. Multiple buildings beginning 154' from DER, 339' left of centerline, up to 28' AGL/1082' MSL. Multiple poles beginning 881' from DER, 135' left of centerline, up to 34' AGL/1088' MSL. Multiple antennas beginning 1141' from DER, 40' left of centerline, up to 58' AGL/1107' MSL. Trees beginning 324' from DER, 4' left of centerline, up to 100' AGL/1146' MSL. Fence 80' from DER, 145' right of centerline, 6' AGL/1061' MSL. Multiple buildings beginning 144' from DER, 102' right of centerline, up to 22' AGL/1081' MSL. Multiple poles beginning 452' from DER, 14' right of centerline, up to 75' AGL/1088' MSL. Trees beginning 64' from DER, 1' right of centerline, up to 100' AGL/1141' MSL.

14205



TAKEOFF MINIMUMS AND (OBSTACLE) DEPARTURE PROCEDURES

CHICAGO, IL

CHICAGO MIDWAY INTL (MDW)
AMDT 11 14205 (FAA)

DEPARTURE PROCEDURE: **Rwys 4L, 4R**, Climbing right turn to 2400 heading 100° before proceeding on course. **Rwys 13C, 13L, 13R**, Climb heading 138° to 1400 before turning. **Rwys 22L, 22R**, Climb heading 227° to 1400 before turning. **Rwys 31C, 31L, 31R**, Climb heading 318° to 1400 before turning.

NOTE: **Rwy 4L**, fence 18' from DER, 257' left of centerline, 12' AGL/616' MSL. Vehicle on road 143' from DER, 163' left of centerline, 16' AGL/620' MSL. Poles and building beginning 167' from DER, 64' left of centerline, 25' AGL/630' MSL. Rising terrain 10' from DER, 492' right of centerline, 606' MSL. Signs beginning 1596' from DER, left and right of centerline, up to 88' AGL/692' MSL. Light poles, trees, towers and pole beginning 281' from DER, left and right of centerline, up to 75' AGL/679' MSL. **Rwy 4R**, navaid 300' from DER, on centerline, 9' AGL/614' MSL. Blast fence 278' from DER, 44' left of centerline, 9' AGL/613' MSL. Tower 3984' from DER, 1142' left of centerline, 109' AGL/708' MSL. Tramway 1491' from DER, 571' right of centerline, 48' AGL/654' MSL. Fence and wall beginning 249' from DER, left and right of centerline, up to 13' AGL/616' MSL. Light poles, transmission line towers and poles beginning 40' from DER, left and right of centerline, up to 39' AGL/644' MSL. Trees and sign beginning 905' from DER, 416' left of centerline, up to 75' AGL/679' MSL. Trees and flagpole beginning 921' from DER, 67' right of centerline, up to 53' AGL/657' MSL. Tower 1823' from DER, 110' right of centerline, 61' AGL/672' MSL. **Rwy 13C**, navaid 249' from DER, on centerline, 9' AGL/619' MSL. Building and trees beginning 37' from DER, 470' right of centerline, up to 27' AGL/641' MSL. Building and blast fence beginning 102' from DER, 51' left of centerline, up to 15' AGL/625' MSL. Light poles, sign and transmission line towers beginning 179' from DER, left and right of centerline, up to 39' AGL/650' MSL. Buildings and trees beginning 271' from DER, 569' left of centerline, up to 70' AGL/680' MSL. Buildings beginning 565' from DER, left and right of centerline, up to 42' AGL/654' MSL. Trees beginning 823' from DER, left and right of centerline, up to 81' AGL/700' MSL. **Rwy 13L**, buildings beginning 665' from DER, left and right of centerline, up to 33' AGL/641' MSL. Fence and wall beginning 178' from DER, 462' left of centerline, up to 15' AGL/622' MSL. Light poles, trees and transmission line towers beginning 362' from DER, left and right of centerline, up to 75' AGL/684' MSL. **Rwy 13R**, wind sock 263' from DER, 256' left of centerline, 11' AGL/621' MSL. Building 80' from DER, 334' right of centerline, 23' AGL/636' MSL. Buildings beginning 459' from DER, 291' right of centerline, up to 50' AGL/663' MSL. Light poles, trees and transmission line towers beginning 978' from DER, 52' right of centerline, up to 53' AGL/692' MSL. **Rwy 22L**, building and light poles beginning 73' from DER, 489' left of centerline, up to 31' AGL/648' MSL. Buildings, light poles, trees and transmission line towers beginning 211' from DER, left and right of centerline, up to 60' AGL/689' MSL. Tank 4100' from DER, 161' right of centerline, 113' AGL/728' MSL. Poles beginning 3991' from DER, 571' left of centerline, up to 107' AGL/743' MSL. **Rwy 22R**, tank 4332' from DER, 763' left of centerline, 113' AGL/728' MSL. Fence and wall beginning 8' from DER, left and right of centerline, up to 13' AGL/630' MSL. Building 946' from DER, 568' left of centerline, 62' AGL/677' MSL. Building, light poles, trees and transmission line towers beginning 84' from DER, left and right of centerline, up to 43' AGL/659' MSL. Trees beginning 1' from DER, 306' right of centerline, up to 52' AGL/669' MSL. Trees beginning 493' from DER, 30' right of centerline, up to 75' AGL/689' MSL.

Figure 170. Takeoff Minimums and (Obstacle) Departure Procedures.



TAKEOFF MINIMUMS AND (OBSTACLE) DEPARTURE PROCEDURES

14205

CHICAGO, IL (CON'T)

CHICAGO MIDWAY INTL (MDW)

AMDT 11 14205 (FAA)

NOTE: **Rwy 31C**, navaid 238' from DER, on centerline, 12' AGL/617' MSL. Navaid 182' from DER, 309' right of centerline, 19' AGL/624' MSL. Tank and water tower beginning 5575' from DER, 1418' right of centerline, 162' AGL/757' MSL. Spire 2213' from DER, 711' left of centerline, 77' AGL/682' MSL. Trees beginning 82' from DER, 107' left of centerline, up to 45' AGL/658' MSL. Trees, poles and building beginning 450' from DER, 37' left of centerline, up to 75' AGL/670' MSL. Trees and transmission line towers beginning 83' from DER, 449' left of centerline, up to 66' AGL/670' MSL. Poles, trees and buildings beginning 141' from DER, 20' right of centerline, up to 39' AGL/647' MSL. Poles and trees beginning 1116' from DER, 12' right of centerline, up to 75' AGL/673' MSL. **Rwy 31L**, rising terrain 15' from DER, 502' right of centerline, 608' MSL. Signs beginning 68' from DER, left and right of centerline, up to 5' AGL/611' MSL. Buildings beginning 338' from DER, 451' left of centerline, up to 53' AGL/661' MSL. Trees and light poles beginning 958' from DER, 36' left of centerline, up to 65' AGL/674' MSL. Trees beginning 1411' from DER, 7' right of centerline, up to 63' AGL/667' MSL. **Rwy 31R**, navaid 614' from DER, 474' left of centerline, 19' AGL/624' MSL. Sign 494' from DER, 190' left of centerline, 23' AGL/638' MSL. Trees, poles and building beginning 16' from DER, 90' right of centerline, up to 34' AGL/638' MSL. Trees, poles and buildings beginning 208' from DER, 18' right of centerline, up to 63' AGL/667' MSL. Trees, poles and buildings beginning 256' from DER, 6' left of centerline, up to 33' AGL/650' MSL. Trees, poles and buildings beginning 574' from DER, 3' left of centerline, up to 60' AGL/664' MSL.

CHICAGO-O'HARE INTL (ORD)

AMDT 19 13290 (FAA)

TAKEOFF MINIMUMS: **Rwy 27L**, std. w/ min. climb of 220' per NM to 1700. **Rwy 27R**, std. w/ min. climb of 228' per NM to 1800. **Rwy 28C**, std. w/ min. climb of 236' per NM to 1700. **Rwy 28R**, std. w/ min. climb of 222' per NM to 1700. **Rwy 32L**, std. w/ min. climb of 240' per NM to 1800.

NOTE: **Rwy 4L**, building 3302' from DER, 1249' right of centerline, 109' AGL/750' MSL. **Rwy 4R**, tree 810' from DER, 611' right of centerline, 36' AGL/675' MSL. Trees beginning 2149' from DER, 834' left of centerline, up to 100' AGL/749' MSL. Parked aircraft on ramp 153' from DER, 329' left of centerline, 80' AGL/735' MSL. **Rwy 9L**, building 2771' from DER, 1234' right of centerline, 94' AGL/745' MSL. **Rwy 9R**, street light 877' from DER, 689' right of centerline, 40' AGL/673' MSL. Tree 3492' from DER, 1054' left of centerline, 100' AGL/744' MSL. **Rwy 10L**, parked aircraft on ramp 33' from DER, 440' left of centerline, 80' AGL/735' MSL. Parked aircraft on ramp 940' from DER, 541' left of centerline, 80' AGL/735' MSL. Towers beginning 2522' from DER, 983' right of centerline, up to 127' AGL/771' MSL. **Rwy 10C**, rod on RTR tower 790' from DER, 38' left of centerline, up to 65' AGL/715' MSL. Antenna beginning 656' from DER, 1' left of centerline, up to 48' AGL/697' MSL. Obstruction light on GS 1170' from DER, 777' left of centerline, up to 45' AGL/694' MSL. **Rwy 14L**, light poles beginning 981' from DER, 745' left of centerline, up to 40' AGL/684' MSL. Parked aircraft on ramp 100' from DER, 363' right of centerline, 80' AGL/729' MSL. Sign 1292' from DER, 724' right of centerline, 37' AGL/682' MSL. **Rwy 14R**, parked aircraft on ramp 1104' from DER, 766' right of centerline, 80' AGL/736' MSL. **Rwy 22R**, parked aircraft on ramp 34' from DER, 430' left of centerline, 80' AGL/736' MSL. **Rwy 27L**, parked aircraft on ramp 70' from DER, 405' left of centerline, 80' AGL/740' MSL. Pole 5584' from DER, 1824' left of centerline, 147' AGL/812' MSL. Parked aircraft on ramp 3627' from DER, 1225' right of centerline, 80' AGL/754' MSL. **Rwy 27R**, obstruction light on tank 1489' from DER, 886' left of centerline, 53' AGL/726' MSL. Elevator 2778' from DER, 1020' left of centerline, 111' AGL/776' MSL. **Rwy 28C**, railroad beginning 90' from DER, 81' left of centerline, 23' AGL/689' MSL. Trees beginning 3525' from DER, 697' left of centerline, up to 100' AGL/771' MSL. Trees beginning 2689' from DER, 126' left of centerline, up to 100' AGL/746' MSL. Trees beginning 2408' from DER, 197' right of centerline, up to 100' AGL/739' MSL. Trees beginning 2372' from DER, 1100' left of centerline, up to 100' AGL/737' MSL. **Rwy 28R**, trees beginning 1717' from DER, 752' left of centerline, up to 100' AGL/789' MSL. **Rwy 32L**, pole 1993' from DER, 791' left of centerline, 49' AGL/716' MSL.

14205



TAKEOFF MINIMUMS AND (OBSTACLE) DEPARTURE PROCEDURES



Figure 170A. Takeoff Minimums and (Obstacle) Departure Procedures.



TAKEOFF MINIMUMS AND (OBSTACLE) DEPARTURE PROCEDURES

14205



CHICAGO, IL (CON'T)

LANSING MUNI (IGQ)

AMDT 5 09183 (FAA)

TAKEOFF MINIMUMS: **Rwy 36**, 300-1¼ or std. w/ min. climb of 322' per NM to 900.

DEPARTURE PROCEDURE: **Rwy 36**, climb heading 002° to 1200 before proceeding on course.

NOTE: **Rwy 9**, poles beginning 1203' from DER, from left to right of centerline, up to 32' AGL/647' MSL.

Building 1882' from DER, 964' left of centerline, 50' AGL/668' MSL. Tower 4314' from DER, 664' left of centerline, 149' AGL/764' MSL. **Rwy 18**, trees beginning 381' from DER, 440' right of centerline, up to 42' AGL/661' MSL. **Rwy 27**, hangar and building beginning 254' from DER, 69' right of centerline, up to 26' AGL/641' MSL. Trees, antennas, antennas on buildings, signs, light poles, and road with vehicles beginning 326' from DER, from left to right of centerline, up to 68' AGL/683' MSL. Tank 575' from DER, 65' left of centerline, 16' AGL/630' MSL. **Rwy 36**, pole 5546' from DER, 1932' right of centerline, 164' AGL/777' MSL.

CHICAGO/AURORA, IL

AURORA MUNI (ARR)

AMDT 1 07298 (FAA)

NOTE: **Rwy 9**, vehicle on road 794' from DER, right and left of centerline, 15' AGL/734' MSL. Multiple trees beginning 4126' from DER, on centerline, 100' AGL/819' MSL. **Rwy 15**, multiple trees, power poles and road beginning 900' from DER, 47' right of centerline, up to 100' AGL/809' MSL. Power pole 1313' from DER, 47' left of centerline, 34' AGL/733' MSL. **Rwy 18**, multiple power poles beginning 1218' from DER, 190' right of centerline, up to 35' AGL/734' MSL. Multiple trees beginning 3646' from DER, on centerline up to 100' AGL/809' MSL. **Rwy 27**, vehicle on road 1020' from DER, right and left of centerline, 15' AGL/734' MSL. **Rwy 33**, multiple trees and road beginning 788' from DER, 238' right of centerline, up to 79' AGL/788' MSL. Road and power pole beginning 577' from DER, 137' left of centerline, up to 38' AGL/747' MSL. **Rwy 36**, tree, pole and fence beginning 31' from DER, 169' left of centerline, up to 35' AGL/734' MSL. Vehicle on road beginning 1099' from DER, right and left of centerline, 15' AGL/734' MSL.

CHICAGO/LAKE IN THE HILLS, IL

LAKE IN THE HILLS (3CK)

ORIG-A 12096 (FAA)

NOTE: **Rwy 8**, road beginning 118' from DER, left/right and on centerline, 15' AGL/901' MSL. Multiple trees beginning 2174' from DER, 294' left of centerline, up to 100' AGL/986' MSL. Multiple trees beginning 3312' from DER, 1023' right of centerline, up to 100' AGL/994' MSL. **Rwy 26**, multiple trees beginning 55' from DER, 288' right of centerline, up to 100' AGL/999' MSL. Multiple trees beginning 299' from DER, 101' left of centerline, up to 100' AGL/959' MSL. Power lines beginning 1714' from DER, 12' right of centerline, up to 36' AGL/937' MSL. Power lines beginning 1879' from DER, 87' left of centerline, up to 52' AGL/952' MSL.

CHICAGO/PROSPECT HEIGHTS/ WHEELING, IL

CHICAGO EXECUTIVE (PWK)

AMDT 3 11125 (FAA)

TAKEOFF MINIMUMS: **Rwy 12**, 300-1½ or std. w/min. climb of 230' per NM to 900. Or alternatively, with standard takeoff minimums and a normal 200' per NM climb gradient, takeoff must occur no later than 1700' prior to DER. **Rwy 30**, 300-1 or std. w/min. climb of 250' per NM to 900, or alternatively, with standard takeoff minimums and a normal 200' per NM climb gradient, takeoff must occur no later than 2000' prior to DER.

NOTE: **Rwy 6**, trees beginning 10' from DER, left and right of centerline, up to 100' AGL/764' MSL. Vehicles on road beginning 102' from DER, left and right of centerline, up to 17' AGL/661' MSL. **Rwy 12**, vehicles on roads beginning 6' from DER, left and right of centerline, up to 17' AGL/661' MSL. Trees beginning 34' from DER, left and right of centerline, up to 100' AGL/764' MSL. Multiple antennas, buildings and poles beginning 164' from DER, right and left of centerline, up to 174' AGL/834' MSL. **Rwy 16**, multiple antennas, buildings, and poles beginning 91' from DER, left and right of centerline, up to 30' AGL/675' MSL. Vehicles on road beginning 288' from DER, left and right of centerline, up to 17' AGL/658' MSL. Trees beginning 442' from DER, left and right of centerline, up to 68' AGL/712' MSL. **Rwy 24**, vehicles on roads beginning 1' from DER, left and right of centerline, up to 17' AGL/666' MSL. Multiple buildings, poles and tower beginning 63' from DER, left and right of centerline, up to 130' AGL/783' MSL. Trees beginning 842' from DER, left and right of centerline, up to 48' AGL/693' MSL. **Rwy 30**, vehicles on road beginning 4' from DER, left and right of centerline, up to 17' AGL/666' MSL. Fence 63' from DER, 24' right of centerline, 12' AGL/652' MSL. Multiple buildings, poles and transmission towers beginning 70' from DER, left and right of centerline, up to 128' AGL/778' MSL. Trees beginning 77' from DER, left and right of centerline, up to 100' AGL/759' MSL. Antenna 5087' from DER, 759' right of centerline, 152' AGL/802' MSL. **Rwy 34**, trees beginning 116' from DER, left and right of centerline, up to 85' AGL/725' MSL. Building 718' from DER, 541' right of centerline, 53' AGL/693' MSL.

14205



TAKEOFF MINIMUMS AND (OBSTACLE) DEPARTURE PROCEDURES



Figure 170B. Takeoff Minimums and (Obstacle) Departure Procedures.



ALTERNATE MINS

M1



INSTRUMENT APPROACH PROCEDURE CHARTS

A IFR ALTERNATE AIRPORT MINIMUMS

Standard alternate minimums for non-precision approaches and approaches with vertical guidance [NDB, VOR, LOC, TACAN, LDA, SDF, VOR/DME, ASR, RNAV (GPS) or RNAV (RNP)] are 800-2. Standard alternate minimums for precision approaches (ILS, PAR, or GLS) are 600-2. 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, absence of weather reporting service, or lack of adequate navigation coverage. Civil pilots see FAR 91. IFR Alternate Minimums: Ceiling and Visibility Minimums not applicable to USA/USN/USAF. Pilots must review the IFR Alternate Minimums Notes for alternate airfield suitability.

NAME ALTERNATE MINIMUMS

ALLENTOWN, PA

LEHIGH VALLEY

INTL (ABE)..... **ILS or LOC Rwy 13¹**
¹Categories A, B, 900-2; Category C, 900-2½;
 Category D, 900-2¾.

ALLENTOWN QUEEN

CITY MUNI (XLL)..... **RNAV (GPS) Rwy 7**
VOR-B¹

¹NA when local weather not available
 Categories A, B, 900-2; Category C, 900-2½.

.TOONA, PA

.TOONA-BLAIR

OUNTY (AOO)..... **ILS or LOC Rwy 21¹²**
RNAV (GPS) Rwy 3⁵
RNAV (GPS) Rwy 21¹³
RNAV (GPS) Y Rwy 3¹³
RNAV (GPS) Z Rwy 3¹
VOR-A1¹⁴

NA when local weather not available.
 ILS, Categories A, B, 800-2; Category C, 1300-3; Category D, 1400-3; LOC, Category C, 1300-3; Category D, 1400-3.
³Category D, 1200-3.
⁴Categories A, B, 1000-2; Category C, 1000-2¾; Category D, 1200-3.
⁵Categories A, B, 900-2; Category C, 900-2½, Category D, 1200-3.

NAME ALTERNATE MINIMUMS

BECKLEY, WV

RALEIGH COUNTY

MEMORIAL (BKW)..... **ILS or LOC Rwy 19¹²**
RNAV (GPS) Rwy 1¹³
RNAV (GPS) Rwy 10¹³
RNAV (GPS) Rwy 19¹³
RNAV (GPS) Rwy 28¹⁴
VOR Rwy 10¹³
VOR Rwy 19¹³

¹NA when local weather not available.
²ILS, Categories A, B, C, 700-2; Category D, 700-2¾. LOC, Category D, 800-2¼.
³Category D, 800-2¼.
⁴Categories A, B, 900-2; Category C, 900-2½; Category D, 900-2¾.

BLUEFIELD, WV

MERCER

COUNTY (BLF)..... **ILS or LOC Rwy 23¹**
RNAV (GPS) Rwy 5²
RNAV (GPS) Rwy 23³
VOR/DME Rwy 23²
VOR Rwy 23⁴

NA when local weather not available.
¹ILS, Categories A, B, 700-2; Category C, 800-2; Category D, 800-2¾. LOC, Category D, 800-2¼.
²Category D, 800-2¼.
³Category C, 800-2¼; Category D, 800-2½.
⁴Categories A, B, 1000-2; Category C, 1000-2¾; Category D, 1000-3.

BRADFORD, PA

BRADFORD

RGNL (BFD)..... **ILS or LOC Rwy 32**
RNAV (GPS) Rwy 14
RNAV (GPS) Rwy 32
VOR Rwy 14¹
VOR/DME Rwy 14

NA when local weather not available.
¹Category C, 800-2½; Category D, 800-2¾.



ALTERNATE MINS

NE-4



Figure 173. IFR Alternate Airport Minimums.

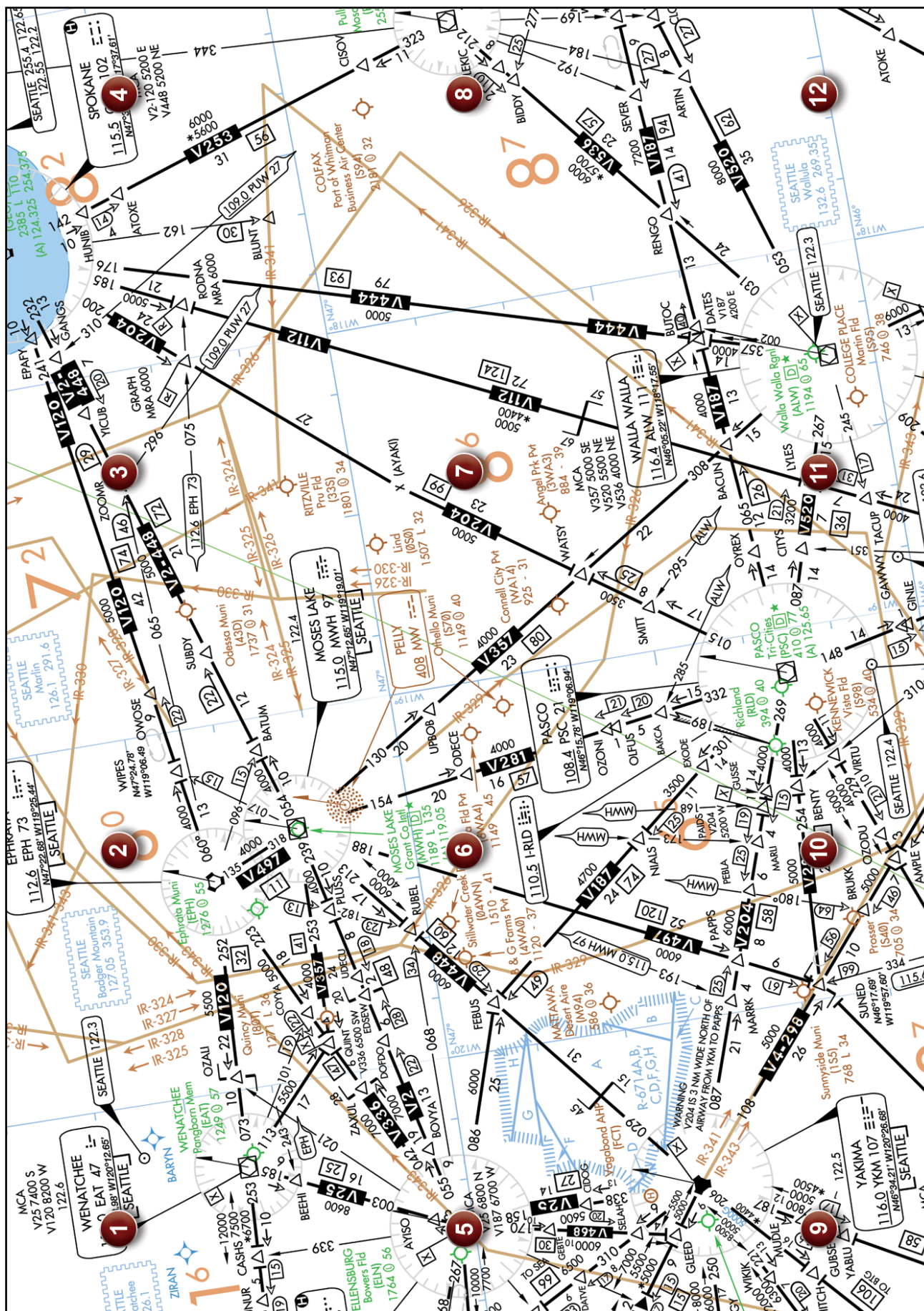


Figure 175. Low Altitude Airways.

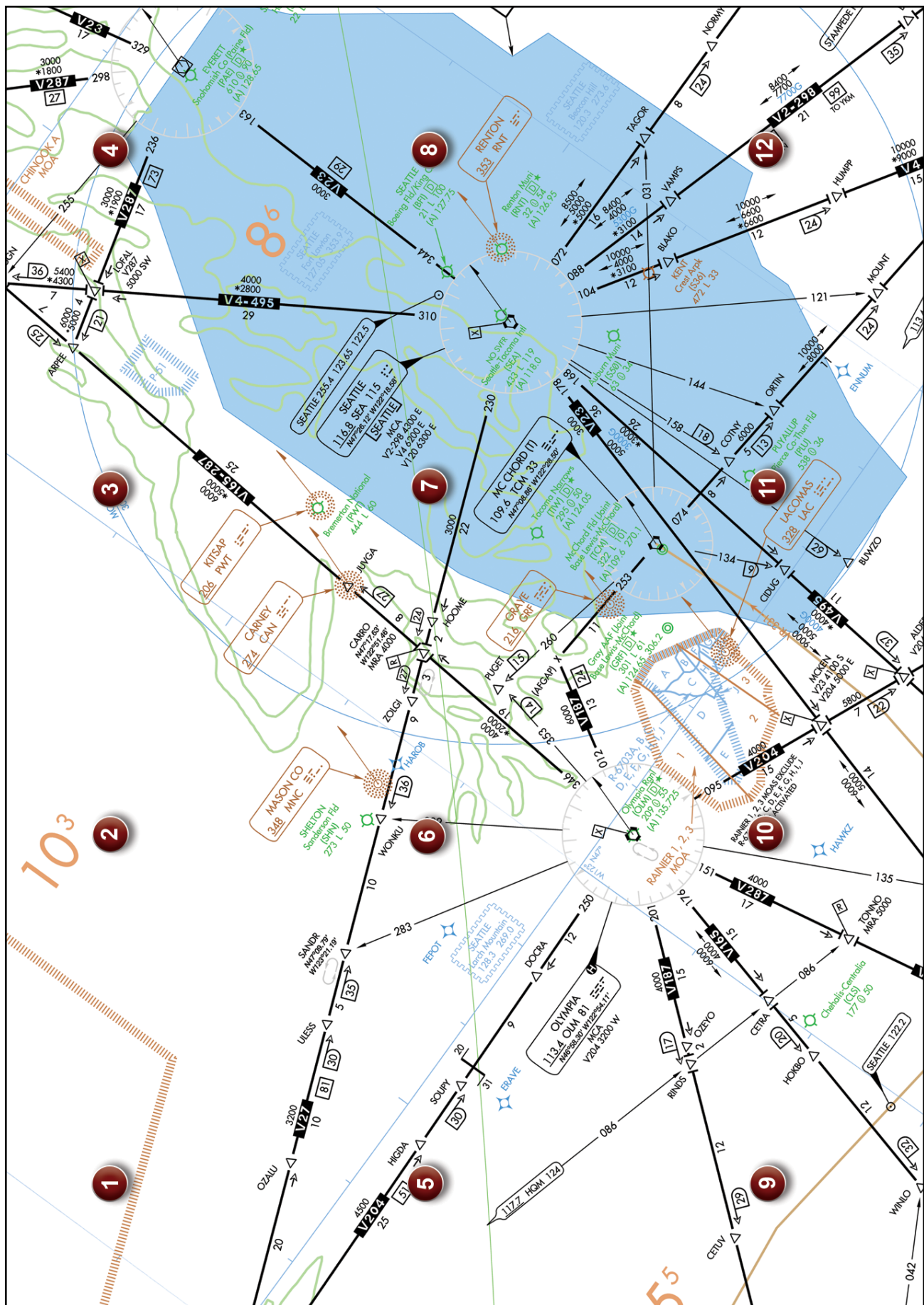


Figure 176. Low Altitude Airways.

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WASHINGTON

HOQUIAM

BOWERMAN (HQM)(KHQM) 2 W UTC-8(-7DT) N46°58.27' W123°56.19'

SEATTLE
H-1B, L-1D
IAP

18 B FUEL 100LL, JET A LRA NOTAM FILE HQM

RWY 06-24: H5000X150 (ASPH) S-30, D-40, 2D-80 HIRL

RWY 06: REIL. PAPI(P4R)—GA 3.0° TCH 40'. Rgt tfc.

RWY 24: MALSR. PAPI(P4L)—GA 3.5° TCH 55'.

AIRPORT REMARKS: Unattended. 100LL avbl 24 hrs a day with a major credit card. For Jet A call 360-593-0949 24 hrs a day. Flocks of waterfowl on and invof arpt. 103' crane 0.2 NM southwest of AER 24. Svc road south of rwy in primary sfc. Ultralights prohibited without written permission from arpt mgr. ACTIVATE HIRL Rwy 06-24, MALSR Rwy 24 and REIL Rwy 06—CTAF.

AIRPORT MANAGER: 360-533-9544

WEATHER DATA SOURCES: ASOS 135.775 (360) 538-7021. HIWAS 117.7 HQM.

COMMUNICATIONS: CTAF/UNICOM 122.7

HOQUIAM RCO 122.2 (SEATTLE RADIO)

SEATTLE CENTER APP/DEP CON 128.3

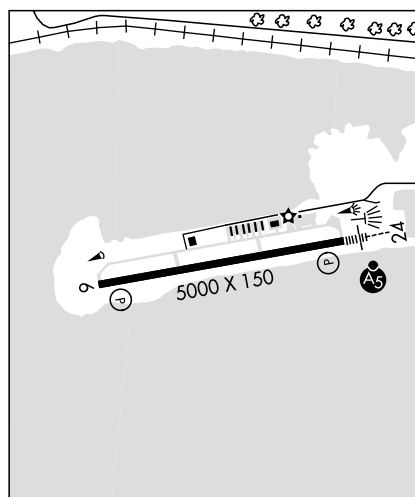
AIRSPACE: CLASS E svc 1400-0600Z± other times CLASS G.

RADIO AIDS TO NAVIGATION: NOTAM FILE HQM.

HOQUIAM (H) VORTACW 117.7 HQM Chan 124 N46°56.82'

W124°08.96' 062° 8.9 NM to fld. 10/19E. HIWAS.

ILS/DME 108.7 I-HQM Chan 24 Rwy 24. Class IT.



HOSKINS FLD (See OLYMPIA on page 188)

ILWACO

PORT OF ILWACO (7W1) 2 E UTC-8(-7DT) N46°18.89' W124°00.23'

SEATTLE

13 B NOTAM FILE SEA

RWY 10-28: H2080X50 (ASPH) S-5 MIRL

RWY 10: Trees.

RWY 28: PAPI(P2L)—GA 4.0°. Thld dsplcd 300'. Trees.

AIRPORT REMARKS: Unattended. Rwy 10-28 markings faded. ACTIVATE MIRL Rwy 10-28—CTAF.

AIRPORT MANAGER: 360-642-3143

COMMUNICATIONS: CTAF 122.9

IONE MUNI (S23) 2 S UTC-8(-7DT) N48°42.48' W117°24.78'

SEATTLE
L-13B

2108 B NOTAM FILE SEA

RWY 15-33: H4059X45 (ASPH) MIRL

RWY 15: Fence.

AIRPORT REMARKS: Unattended. Wildlife invof rwy.

AIRPORT MANAGER: 509-442-3416

COMMUNICATIONS: CTAF 122.9

RADIO AIDS TO NAVIGATION: NOTAM FILE GEG.

SPOKANE (H) VORTACW 115.5 GEG Chan 102 N47°33.90' W117°37.61' 346° 69.2 NM to fld. 2756/21E.

HIWAS.

VOR portion unusable:

300°-330° byd 30 NM blo 9,000'

335°-360° byd 18 NM blo 7,000'

335°-360° byd 25 NM

360°-015° byd 26 NM blo 7,000'

NDB (MHW) 379 ION N48°42.61' W117°24.81' at fld. NOTAM FILE SEA. VFR only.

• • • • •

HELIPAD H1: H60X60 (CONC) MIRL

JEFFERSON CO INTL (See PORT TOWNSEND on page 192)

JOINT BASE LEWIS-MCCHORD (See MCCHORD FLD (JOINT BASE LEWIS-MCCHORD) on page 183)

JUMP-OFF-JOE N46°06.24' W119°07.92'

SEATTLE
L-13A

RCO 122.4 (SEATTLE RADIO)

Figure 177. Excerpt from Chart Supplement.

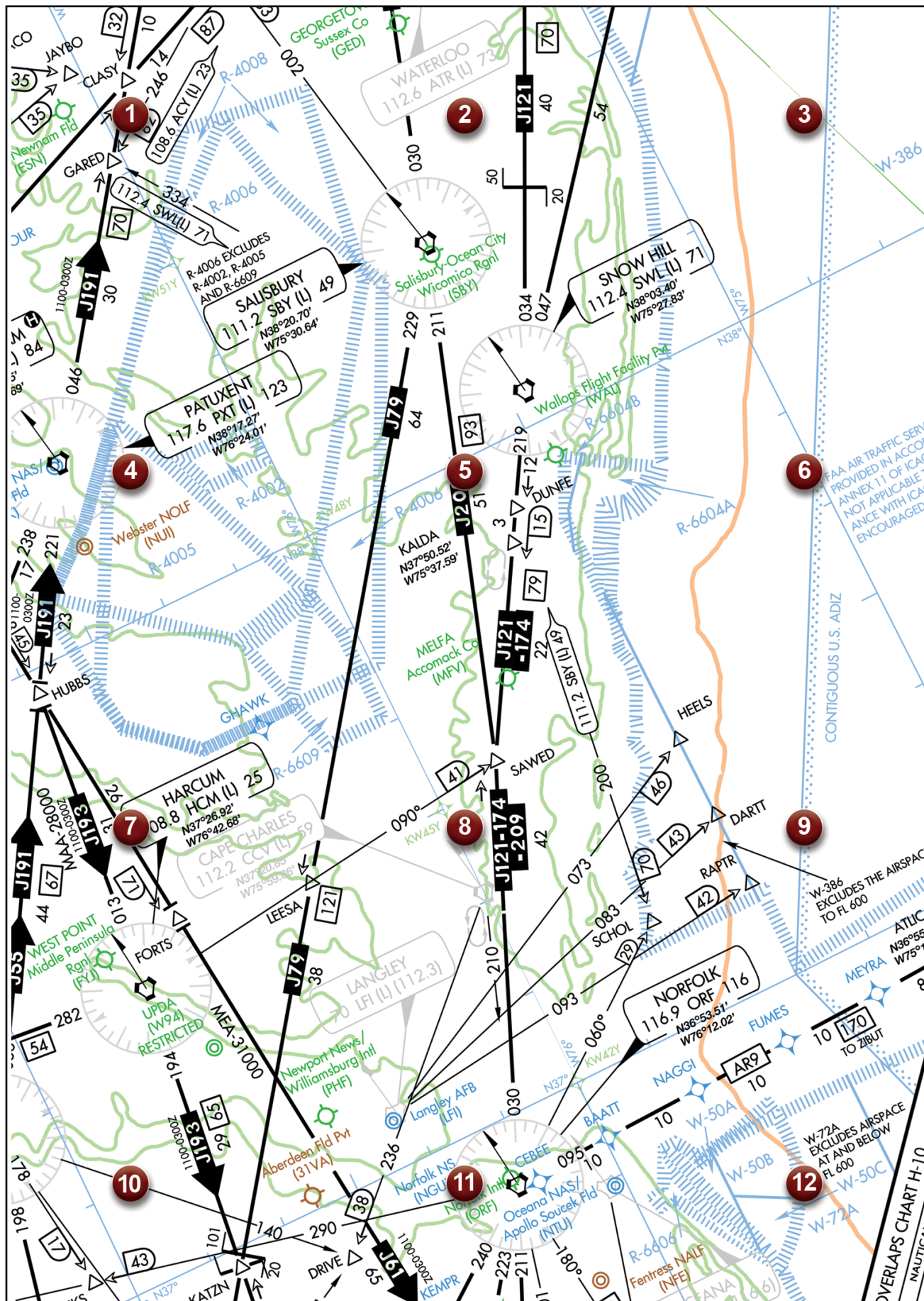


Figure 181. High Altitude Airways.

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NEVADA

CONTINUED FROM PRECEDING PAGE

AIRPORT REMARKS: Attended continuously. Large numbers of birds and bats invof arpt btn SS-SR. Lgtd golf range 1400' south of Rwy 01R-19L and Rwy 01L-19R. Extensive glider/soaring ops weekends and hol, SR-SS, LAS 187/020, alts up to but not including FL 180. Gliders remain clear of the terminal ctl area but otherwise opr within the entire southwest quadrant of the terminal ctl area Veil. Acft may experience reflection of sun from glass hotels lctd northwest of arpt. Reflection may occur at various alts, headings and distances from arpt. Numerous helicopter ops on west side of arpt. Rwy 01L-19R 496,000 lbs GWT for L-1011, 555,000 lbs GWT for DC-10, 602,500 lbs GWT for MD-11. Acft using full length departure on Rwy 07L use minimal power until passing the power-up point on rwy. Power-up point is 348' east of blast pad and marked with sign and std markings for beginning of rwy. Turbojet dep not permitted Rwy 01R-19L or Rwy 01L-19R 0400-1600Z‡. Exception for wx or operational necessity. All NSTD rwy ops PPR from Department of Aviation. ASDE-X surveillance system in use. Opr transponders with Mode C on all twys and rwys. Acft taxiing westbound on Twy B near Twy E use caution not to enter the rwy on Twy Y, acft taxiing westbound on Twy W near Twy E use caution not to enter the rwy on Twy U. Twy C no centerline lgts west of Twy B6, has edge lgts on south side of twy in this area. Directional twy signs will be incomplete due to construction. Acft larger than B757 PPR from Department of Aviation to use Twy H. Ops at all terminal gates and cargo ramp controlled by Department of Aviation 1330-0900Z‡. All acft ctc ramp ctl on freq 124.4 for ops at A, B, and C gates, ctc ramp ctl on freq 127.9 for ops at D and E gates and cargo ramp prior to entering ramp or pushing back from gate or parking spot. From 0900-1330Z‡ ctc Gnd Con on freq 121.1 for ops at all gates and cargo ramp. Acft opr near the intersection of Twys S, D, G and the north end of Twy Z should be alert as there are closely aligned twy centerlines and radius turns. Acft that departure full length of Rwy 01L and Rwy 07L must hold at the same hold line, as there is no room to hold between the rwy ends, and such acft should verify that they are on the correct rwy. Acft dep Rwy 19R use minimal power passing the rwy thld. Rwy 19R thld has std rwy markings and is 780' south of the blast pad. Ldg Rights Arpt: Customs avbl to general aviation acft 1600-0600Z‡, all other times PPR call 702-2615539. General aviation acft rqrg immigration/customs svcs must ctc Department of Aviation for parking arrangements minimum 2 hrs prior to arr 702-261-4411. General aviation acft using the west side customs facility must ctc ramp ctl 124.4. General aviation parking very ltd. For parking availability ctc either FBO 702-736-1830 or 702-739-1100. Rotating bcn not visible 115°-240° southeast to southwest from twr. Rwy status lgts are in ops. Tiedown fee. General aviation customs and immigration lctd west side of afld between FBO's. Flight Notification Service (ADUCS) avbl. NOTE: See Special Notices—Intersection Departures During Period of Darkness, Grand Canyon Special Flight Rules Area.

AIRPORT MANAGER: 702-261-5211

WEATHER DATA SOURCES: ASOS (702) 736-1416

COMMUNICATIONS: D-ATIS 132.4 702-736-0950 UNICOM 122.95

Ⓡ LAS VEGAS APP CON 125.025 125.6 (Rwy 25L and Rwy 25R)

Ⓡ LAS VEGAS DEP CON 125.02 (North)125.9 (South)

LAS VEGAS TOWER 119.9 (Rwy 07L-25R and Rwy 07R-25L) 118.75 (Rwy 01L-19R and Rwy 01R-19L)

GND CON 121.9 (West of Rwy 01R-19L) 121.1 (East of Rwy 01R-19L) **RAMP CON** 124.4 (Terminal A, B, C) 127.9 (D, Gates and Cargo Ramp) 129.175 (A, B, C Gates) **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. 2136/15E.

No NOTAM MP: 1600-1800Z‡ Sat

VORTAC unusable:

025°-160° byd 20 NM blo 6,000'

160°-200° byd 20 NM blo 9,000'

200°-025° byd 25 NM blo 11,000'

200°-220° byd 15 NM blo 9,000'

220°-245° byd 35 NM blo 15,000'

245°-260° byd 35 NM blo 14,000'

260°-275° byd 35 NM blo 14,000'

275°-310° byd 35 NM blo 16,500'

ILS/DME 110.1 I-CUA Chan 38 Rwy 01L. Class IB. LOC unusable byd 30° left of course. LOC unusable within .2 NM from threshold.

ILS/DME 111.75 I-RLE Chan 54(Y) Rwy 25L. Class IE. LOC unusable byd 19° south of course.

ILS/DME 110.3 I-LAS Chan 40 Rwy 25R.

Figure 185. Excerpt from Chart Supplement.

LAS VEGAS

HENDERSON EXECUTIVE (HND)(KHND) 11 S UTC-8(-7DT) N35°58.37' W115°08.07'
2492 B FUEL 100LL, JET A OX 1, 2 TPA-3492(1000) NOTAM FILE HND

LAS VEGAS
H-4I, L-7E
IAP, AD

RWY 17R-35L: H6501X100 (ASPH) S-30, D-60 MIRL 1.4% up S

RWY 17R: REIL. PAPI(P4L)—GA 3.0° TCH 40'.

RWY 35L: REIL. PAPI(P4L)—GA 4.3° TCH 52'. Road.

RWY 17L-35R: H5001X75 (ASPH) S-30, D-30 MIRL 1.4% up S

RWY 17L: REIL. PAPI(P4L)—GA 3.0° TCH 40'.

RWY 35R: REIL. PAPI(P4L)—GA 4.3° TCH 52'.

AIRPORT REMARKS: Attended 1300-0600Z†. Self-svc fuel 100LL 24 hrs.

Rwy 17L-35R is CLOSED 0400-1500Z†. Extensive commercial air tour t/c arriving from southeast at different times during dalgt hrs. Acft departure Rwy 17R or Rwy 35L should verify that they are taking off from the rwy and not the parallel twy. MIRI Rwy 17L-35R OTS unless Rwy 17R-35L is clsd. ACTIVATE MIRL Rwy 17R-35L and Rwy 17L-35R, PAPI Rwy 17R and Rwy 35L, PAPI Rwy 17L and Rwy 35R REIL Rwy 17R and 35L REIL Rwy 17L and 35R and twy—CTAF. REIL Rwy 17L and 35R avbl only when Rwy 17R and 35L clsd.

AIRPORT MANAGER: 702-261-4802

WEATHER DATA SOURCES: ASOS 120.775 (702) 614-4537.

COMMUNICATIONS: CTAF 125.1 ATIS 120.775 UNICOM 122.95

MOUNT POTOSI RCO 122.35 (RENO RADIO)

Ⓡ **LAS VEGAS APP/DEP CON** 118.4

TOWER 125.1 (1400-0400Z†) **GND CON** 127.8

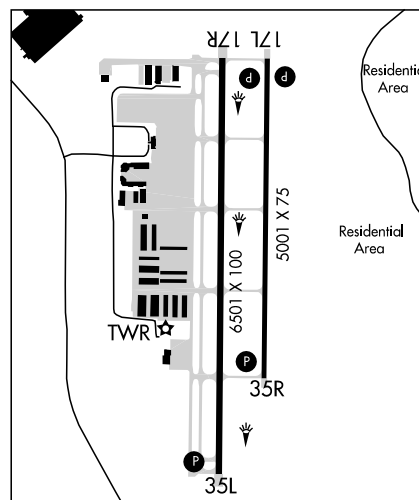
AIRSPACE: CLASS D svc 1400-0400Z† other times CLASS G.

RADIO AIDS TO NAVIGATION: NOTAM FILE RNO.

BOULDER CITY (H) VORTACW 116.7 BLD Chan 114 N35°59.75' W114°51.81' 249° 13.3 NM to fld. 3642/15E.
HIWAS.

Unusable:

155°-180° byd 30 NM blo 9,000'



MC CARRAN INTL (LAS)(KLAS) 5 S UTC-8(-7DT) N36°04.80' W115°09.14'

LAS VEGAS
H-4I, L-7E
IAP, AD

2181 B S4 FUEL 100, 100LL, JET A1+ OX 1, 2, 3 LRA Class I, ARFF Index E NOTAM FILE LAS

RWY 07L-25R: H14512X150 (ASPH-PFC) S-23, D-220, 2S-175,

2D-633, 2D/2D2-877 HIRL

RWY 07L: PAPI(P4L)—GA 3.0° TCH 76'. Thld dsplcd 2138'. Hangar. 1.1% down.

RWY 25R: MALSR. PAPI(P4L)—GA 3.0° TCH 84'. Thld dsplcd 1397'. 0.9% up.

RWY 07R-25L: H10525X150 (CONC-GRVD) S-23, D-220, 2S-175,

2D-633, 2D/2D2-914 HIRL

RWY 07R: REIL. PAPI(P4L)—GA 3.0° TCH 61'. Pole. 1.1% down.

RWY 25L: MALSF. PAPI(P4L)—GA 3.0° TCH 84'. 0.9% up.

RWY 01R-19L: H9771X150 (CONC-GRVD) S-23, D-220, 2S-175,

2D-633, 2D/2D2-877 MIRL

RWY 01R: REIL. PAPI(P4L)—GA 3.0° TCH 76'. Thld dsplcd 491'. Railroad. Rgt t/c. 1.1% down.

RWY 19L: REIL. PAPI(P4L)—GA 3.0° TCH 75'. Thld dsplcd 878'. Pole. 0.9% up.

RWY 01L-19R: H8988X150 (CONC-GRVD) S-30, D-145, 2S-175,

2D-460, 2D/2D2-833 HIRL

RWY 01L: MALSF. PAPI(P4L)—GA 3.4° TCH 57'. Thld dsplcd 587'. Railroad. 1.1% down.

RWY 19R: REIL. PAPI(P4L)—GA 3.0° TCH 80'. Fence. Rgt t/c. 1.0% up.

RUNWAY DECLARED DISTANCE INFORMATION

RWY 01L:TORA-8985 TODA-8985 ASDA-8985 LDA-8401

RWY 01R:TORA-9775 TODA-10172 ASDA-9441 LDA-8681

RWY 07L:TORA-14510 TODA-15099 ASDA-14099 LDA-11966

RWY 19L:TORA-9775 TODA-10175 ASDA-9685 LDA-8745

RWY 19R:TORA-8985 TODA-9397 ASDA-8397 LDA-8397

RWY 25R:TORA-14510 TODA-15155 ASDA-14155 LDA-12755

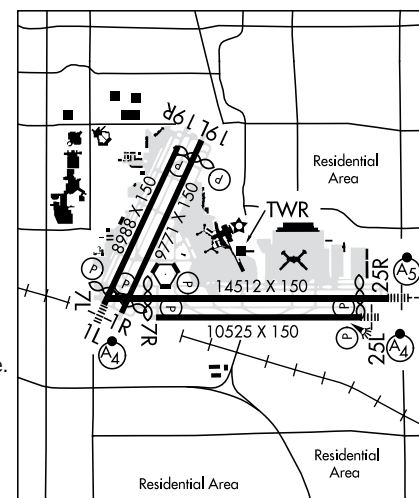


Figure 185A. Excerpt from Chart Supplement.

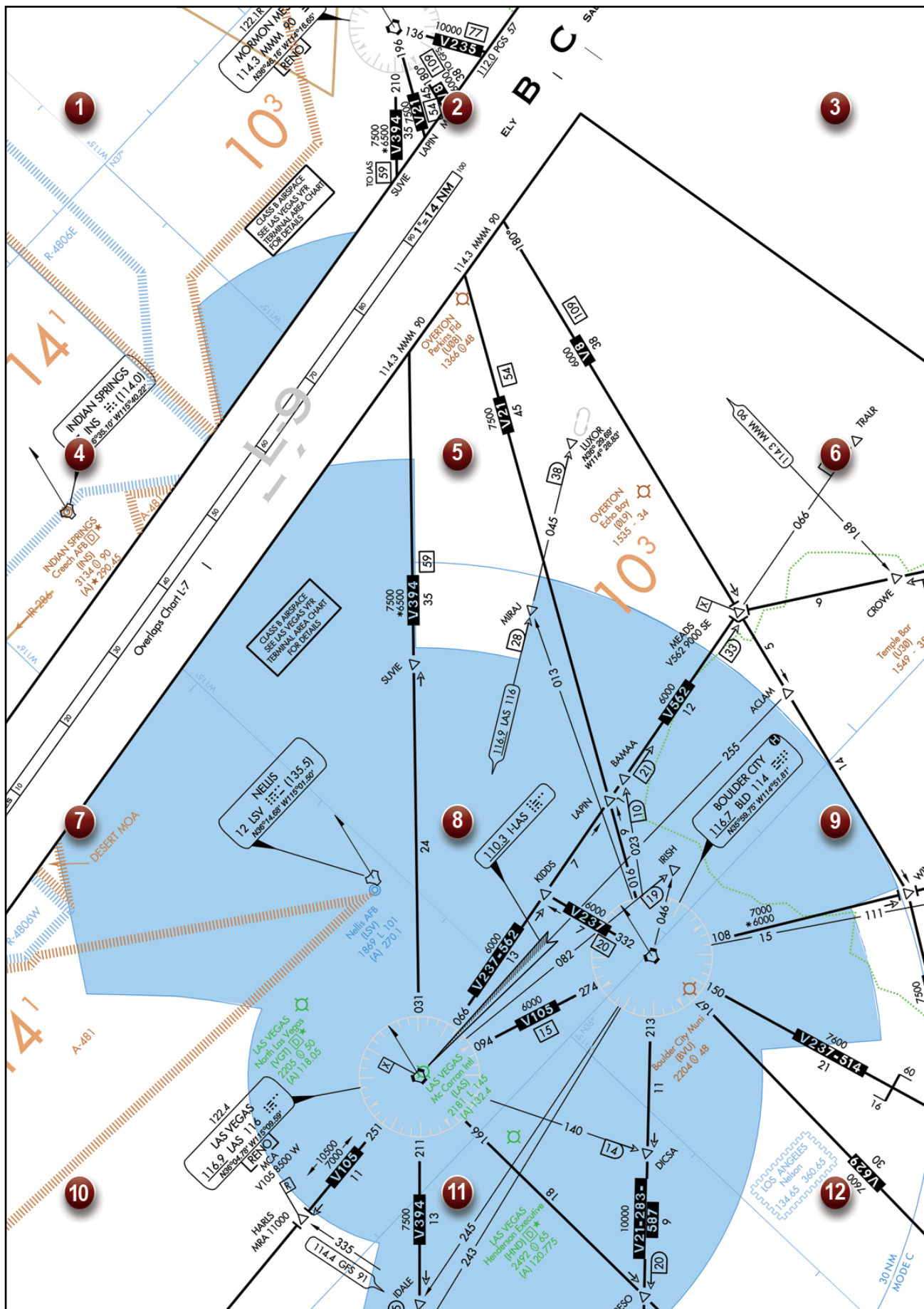


Figure 186. Low Altitude Airways.

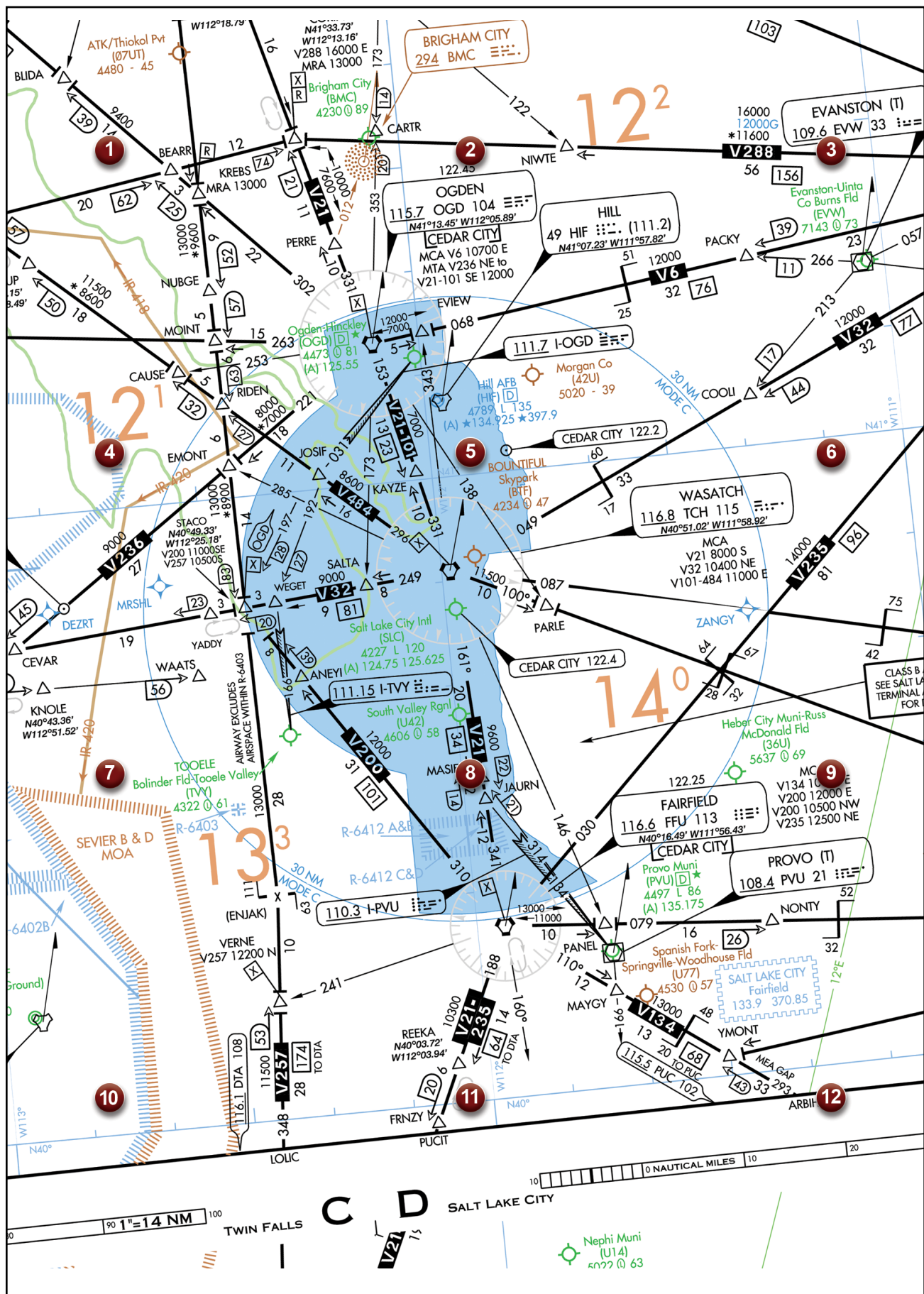


Figure 187. Low Altitude Airways.

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UTAH

PRICE

CARBON CO RGNL/BUCK DAVIS FLD (PUC)(KPUC) 3 E UTC-7(-6DT) N39°36.84' W110°45.09' DENVER
5957 B S2 FUEL 100LL, JET A OX 1, 2 NOTAM FILE PUC H-3E, L-9D
RWY 18-36: H8313X100 (ASPH-PFC) D-40 MIRL IAP
RWY 18: PAPI(P2L)—GA 4.0° TCH 45'. Fence. 1.9% down.
RWY 36: MALSF. PAPI(P4L)—GA 3.0° TCH 52'. 1.6% up.
RWY 14-32: H4514X75 (ASPH) S-13 MIRL 1.1% up NW
RWY 32: Road.
RWY 07-25: H3541X75 (ASPH) S-12.5 1.0% up E
RWY 25: Thld dspcd 228'. Road.
AIRPORT REMARKS: Attended Mon-Fri 1400-0100Z†, Sat-Sun 1500-0000Z†. 24 hr self svc fuel avbl with credit card. Refuse dump 1/2 mile SW Rwy 36 thld—occasional smoke visibility hazard; bird hazard. Deer on and in the vicinity of arpt. Glider ops invof arpt SR-SS. Rwy 18 high voltage transmission line on extended centerline. Rwy 07 + 60' drop off 520' from rwy end. Rwy 14 + 40' drop off 250' from thld. Rwy 07-25 pavement cracking and separating. ACTIVATE MIRL Rwy 18-36 and Rwy 14-32 PAPI Rwy 36 and MALSF Rwy 36—CTAF. PAPI Rwy 18 opr continuously.
AIRPORT MANAGER: 435-637-9556
WEATHER DATA SOURCES: ASOS 135.425 (435) 637-2790.
COMMUNICATIONS: CTAF/UNICOM 122.8
RCO 122.2 (CEDAR CITY RADIO)
SALT LAKE CENTER APP/DEP CON 133.9
RADIO AIDS TO NAVIGATION: NOTAM FILE PUC.
(H) VORW/DME 115.5 PUC Chan 102 N39°36.19' W110°45.21' at fld. 5830/14E.
VOR portion unusable:
275°-300° byd 25 NM blo 12,000'
300°-330° byd 25 NM blo 13,500'
330°-010° byd 25 NM blo 17,300'
DME portion unusable:
275°-010° byd 27 NM blo 17,300'
275°-010° byd 35 NM
VOR/DME unusable:
010°-070° byd 25 NM blo 14,000'
200°-275° byd 27 NM blo 13,000'
ILS/DME 109.35 I-PUC Chan 30(Y) Rwy 36.

PROVO MUNI (PVU)(KPVU) 2 SW UTC-7(-6DT) N40°13.15' W111°43.40' SALT LAKE CITY
4497 B S4 FUEL 100, JET A OX 2, 4 TPA—See Remarks Class I, ARFF Index B H-3D, L-9C, 11D
NOTAM FILE PVU IAP, AD
RWY 13-31: H8599X150 (ASPH-PFC) S-65, D-85, 2S-108, 2D-140
HIRL
RWY 13: REIL. PAPI(P4L)—GA 3.0° TCH 42'. Rgt tfc.
RWY 31: PAPI(P2L)—GA 3.0° TCH 46'.
RWY 18-36: H6614X150 (ASPH) S-50, D-70, 2S-89, 2D-110 MIRL
RWY 18: PAPI(P2L)—GA 3.0° TCH 45'. Rgt tfc.
RWY 36: PAPI(P2L)—GA 3.0° TCH 46'.
RUNWAY DECLARED DISTANCE INFORMATION
RWY 13: TORA-8599 TODA-8599 ASDA-8599 LDA-8599
RWY 18: TORA-6614 TODA-6614 ASDA-6614 LDA-6614
RWY 31: TORA-8599 TODA-8599 ASDA-8599 LDA-8599
RWY 36: TORA-6614 TODA-6614 ASDA-6614 LDA-6614
AIRPORT REMARKS: Attended Nov-May 1300-0400Z†, Jun-Oct 1300-0500Z†. For arpt svcs etc 128.85. 24 hr PPR for unscheduled air carrier ops call airport manager 801-852-6715. Extensive flight training invof arpt. Use caution for extensive paragliding ops invof point of the mountain. Primary radar not avbl. Radar tfc advisories and svcs avbl for transponder equipped acft only. Be alert: helicopters arriving and departing from rwys and twys. TPA—5500(1003) single engine, 6000(1503) turbo/jet. NOTE: See Special Notice—Extensive Flight Training in vicinity of Provo Municipal Airport.
AIRPORT MANAGER: 801-852-6715
WEATHER DATA SOURCES: AWOS-3 135.175 (801) 373-9782. LAWRS.
COMMUNICATIONS: CTAF 125.3 ATIS 135.175
SALT LAKE CITY APP/DEP CON 118.85
TOWER 125.3 (1400-0400Z†) GND CON 119.4
AIRSPACE: CLASS D svc airport 1400-0400Z† other times CLASS E.

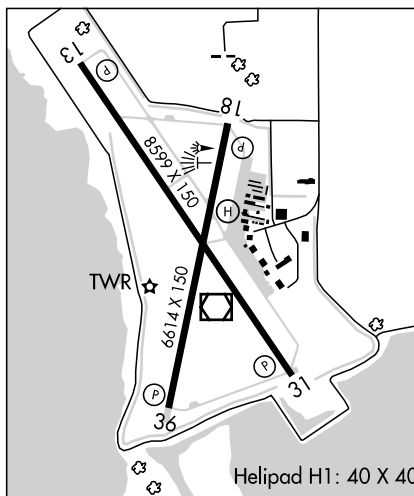


Figure 188. Excerpt from Chart Supplement.

UTAH

343

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RADIO AIDS TO NAVIGATION: NOTAM FILE PVU.

(T) **VOR/DME** 108.4 PVU Chan 21 N40°12.90' W111°43.28' at fld. 4493/15E.

VOR/DME unusable:

350°-080° byd 10 NM

ILS/DME 110.3 I-PVU Chan 40 Rwy 13. Class IT. ILS/DME unmonitored when twr clsd.

HELIPAD H1: H40X40 (CONC)

RICHFIELD MUNI (RIF)(KRIF) 1 SW UTC-7(-6DT) N38°44.05' W112°06.10'

LAS VEGAS

5318 B S4 **FUEL** 100LL, JET A NOTAM FILE CDC

H-3D, L-9C

RWY 01-19: H7100X100 (ASPH) S-19 MIRL 0.5% up S

IAP

RWY 01: PAPI(P2L)—GA 3.5°. Tree. Rgt tfc.

RWY 19: PAPI(P2L)—GA 3.5°. Pole.

AIRPORT REMARKS: Attended 1500-0000Z±. For fuel after hours call 435-896-3053. ACTIVATE MIRL Rwy 01-19—CTAF.

AIRPORT MANAGER: 435-896-9413

WEATHER DATA SOURCES: AWOS-3 133.375 (435) 896-1775.

COMMUNICATIONS: CTAF/UNICOM 122.8

RCO 122.5 (CEDAR CITY RADIO)

SALT LAKE CENTER APP/DEP CON 133.6

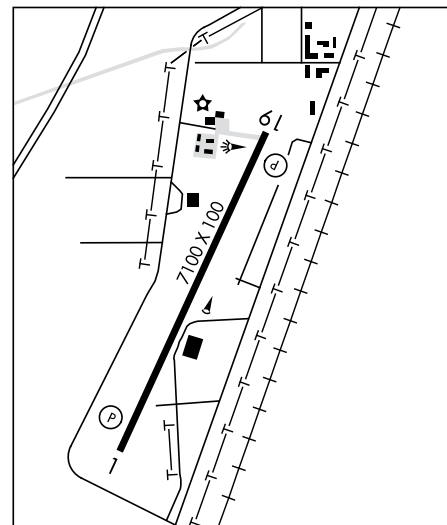
RADIO AIDS TO NAVIGATION: NOTAM FILE CDC.

DELTA (H) VORTACW 116.1 DTA Chan 108 N39°18.13'

W112°30.33' 135° 38.9 NM to fld. 4642/16E.

VOR portion unusable

045°-090° byd 25 NM blo 10,700'



ROOSEVELT MUNI (74V) 3 SW UTC-7(-6DT) N40°16.71' W110°03.08'

SALT LAKE CITY

5176 B S4 **FUEL** 100LL, JET A NOTAM FILE CDC

H-3E, L-9D, 11D

RWY 07-25: H6501X75 (ASPH) S-12 MIRL 1.0% up W

IAP

RWY 07: REIL. PAPI(P2L)—GA 3.0° TCH 40'. Brush.

RWY 25: REIL. PAPI(P2L)—GA 3.0° TCH 40'.

AIRPORT REMARKS: Attended Mon-Fri 1600-0100Z±. For svc call 435-724-0539 or 435-722-5001. Fuel 24 hr credit card svc avbl. ACTIVATE MIRL Rwy 07-25, PAPI Rwy 07 and Rwy 25 and REIL Rwy 07 and Rwy 25—CTAF.

AIRPORT MANAGER: 435-722-5001

WEATHER DATA SOURCES: AWOS-3 118.975 (435) 722-4201.

COMMUNICATIONS: CTAF/UNICOM 122.8

MYTON RCO 112.7 T 122.1R (CEDAR CITY RADIO)

RADIO AIDS TO NAVIGATION: NOTAM FILE CDC.

MYTON (H) VOR/DME 112.7 MTU Chan 74 N40°08.95' W110°07.62' 010° 8.5 NM to fld. 5401/14E.

Figure 188A. Excerpt from Chart Supplement.

SALT LAKE CITY

SALT LAKE CITY INTL (SLC)(KSLC) P (ANG) 3 W UTC-7(-6DT) N40°47.30' W111°58.67'
4227 B S4 FUEL 100LL, JET A1+ OX 1, 2, 3, 4 LRA Class I, ARFF Index E

SALT LAKE CITY
H-3D, L-9C, 11D
IAP, AD

NOTAM FILE SLC

RWY 16L-34R: H12002X150 (ASPH-GRVD) S-60, D-200, 2S-175,
2D-350, 2D/2D2-850 HIRL CL

RWY 16L: ALSF2. TDZL. PAPI(P4L)—GA 3.0° TCH 70'.

RWY 34R: ALSF2. TDZL. PAPI(P4L)—GA 3.0° TCH 73'.

RWY 16R-34L: H12000X150 (CONC-GRVD) S-60, D-200, 2S-175,
2D-350, 2D/2D2-850 HIRL CL

RWY 16R: ALSF2. TDZL. PAPI(P4L)—GA 3.0° TCH 73'.

RWY 34L: ALSF2. TDZL. PAPI(P4L)—GA 3.0° TCH 73'.

RWY 17-35: H9597X150 (ASPH-GRVD) S-60, D-200, 2S-175,
2D-350, 2D/2D2-850 HIRL CL

RWY 17: MALSR. TDZL. PAPI(P4R)—GA 3.0° TCH 76'.

RWY 35: MALSR. TDZL. PAPI(P4L)—GA 3.0° TCH 74'. Thld displcd
324'. Antenna.

RWY 14-32: H4892X150 (ASPH-GRVD) S-60, D-200, 2D-350,
2D/2D2-850 HIRL

RWY 14: PAPI(P4L)—GA 3.0° TCH 40'.

RWY 32: PAPI(P4L)—GA 3.0° TCH 41'.

RUNWAY DECLARED DISTANCE INFORMATION

RWY 14: TORA-4892 TODA-4892 ASDA-4892 LDA-4892

RWY 16L: TORA-12002 TODA-12002 ASDA-12002 LDA-12002

RWY 16R: TORA-12000 TODA-12000 ASDA-12000 LDA-12000

RWY 17: TORA-9597 TODA-9597 ASDA-9597 LDA-9597

RWY 32: TORA-4892 TODA-4892 ASDA-4892 LDA-4892

RWY 34L: TORA-12000 TODA-12000 ASDA-12000 LDA-12000

RWY 34R: TORA-12002 TODA-12002 ASDA-12002 LDA-12002

RWY 35: TORA-9597 TODA-9597 ASDA-9597 LDA-9273

MILITARY SERVICE: JASU (MD-3M) (MA-1A) (M32A-60A) FUEL A++ avbl at ANG. (NC-100LL, A1+) FLUID LPOX OIL
O-148(Mil)

AIRPORT REMARKS: Attended continuously. Flocks of birds on and invof arpt. Rwy 14-32 taxi ops only blo 1,200 ft RVR. Rwy 14-32 CLOSED blo 1200' RVR. Due to t/c volume, local departure and arrival ops are discouraged and delays can be expected between 1700-1900Z and 0300-0600Z. Rwy 34R deice pad construction Apr-2013-Sep-2014. See current NOTAMs for dates and additional information. South cargo apron access abeam Twy H2. Inner apron clsd between Twy H2 and apron spot 3. Twy Y rstd to wingspans less than 171'. Special VFR is not recommended at the arpt, if req, expect delays. Use caution for extensive paragliding ops invof point of the mountain. ASDE-X Surveillance System in use. Opr transponders with Mode C on all twys and rwys. Touchdown, midpoint and rollout rwy visual range Rwy 16L, Rwy 34R, Rwy 16R, Rwy 34L. Touchdown and rollout rwy visual range Rwy 17, Rwy 35. Flight Notification Service (ADCUS) avbl. NOTE: See Special Notices—Continuous Power Facilities.

AIRPORT MANAGER: 801-575-2401

WEATHER DATA SOURCES: ASOS (801) 328-3567 TDWR.

COMMUNICATIONS: D-ATIS 125.625 124.75 801-325-9749 UNICOM 122.95

RCO 122.4 (CEDAR CITY RADIO)

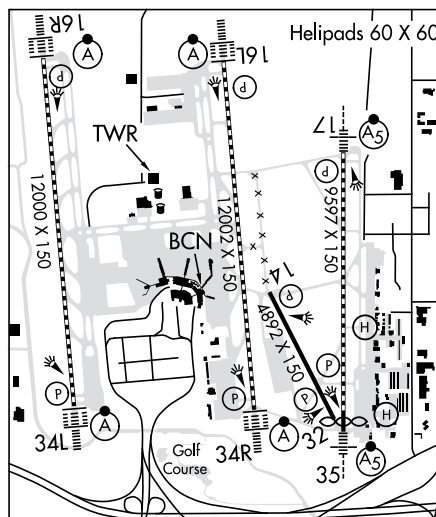
® **SALT LAKE CITY APP/DEP CON** 120.9 (S of 41° latitude below 8000') 121.1 (N of 41° latitude below 8000') 124.3 (110°-160° above 8,000') 124.9 (300°-340° above 8000') 126.25 (250°-300° above 8000') 128.1 (160°-250° above 8000') 135.5 (340°-110° above 8000').

TOWER 118.3 (Rwy 17-35 and Rwy 14-32) 119.05 (Rwy 16L-34R) 132.65 (Rwy 16R-34L)

GND CON 121.9 (Rwy 17-35 and Rwy 14-32) 123.775 (Rwy 16R-34L and Rwy 16L-34R) **CLNC DEL** 127.3

PRE-TAXI CLNC 127.3 **PRE-DEP CLNC** 127.3

AIRSPACE: CLASS B See VFR Terminal Area Chart



CONTINUED ON NEXT PAGE

Figure 189. Excerpt from Chart Supplement.

CONTINUED FROM PRECEDING PAGE

VOR TEST FACILITY (VOT) 111.0

RADIO AIDS TO NAVIGATION: NOTAM FILE SLC.

WASATCH (H) VORTACW 116.8 TCH Chan 115 N40°51.02' W111°58.91' 161° 3.7 NM to fld. 4220/16E.

VOR portion unusable:
 015°-030° blo 26,000'
 030°-050° byd 20 NM
 050°-085° byd 20 NM blo 18,000'
 085°-125° byd 30 NM blo 15,000'
 360°-015° byd 20 NM blo 17,000'

DME unusable:
 030°-080° byd 17 NM blo 17,000'
 030°-080° byd 25 NM
 080°-140° byd 17 NM blo 15,000'
 080°-140° byd 25 NM
 185°-220° byd 25 NM blo 16,000'
 260°-290° byd 25 NM blo 11,000'
 350°-360° byd 30 NM blo 16,000'
 360°-030° byd 17 NM blo 16,000'
 360°-030° byd 30 NM

TACAN AZIMUTH unusable:

030°-140°
 ILS/DME 109.5 I-MOY Chan 32 Rwy 16L. DME also serves ILS Rwy 34R.
 ILS/DME 111.9 I-UAT Chan 56 Rwy 16R. Class IIIE. DME also serves ILS Rwy 34L.
 ILS/DME 111.5 I-BNT Chan 52 Rwy 17. Class - IE. DME also serves ILS Rwy 35.
 ILS/DME 111.9 I-UUH Chan 56 Rwy 34L. Class IIIE. DME also serves ILS Rwy 16R.
 ILS/DME 109.5 I-SLC Chan 32 Rwy 34R. Class IIIE. DME also serves ILS Rwy 16L.
 ILS/DME 111.5 I-UTJ Chan 52 Rwy 35. DME service provided by ILS Rwy 17.

HELIPAD HB: H60X60 (ASPH)

HELIPAD HF: H60X60 (ASPH)

HELIPORT REMARKS: Helipads B and F located on general aviation aprons. Lighted pole 51' AGL 383' ESE of Helipad B.

SOUTH VALLEY RGNL (U42) P (ARNG) 7 SW UTC-7(-6DT) N40°37.17' W111°59.57'

SALT LAKE CITY
 H-3D, L-9C, 11D
 IAP

4606 B S4 FUEL 100LL, JET A OX 1 TPA-5406(800) NOTAM FILE CDC

RWY 16-34: H5862X100 (ASPH) S-30, D-43 MIRL

RWY 16: REIL. PAPI(P4L)-GA 3.0° TCH 40'. Rgt tfc.

RWY 34: REIL. PAPI(P4L)-GA 3.0° TCH 40'. Road.

AIRPORT REMARKS: Attended 1400-0400Z±. Flocks of birds on and invof arpt. Use caution for extensive paragliding ops invof point of the mountain. ACTIVATE MIRL Rwy 16-34, REIL Rwy 16 and Rwy 34-CTAF. PAPI Rwy 16 and Rwy 34 opr continuously.

AIRPORT MANAGER: 801-575-2401

WEATHER DATA SOURCES: AWOS-3 134.425 (801) 562-0271. addl phone 801-566-2084.

COMMUNICATIONS: CTAF/UNICOM 122.7

Ⓡ SALT LAKE CITY APP/DEP CON 120.2 124.3

CLNC DEL 127.0

RADIO AIDS TO NAVIGATION: NOTAM FILE SLC.

WASATCH (H) VORTACW 116.8 TCH Chan 115 N40°51.02' W111°58.91' 166° 13.8 NM to fld. 4220/16E.

VOR portion unusable:
 015°-030° blo 26,000'
 030°-050° byd 20 NM
 050°-085° byd 20 NM blo 18,000'
 085°-125° byd 30 NM blo 15,000'
 360°-015° byd 20 NM blo 17,000'

DME unusable:
 030°-080° byd 17 NM blo 17,000'
 030°-080° byd 25 NM
 080°-140° byd 17 NM blo 15,000'
 080°-140° byd 25 NM
 185°-220° byd 25 NM blo 16,000'
 260°-290° byd 25 NM blo 11,000'
 350°-360° byd 30 NM blo 16,000'
 360°-030° byd 17 NM blo 16,000'
 360°-030° byd 30 NM

TACAN AZIMUTH unusable:

030°-140°

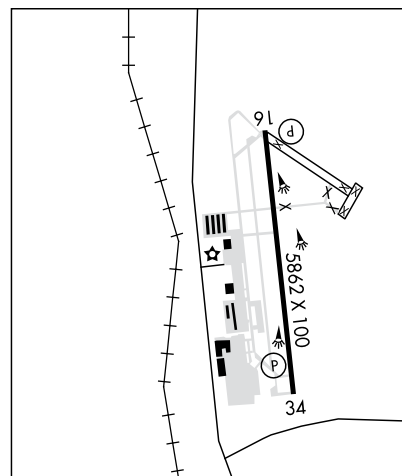


Figure 189A. Excerpt from Chart Supplement.

MINNEAPOLIS-ST PAUL INTL/WOLD-CHAMBERLAIN

(MSP)(KMSP) P (AFRC ANG N) 6 SW

TWIN CITIES

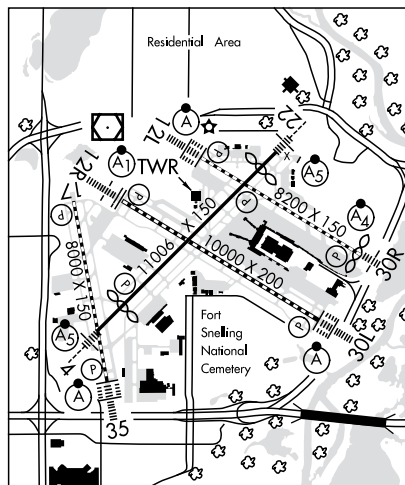
UTC-6(-5DT) N44°52.92' W93°13.31'

H-21, L-121, 141, A

842 B S4 FUEL 100LL, JET A OX 1, 3 LRA Class I, ARFF Index E NOTAM FILE MSP

IAP, AD

- RWY 04-22:** H11006X150 (CONC-GRVD) S-100, D-200, 2S-175, 2D-400, 2D/2D2-850 HIRL
- RWY 04:** MALSR. PAPI(P4L)—GA 3.0° TCH 76'. Thld dsplcd 1550'. Tree.
- RWY 22:** MALSR. PAPI(P4L)—GA 3.0° TCH 61'. Thld dsplcd 1000'. Tree.
- RWY 12R-30L:** H10000X200 (CONC-GRVD) S-100, D-200, 2S-175, 2D-400, 2D/2D2-850 HIRL CL
- RWY 12R:** ALSF1. TDZL. PAPI(P4L)—GA 3.0° TCH 66'. Tree. 0.3% down.
- RWY 30L:** ALSF2. TDZL. PAPI(P4L)—GA 3.0° TCH 78'. Tree.
- RWY 12L-30R:** H8200X150 (CONC-GRVD) S-100, D-200, 2S-175, 2D-400, 2D/2D2-850 HIRL CL
- RWY 12L:** ALSF2. TDZL. PAPI(P4L)—GA 3.0° TCH 79'. Tree. 0.3% down.
- RWY 30R:** MALSF. PAPI(P4L)—GA 3.0° TCH 71'. Thld dsplcd 200'. Tree.
- RWY 17-35:** H8000X150 (CONC-GRVD) S-100, D-200, 2S-175, 2D-400, 2D/2D2-850 HIRL CL
- RWY 17:** REIL. PAPI(P4R)—GA 3.0° TCH 60'. Tree.
- RWY 35:** ALSF2. TDZL. PAPI(P4L)—GA 3.0° TCH 71'.



LAND AND HOLD-SHORT OPERATIONS

LDG RWY	HOLD-SHORT POINT	AVBL LDG DIST
RWY 22	TWY K	8550
RWY 30L	TWY A9-W9	8150

RUNWAY DECLARED DISTANCE INFORMATION

RWY	TORA	TODA	ASDA	LDA
RWY 04:	11006	11006	11006	9456
RWY 12L:	8200	8200	7620	7620
RWY 12R:	10000	10000	10000	10000
RWY 17:	8000	8000	8000	8000
RWY 22:	11006	11006	11006	10006
RWY 30L:	10000	10000	10000	10000
RWY 30R:	8200	8200	8200	8000
RWY 35:	8000	8000	8000	8000

ARRESTING GEAR/SYSTEM

RWY 12R: EMAS

MILITARY SERVICE: FUEL A++(Mil), A+ (C612-726-5700) (NC-100LL)

AIRPORT REMARKS: Attended continuously. Birds on and in/ovf arpt. Training flights prohibited. General aviation flights must terminate at the FBO or US Customs unless approved by Airport Manager. All GA acft with less than 20 passengers that need to clear U.S. Customs should ctc 128.95 or 612-726-5700 prior to arr. All unscheduled acft at terminal 2-Humphrey are required to ctc terminal 2 gate ctl on 122.95 or call 612-726-5742 prior to arrival. All group V1 acft wingspan greater than 214' need to contact airside ops at (612) 726-5111 prior to arrival to obtain (prior permission required) PPR. For noise abatement procedures call 612-726-9411. No stage 1 Category Civil acft, nighttime hrs are 0430-1200Z†. Complex geometry at Rwy 04 approach end. Rwy 04 departures check compass to verify correct rwy heading. ASDE-X surveillance system in use. Opr transponders with mode C on all twys and rwys. Rwy 04 runway visual range avbl touchdown, rollout. Rwy 22 runway visual range avbl touchdown, rollout. Rwy 12R runway visual range avbl touchdown, midfield, rollout. Rwy 30L runway visual range avbl touchdown, midfield, rollout. Rwy 12L runway visual range avbl touchdown, midfield, rollout. Rwy 30R runway visual range avbl touchdown, midfield, rollout. Rwy 17 runway visual range avbl touchdown, midfield, rollout. Rwy 35 runway visual range avbl touchdown, midfield, rollout. Vehicles parked along south end of Twy S. Rwy status lgts are in operation. Ldg fee. Flight Notification Service (ADCUS) avbl.

NOTE: See Special Notices—Intersection Departures During Period Of Darkness, Continuous Power Facilities.

AIRPORT MANAGER: 612-725-6464

WEATHER DATA SOURCES: ASOS (612) 725-0939 LLWAS, TDWR.

COMMUNICATIONS: D-ATIS ARR 135.35 (612) 726-9240 D-ATIS DEP 120.8 UNICOM 122.95

RCO 122.3 (PRINCETON RADIO)

Ⓡ APP CON 119.3 (N and E of arrival rwy and Rwy 17) 126.95 (S or W of arrival rwy and Rws 04, 12R and 30L) 118.725 (Rwy 35)

TOWER 126.7 (Rws 12R-30L and 04-22) 123.95 (Rwy 12L-30R) 123.675 (Rwy 17-35)

GND CON 121.9 (S) 121.8 (N) 127.925 (W) CLNC DEL 133.2 GND METERING 133.57

Ⓡ DEP CON 125.75 (N or W of arrival rwy) 124.7 (S or E of arrival rwy) 132.975

AIRSPACE: CLASS B See VFR Terminal Area Chart

Figure 191. Excerpt from Chart Supplement.

MINNESOTA

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CONTINUED FROM PRECEDING PAGE

VOR TEST FACILITY (VOT) 111.0

RADIO AIDS TO NAVIGATION: NOTAM FILE MSP.

(H) VOR/DME 115.3 MSP Chan 100 N44°53.79' W93°14.19' 142° 1.1 NM to fld. 833/2E.

VOR portion unusable:
260°-270° blo 4,000'

ILS 109.3 I-APL Rwy 04. Glideslope unusable for coupled apchs blo 1,085'. LOC unusable byd 25° left and r of course.

ILS/DME 110.7 I-PJL Chan 44 Rwy 12L. Class III/E. DME also serves Rwy 30R. DME unusable byd 20° left of course.

ILS/DME 110.3 I-HKZ Chan 40 Rwy 12R. Class III/E. DME unusable byd 25° right of course.

LOC/DME 110.95 I-TJZ Chan 46(Y) Rwy 17.

LOC 110.5 I-SIJ Rwy 22.

ILS/DME 110.3 I-MSP Chan 40 Rwy 30L. Class IIE.

ILS/DME 110.7 I-INN Chan 44 Rwy 30R. Class IE.

ILS/DME 110.95 I-BMA Chan 46(Y) Rwy 35. Class IIIE.

MONTEVIDEO-CHIPPEWA CO (MVE)(KMVE) 2 N UTC-6(-5DT) N44°58.15' W95°42.62'

TWIN CITIES

1035 B S4 FUEL 100LL NOTAM FILE MVE

L-12I, 14H

RWY 14-32: H3995X75 (ASPH) S-14, D-18 MIRL 0.4% up NW

IAP

RWY 14: REIL. PAPI(P4L)—GA 3.0° TCH 25'.

RWY 32: REIL. PAPI(P4L)—GA 3.0° TCH 25'.

RWY 03-21: 2385X165 (TURF) 0.5% up SW

AIRPORT REMARKS: Attended Mon-Sat 1400-2230Z±, Sun 1900-2230Z±.

Fuel self serve, after hrs call 320-226-1483. Ultralights on and invof arpt. Rwy 03-21 not plowed winter months. Badger and gopher holes. Rwy 03-21 thlds and edges marked with yellow cones. Rwy 14-32 non frangible cages around REILS. ACTIVATE MIRL Rwy 14-32, REIL and PAPI Rwy 14 and REIL and PAPI Rwy 32—CTAF.

AIRPORT MANAGER: 320-269-4829

WEATHER DATA SOURCES: AWOS-3 111.6 MVE (320) 269-5830.

COMMUNICATIONS: CTAF/UNICOM 122.8

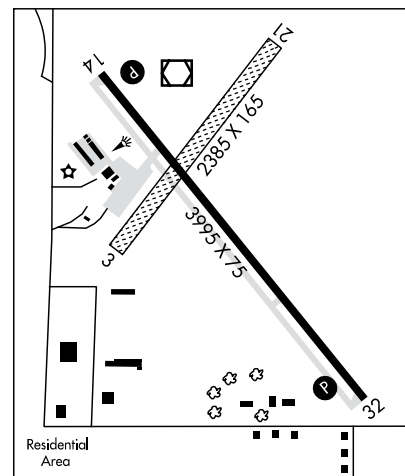
RCO 122.45 (PRINCETON RADIO)

MINNEAPOLIS CENTER APP/DEP CON 125.5

RADIO AIDS TO NAVIGATION: NOTAM FILE MVE.

(T) VOR/DME 111.6 MVE Chan 53 N44°58.36'

W95°42.73' at fld. 1037/5E. AWOS-3 VOR/DME unmonitored.



MONTZ N43°34.42' W94°19.08' NOTAM FILE FRM.

OMAHA

NDB (LOM) 420 FQ 311° 6.0 NM to Fairmont Muni.

MOORHEAD MUNI (JKJ)(KJKJ) 4 SE UTC-6(-5DT) N46°50.36' W96°39.84'

TWIN CITIES

918 B S4 FUEL 100LL, JET A TPA-1718(800) NOTAM FILE JKJ

L-14G

RWY 12-30: H4300X75 (ASPH) MIRL

IAP

RWY 12: REIL. PAPI(P4L)—GA 3.0° TCH 25'.

RWY 30: REIL. PAPI(P4L)—GA 3.0° TCH 25'. Tree.

AIRPORT REMARKS: Attended Mon-Fri 1400-2300Z±. For svc after hrs call

218-287-1400. Self svc fuel avbl 24 hrs with credit card. Arpt underlies Fargo TRSA, Hector Intl Class D Airspace 3 miles NW of arpt. Noise abatement procedures in effect, ctc arpt manager 218-287-1400. ACTIVATE MIRL Rwy 12-30, REIL Rwy 12 and Rwy 30 and PAPI Rwy 12 and Rwy 30—CTAF.

AIRPORT MANAGER: 701-552-1865

WEATHER DATA SOURCES: AWOS-3 120.0 (218) 287-5049.

COMMUNICATIONS: CTAF/UNICOM 123.0

FARGO APP/DEP CON 120.4 (1200-0500Z±)

MINNEAPOLIS CENTER APP/DEP CON 127.35

GCO 121.725 (FARGO APP AND PNM AFSS)

RADIO AIDS TO NAVIGATION: NOTAM FILE FAR.

FARGO (H) VORTACW 116.2 FAR Chan 109 N46°45.20'

W96°51.08' 047° 9.3 NM to fld. 908/9E. HIWAS.

TACAN AZIMUTH unusable:

250°-275°

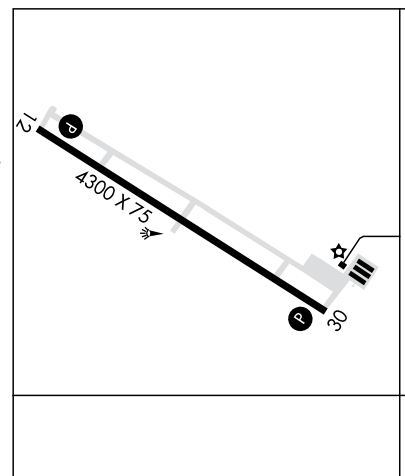


Figure 191A. Excerpt from Chart Supplement.

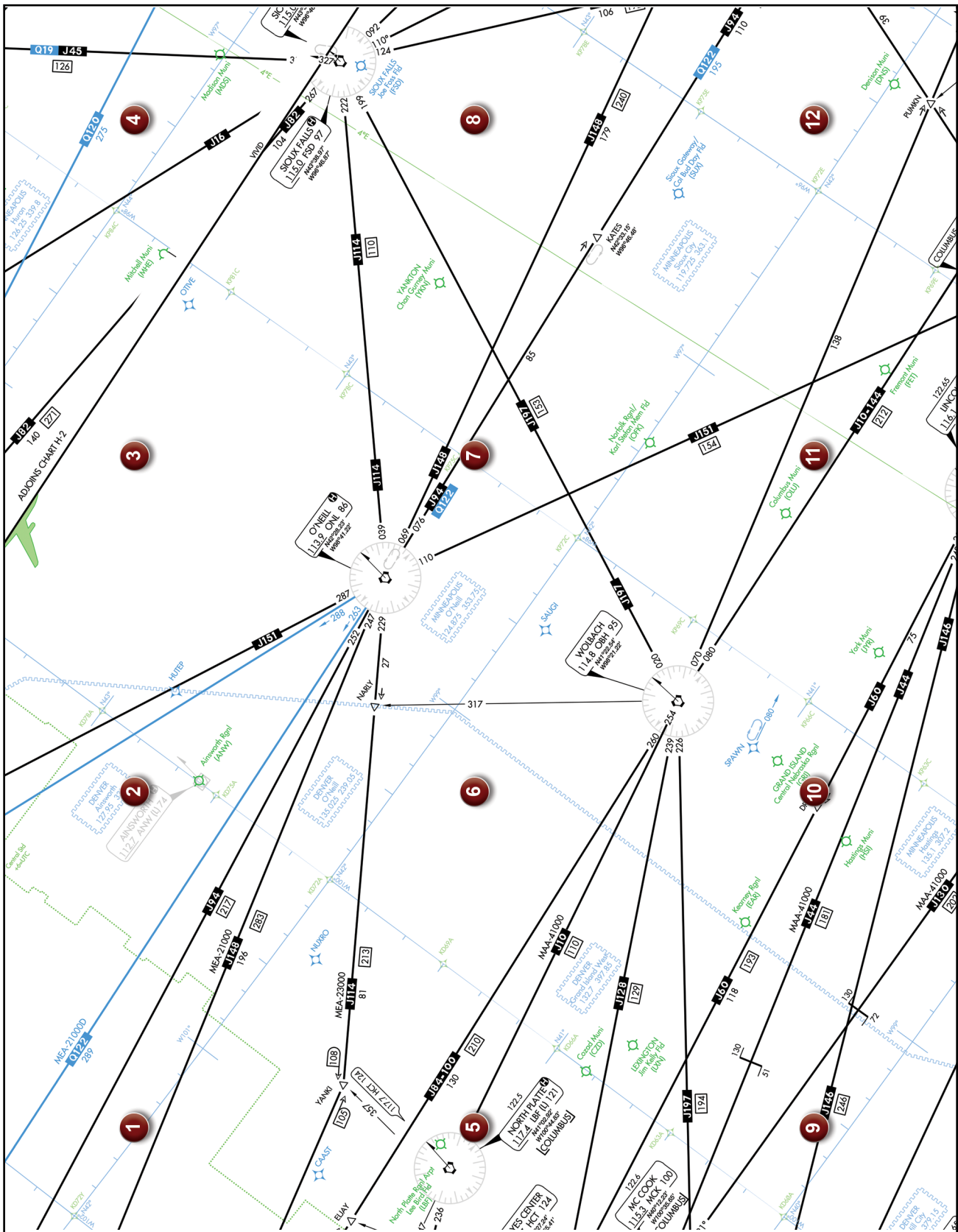


Figure 192. High Altitude Airways.

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COLORADO

EADS MUNI (9V7) 1 W UTC-7(-6DT) N38°28.51' W102°48.65'

WICHITA

4245 NOTAM FILE DEN

L-10G

RWY 17-35: H3860X60 (ASPH) MIRL

RWY 17: Road.

RWY 35: Road.

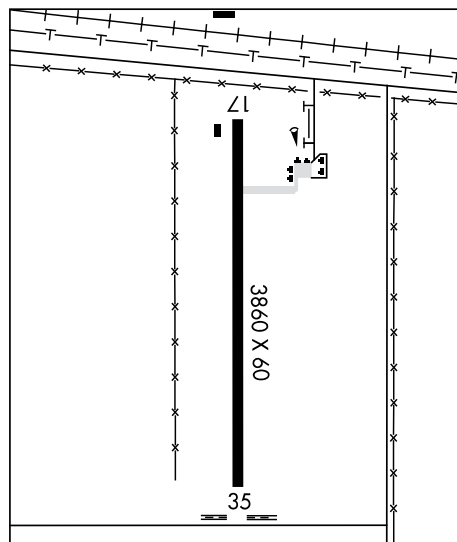
AIRPORT REMARKS: Unattended. Be alert, intensive USAF student training invof Colorado Springs and Pueblo Colorado. Rwy 17 +25' bldgs 220' right of centerline 108' from rwy end. Rwy 17 has +17' railroad 530' from thld centerline, -4' ditch 375' from thld centerline. Apron area is milled asph. Twy and rwy have no markings. See Special Notices USAF 306 FTG Flight Training Areas, Vicinity of Colorado Springs and Pueblo Colorado.

AIRPORT MANAGER: 719-438-5590

COMMUNICATIONS: CTAF 122.9

RADIO AIDS TO NAVIGATION: NOTAM FILE LAA.

LAMAR (H) VOR/DME 116.9 LAA Chan 116 N38°11.83' W102°41.25' 329° 17.7 NM to fld. 3944/12E.



EAGLE CO RGNL (EGE)(KEGE) P (ARNG) 4 W UTC-7(-6DT) N39°38.57' W106°54.96'

DENVER

6547 B S4 **FUEL** 100LL, JET A1, A1+ OX 1, 3 Class I, ARFF Index C NOTAM FILE EGE

H-3E, L-9E

RWY 07-25: H9000X150 (ASPH-GRVD) S-75, D-140, 2S-175, 2D-255 HIRL

IAP, AD

RWY 07: REIL. Tree. Rgt tfc. 0.9% up.

RWY 25: MALSR. PAPI(P4R)—GA 3.0° TCH 55'. Thld dsplcd 1000'. 1.0% down.

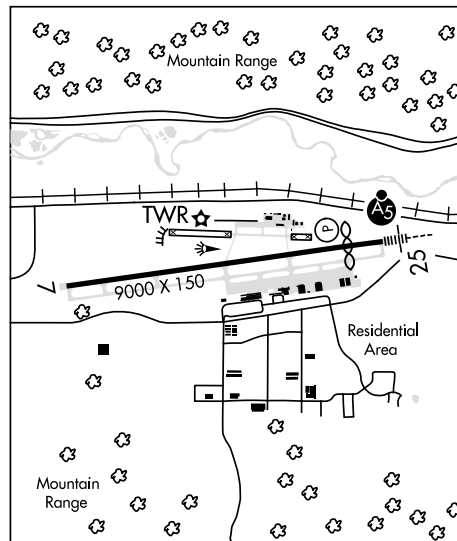
RUNWAY DECLARED DISTANCE INFORMATION

RWY 07: TORA-9000 TODA-9000 ASDA-9000 LDA-9000

RWY 25: TORA-9000 TODA-9000 ASDA-9000 LDA-8000

MILITARY SERVICE: **FUEL** A+ (1300-0400Z‡, C970-524-7700, OT \$125 per hr.) (NC-100LL, A1, A1+) **FLUID** HPOX-RB

AIRPORT REMARKS: Attended May-Nov 1400-0400Z‡, Dec-Apr 1400-0600Z‡. Unscheduled air carrier operations with more than 30 passenger seats call arpt fire department 970-328-2688. High unmarked terrain all quadrants. Critical acct are Category D IV, B757-200 equivalent and lower. Ngt ops discouraged to pilots unfamiliar with arpt. Recommend all acct departing Rwy 25 initiate a left turn as soon as alt and safety permit to avoid high terrain. Rwy 25 PAPI only visible to 3° left of centerline due to terrain. Extensive military helicopter training ops sfc to 1000' AGL within 25 NM radius Eagle Co Arpt 1330-0500Z‡. Rwy 07 touchdown runway visual range avbl. Rwy 25 touchdown runway visual range avbl. No snow removal or rwy monitoring between 0600Z‡ and 1300Z‡. Air carrier acct should not leave or enter Twy A east of Twy C-2. For twr hrs ctc ARFF at 970-328-2688. During hrs when twr clsd **ACTIVATE** HIRL Rwy 07-25, REIL Rwy 07, and MALSR Rwy 25—CTAF. PAPI Rwy 25 operates 24 hrs. U.S. Customs user fee arpt: regular office hrs Thu-Mon 1600-0000Z‡. After hrs svc avbl. Office 970-524-0490. After hrs 303-472-1125. Three hr advance notice required. Ldg fee.



AIRPORT MANAGER: 970-328-2680

WEATHER DATA SOURCES: AWOS-3 135.575 (970) 524-7386.

COMMUNICATIONS: CTAF 119.8 ATIS 135.575

RCO 122.2 (DENVER RADIO)

DENVER CENTER APP/DEP CON 128.65

TOWER 119.8 (1400-0200Z‡) **GND CON** 121.8 **CLNC DEL** 124.75

AIRSPACE: **CLASS D** svc 1400-0200Z‡ other times **CLASS E**.

Figure 198. Excerpt from Chart Supplement.

COLORADO

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CONTINUED FROM PRECEDING PAGE

RADIO AIDS TO NAVIGATION: NOTAM FILE DEN.

SNOW (T) VORW/DME 109.2 SXW Chan 29 N39°37.77' W106°59.47' 065° 3.6 NM to fld. 8070/12E.
VOR/DME unmonitored 0600–1300Z†.

VOR portion unusable:
310°–355°

VOR/DME unusable:
115°–135°

ILS/DME 109.75 I-ESJ Chan 34(Y) Rwy 25. Glideslope unmonitored.

LDA/DME 108.3 I-VAZ Chan 20 Rwy 25. LOC unusable byd 14 NM blo 10,940'. LOC unusable byd 15° left and right of course.

EASTON (VALLEY VIEW) (See GREELEY on page 248)

EMPIRE OCO N39°47.67' W105°45.78'/12493
AWOS-3 134.325

DENVER
L-9E

ERIE MUNI (EIK)(KEIK) 3 S UTC-7(-6DT) N40°00.62' W105°02.89'
5119 B S4 **FUEL** 100LL, JET A OX 3, 4 NOTAM FILE DEN

CHEYENNE
L-10F, A
IAP

RWY 15-33: H4700X60 (CONC) S-12.5 MIRL 0.9% up S

RWY 15: REIL. PAPI(P2L)—GA 3.0° TCH 58'. Tree. Rgt tfc.

RWY 33: PAPI(P2L)—GA 3.0° TCH 52'. Hill.

AIRPORT REMARKS: Attended Mon-Sat 1500-0000Z†, Sun 1500-2100Z†.

After hrs emerg ctc 303-870-5659. Self svc credit card fuel avbl 24 hrs. Rwy 15 has -2' to -6' ditches within 700' of rwy end at various locations. Rwy 33 has -6' to -12' ditch 60' left of centerline parallel to first 750' of rwy. Rwy 33 has 30' road 1350' from thld outbound. Rwy 15-33 -2' terrain 60' to 70' E of rwy centerline, full length.

ACTIVATE MIRL Rwy 15-33 PAPI Rwy 15 and Rwy 33 and REIL Rwy 15 CTAF.

AIRPORT MANAGER: 303-664-0633

WEATHER DATA SOURCES: AWOS-3 133.825 (303) 604-4339.

COMMUNICATIONS: CTAF/UNICOM 123.0

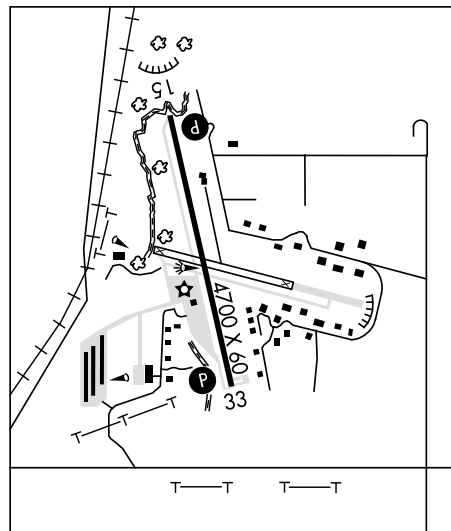
Ⓡ **DENVER APP/DEP CON** 126.1

RADIO AIDS TO NAVIGATION: NOTAM FILE BJC.

JEFFCO (H) VORW/DME 115.4 BJC Chan 101 N39°54.78'
W105°08.34' 025° 7.2 NM to fld. 5737/11E.

VOR portion unusable:
226°–245° byd 36 NM blo 17,000'
246°–278° byd 30 NM blo 19,000'
279°–300° byd 34 NM blo 18,000'

DME unusable:
246°–278° byd 30 NM



FALCON N39°41.41' W104°37.26' NOTAM FILE DEN.
(H) VORTACW 116.3 FQF Chan 110 225° 12.8 NM to Centennial. 5780/11E.
TACAN & DME unusable:
068°–088° byd 10 NM blo 11,500'

DENVER
H-3F, 5A, L-10G, A

FORT COLLINS-LOVELAND MUNI (See FORT COLLINS/LOVELAND on page 246)

Figure 198A. Excerpt from Chart Supplement.

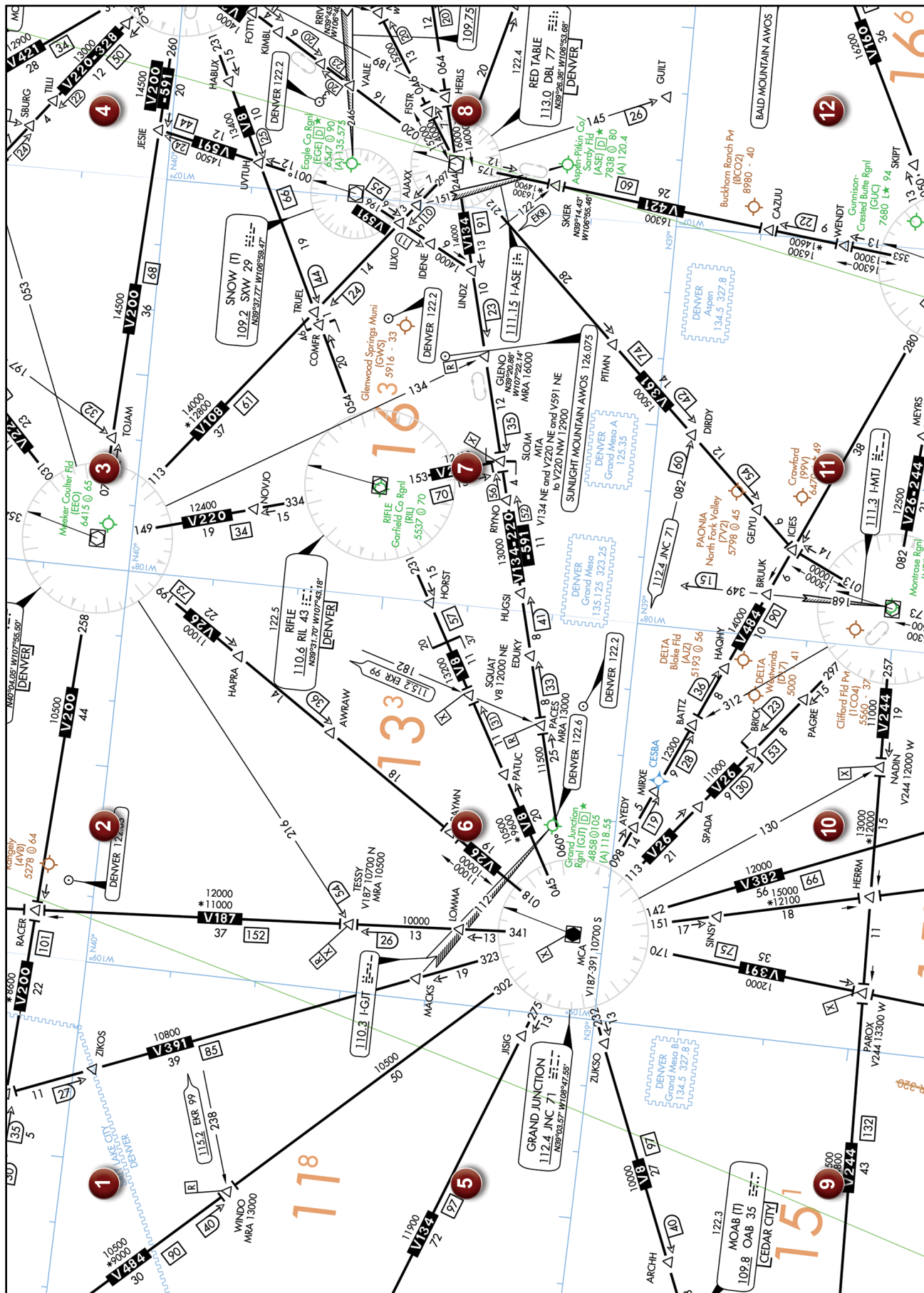


Figure 199. Low Altitude Airways.

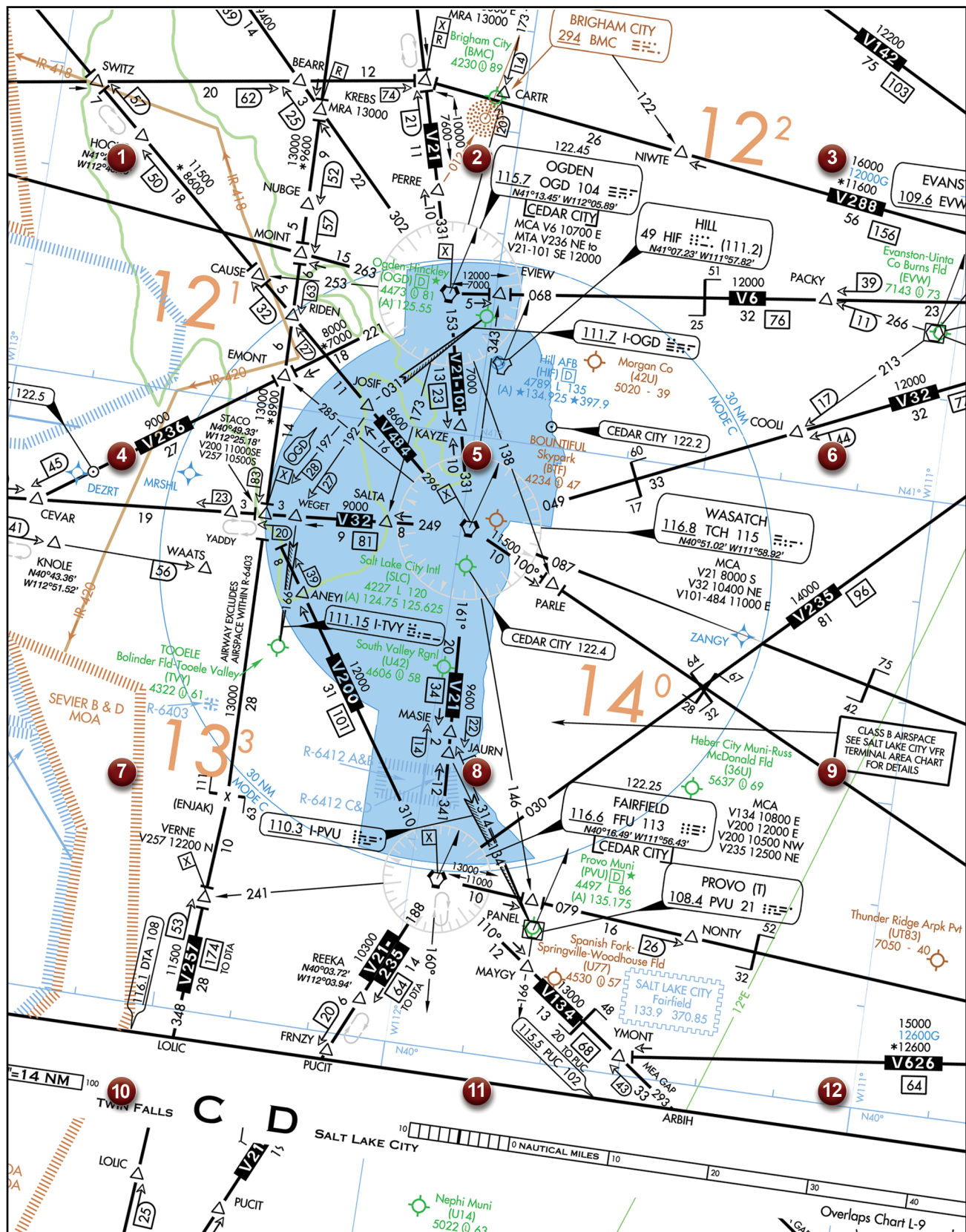


Figure 200. Low Altitude Airways.

340

UTAH

NEPHI MUNI (U14) 3 NW UTC-7(-6DT) N39°44.20' W111°52.20'

LAS VEGAS

5022 B **FUEL** 100LL, JET A NOTAM FILE CDC

H-3D, L-9C

RWY 17-35: H6300X100 (ASPH) S-21, D-30 MIRL 0.6% up S

IAP

RWY 17: REIL. PAPI(P2L)—GA 3.0° TCH 40'.

RWY 35: REIL. PAPI(P2L)—GA 3.0° TCH 40'.

AIRPORT REMARKS: Unattended. Fuel avbl 24 hrs, self svc credit card system. ACTIVATE MIRL Rwy 17-35, PAPI Rwy 17 and Rwy 35, and REIL Rwy 17 and Rwy 35—CTAF.

AIRPORT MANAGER: 435-623-0822

WEATHER DATA SOURCES: AWOS-3 118.275 (435) 623-1397.

COMMUNICATIONS: CTAF/UNICOM 122.8

Ⓡ **SALT LAKE CENTER APP/DEP CON** 127.825

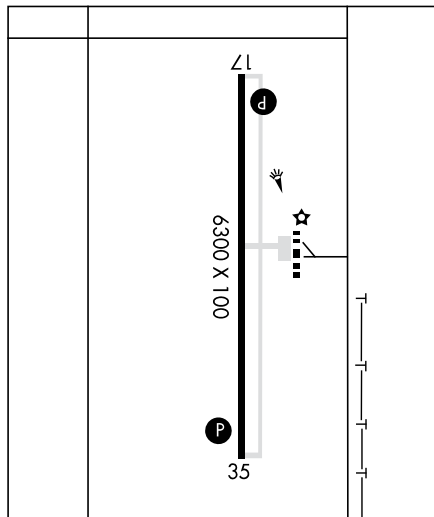
RADIO AIDS TO NAVIGATION: NOTAM FILE PVU.

PROVO (T) VOR/DME 108.4 PVU Chan 21 N40°12.90'

W111°43.28' 179° 29.5 NM to fld. 4493/15E.

VOR/DME unusable:

350°-080° byd 10 NM



OGDEN-HINCKLEY (OGD)(KOGD) 3 SW UTC-7(-6DT) N41°11.74' W112°00.78'

SALT LAKE CITY

4473 B S4 **FUEL** 100, JET A1+ OX 1, 2 TPA—See Remarks Class I, ARFF Index B

H-3D, L-9C, 11D

NOTAM FILE OGD

IAP, AD

RWY 03-21: H8103X150 (ASPH-GRVD) S-85, D-150, 2S-152 HIRL

RWY 03: MALS. PAPI(P4L)—GA 3.0° TCH 56'. Trees. 0.8% down.

RWY 21: PAPI(P4L)—GA 3.0° TCH 50'. Thld dspcd 851'. Pole. Rgt tfc. 0.6% up.

RWY 16-34: H5195X100 (ASPH-GRVD) S-80, D-140 PCN 63 F/A/X/T

MIRL 0.4% up S

RWY 16: REIL. PAPI(P4L)—GA 3.0° TCH 50'. Road. Rgt tfc.

RWY 34: REIL. PAPI(P4L)—GA 3.0° TCH 50'. Sign.

RWY 07-25: H3618X150 (ASPH) S-12.5 0.4% up W

RWY 07: VASI(V4L)—GA 3.5° TCH 50'.

RWY 25: Rgt tfc.

LAND AND HOLD-SHORT OPERATIONS

LDG RWY	HOLD-SHORT POINT	AVBL LDG DIST
RWY 03	07-25	4700
RWY 07	03-21	3500
RWY 21	16-34	4600
RWY 34	07-25	3880

RUNWAY DECLARED DISTANCE INFORMATION

RWY 03: TORA-8103 TODA-8103 ASDA-7252 LDA-7252
RWY 07: TORA-3618 TODA-3618 ASDA-3618 LDA-3618
RWY 16: TORA-5195 TODA-5195 ASDA-5195 LDA-5195
RWY 21: TORA-8103 TODA-8103 ASDA-8103 LDA-7252
RWY 25: TORA-3618 TODA-3618 ASDA-3618 LDA-3618
RWY 34: TORA-5195 TODA-5195 ASDA-5195 LDA-5195

AIRPORT REMARKS: Attended continuously. Parachute jumping on NE portion of arpt east of Twy A. No multiple approaches. Heavy volume of Military acft flying over Ogden Arpt at 5700'-6300' MSL enroute to Hill AFB. No practice approaches—full stop lds only from 0500-1400Z±. Rwy 07-25 numerous large and deep cracks, break-outs and ravelling. Rwy 07-25 massive crack-sealing has obliterated much of the marking. CLOSED to acft ops with more than 30 passenger seats except PPR, minimum 60 min notice required, call arpt manager 801-629-8223/336-7459/710-3706. No snow removal after twr closes. Arpt sfc condition unmonitored 0300-1400Z±. TPA—5200(727) rqr due to interfacing tfc from Hill AFB. When twr clsd ACTIVATE HIRL Rwy 03-21, MIRL Rwy 16-34 and twy lgts—CTAF. Rwy 07-25 not avbl when twr clsd.

AIRPORT MANAGER: 801-629-8223

WEATHER DATA SOURCES: ASOS (801) 622-5600

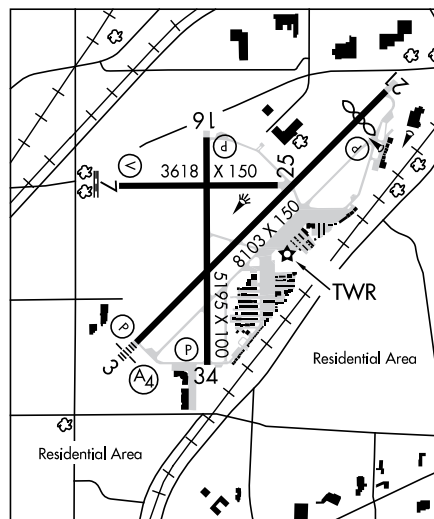


Figure 201. Excerpt from Chart Supplement.

UTAH

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CONTINUED FROM PRECEDING PAGE

COMMUNICATIONS: CTAF 118.7 ATIS 125.55 UNICOM 122.95
RCO 122.45 (CEDAR CITY RADIO)

Ⓡ SALT LAKE CITY APP/DEP CON 121.1

TOWER 118.7 (1400-0300Z±) GND CON 121.7

AIRSPACE: CLASS D svc 1400-0300Z± other times CLASS E.

RADIO AIDS TO NAVIGATION: NOTAM FILE OGD.

(L) VORTACW 115.7 OGD Chan 104 N41°13.45' W112°05.89' 100° 4.2 NM to fld. 4223/14E.

VOR portion unusable:
030°-070° byd 25 NM blo 17,000'
070°-130° byd 15 NM
355°-030° byd 15 NM

TACAN and DME unusable:
255°-280° byd 30 NM blo 11,000'
355°-130° byd 15 NM

ILS/DME 111.7 I-OGD Chan 54 Rwy 03. Class IT. ILS/DME unmonitored when ATCT closed.

COMM/NAV/WEATHER REMARKS: Emerg frequency 121.5 not avbl at twr.

PANGUITCH MUNI (U55) 3 NE UTC-7(-6DT) N37°50.71' W112°23.52'

LAS VEGAS
H-3D, L-9C
IAP

6763 B S2 NOTAM FILE CDC

RWY 18-36: H5700X75 (ASPH) S-20 MIRL

RWY 18: PAPI(P2L)—GA 3.0° TCH 40'.

RWY 36: PAPI(P2L)—GA 3.0° TCH 40'.

AIRPORT REMARKS: Unattended. Antelope on and in vicinity of arpt during summer months. ACTIVATE MIRL Rwy 18-36 and PAPI Rwy 18 and Rwy 36—CTAF.

AIRPORT MANAGER: 435-676-8585

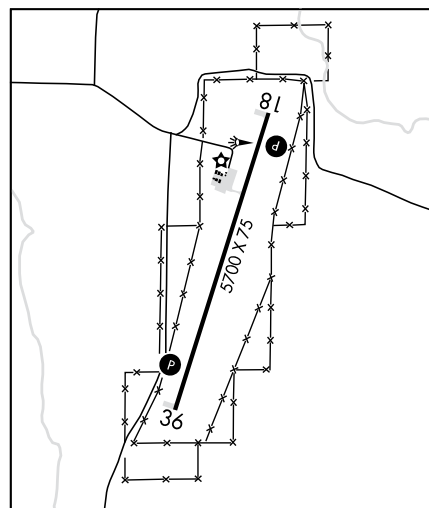
WEATHER DATA SOURCES: AWOS-3 133.125 (435) 676-8784.

COMMUNICATIONS: CTAF 122.9

Ⓡ SALT LAKE CENTER APP/DEP CON 133.6

RADIO AIDS TO NAVIGATION: NOTAM FILE BCE.

BRYCE CANYON (H) VORTACW 112.8 BCE Chan 75 N37°41.35'
W112°18.23' 321° 10.2 NM to fld. 9040/15E.



PAROWAN (1L9) 1 NE UTC-7(-6DT) N37°51.58' W112°48.95'

LAS VEGAS
H-3D, L-9C

5930 B S3 FUEL 100LL, JET A OX 1, 2, 4 NOTAM FILE CDC

RWY 04-22: H5000X75 (ASPH) S-12.5 MIRL 1.3% up SW

RWY 04: REIL. PAPI(P2L)—GA 3.0° TCH 40'. Fence.

RWY 22: REIL. PAPI(P2L)—GA 3.0° TCH 40'. Road. Rgt tfc.

AIRPORT REMARKS: Attended 1500-0000Z±. Prairie dog mounds and holes on rwy edges and twy. REIL Rwy 04 OTS indef. ACTIVATE MIRL Rwy 04-22, PAPI Rwy 04 and PAPI Rwy 22, REIL Rwy 04 and REIL Rwy 22—CTAF.

AIRPORT MANAGER: 435-477-8911

COMMUNICATIONS: CTAF/UNICOM 122.8

RADIO AIDS TO NAVIGATION: NOTAM FILE CDC.

CEDAR CITY (H) VORW/DME 117.3 CDC Chan 120 N37°47.24'
W113°04.09' 054° 12.8 NM to fld. 5464/16E.

VOR/DME unusable:
060°-100° byd 20 NM
100°-135° byd 15 NM
135°-175° byd 20 NM
215°-255° byd 35 NM blo 10,500'

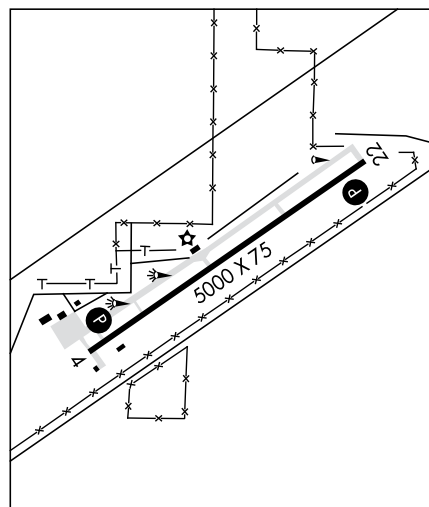


Figure 201A. Excerpt from Chart Supplement.

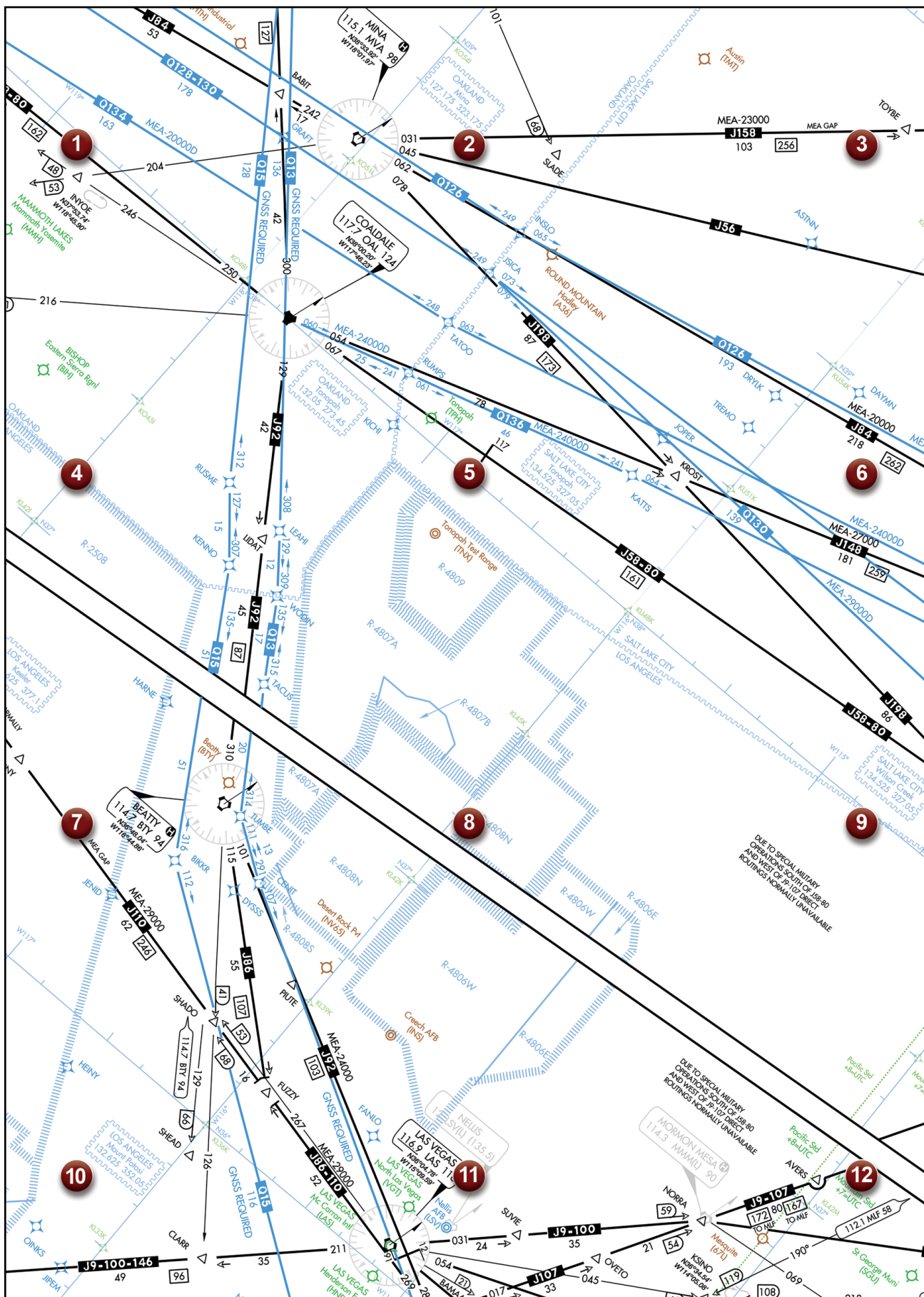


Figure 204. High Altitude Airways.

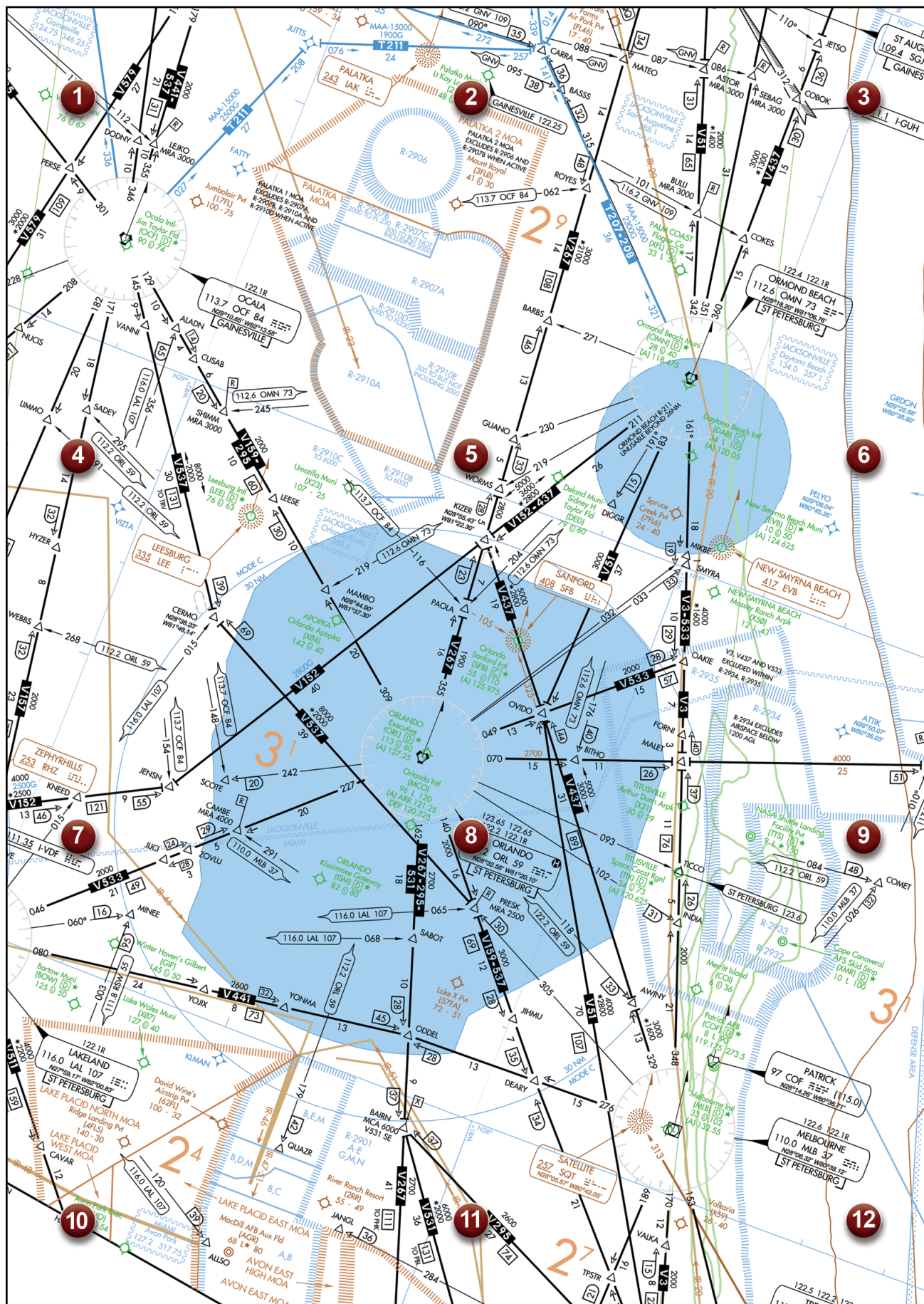


Figure 211. Low Altitude Airways.

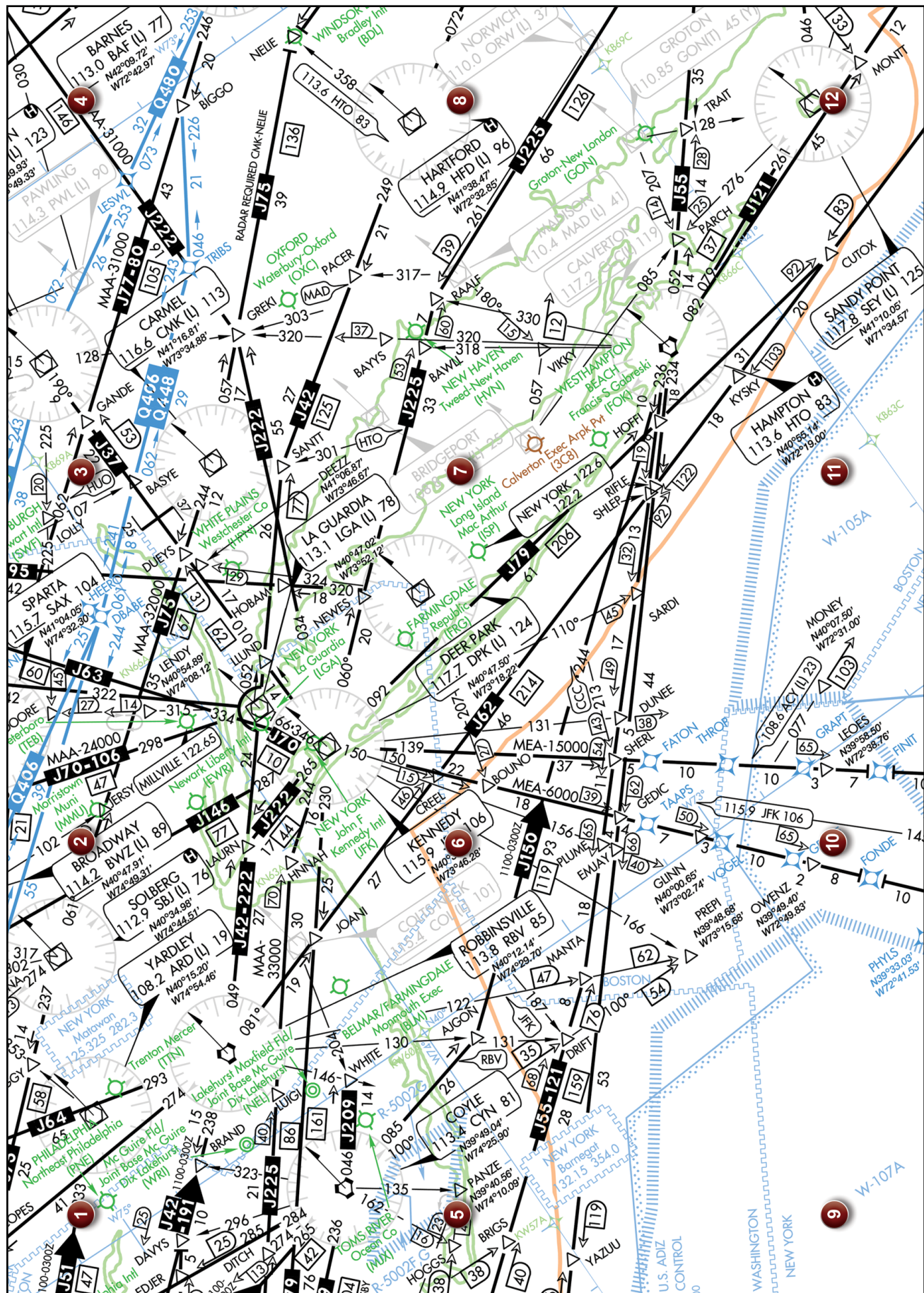


Figure 217. High Altitude Airways.

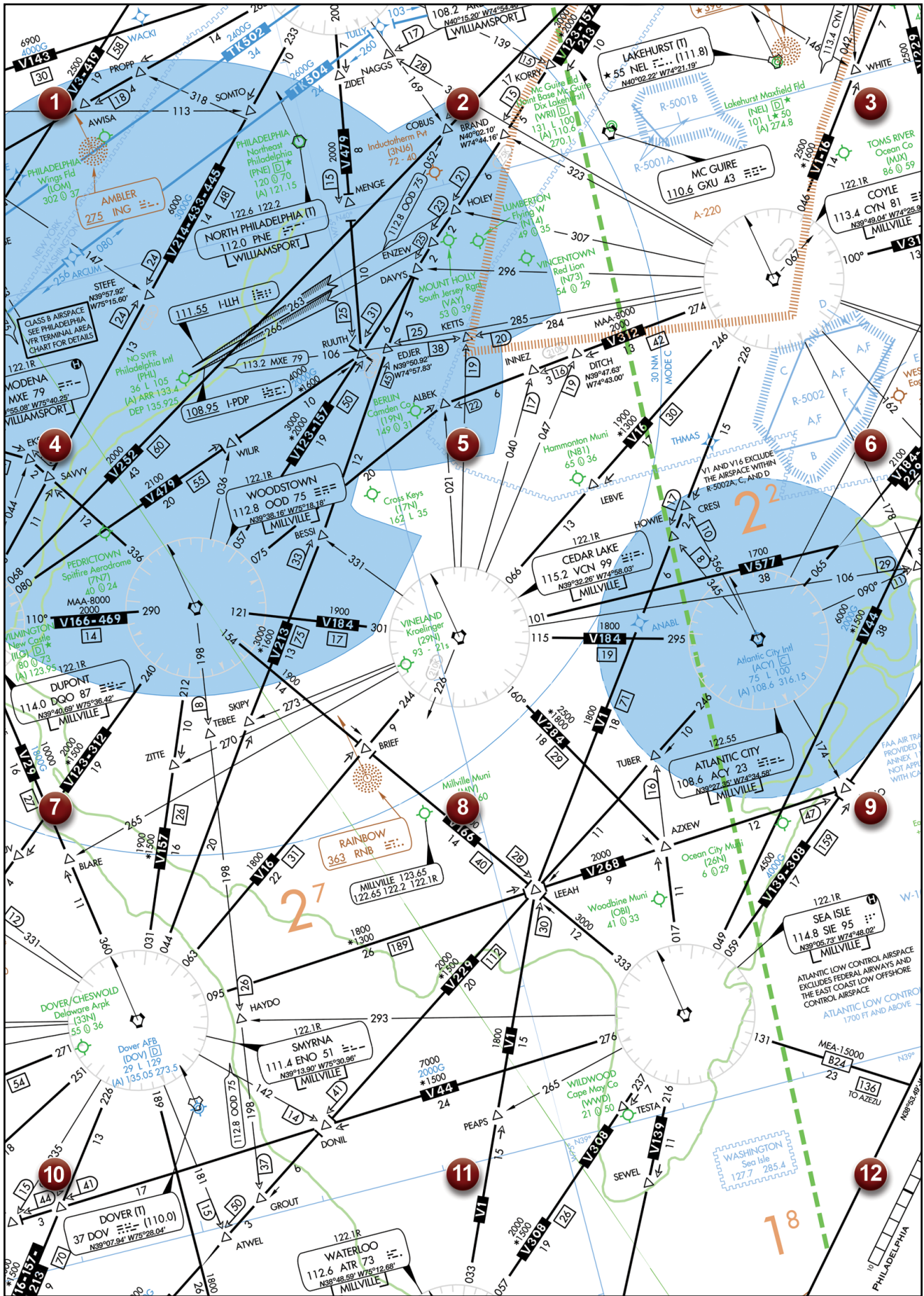


Figure 218. Low Altitude Airways.

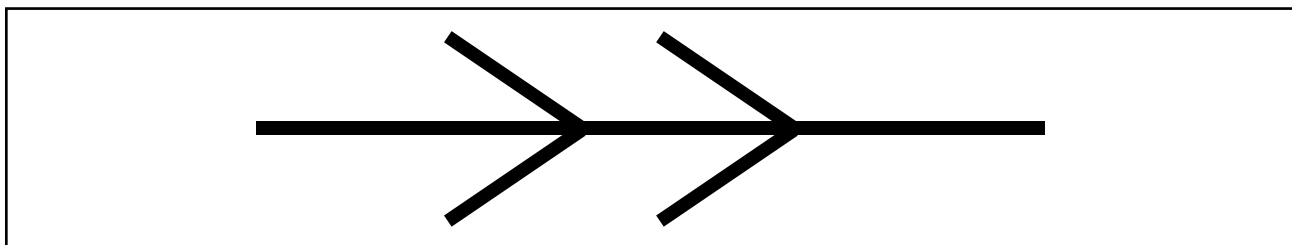


Figure 219. Chart and Navigation Symbol.

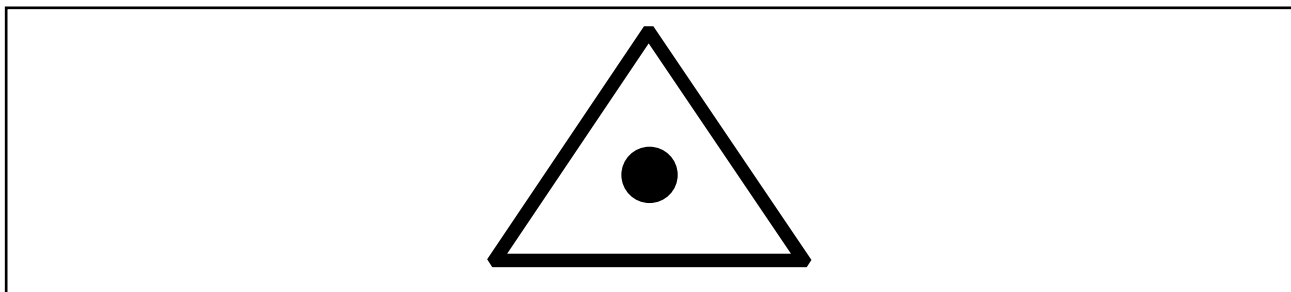


Figure 220. Chart and Navigation Symbol.

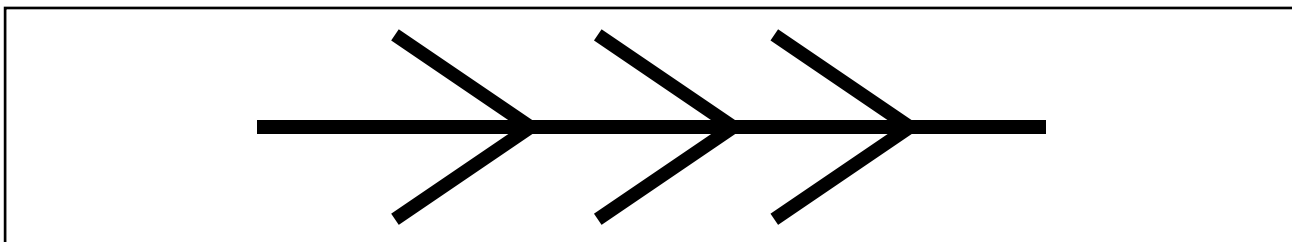


Figure 221. Chart and Navigation Symbol.

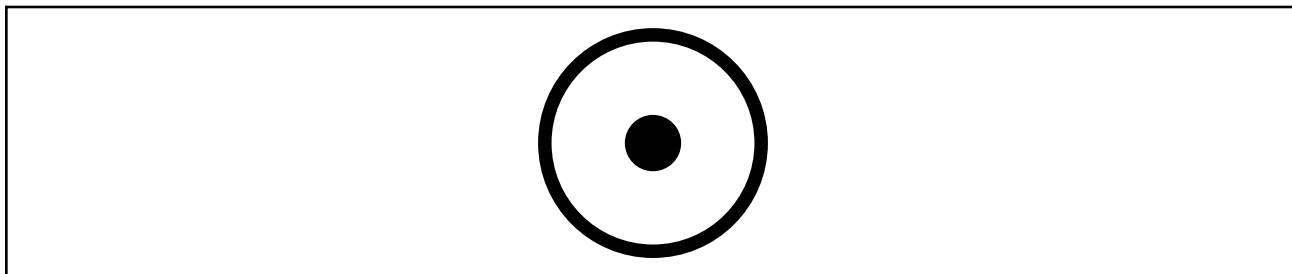


Figure 222. Chart and Navigation Symbol.



Figure 223. Airport Sign and Marking.



Figure 224. Airport Sign and Marking.

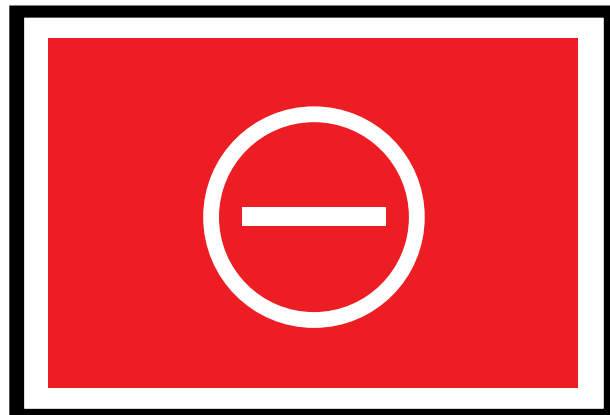


Figure 225. Airport Sign.



Figure 226. Airport Sign.



Figure 227. Airport Sign.

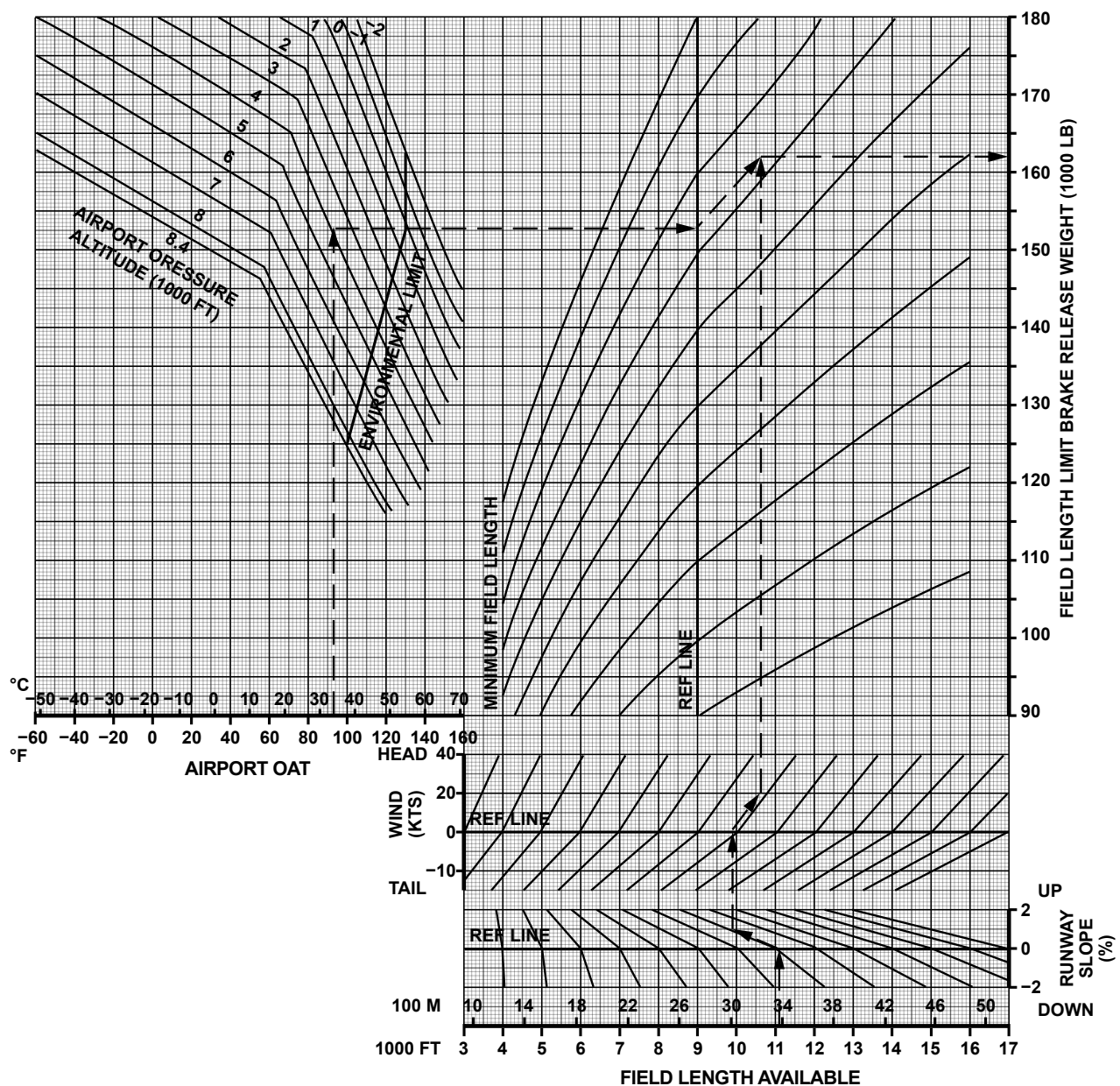


Figure 228. Airport Sign.

Takeoff Field Limit - Dry Runway

Flaps 10

Based on engine bleed for packs on and anti-ice off



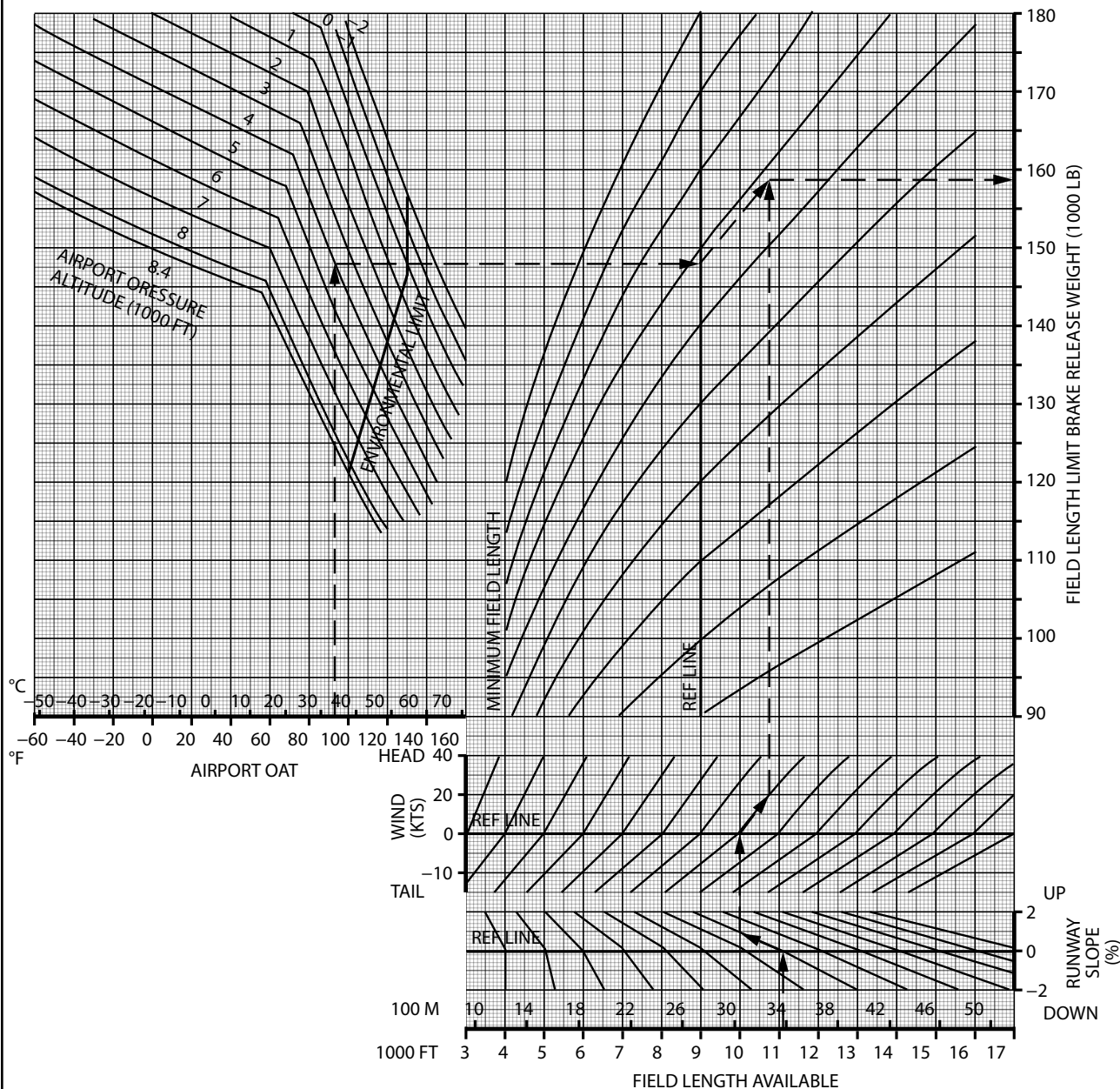
With engine bleed for packs off, increase weight by 900 lb.
 With engine anti-ice on, decrease weight by 450 lb.
 With engine and wing anti-ice on, decrease weight by 1800 lb (optional system).

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



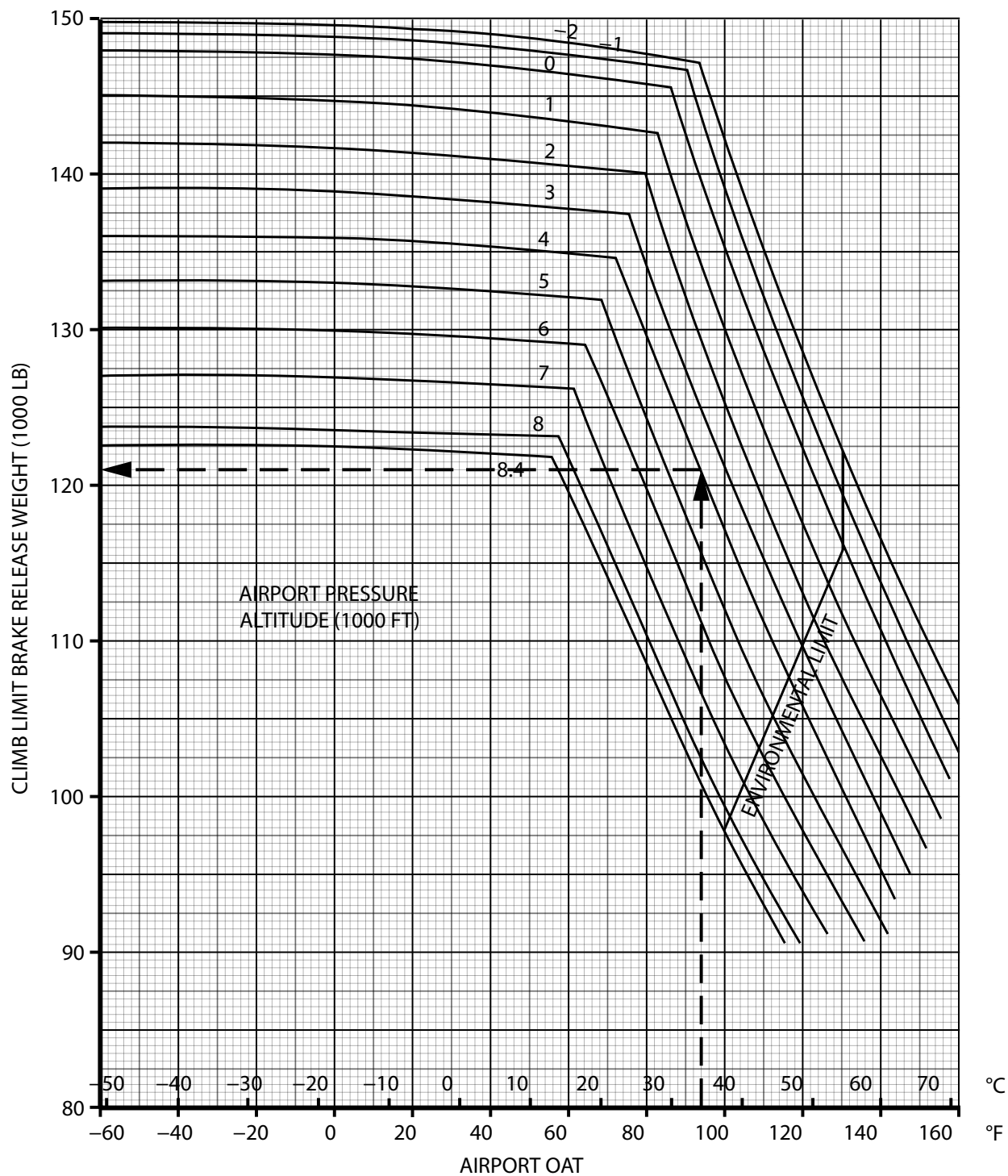
With engine bleed for packs off, increase weight by 1000 lb.
 With engine anti-ice on, decrease weight by 450 lb.
 With engine and wing anti-ice on, decrease weight by 1800 lb (optional system).

Figure 230. Takeoff Field Limit—Dry Runway.

Takeoff Climb Limit

Flaps 15

Based on engine bleed for packs on and anti-ice off



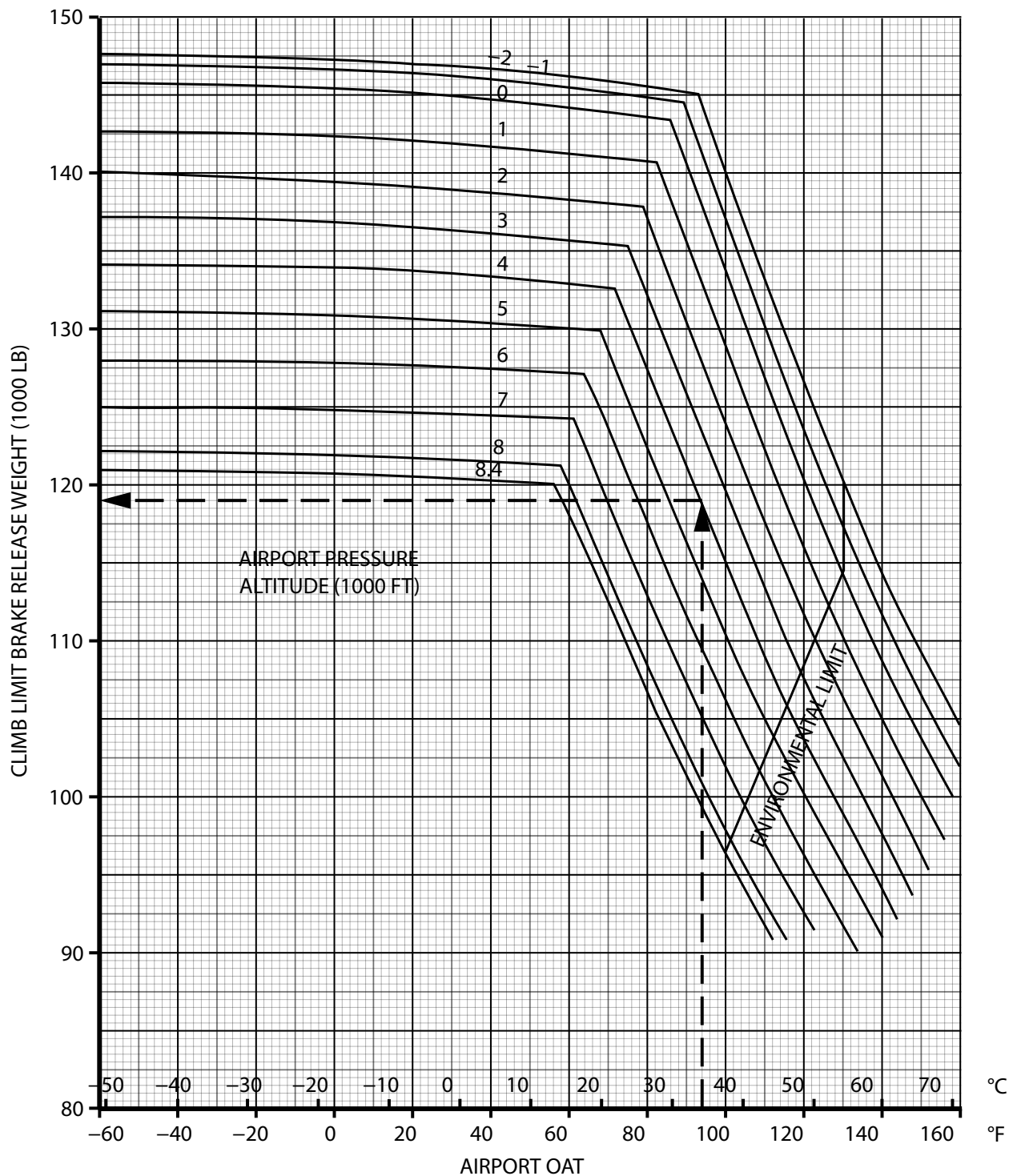
With engine bleed for packs off, increase weight by 2400 lb.
 With engine anti-ice on, decrease weight by 400 lb.
 With engine and wing anti-ice on, decrease weight by 2300 lb (optional system).

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.

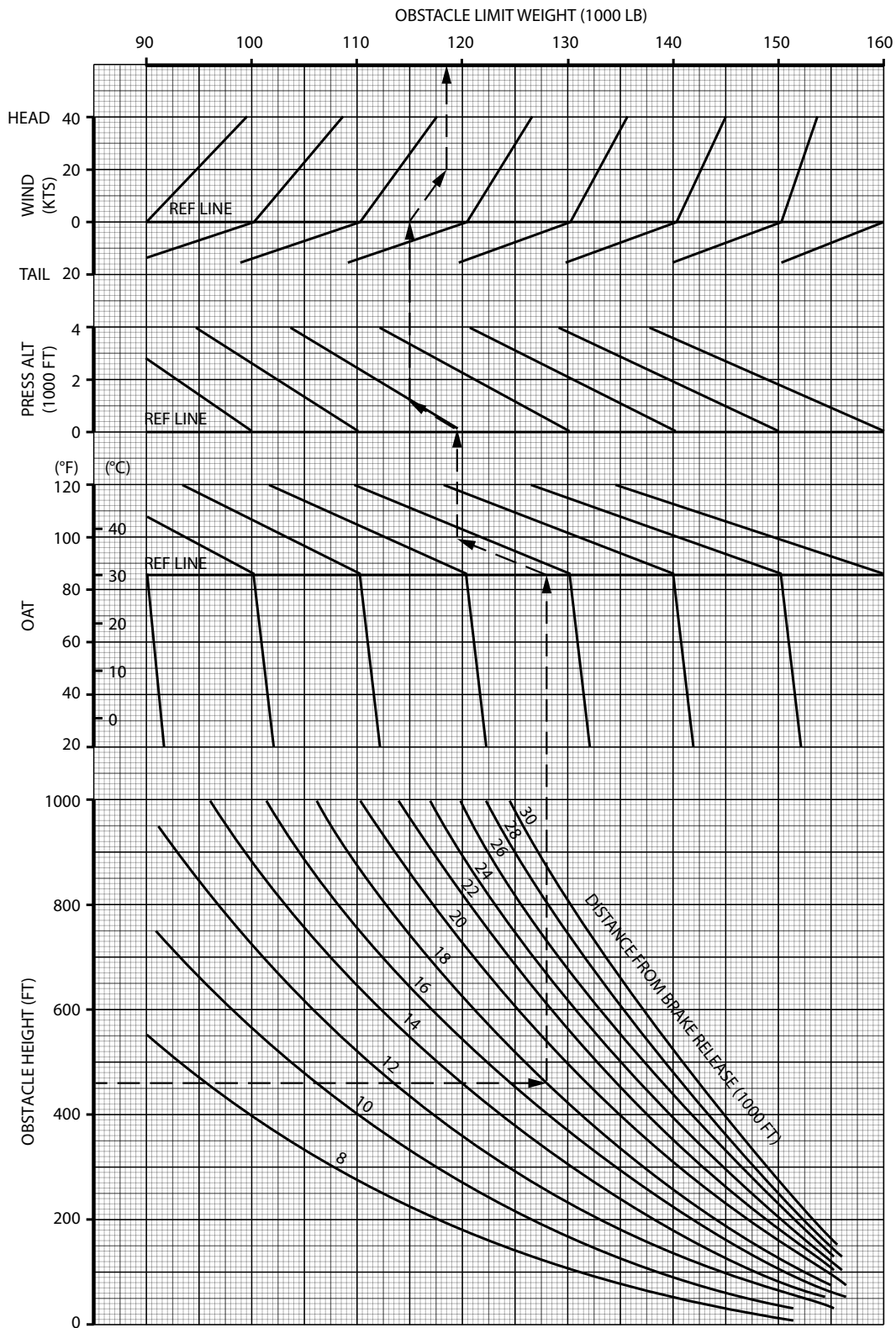
With engine and wing anti-ice on, decrease weight by 2300 lb (optional system).

Figure 232. Takeoff Climb Limit.

Obstacle Limit

Flaps 15

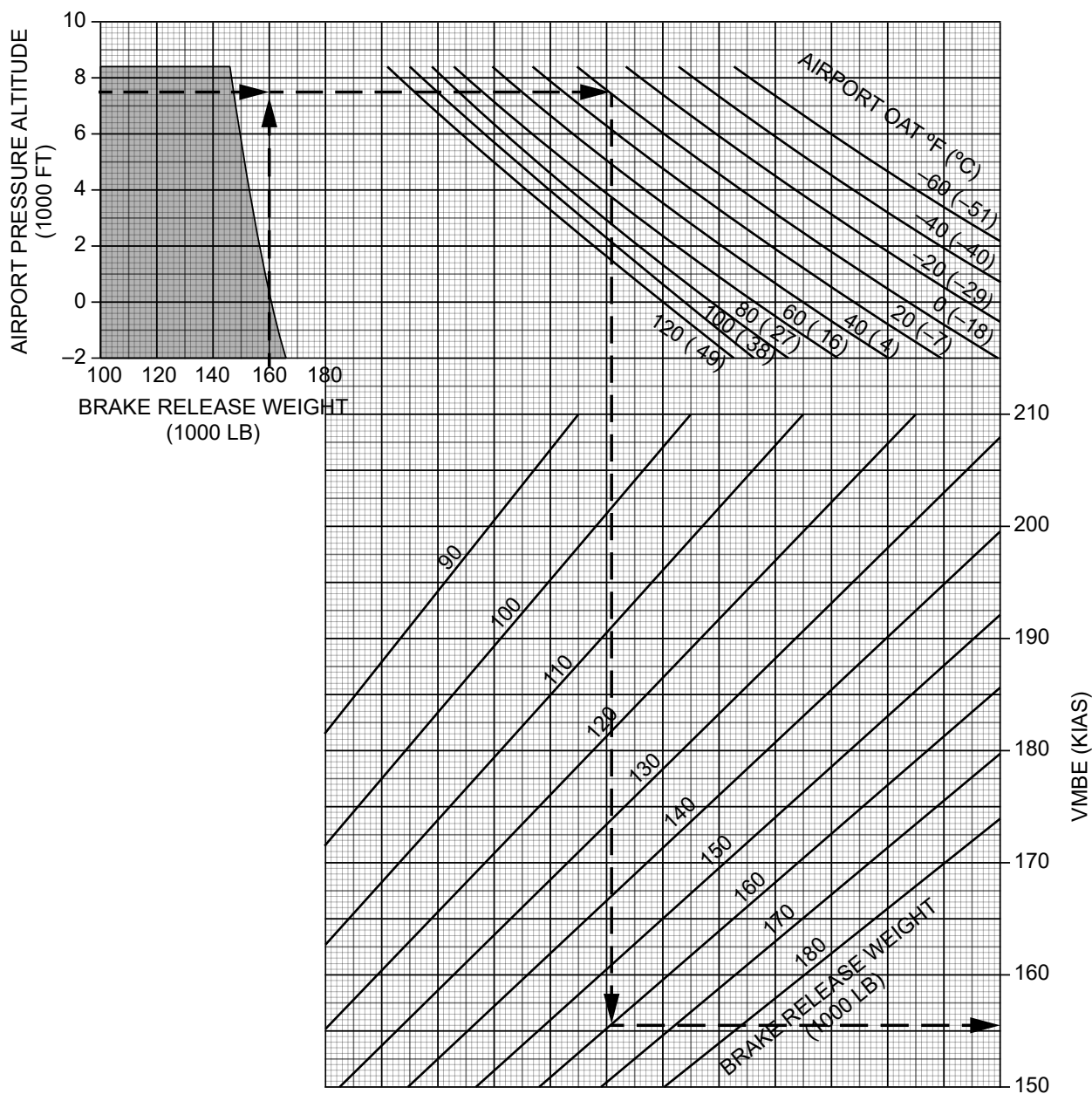
Based on engine bleed for packs on and anti-ice off



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.

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	6	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	-2
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	126	131	136
160	128	135	141	128	132	138	121	126	133
150	123	131	137	122	128	135	115	122	129
140	117	126	133	117	123	131	109	117	125
130	111	121	129	111	118	127	103	111	121
120	105	115	124	104	113	122	97	106	116
110	99	109	119	98	107	117	91	100	111
100	92	103	114	92	101	112	84	94	106
90	86	97	109	85	95	107			

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	10	10	3	4	5	6	6	6	-2	-2	-2	-3	-3	-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 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.

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HOT SPOTS

An "airport surface hot spot" is a location on an aerodrome movement area with a history or potential risk of collision or runway incursion, and where heightened attention by pilots/drivers is necessary.

A "hot spot" is a runway safety related problem area on an airport that presents increased risk during surface operations. Typically it is a complex or confusing taxiway/taxiway or taxiway/runway intersection. The area of increased risk has either a history of or potential for runway incursions or surface incidents, due to a variety of causes, such as but not limited to: airport layout, traffic flow, airport marking, signage and lighting, situational awareness, and training. Hot spots are depicted on airport diagrams as open circles or polygons designated as "HS 1", "HS 2", etc. and tabulated in the list below with a brief description of each hot spot. Hot spots will remain charted on airport diagrams until such time the increased risk has been reduced or eliminated.

CITY/AIRPORT	HOT SPOT	DESCRIPTION*
CARLSBAD, CA MC CLELLAN-PALOMAR (CRQ)	HS 1	Large Jets may obscure twr visibility of small aircraft.
CHINO, CA CHINO (CNO)	HS 1 HS 2	Twy D close proximity to Rwy 08L-26R. Twy L close proximity to Rwy 03-21.
HAWTHORNE, CA JACK NORTHROP FIELD/ HAWTHORNE MUNI (HHR)	HS 1	Rwy 25 run-up area.
LONG BEACH, CA LONG BEACH (DAUGHERTY FLD) (LGB)	HS 1 HS 2 HS 3 HS 4 HS 5 HS 6 HS 7	Rwy 30 and Rwy 07L-25R, Twy A and Twy D. Rwy 12-30 and Rwy 07L-25R, Twy B and Twy K. Rwy 07R-25L, Twy B. Rwy 07R-25L and Rwy 12-30, Twy J and Twy D. Rwy 16R-34L, southwest ramp, Twy F and Twy B. Rwy 34R and Rwy 07R-25L. Rwy 12-30 cross every other rwy.
LOS ANGELES, CA LOS ANGELES INTL (LAX)	HS 1	Twy R not visible from the control twr.
PALM SPRINGS, CA PALM SPRINGS INTL (PSP)	HS 1 HS 2 HS 3 HS 4	Twy C mistaken for Rwy 13R-31L or Rwy 13L-31R. Int of Twy B and Twy C. Twy B and Rwy 31R. Twy C and Twy J.
RIVERSIDE, CA RIVERSIDE MUNI (RAL)	HS 1 HS 2	Rwy 27, Twy C. ATC non-visibility area.
SAN DIEGO, CA MONTGOMERY FLD (MYF)	HS 1 HS 2 HS 3	Rwy 10R-28L, Twy G and Twy H. Rwy 28R and Rwy 28L, Twys G. Rwy 28R and Rwy 28L, Twys F.
SANTA ANA, CA JOHN WAYNE ARPT-ORANGE COUNTY (SNA)	HS 1 HS 2 HS 3	Rwy 19L and Rwy 19R, Twy L and Twy K. Rwy 19L and Rwy 19R, Twy H. Twy A, Twy H, and Twy C.

(SEE CONTINUATION PAGE FOR MORE LISTINGS)

Figure 241. Hot Spots.

HOT SPOTS		
(CONTINUED)		
CITY/AIRPORT	HOT SPOT	DESCRIPTION*
SANTA BARBARA, CA SANTA BARBARA MUNI (SBA)	HS 1	Rwy 07-25, Twy C.
	HS 2	Rwy 15L and Rwy 15R, Twy C, wide pavement.
	HS 3	Rwy 15L-33R, Rwy 15R-33L, Rwy 07-25. Rwy 15L-33R and Rwy 15R-33L utilized for taxi.
	HS 4	Rwy 25, Twy H and Twy J.
SANTA MARIA, CA CAPTAIN G. ALLAN HANCOCK FLD (SMX)	HS 1	Twy A, Twy C, and Twy D.
	HS 2	Rwy 20 and Twy A.
	HS 3	Rwy 12 and Twy B.
VICTORVILLE, CA SOUTHERN CALIFORNIA LOGISTICS (VCV)	HS 1	Wrong rwy departure risk.

Figure 241A. Hot Spots.

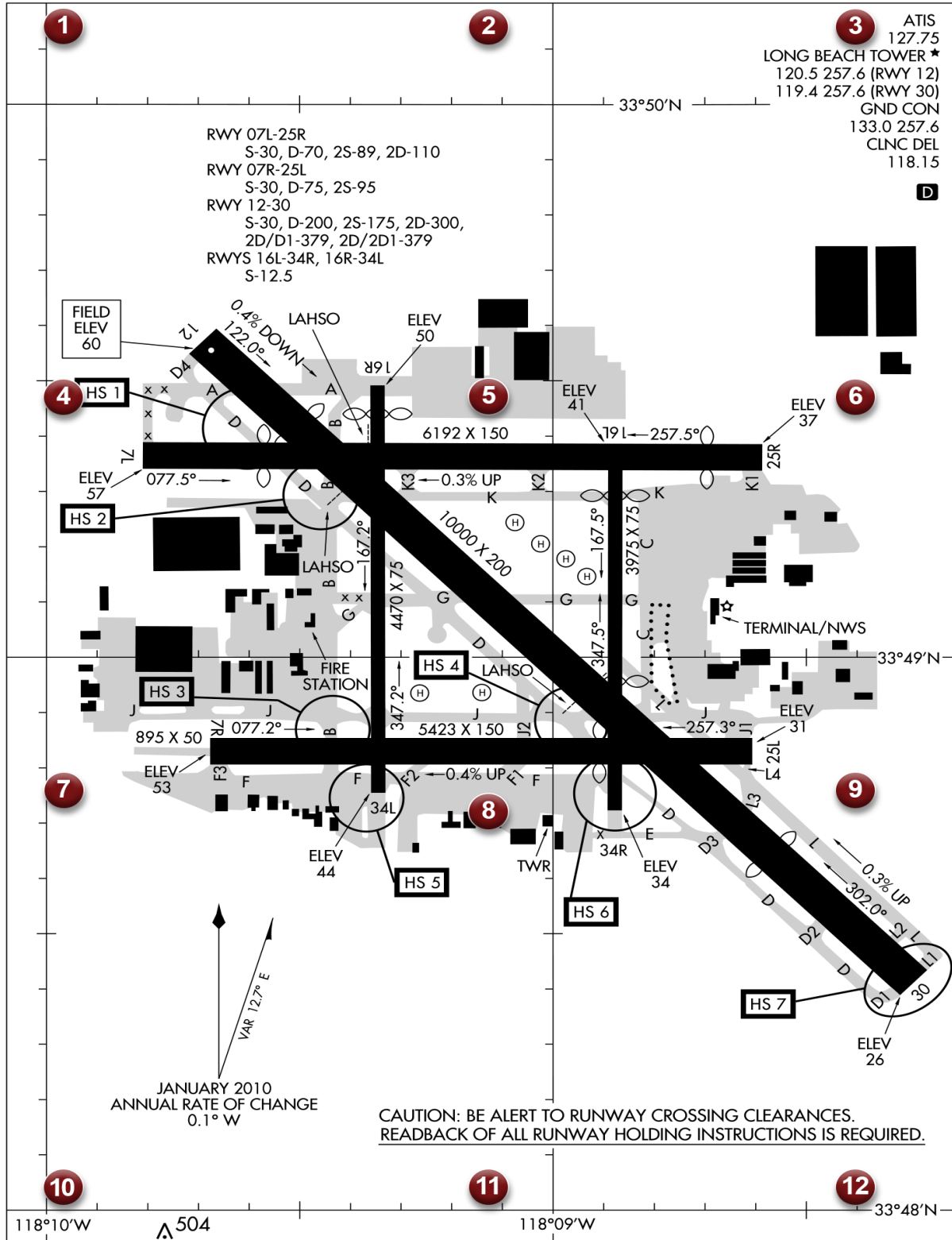
10266

AIRPORT DIAGRAM

AL-236 (FAA)

LONG BEACH (DAUGHERTY FIELD) (LGB)

LONG BEACH, CALIFORNIA



AIRPORT DIAGRAM

LONG BEACH, CALIFORNIA
LONG BEACH (DAUGHERTY FIELD) (LGB)

10266

Figure 242. Airport Diagram (LGB).

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HOT SPOTS

An "airport surface hot spot" is a location on an aerodrome movement area with a history or potential risk of collision or runway incursion, and where heightened attention by pilots/drivers is necessary.

A "hot spot" is a runway safety related problem area on an airport that presents increased risk during surface operations. Typically it is a complex or confusing taxiway/taxiway or taxiway/runway intersection. The area of increased risk has either a history of or potential for runway incursions or surface incidents, due to a variety of causes, such as but not limited to: airport layout, traffic flow, airport marking, signage and lighting, situational awareness, and training. Hot spots are depicted on airport diagrams as open circles or polygons designated as "HS 1", "HS 2", etc. and tabulated in the list below with a brief description of each hot spot. Hot spots will remain charted on airport diagrams until such time the increased risk has been reduced or eliminated.

CITY/AIRPORT	HOT SPOT	DESCRIPTION*
DAYTONA BEACH, FL DAYTONA BEACH INTL (DAB)	HS 1	Int of Twy W and Twy S.
FORT LAUDERDALE, FL FORT LAUDERDALE- HOLLYWOOD INTL (FLL)	HS 1 HS 2 HS 3 HS 4 HS 5	Twy E at Rwy 09L-27R. Twy D at Rwy 09L-27R. Twy Q at Rwy 09L-27R. Twy E int departure for Rwy 27L. Twy departure risk. Twy B instead of Rwy 09L.
HOLLYWOOD, FL NORTH PERRY (HWO)	HS 1 HS 2 HS 3	Southbound on Twy D for Rwy 27R departures. The hold line for Rwy 36L is also the hold line for Rwy 09R. Aircraft taxiing on Twy L westbound to depart on Rwy 18R-36L.
MIAMI, FL MIAMI INTL (MIA)	HS 1 HS 2 HS 3 HS 4	Short twy risk. Short twy risk. Rwy 27 and Rwy 30 wrong rwy departure risk. Short twy between rwys.
MIAMI, FL OPA-LOCKA EXECUTIVE (OPF)	HS 1	Surface painted LOCATION and DIRECTION signs ONLY.
ORLANDO, FL ORLANDO SANFORD INTL (SFB)	HS 1 HS 2	Twy C is beyond the Rwy 09C APCH hold sign and marking. Hold line for Rwy 09R on Twy R northbound is adjacent to Twy S.
STUART, FL WITHAM FIELD (SUA)	HS 1 HS 2	Intersecting rwys, wrong rwy departure risk. Rwy 12 and Twy A1.

*See appropriate A/FD, Alaska or Pacific Supplement HOT SPOT table for additional information.

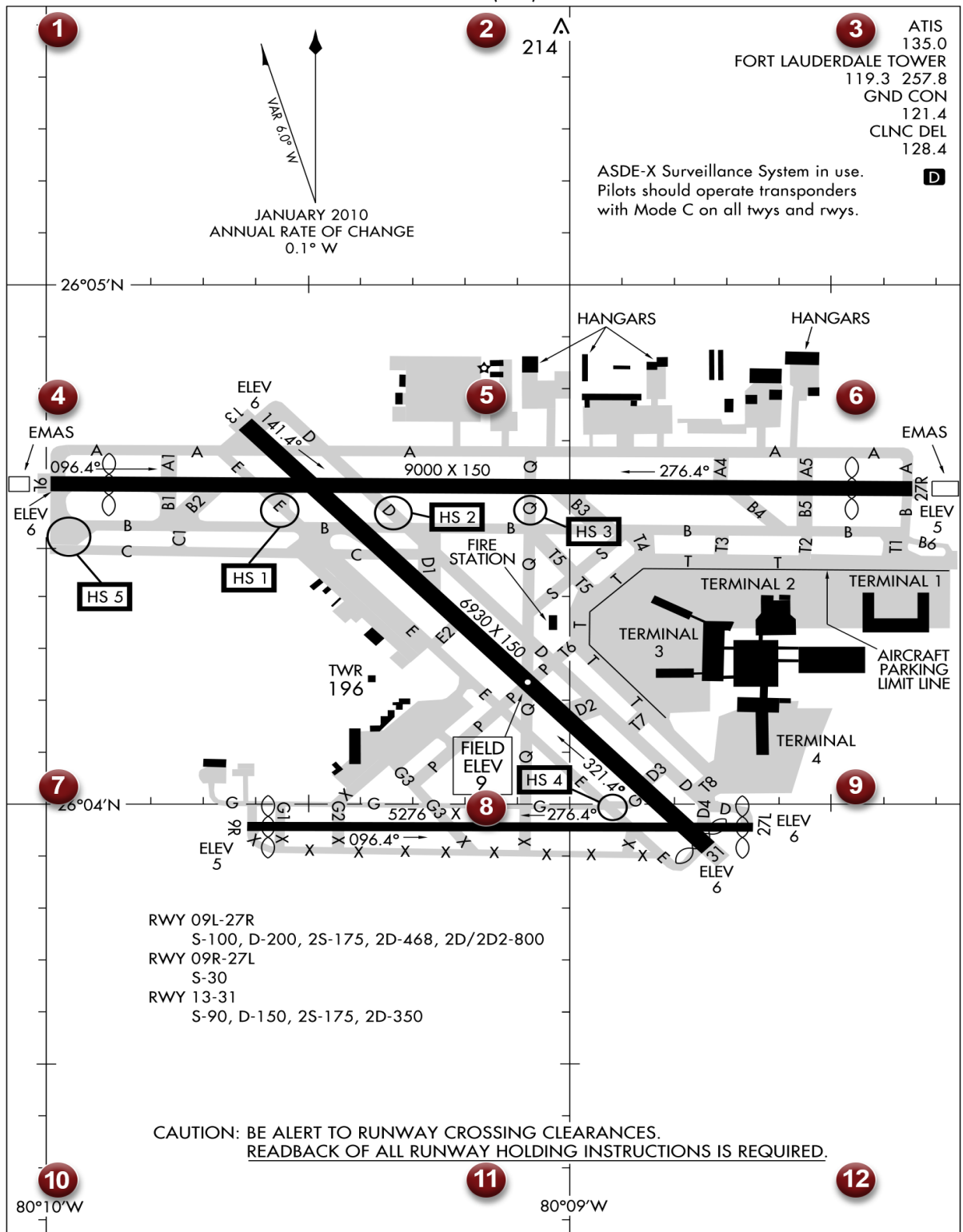
11069

Figure 243. Hot Spots.

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AIRPORT DIAGRAM

FORT LAUDERDALE-HOLLYWOOD INTL (FLL)
AL-744 (FAA) FORT LAUDERDALE, FLORIDA



AIRPORT DIAGRAM

FORT LAUDERDALE, FLORIDA
FORT LAUDERDALE-HOLLYWOOD INTL (FLL)

11069

Figure 244. Airport Diagram (FLL).

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HOT SPOTS

An "airport surface hot spot" is a location on an aerodrome movement area with a history or potential risk of collision or runway incursion, and where heightened attention by pilots/drivers is necessary.

A "hot spot" is a runway safety related problem area on an airport that presents increased risk during surface operations. Typically it is a complex or confusing taxiway/taxiway or taxiway/runway intersection. The area of increased risk has either a history of or potential for runway incursions or surface incidents, due to a variety of causes, such as but not limited to: airport layout, traffic flow, airport marking, signage and lighting, situational awareness, and training. Hot spots are depicted on airport diagrams as open circles or polygons designated as "HS 1", "HS 2", etc. and tabulated in the list below with a brief description of each hot spot. Hot spots will remain charted on airport diagrams until such time the increased risk has been reduced or eliminated.

CITY/AIRPORT	HOT SPOT	DESCRIPTION*
CHANDLER, AZ CHANDLER MUNI (CHD)	HS 1	Rwy 22R may be used as an alternate taxi route.
LAS VEGAS, NV HENDERSON EXECUTIVE (HND)	HS 1	Twy H, Twy G, and Rwy 17R.
	HS 2	Twy E and ramp area. High volume of traffic.
	HS 3	Twy A and run up area. Twy A being confused for Rwy 35L.
LAS VEGAS, NV McCARRAN INTL (LAS)	HS 1	Rwy 01R-19L, Twy S and the ramp.
	HS 2	Rwy 01R-19L and Rwy 01L-19R, Twy U.
	HS 3	Rwy 01R-19L and Rwy 01L-19R, Twy Y.
	HS 4	Rwy 07L and Rwy 01L, co-located rwy holding position markings.
	HS 5	Twy E.
LAS VEGAS, NV NORTH LAS VEGAS (VGT)	HS 1	Rwy 07, Twy G and Twy F.
	HS 2	Rwy 12R, Twy G.
	HS 3	Rwy 12R, Twy A and Twy B.
	HS 4	Rwy 12L, Twy A.
MESA, AZ FALCON FIELD (FFZ)	HS 1	Rwy 04R-22L, Twy B and Twy D.
MINDEN, NV MINDEN-TAHOE (MEV)	HS 1	Complex int.
	HS 2	Frequent crossings for sailplane operations.
OGDEN, UT OGDEN-HINCKLEY (OGD)	HS 1	Twy D intersects Rwy 25 at north edge of Rwy 03-21. Wrong rwy departure risk.
	HS 2	Confusing twy int in close proximity to rwy.
PHOENIX, AZ PHOENIX DEER VALLEY (DVT)	HS 1	Inadvertent Rwy 07R-25L crossings from Twy B5.
	HS 2	Inadvertent Rwy 07R-25L crossings from Twy B9.
PHOENIX, AZ PHOENIX-MESA GATEWAY (IWA)	HS 1	Twy V, Twy B, and Twy K complex int.
PHOENIX, AZ PHOENIX SKY HARBOR INTL (PHX)	HS 1	Pilots sometimes mistake Twy F for Rwy 07L or Rwy 07R.
	HS 2	Pilots sometimes cross Rwy 07L-25R at Twy F8, Twy F9, or Twy F10, without authorization.
	HS 3	Aircraft taxiing from southern ramps have turned onto Rwy 25L when given instructions to cross Rwy 25L at Twy H3.

(SEE CONTINUATION PAGE FOR MORE LISTINGS)

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Figure 245. Hot Spots.

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HOT SPOTS		
(CONTINUED)		
CITY/AIRPORT	HOT SPOT	DESCRIPTION*
PRESCOTT, AZ ERNEST A. LOVE FLD (PRC)	HS 1	Not visible from the twr.
	HS 2	Complex int.
	HS 3	Complex int.
	HS 4	Not visible from the twr.
	HS 5	Frequent rwy crossings.
PROVO, UT PROVO MUNI (PVU)	HS 1	Twy A and Twy A3 close proximity to ramp and rwys.
RENO, NV RENO/TAHOE INTL (RNO)	HS 1	Rwy 07-25, Twy A and Twy B.
	HS 2	Twy C and the ramp.
	HS 3	Rwy 16L, Twy C and Twy D.
SALT LAKE CITY, UT SALT LAKE CITY INTL (SLC)	HS 1	Hold line on apch end of Rwy 32 protects Rwy 35.
	HS 2	Confusing int. Twy K2 ramp in close proximity to Rwy 17-35.
	HS 3	Area not visible from control twr. Hold line at K1 in close proximity to ramp, protects Rwy 32 and Rwy 35.
	HS 4	Intermittent radio reception with ATC at apch end of Rwy 16L for some aircraft.
TUCSON, AZ RYAN FIELD (RYN)	HS 1	Rwy 33 and Rwy 06R, Twy B.
TUCSON, AZ TUCSON INTL (TUS)	HS 1	Twy A, Twy D and Twy A3, complex int.
	HS 2	Rwy 11L and Rwy 11R apch areas.
	HS 3	Rwy 29R and Rwy 29L.
	HS 4	Twy A5 and Twy A6 in close proximity of Rwy 11L-29R.

*See appropriate A/FD, Alaska or Pacific Supplement HOT SPOT table for additional information.

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Figure 245A. Hot Spots.

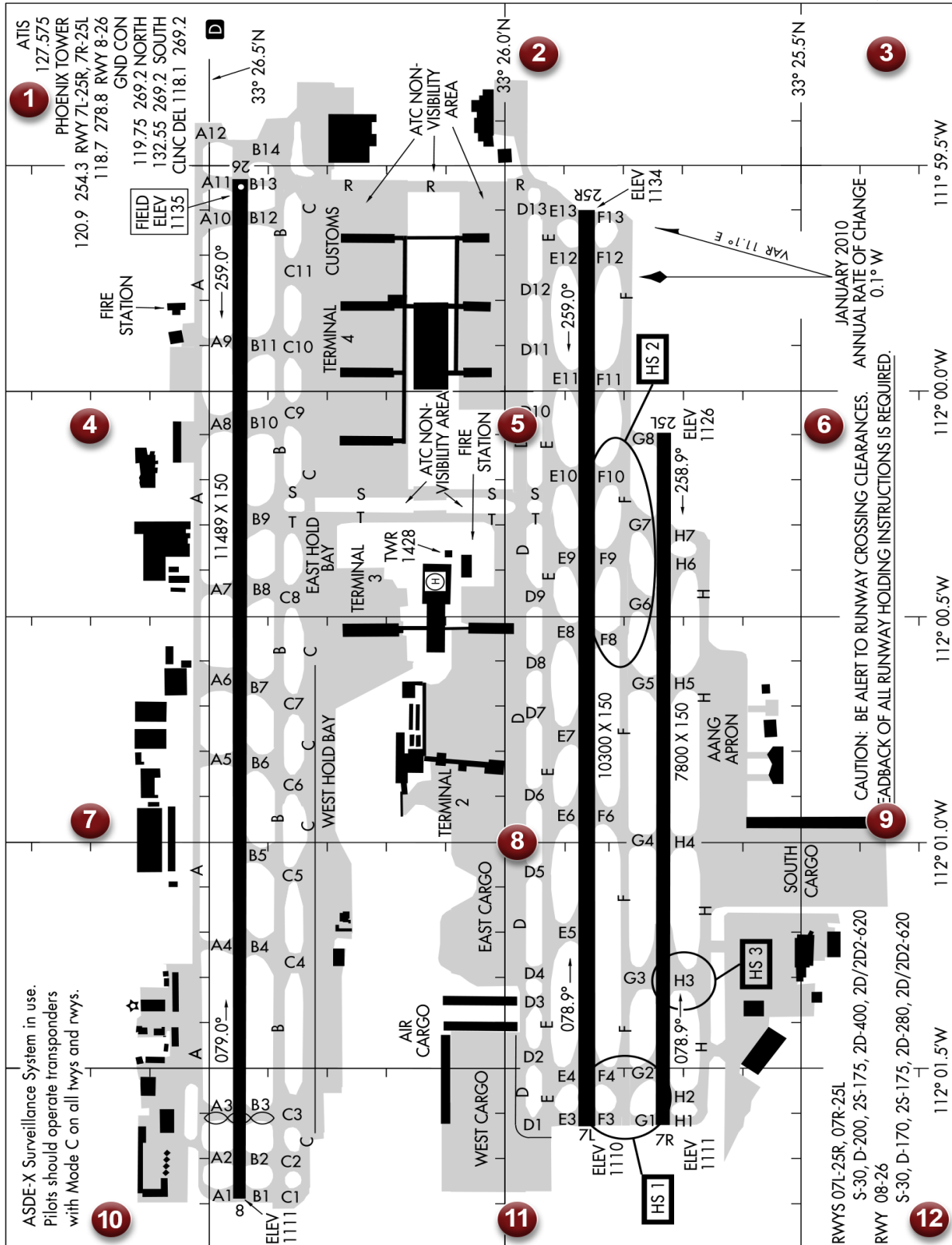
11013

AIRPORT DIAGRAM

PHOENIX SKY HARBOR INTL (PHX)

AL-322 (FAA)

PHOENIX, ARIZONA



JANUARY 2010
ANNUAL RATE OF CHANGE
0.1° W
CAUTION: BE ALERT TO RUNWAY CROSSING CLEARANCES. ANNUAL RATE OF CHANGE
0.1° W
REARBACK OF ALL RUNWAY HOLDING INSTRUCTIONS IS REQUIRED.

AIRPORT DIAGRAM

PHOENIX, ARIZONA

PHOENIX SKY HARBOR INTL (PHX)

11013

RWYS 07L-25R, 07R-25L
S-30, D-200, 2S-175, 2D-400, 2D/2D2-620
RWY 08-26
S-30, D-170, 2S-175, 2D-280, 2D/2D2-620

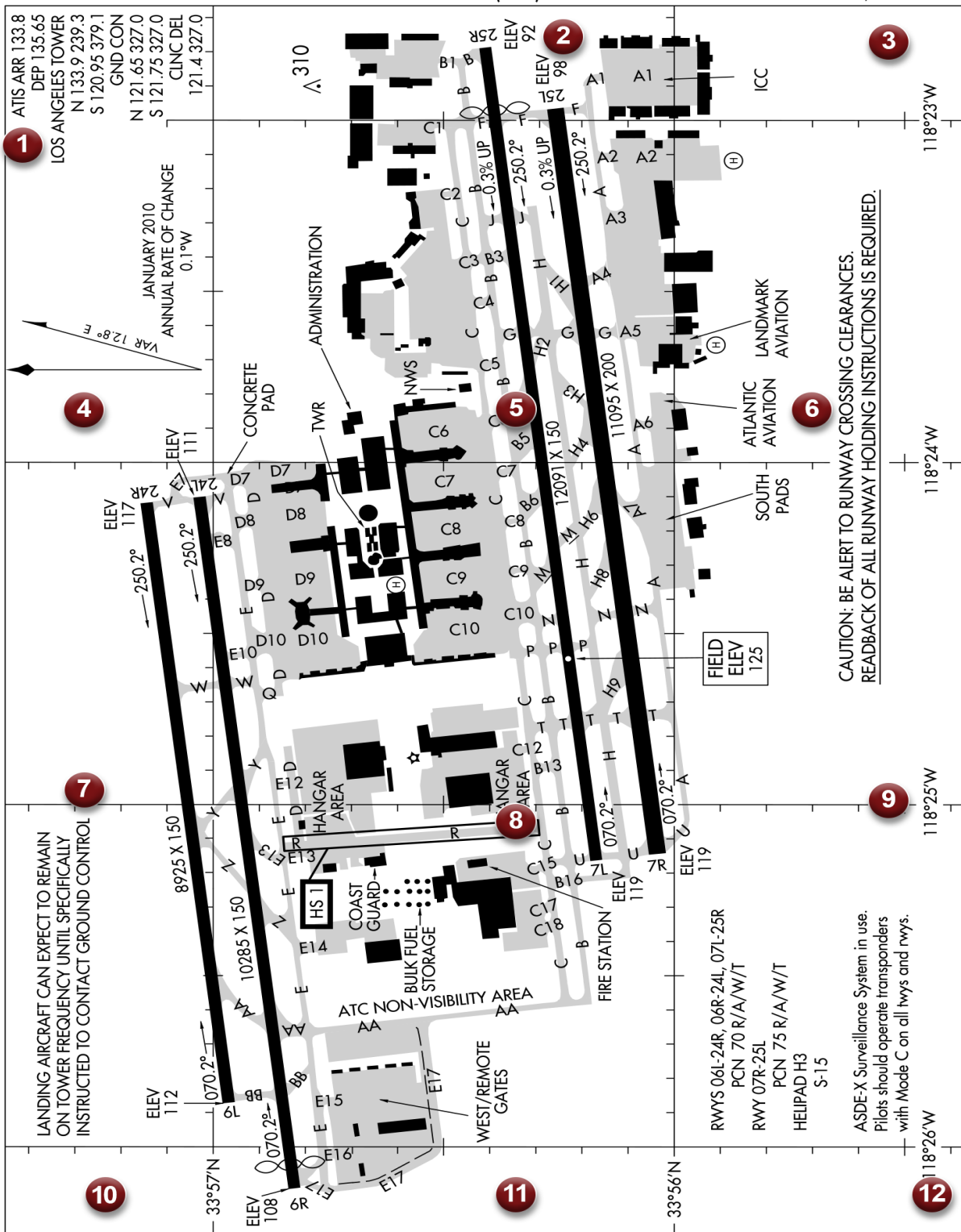
Figure 246. Airport Diagram (PHX).

11069

AIRPORT DIAGRAM

AL-237 (FAA)

LOS ANGELES INTL (LAX)
LOS ANGELES, CALIFORNIA



AIRPORT DIAGRAM

LOS ANGELES, CALIFORNIA
LOS ANGELES INTL (LAX)

11069

Figure 247. Airport Diagram (LAX).

ALAMOSA, COLORADO

AL-18 (FAA)

WAAS CH 90410 W02A	APP CRS 023°	Rwy Idg TDZE Apt Elev	8519 7539 7539
--	------------------------	-----------------------------	---

RNAV (GPS) RWY 2

ALAMOSA/SAN LUIS VALLEY RGNL/BERGMAN FIELD (ALS)

⚠ For inoperative MALSR, increase LNAV/VNAV Cat D visibility to 1 mile. When local altimeter setting not received, procedure NA. For uncompensated Baro-VNAV systems, LNAV/VNAV NA below -30°C (-22°F) or above 34°C (93°F). DME/DME RNP -0.3 NA.

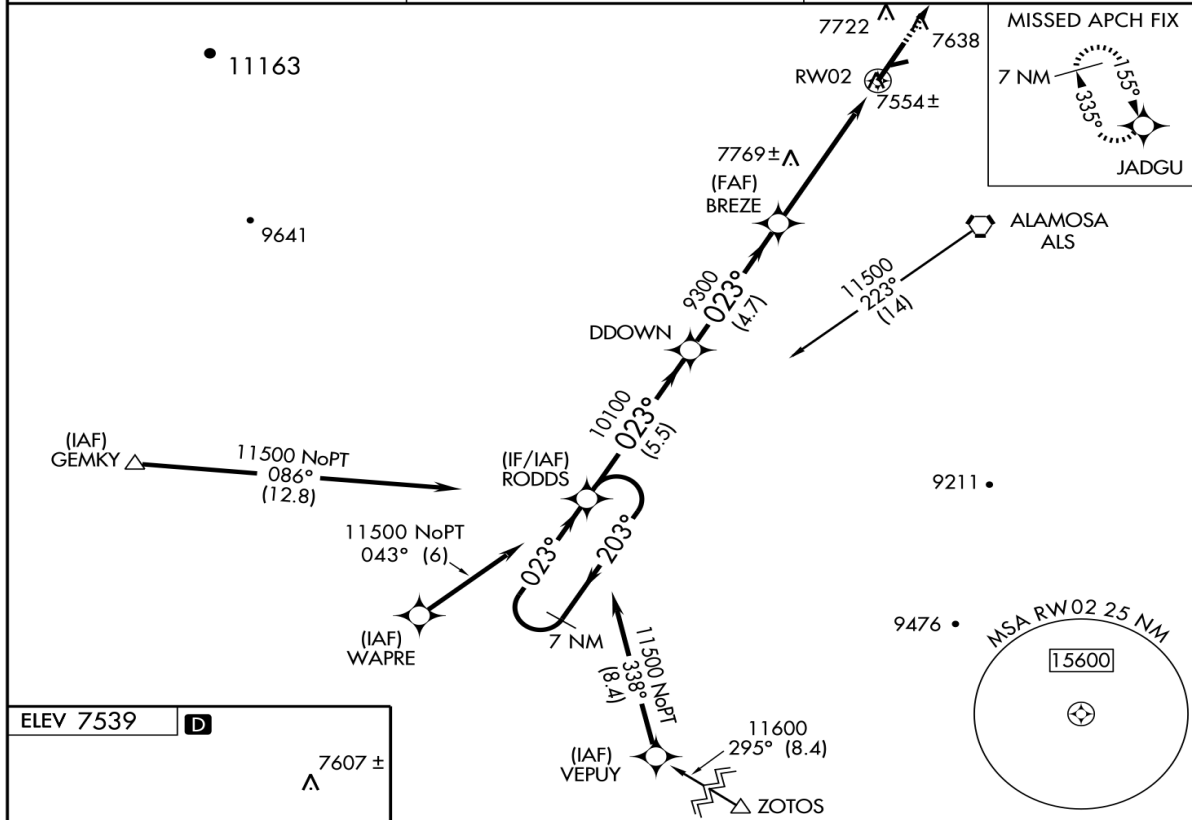
MALSR
A5

MISSED APPROACH: Climb to 10500 direct JADGU and hold.

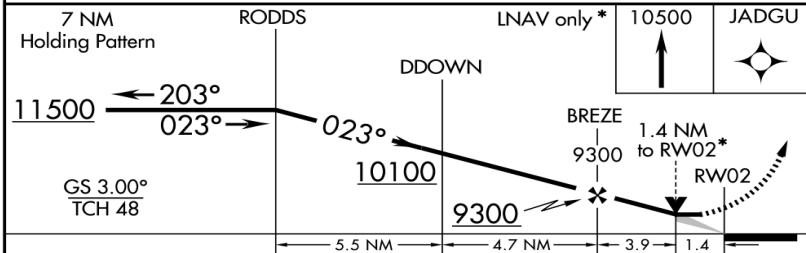
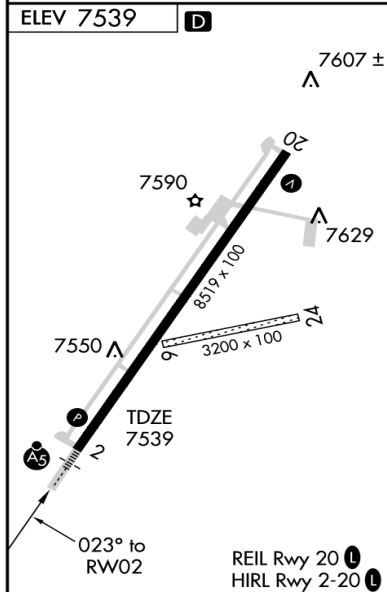
ASOS
135.175

DENVER CENTER
128.375 379.95

UNICOM
122.8 (CTAF)



ELEV 7539



CATEGORY	A	B	C	D
LPV DA	7739-1/2 200 (300-1/2)			
LNAV/ VNAV	7804-1/2 265 (300-1/2)		7804-3/4 265 (300-3/4)	
LNAV MDA	8020-1/2 481 (500-1/2)	8020-3/4 481 (500-3/4)		8020-1 481 (500-1)
CIRCLING	8040-1 501 (600-1)	8040-1 1/2 501 (600-1 1/2)		8100-2 561 (600-2)

ALAMOSA, COLORADO
Orig 09351

ALAMOSA/SAN LUIS VALLEY RGNL/BERGMAN FIELD (ALS)
37°26'N-105°52'W

RNAV (GPS) RWY 2

Figure 248. RNAV (GPS) RWY 2 (ALS).


BETHEL, ALASKA

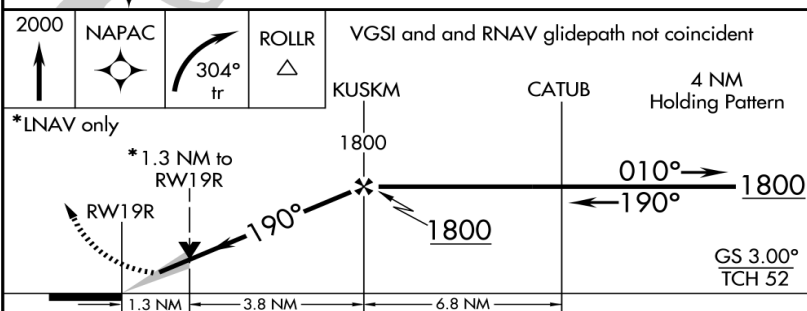
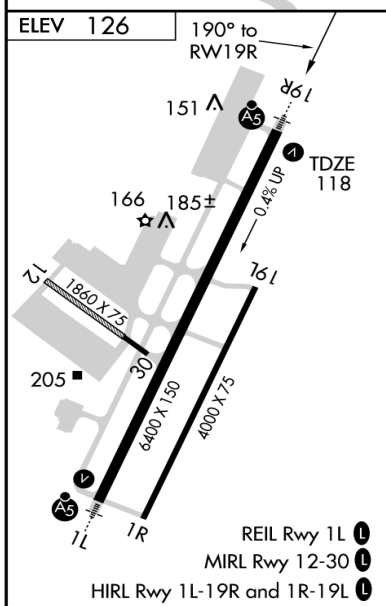
AL-5001 (FAA)

WAAS CH 70507 W19A	APP CRS 190°	Rwy Idg 6400 TDZE 118 Apt Elev 126
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RNAV (GPS) RWY 19R

BETHEL (BET)(PABE)

<p>▼ Circling to Rwy 12-30 and 1R-19L NA at night. W For inoperative MALSRL, increase LPV all Cats visibility to RVR 5000. Circling NA west of Rwy 1L-19R. For uncompensated Baro-VNAV systems, LNAV/VNAV NA below -25°C (-13°F) or above 48°C (118°F). DME/DME RNP-0.3 NA.</p>	<p>MALSRL </p>	<p>MISSED APPROACH: Climb to 2000 direct NAPAC and right turn via 304° track to ROLLR and hold.</p>	
<p>ATIS 119.8</p>	<p>ANCHORAGE CENTER 125.2 372.0</p>	<p>BETHEL TOWER ★ 118.7 (CTAF)</p>	<p>GND CON 121.7</p>



CATEGORY	A	B	C	D
LPV DA		368/24	250 (300-½)	
LNAV/VNAV DA		459/40	341 (400-¾)	
LNAV MDA	560/24	442 (500-½)	560/40 442 (500-¾)	560/50 442 (500-1)
CIRCLING	560-1	580-1	600-1½	680-2
	434 (500-1)	454 (500-1)	474 (500-1½)	554 (600-2)

BETHEL, ALASKA
Amdt 1 10266

60°47'N-161°50'W

BETHEL (BET)(PABE) RNAV (GPS) RWY 19R

Figure 249. RNAV (GPS) RWY 19R (BET) (PABE).

CHATTANOOGA, TENNESSEE

AL-79 (FAA)

11013

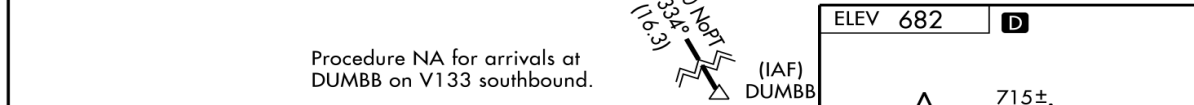
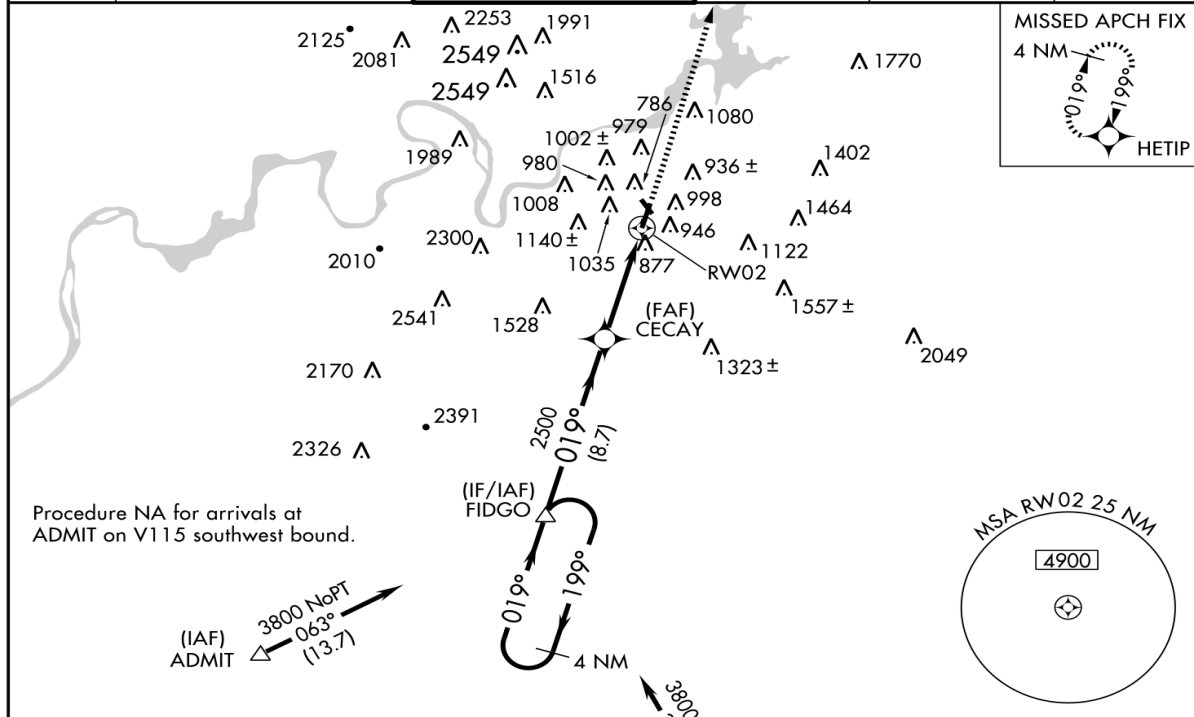
WAAS CH 65605 W02A	APP CRS 019°	Rwy Idg TDZE Apt Elev	7200 682 682
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RNAV (GPS) RWY 2

CHATTANOOGA/LOVELL FIELD (CHA)

<p>▽ For uncompensated Baro-VNAV systems, LNAV/VNAV NA below 16°C (4°F) or above 47°C (116°F). DME/DME RNP-0.3 NA.</p> <p>▲ ASR Circling to Rwy 15/33 NA when control tower closed.</p>	<p>MALSRL</p>	<p>MISSED APPROACH: Climb to 3800 direct HETIP and hold.</p>
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ATIS 119.85	CHATTANOOGA APP CON ★ 125.1 379.1	CHATTANOOGA TOWER ★ 118.3 (CTAF) 257.8	GND CON 121.7 348.6	CLNC DEL 120.95 348.6	UNICOM 122.95
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4 NM Holding Pattern	VGSi and RNAV glidepath not coincident (VGSi Angle 3.00°/TCH 56).			3800 HETIP
	FIDGO	CECAY	DUMBB	
	← 199°	019°		
	3800	2500	2500	3800
	GS 3.00°			
	TCH 51			
		8.7 NM	4 NM	1.5 NM

CATEGORY	A	B	C	D
LPV DA		882/24	200 (200-½)	
LNAV/VNAV DA		1196/60	514 (600-1¼)	
LNAV MDA	1200/24	518 (600-½)	1200/50 518 (600-1)	1200/60 518 (600-1¼)
CIRCLING	1300-1 618 (700-1)	1340-1 658 (700-1)	1340-1¾ 658 (700-1¾)	1460-2½ 778 (800-2½)

CHATTANOOGA, TENNESSEE
Amdt 1 13JAN11

CHATTANOOGA/LOVELL FIELD (CHA)
35°02'N-85°12'W

RNAV (GPS) RWY 2

Figure 250. RNAV (GPS) RWY 2 (CHA).

HONOLULU, HAWAII

AL-754 (FAA)


11013

APP CRS	Rwy Idg	12000
259°	TDZE	10
	Apt Elev	13

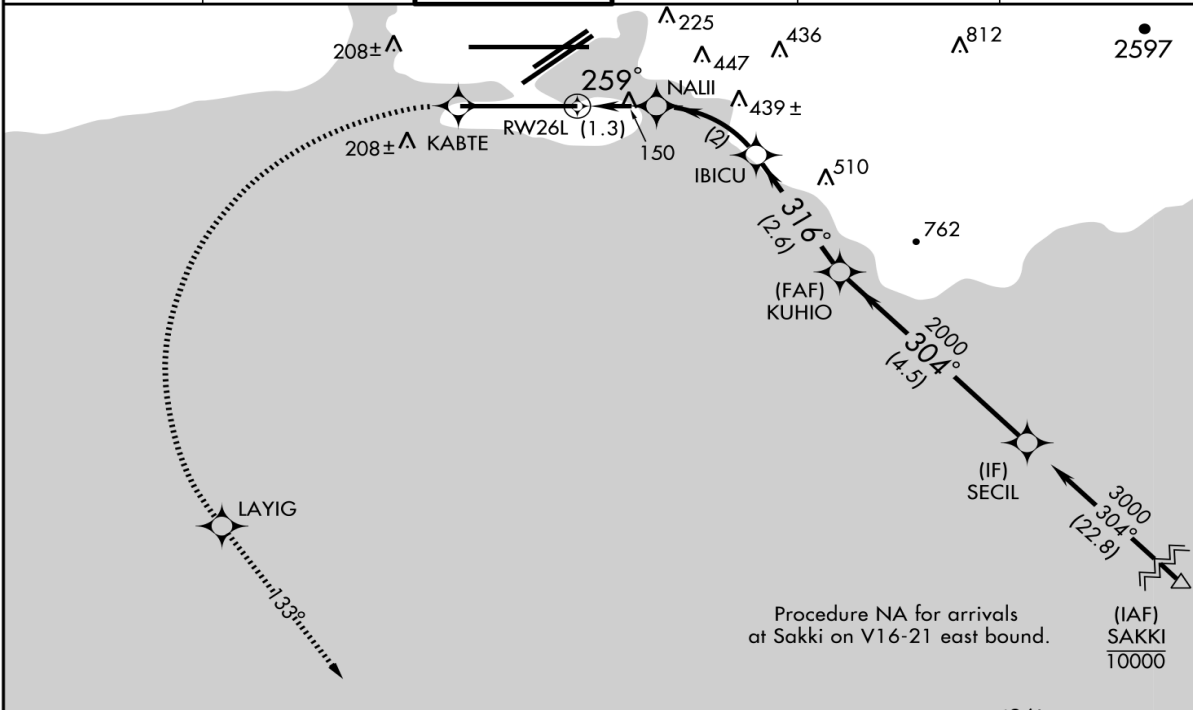
RNAV (RNP) RWY 26L

HONOLULU INTL (HNL) (PHNL)

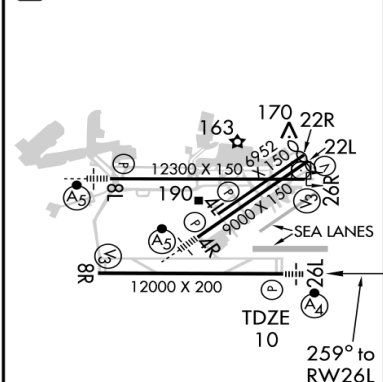
RF and GPS REQUIRED. For uncompensated Baro-VNAV systems, procedure NA below 15°C (58°F) or above 49°C (121°F). For inoperative MALSF, increase RNP 0.15 visibility to 1 all Cats. * Missed approach requires a minimum climb of 234' per NM to 300.

MALSF
 MISSED APPROACH: Climb to 3000 via 259° track to KABTE, left turn via 4.9 radius to LAYIG, 133° track to ALANA and hold.

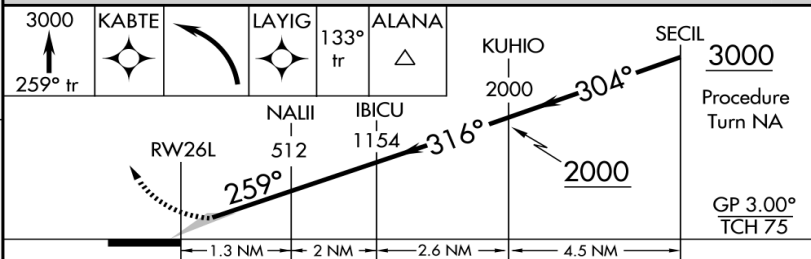
ATIS 127.9 251.15	HCF APPROACH 118.3 269.0	HONOLULU TOWER 118.1 257.8	GND CON 121.9 348.6	CLNC DEL 121.4 281.4	RAMP CONTROL 121.8
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ELEV 13	SEALANES: 8W-26W 5000 X 300 4W-22W 3000 X 150
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MIRL Rwy 4L-22R
 REIL Rwys 4L, 8R, 22L, 22R and 26R
 HIRL Rwys 4R-22L, 8L-26R and 8R-26L



CATEGORY	A	B	C	D
RNP 0.15 DA*	260-1/2		250 (300-1/2)	

SPECIAL AIRCRAFT & AIRCREW AUTHORIZATION REQUIRED

HONOLULU, HAWAII
 Orig-B 13JAN11

HONOLULU INTL (HNL) (PHNL)
RNAV (RNP) RWY 26L
 21° 19' N-157° 55' W

Figure 251. RNAV (RNP) RWY 26L (HNL) (PHNL).

AUBURN-LEWISTON, MAINE

AL-750 (FAA)

10266

WAAS CH 69219 W04A	APP CRS 041°	Rwy ldg TDZE Apt Elev	5001 270 288
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RNAV (GPS) RWY 4

AUBURN-LEWISTON MUNI (LEW)

⚠ Circling to Rwy 17, 22, 35 NA at night. For uncompensated Baro-VNAV systems, LNAV/VNAV NA below -15°C (5°F) or above 48°C (118°F). DME/DME RNP-0.3 NA. Visibility reduction by helicopters NA. When local altimeter setting not received, use Augusta altimeter setting and increase all DA 71 feet and all MDA 80 feet; increase LNAV/VNAV all Cats visibility ¼ mile and LNAV and circling Cats C/D visibility ¼ mile. Baro-VNAV and VDP NA when using Augusta altimeter setting. Inoperative table does not apply to LPV all Cats. For inoperative MALS, increase LNAV Cats A and B visibility to 1 mile. For inoperative MALS, when using Augusta altimeter setting increase LNAV Cats A and B visibility to 1 mile.



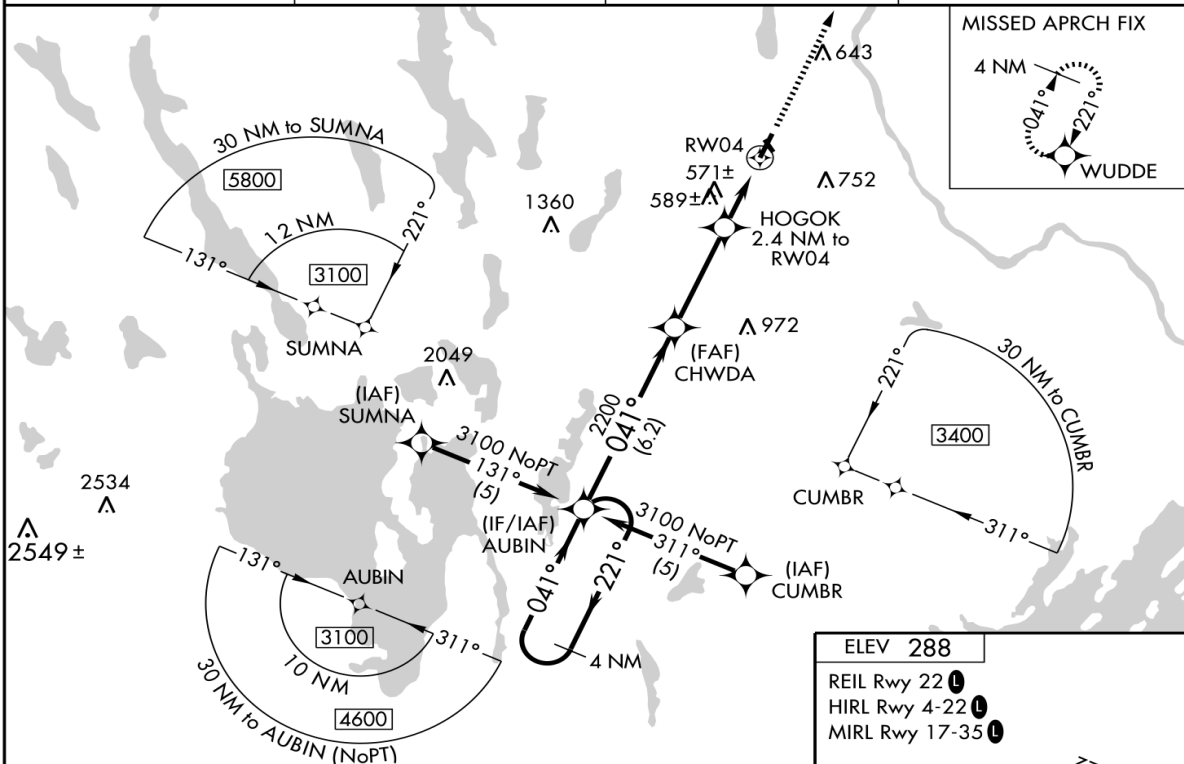
MISSED APPROACH: Climb to 3100 direct WUDDE and hold.

AWOS-3
118.025

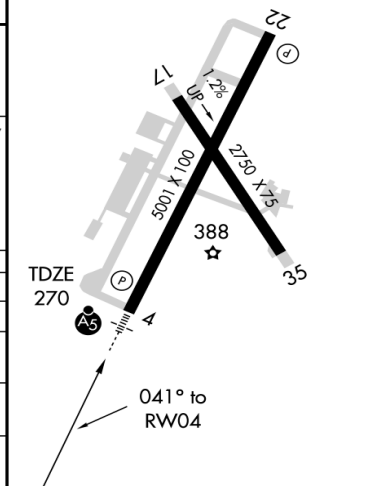
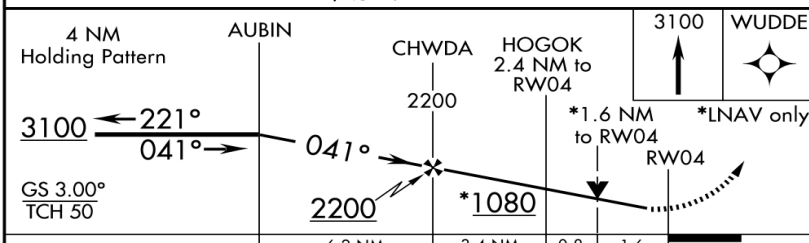
PORTLAND APP CON ★
125.5 353.9

PORTLAND CLNC DEL
124.05

UNICOM
122.8 (CTAF)



ELEV 288
REIL Rwy 22
HIRL Rwy 4-22
MIRL Rwy 17-35



CATEGORY	A	B	C	D
LPV DA	470-¾ 200 (200-¾)			
LNAV/VNAV DA	936-1¾ 666 (700-1¾)			
LNAV MDA	840-¾ 570 (600-¾)	840-1 570 (600-1)		840-1¼ 570 (600-1¼)
CIRCLING	840-1 552 (600-1)	860-1 572 (600-1)	920-1¾ 632 (700-1¾)	1060-2½ 772 (800-2½)

AUBURN-LEWISTON, MAINE
Amdt 1 29JUL10

44°03'N - 70°17'W

AUBURN-LEWISTON MUNI (LEW) RNAV (GPS) RWY 4

Figure 252. RNAV (GPS) RWY 4 (LEW).

LEADVILLE, COLORADO

AL-9146 (FAA)

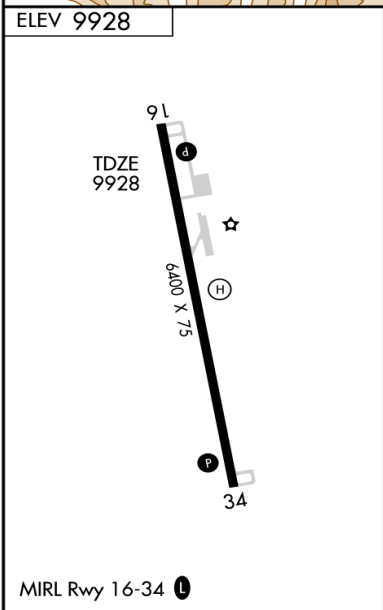
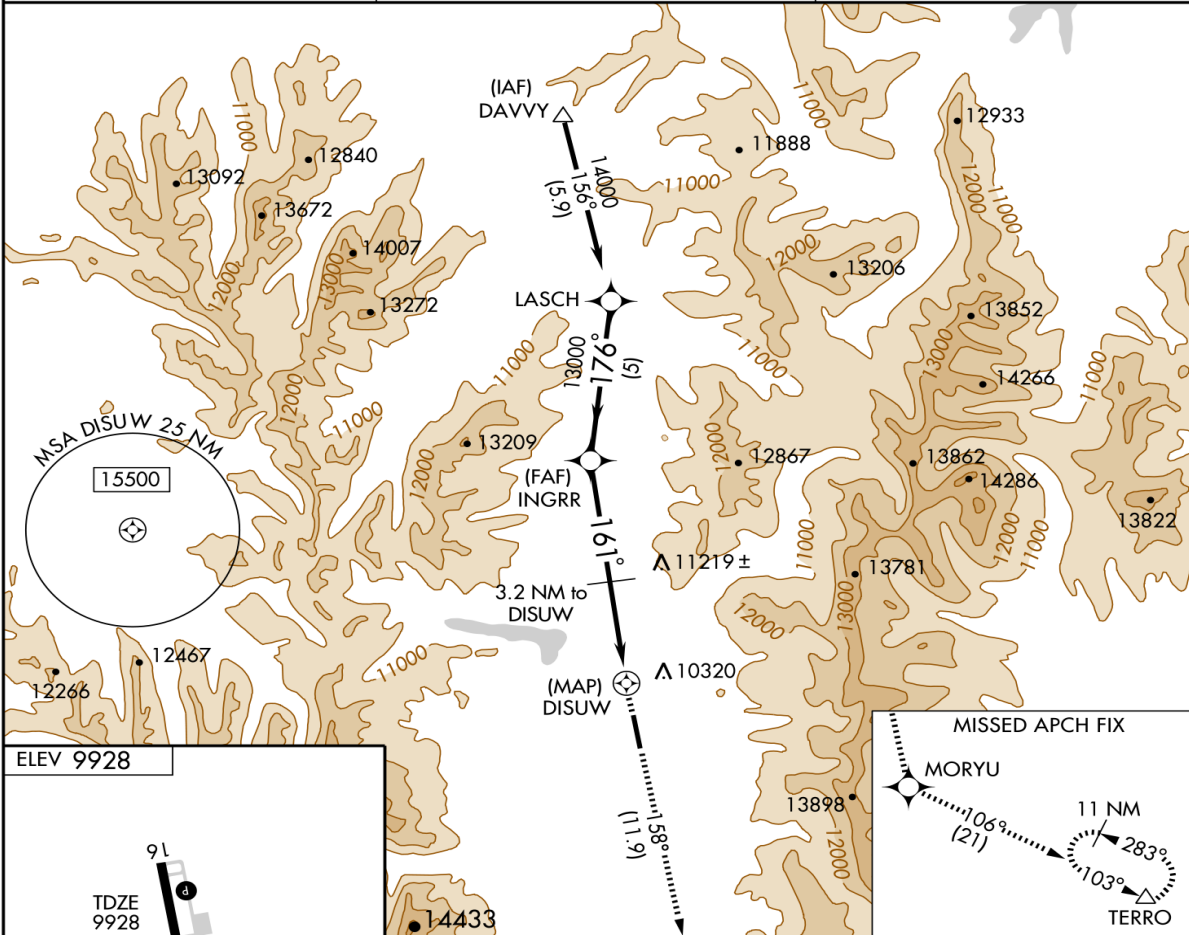
APP CRS	Rwy Idg	6400
161°	TDZE	9928
	Apt Elev	9928

GPS RWY 16

LEADVILLE/LAKE COUNTY (LXV)

NA MISSED APPROACH: Climb to 16000 via 158° course to MORYU WP, then via 106° course to TERRO WP and hold.

ASOS 118.375	DENVER CENTER 119.85 363.15	UNICOM 122.8 (CTAF)
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LASCH	VGSI and descent angles not coincident.		16000	MORYU	106°	TERRO
	14000	INGRR	158°	3.2 NM to DISUW	course	△
Procedure Turn NA	176°	13000	3.62° TCH 45	DISUW		
	5 NM	3.8 NM		3.2 NM	1 NM	
CATEGORY	A	B	C	D		
S-16	11360-1¼ 1432 (1500-1¼)	11360-1½ 1432 (1500-1½)			NA	
CIRCLING	11360-1¼ 1432 (1500-1¼)	11360-1½ 1432 (1500-1½)			NA	

LEADVILLE, COLORADO
Orig 09127

39°13'N - 106°19'W

GPS RWY 16

Figure 253. GPS RWY 16 (LXV).

Appendix 2

JUNEAU, ALASKA

AL-1191 (FAA)

LOC/DME I-JDL 109.9 Chan 36	APP CRS 068°	Rwy Idg 8457 TDZE 21 Apt Elev 21
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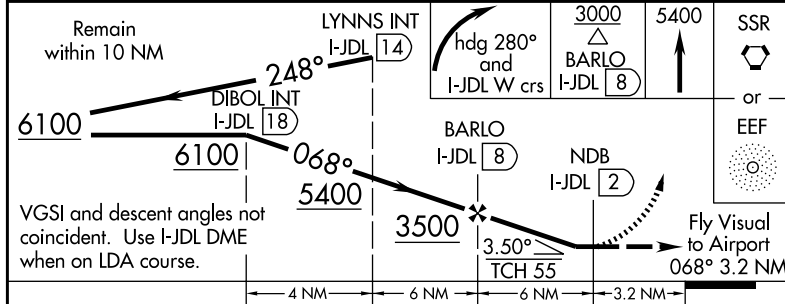
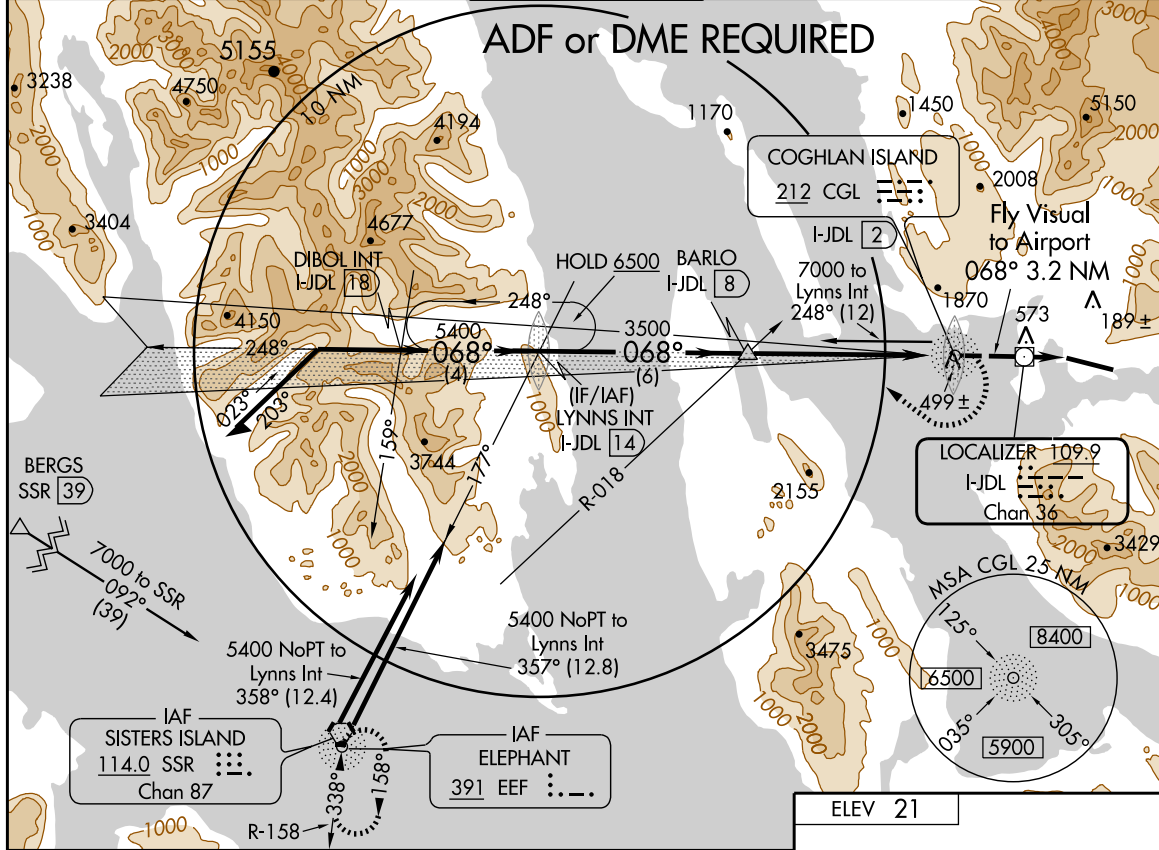
LDA X RWY 8
JUNEAU INTL (JNU) (PAJN)

⚠ Circling NA north of Rwy 8/26. CAUTION: Any go-around after passing MAP will not provide standard obstruction clearance. For night circling, if runway lights not visible over MAP, execute missed approach.

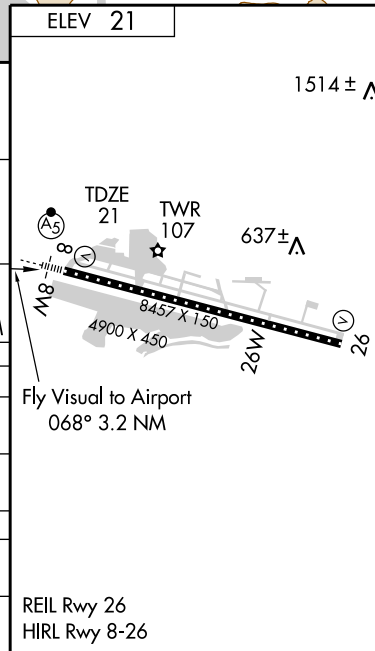
MALSR

MISSED APPROACH: Immediate climbing right turn via heading 280° and I-JDL west course to cross BARLO Int/I-JDL 8 DME at or above 3000. Continue climb to 5400 direct SSR VORTAC or EEF NDB and hold.

ATIS 135.2	ANCHORAGE CENTER 133.9	JUNEAU TOWER★ 118.7 (CTAF) 278.3	GND CON 121.9	JUNEAU RADIO 122.2
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CATEGORY	A	B	C	D
S-8	2120-4 2099 (2100-4)	2700-4 2679 (2700-4)	3200-4 3179 (3200-4)	3440-4 3419 (3500-4)
CIRCLING	2120-4 2099 (2100-4)	2700-4 2679 (2700-4)	3200-4 3179 (3200-4)	3440-4 3419 (3500-4)
NIGHT MINIMUMS				
S-8	2120-4 2099 (2100-4)	2700-4 2679 (2700-4)	3200-4 3179 (3200-4)	3440-4 3419 (3500-4)
CIRCLING	3000-5 2979 (3000-5)	3000-10 2979 (3000-10)	3200-10 3179 (3200-10)	3440-10 3419 (3500-10)



JUNEAU, ALASKA
Amdt 11B 10210

58°21'N-134°35'W

JUNEAU INTL (JNU) (PAJN)
LDA X RWY 8

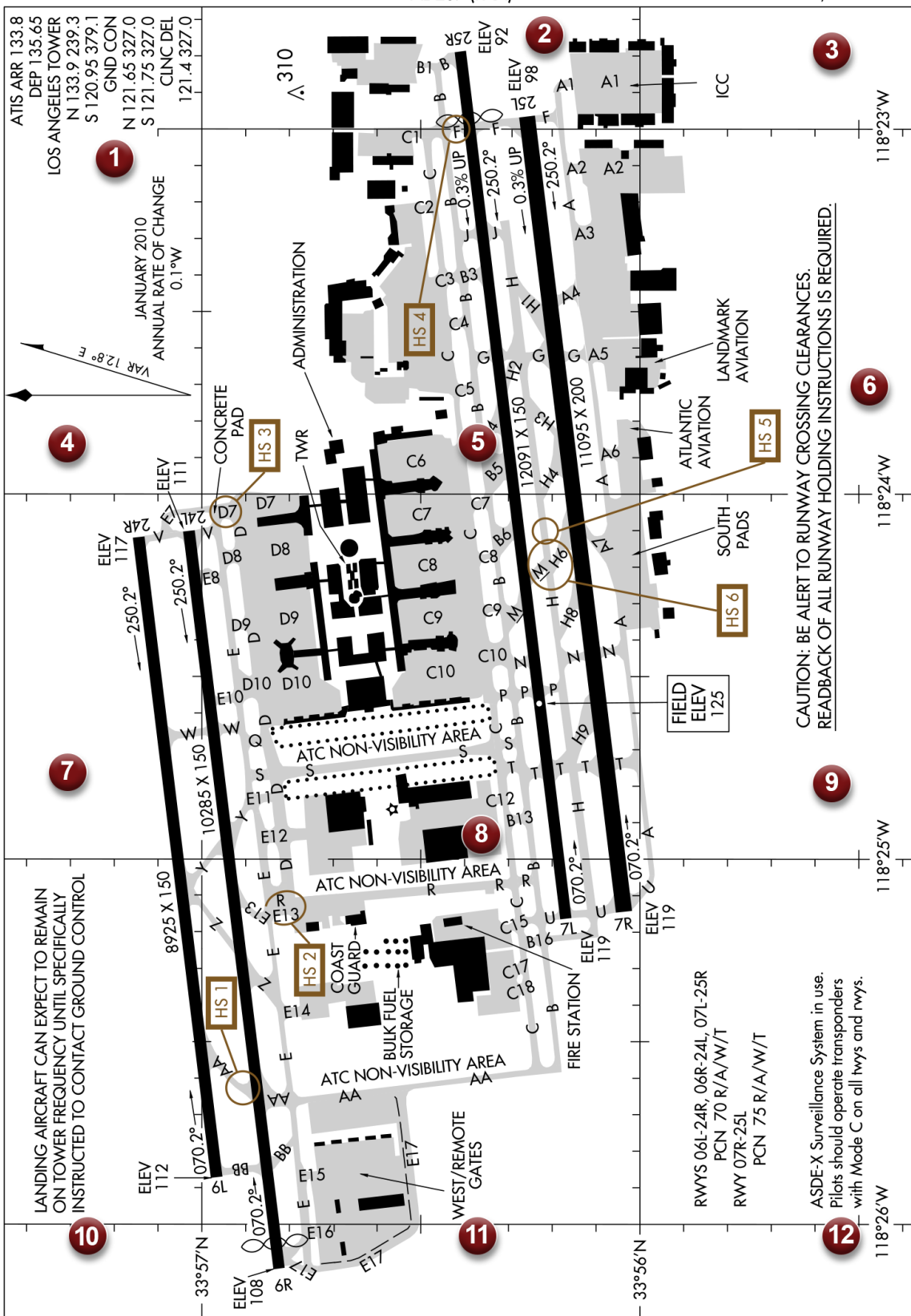
Figure 254. LDA X RWY 8 (JNU) (PAJN).

12096

AIRPORT DIAGRAM

AL-237 (FAA)

LOS ANGELES INTL (LAX)
LOS ANGELES, CALIFORNIA



AIRPORT DIAGRAM

LOS ANGELES, CALIFORNIA
LOS ANGELES INTL (LAX)

12096

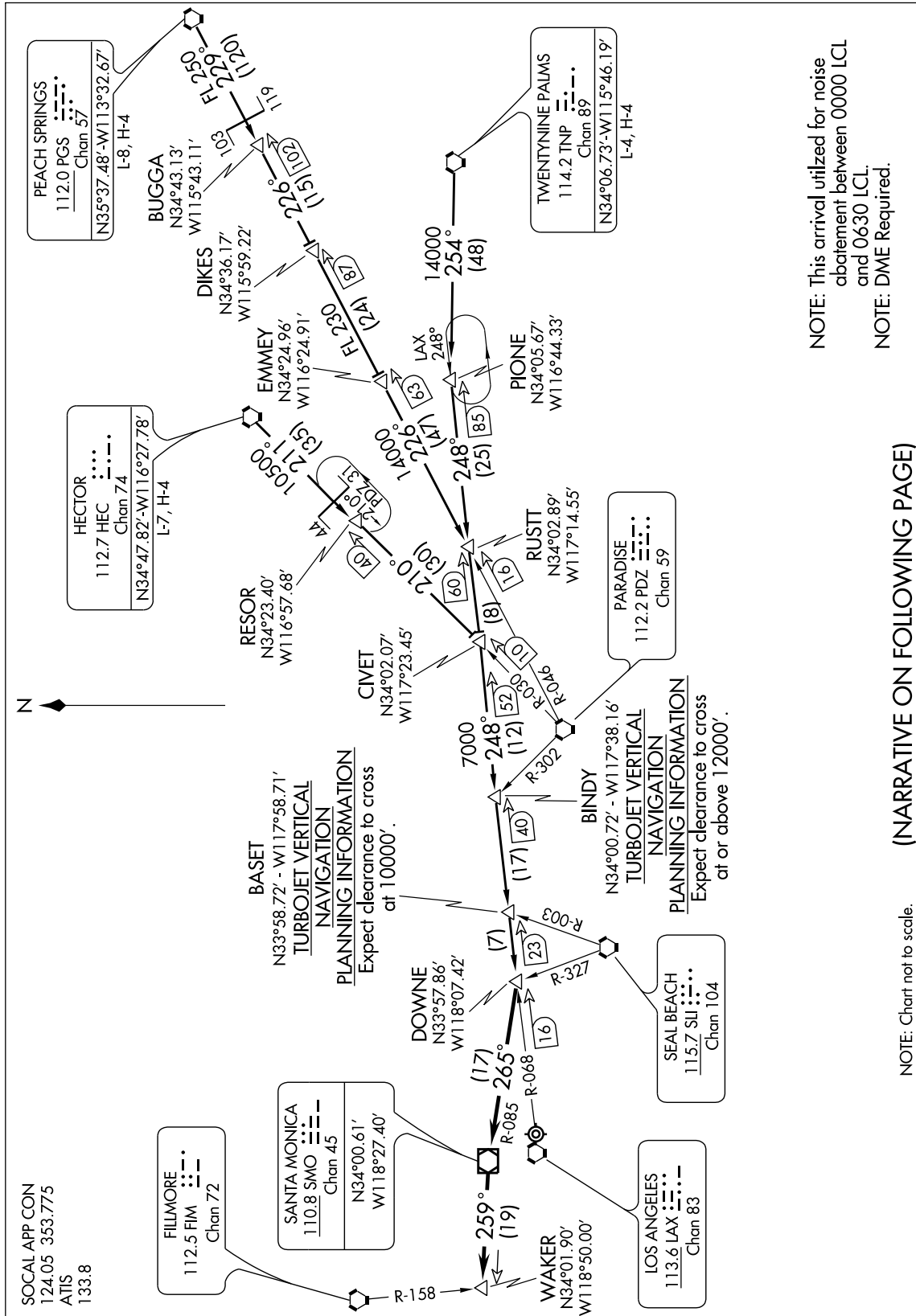
Figure 255. Airport Diagram (LAX).

(DOWNE.DOWNE4) 09351

DOWNE FOUR ARRIVAL

ST-237 (FAA)

LOS ANGELES INTL
LOS ANGELES, CALIFORNIA



DOWNE FOUR ARRIVAL

(DOWNE.DOWNE4) 09351

LOS ANGELES, CALIFORNIA
LOS ANGELES INTL

Figure 255A. DOWNE FOUR Arrival (DOWNE.DOWNE4).

(DOWNE.DOWNE4) 02276
DOWNE FOUR ARRIVAL

ST-237 (FAA)

LOS ANGELES INTL
 LOS ANGELES, CALIFORNIA

ARRIVAL DESCRIPTION

HECTOR TRANSITION (HEC.DOWNE4): 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.DOWNE4): 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.DOWNE4): 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.

DOWNE FOUR ARRIVAL
 (DOWNE.DOWNE4) 02276

LOS ANGELES, CALIFORNIA
 LOS ANGELES INTL

Figure 255B. DOWNE FOUR Arrival (DOWNE.DOWNE4).

LOS ANGELES

LOS ANGELES INTL (LAX) 9 SW UTC-8(-7DT) N33°56.55' W118°24.48'
125 B S4 FUEL JET A OX 1, 3 LRA Class I, ARFF Index E NOTAM FILE LAX

LOS ANGELES

COPTER

RWY 07L-25R: H12091X150 (CONC-GRVD) PCN 70 R/A/W/T HIRL
CL

H-4I, L-3E, 4G, 7B, A
IAP, AD

RWY 07L: MALSR. TDZL. PAPI(P4L)—GA 3.0° TCH 59'. Rgt tfc.

RWY 25R: MALSR. Thld dspclcd 957'. Railroad. 0.3% up.

RWY 07R-25L: H11095X200 (CONC-GRVD) PCN 75 R/A/W/T HIRL
CL

RWY 07R: MALSR. PAPI(P4L)—GA 3.0° TCH 57'. Pole. Rgt tfc.

RWY 25L: ALSF2. TDZL. Railroad. 0.3% up.

RWY 06R-24L: H10285X150 (CONC-GRVD) PCN 70 R/A/W/T HIRL
CL

RWY 06R: MALSR. TDZL. PAPI(P4L)—GA 3.0° TCH 78'. Thld dspclcd
331'. Pole.

RWY 24L: MALSR. PAPI(P4R)—GA 3.0° TCH 79'. Rgt tfc.

RWY 06L-24R: H8925X150 (CONC-GRVD) PCN 70 R/A/W/T HIRL
CL

RWY 06L: MALSR. PAPI(P4L)—GA 3.0° TCH 77'. Pole.

RWY 24R: ALSF2. TDZL. PAPI(P4L)—GA 3.0° TCH 73'. Sign. Rgt tfc.

AIRPORT REMARKS: Attended continuously. Rwy 25L preferred emerg rwy.
Numerous birds on and inof airport. Turbulence may be deflected
upward from the blast fence 180' E of Rwy 25R. ASDE-X Surveillance
System in use: Pilots should operate transponders with Mode C on all
twys and rwys. Tom Bradley International Gates: check LAWA (Los Angeles World Airport) rules and regulations for latest
operating procedures. For B-777-300 and 300ER/A340-600 acft ops restrictions ctc LAX afld ops (310) 646-4265.
Practice instrument approaches and touch and go landings are prohibited. 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. Westbound B747-400 acft on Twy C
prohibited from southbound turns onto Twy P. (Twy C-7, C-8, C-9 north of Twy C) and Twy D-7 south of Twy E will not
accommodate B747 200 and larger acft. Twy D between Twy D-7 and D-8 (north of terminal one) restricted to
B-767-300 and smaller acft. Taxilane D7 south of Twy E Rstd to 767-300 acft and smaller. Twy E-17, A340-600,
B777-300/300ER acft northbound turn onto Twy E-17 from westbound Twy E prohibited. Twy E, A340-600,
B777-300/300ER acft westbound turn onto Twy E from southbound Twy BB prohibited. Twy C-8, A340-600,
B777-300/300ER acft prohibited on Twy C-8 between Twy B and Twy C. Twy C-9, A340-600, B777-300/300ER acft
prohibited on Twy C-9 between Twy B and Twy C. A-380 ops ctc LAX afld opr (310) 646-4265 for acft movement
procedures. West remote gates: acft use of open gates as taxi path is prohibited (gates 206, 207, 208, 209). A
700'X500' clearway has been reestablished at west end of Rwy 24R. Touchdown, midpoint and rollout runway visual
range avbl Rwy 06L, Rwy 24R, Rwy 06R, Rwy 24L, Rwy 07R, Rwy 25L, Rwy 07L, Rwy 25R. Simultaneous acft ops
prohibited on Twy T and Twy H9 between Rwy 07L-25R and Rwy 07R-25L. Simultaneous acft ops prohibited on Twy
H2 and Twy G between Rwy 07L-25R and Rwy 07R-25L. Overnight storage fee. Flight Notification Service (ADCUS)
available. NOTE: See Special Notices—Noise Abatement Procedures, Continuous Power Facilities.

WEATHER DATA SOURCES: ASOS (310) 568-1486
COMMUNICATIONS: D-ATIS ARR 133.8 D-ATIS DEP 135.65 310-646-2297 UNICOM 122.95
①SOCAL APP CON 128.5 (045°-089°), 124.9 (090°-224°), 124.5 (225°-044°) 124.3 (App from west)
TOWER 133.9 (N. complex), 120.95 (S. complex) 119.8
GND CON 121.75 (S. complex) 121.65 (N. complex) CLNC DEL 121.4 120.35
①SOCAL DEP CON 125.2 (225°-044°) 124.3 (045°-224°) (Dep to west)
AIRSPACE: CLASS B See VFR Terminal Area Chart
RADIO AIDS TO NAVIGATION: NOTAM FILE LAX.
(H) VORTACW 113.6 LAX Chan 83 N33°55.99' W118°25.92' 050° 1.3 NM to fld. 182/15E.
VOR portion unusable:
270°-277° byd 25 NM blo 8,000'
277°-300° byd 10 NM blo 8,000'
277°-300° byd 28 NM blo 12,000'
VOR portion unusable:
175°-205° byd 10 NM blo 3,000'

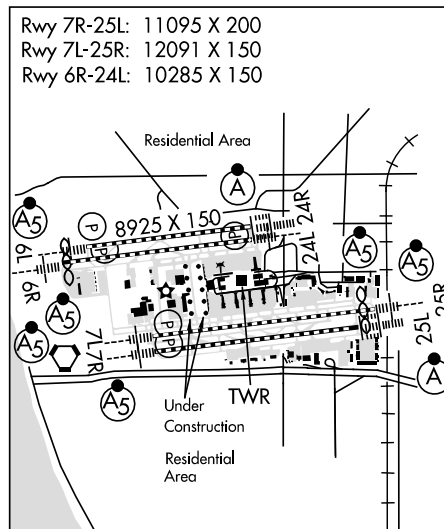


Figure 256. Excerpt from Chart Supplement.

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CALIFORNIA

CONTINUED FROM PRECEDING PAGE

ILS/DME 108.5 I-UWU Chan 22 Rwy 06L. Class IE. DME also serves Rwy 24R.
 ILS/DME 111.7 I-GPE Chan 54 Rwy 06R. Class IE. MM OTS indef. DME also serves Rwy 24L.
 ILS/DME 111.1 I-IAS Chan 48 Rwy 07L. Class ID. MM OTS indef. Glideslope unusable byd 5° right of localizer course. DME also serves Rwy 25R.
 ILS/DME 109.9 I-MKZ Chan 36 Rwy 07R. Class IT. GS unuseable 5° left and 4° right of course. Coupled approaches not applicable below 264' MSL. DME also serves Rwy 25L.
 ILS/DME 111.7 I-HQB Chan 54 Rwy 24L. Class IE. DME also serves Rwy 06R.
 ILS/DME 108.5 I-OSS Chan 22 Rwy 24R. Class IIIE. DME also serves Rwy 06L
 ILS/DME 109.9 I-LAX Chan 36 Rwy 25L. Class IIIE.
 ILS/DME 111.1 I-CFN Chan 48 Rwy 25R. Class IE. DME also serves Rwy 07L.

WHITEMAN (WHP) 1 E UTC-8(-7DT) N34°15.56' W118°24.81'
 1003 B S4 FUEL 100LL, JET A OX 1, 3 TPA—2003(1000) NOTAM FILE WHP
 RWY 12-30: H4120X75 (ASPH) S-12.5 MIRL 1.0% up NW
 RWY 12: REIL. PAPI(P2R)—GA 3.8° TCH 40'. Thld dspclcd 729'. P-line.
 RWY 30: REIL. PAPI(P2L)—GA 3.8° TCH 40'. Thld dspclcd 478'. P-line.
 Rgt tfc.

RUNWAY DECLARED DISTANCE INFORMATION

RWY 12: TORA-3442 TODA-4120 ASDA-3910 LDA-3181
 RWY 30: TORA-3191 TODA-4120 ASDA-3940 LDA-3462

AIRPORT REMARKS: Attended continuously. Birds on and invof arpt.

Helicopter ops 2500' MSL (1500' AGL) and below. Arpt CLOSED to helicopter training/pattern opr 0400-1600Z±. Dirt infield areas.
 Helicopters advised to use care to prevent blasting dirt and debris onto movement areas.

WEATHER DATA SOURCES: AWOS-3PT 132.1 (818) 899-9820.

COMMUNICATIONS: CTAF 135.0 ATIS 132.1 818-899-9820

UNICOM 122.95

Ⓡ **SOCAL APP/DEP CON** 120.4 134.2 (VNY 280°-BUR 050°) 134.2 (VNY 160°-VNY 280°)

TOWER 135.0 (1600-0400Z±) **GND CON** 125.0

CLNC DEL For clnc del when ATCT clsd call Socal App 800-448-3724.

AIRSPACE: CLASS D svc 1600-0400Z± other times CLASS G

RADIO AIDS TO NAVIGATION: NOTAM FILE VNY.

VAN NUYS (L) VORW/DME 113.1 VNY Chan 78 N34°13.41' W118°29.50' 046° 4.4 NM to fld. 812/15E.

VOR/DME unusable:

010°-030° byd 20 NM blo 6,700'

030°-050° byd 25 NM blo 8,600'

330°-350° byd 25 NM blo 5,500'

350°-010° byd 15 NM blo 6,100'

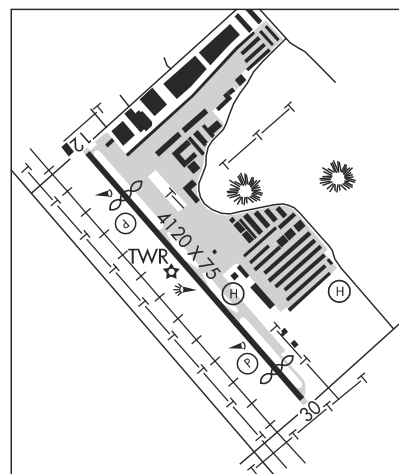
DME unusable:

094°-096° byd 35 NM blo 5,000'

PACOIMA NDB (MHW) 370 PAI N34°15.58' W118°24.80' at fld. NOTAM FILE HHR. VFR only.

COMM/NAV/WEATHER REMARKS: Whiteman arpt altimeter setting not avbl.

LOS ANGELES
COPTER
 L-3E, 4G, 7B, A
 IAP, AD

**LOS BANOS**

LOS BANOS MUNI (LSN) 1 W UTC-8(-7DT) N37°03.83' W120°52.19'

SAN FRANCISCO
 L-3B
 IAP

121 B S2 FUEL 100LL, JET A TPA—921(800) NOTAM FILE RIU

RWY 14-32: H3801X75 (ASPH) S-23 MIRL

RWY 14: REIL. PAPI(P2L)—GA 3.0° TCH 30'. Tree. Rgt tfc.

RWY 32: REIL. PAPI(P2L)—GA 3.0° TCH 38'. Tree.

AIRPORT REMARKS: Unattended. For cash fuel after hours call 209-827-7070. 24 hour automated fuel avbl with major credit card. Avoid overflight of houses south of arpt. No departures over housing areas to east of arpt. MIRL Rwy 14-32 preset low intensity until 0800Z±. To increase intensity and ACTIVATE MIRL Rwy 14-32, REIL Rwy 14 and Rwy 32, and PAPI Rwy 14 and Rwy 32—CTAF.

WEATHER DATA SOURCES: AWOS-3 118.675 (209) 827-7084.

COMMUNICATIONS: CTAF/UNICOM 122.8

PANOCHÉ RCO 122.1R 112.6T (FRESNO RADIO)

Ⓡ **NORCAL APP/DEP CON** 120.95

RADIO AIDS TO NAVIGATION: NOTAM FILE RIU.

PANOCHÉ (L) VORTAC 112.6 PXN Chan 73 N36°42.93' W120°46.72' 332° 21.3 NM to fld. 2060/16E.

VOR unusable:

230°-280° byd 7NM blo 9,000'

Figure 257. Excerpt from Chart Supplement.

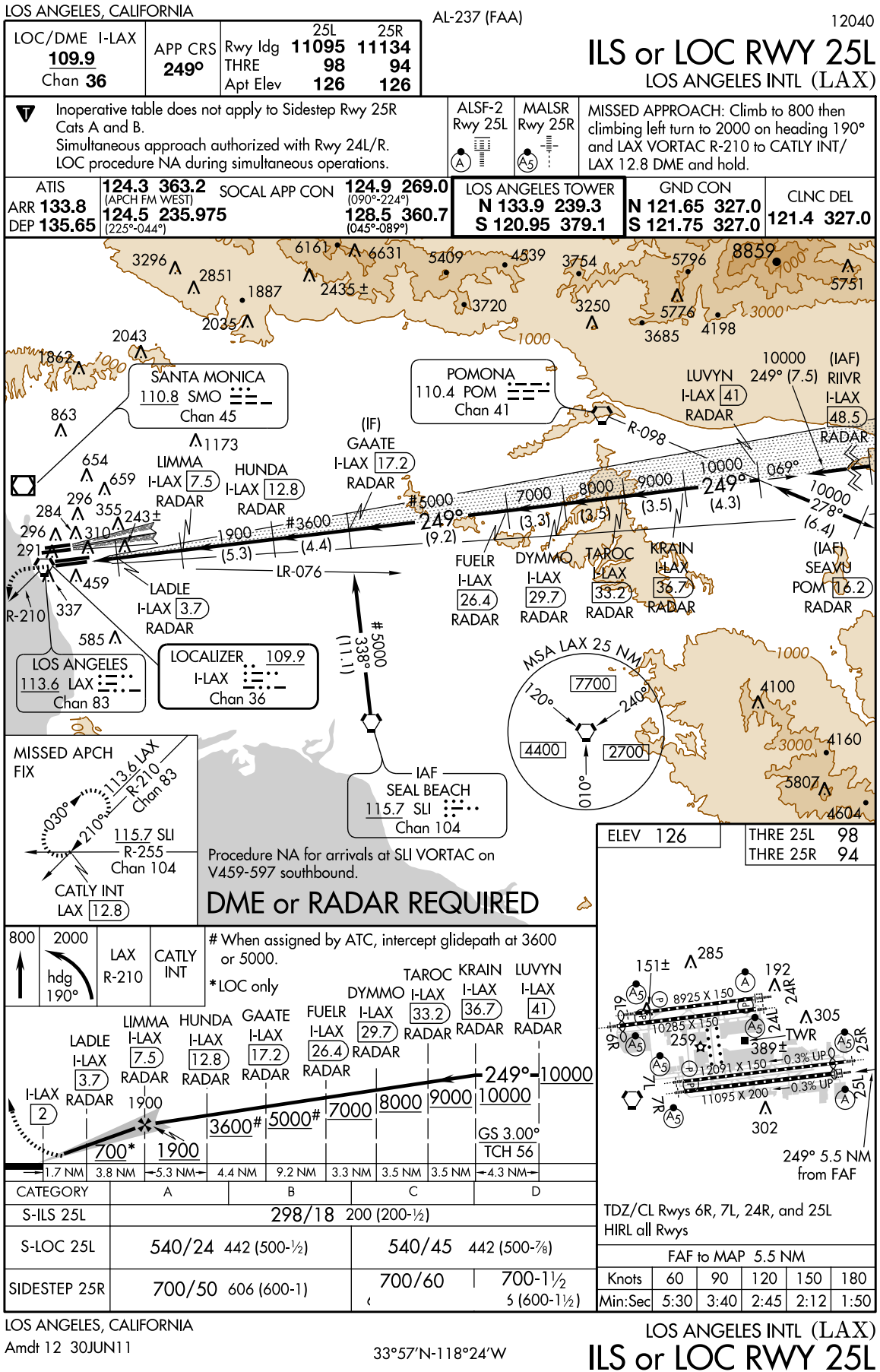


Figure 257A. ILS or ROC RWY 25L (LAX).

Appendix 2

BUFFALO, NEW YORK


AL-65 (FAA)

WAAS CH 81811 W32A	APP CRS 316°	Rwy Idg TDZE Apt Elev	6121 714 728
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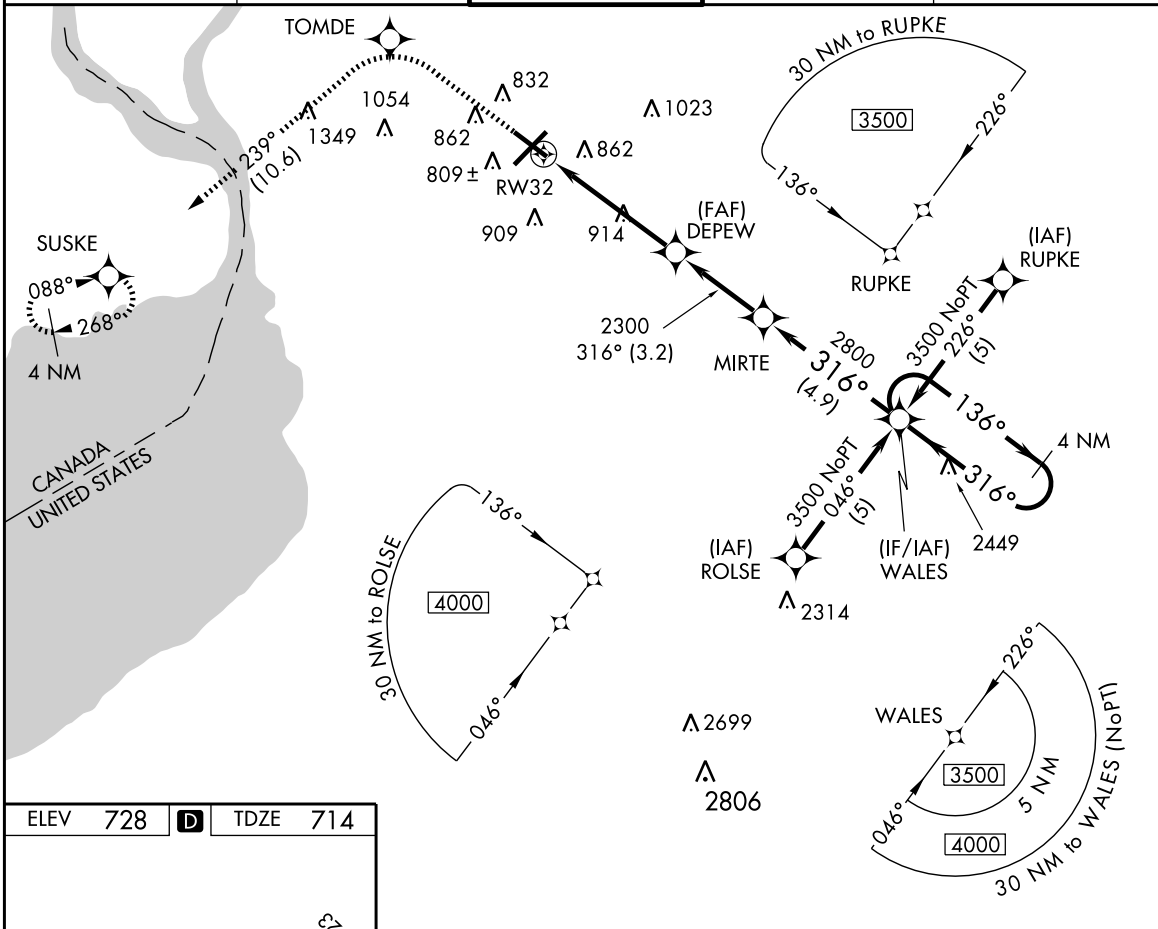
RNAV (GPS) RWY 32

BUFFALO NIAGARA INTL (BUF)

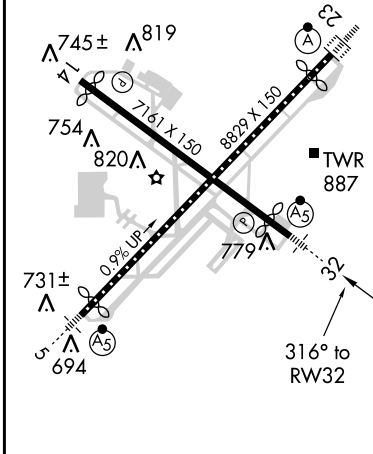
▼ DME/DME RNP-0.3 NA.
Baro-VNAV NA below -16°C (4°F).
For inoperative MALSR increase LPV all Cats visibility to 1 mile.

MALSR  MISSED APPROACH: Climb to 3000 direct TOMDE and via 239° track to SUSKE and hold.

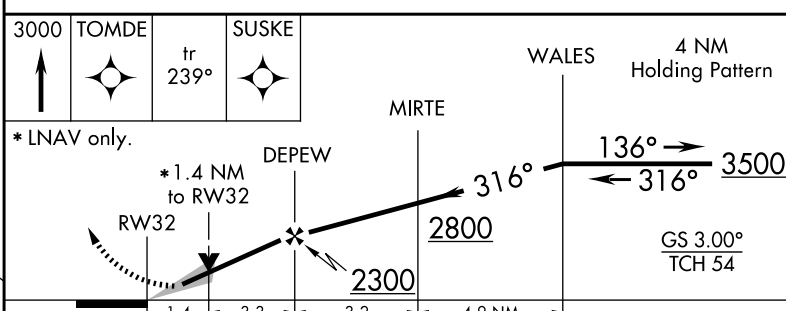
ATIS 135.35	BUFFALO APP CON 126.15 263.125	BUFFALO TOWER 120.5 257.8	GND CON 133.2 257.8	CLNC DEL 124.7 257.8
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ELEV 728	D	TDZE 714
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REIL Rwy 14
TDZ/CL Rwy 5 and 23
HIRL Rwy 5-23 and 14-32



CATEGORY	A	B	C	D
LPV DA	1003-1/2 289 (300-1/2)			
LNAV/VNAV DA	1146-1 432 (500-1)			
LNAV MDA	1220-1/2 506 (500-1/2)	1220-1 506 (500-1)		
CIRCLING	1220-1 1/2 492 (500-1 1/2)		1280-2 552 (600-2)	

BUFFALO, NEW YORK
Amdt 1 11293

42°56'N-78°44'W

RNAV (GPS) RWY 32

Figure 258. RNAV (GPS) RWY 32 (BUF).

HOUSTON, TEXAS

AL-5461 (FAA)

ILS or LOC RWY 33R

LOC I-CDG 111.9	APP CRS 327°	Rwy 33R Idg 12001	Rwy 33L Idg 9999
TDZE 89	TDZE 91	Apt Elev 97	Apt Elev 97

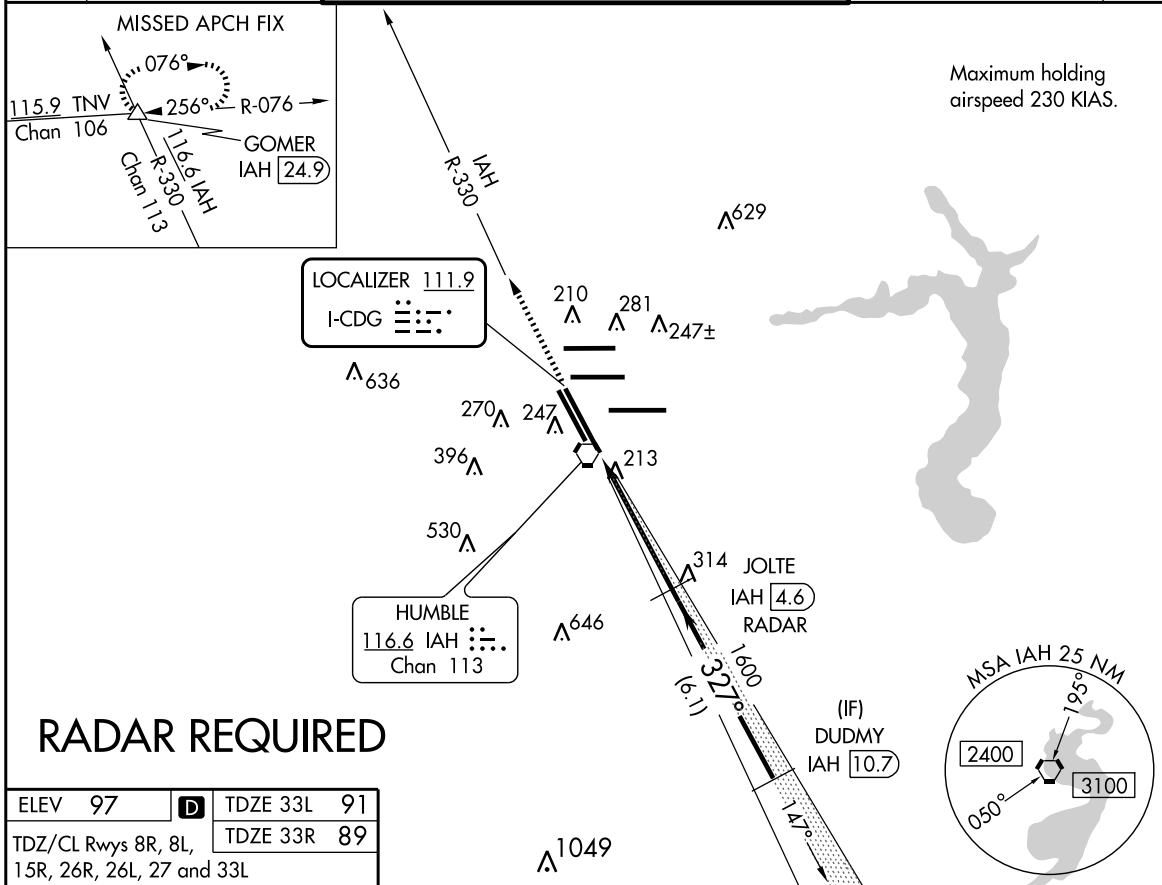
HOUSTON/ GEORGE BUSH
INTERCONTINENTAL/HOUSTON (IAH)

▽ DME from IAH VORTAC. Simultaneous reception of I-CDG and IAH DME required. DME or RADAR REQUIRED. For inoperative MALSR, increase S-ILS 33R Cat E visibility to RVR 4000 and S-LOC 33R Cat E visibility to 1½. #RVR 1800 authorized with the use of FD or AP or HUD to DA.



MISSED APPROACH: Climb to 2000 via IAH R-330 to GOMER INT / IAH 24.9 DME and hold.

ATIS 124.05	HOUSTON APP CON 120.05 379.1 EAST	HOUSTON TOWER 8L/26R 120.725 290.2		GND CON 8L/R 26L/R, 9/27 121.7	CLNC DEL 128.1
	124.35 316.15 WEST	8R/26L 125.35 290.2	15L/R 33L/R 127.3 288.25	15L/R 33L/R 118.575	



ELEV 97 TDZE 33L 91

TDZ/CL Rwy 8R, 8L, 15R, 26R, 26L, 27 and 33L TDZE 33R 89

HIRL all Rwys

9000 X 150 26R

129+ 26L 193

9402 X 150 26L

142

Λ 259 189 Λ 207

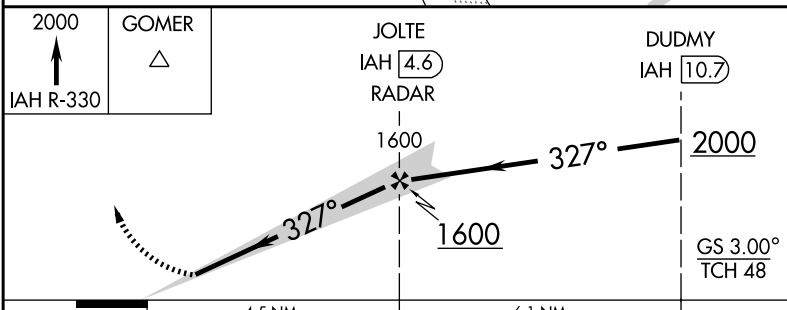
TWR 422

125 10000 X 150 27

247 Λ 33L 133 Λ 33R 196 Λ 172

327° 4.5 NM from FAF

FAF to MAP 4.5 NM					
Knots	60	90	120	150	180
Min:Sec	4:30	3:00	2:15	1:48	1:30



CATEGORY	A	B	C	D	E
S-ILS 33R	# 289/24 200 (200-½)				289/24 200 (200-½)
S-LOC 33R	540/24		451 (500-½)		540/50 451 (500-1)
SIDESTEP Rwy 33L	540-1 449 (500-1)	540-1½ 449 (500-1½)	540-2 449 (500-2)	NA	
CIRCLING	NA				

HOUSTON, TEXAS
Amdt 12A 12040

HOUSTON/ GEORGE BUSH INTERCONTINENTAL/HOUSTON (IAH)
29° 59' N-95° 20' W
ILS or LOC RWY 33R

Figure 259. ILS or LOC RWY 33R (IAH).

TAKEOFF MINIMUMS AND (OBSTACLE) DEPARTURE PROCEDURES

11349

CROCKETT, TX

HOUSTON COUNTY (DKR)

ORIG 11349 (FAA)

TAKE-OFF MINIMUMS: **Rwy 2**, 400-2 or std. w/min. climb of 280' per NM to 800. **Rwy 20**, 300-1½ or std. w/min. climb of 459' per NM to 700.

NOTE: **Rwy 2**, multiple trees beginning 57' from DER, 61' right of centerline, up to 50' AGL/399' MSL. Multiple trees and terrain beginning 27' from DER, 109' left of centerline, up to 50' AGL/409' MSL. Tower 1.5 NM from DER, 2864' left of centerline 233' AGL/623' MSL. **Rwy 20**, multiple towers beginning 4567' from DER, 1025' right of centerline, up to 200' AGL/529' MSL.

EAGLE LAKE, TX

EAGLE LAKE

TAKE-OFF MINIMUMS: **Rwy 17**, 200-1, or std. with a min. climb of 420' per NM to 500.

NOTE: **Rwy 17**, tower 3068' from departure end of runway, 793' left of centerline, 192' AGL/317' MSL.

GALVESTON, TX

SCHOLES INTL AT GALVESTON (GLS)

AMDT 4 08157 (FAA)

TAKE-OFF MINIMUMS: **Rwy 17**, 300-1 or std. w/min. climb of 502' per NM to 300.

NOTE: **Rwy 13**, bush 381' from departure end of runway, 533' left of centerline, 15' AGL/20' MSL. Fence 201' from departure end of runway, 490' left of centerline, 6' AGL/11' MSL. Tree 343' from departure end of runway, 468' right of centerline, 12' AGL/17' MSL. **Rwy 17**, building 3057' from departure end of runway, 339' left of centerline, 123' AGL/130' MSL. Multiple poles beginning 2034' from departure end of runway, 87' right of centerline, up to 60' AGL/70' MSL. Multiple transmission towers beginning 636' from departure end of runway, 551' right of centerline, up to 55' AGL/60' MSL. Tree 460' from departure end of runway, 316' right of centerline, 22' AGL/29' MSL. **Rwy 31**, multiple cranes beginning 4341' from departure end of runway, 1017' left of centerline, up to 131' AGL/131' MSL. **Rwy 35**, tree 730' from departure end of runway, 501' right of centerline, 27' AGL/32' MSL.

GIDDINGS, TX

GIDDINGS-LEE COUNTY (GYB)

ORIG 10210 (FAA)

NOTE: **Rwy 17**, numerous trees beginning 720' from DER, 58' right of centerline, up to 50' AGL/479' MSL. Numerous trees beginning 754' from DER, 340' left of centerline, up to 50' AGL/479' MSL. **Rwy 35**, numerous trees beginning 613' from DER, 272' right of centerline, up to 50' AGL/539' MSL. Numerous trees beginning 558' from DER, 265' left of centerline, up to 50' AGL/559' MSL. Vehicle on road 516' from DER, 246' left of centerline, 15' AGL/514' MSL.

HOUSTON, TX

DAN JONES INTL (T51)

ORIG 11321 (FAA)

TAKE-OFF MINIMUMS: **Rwy 17**, NA - numerous trees. **Rwy 35**, NA - numerous trees.

HOUSTON, TX (CON'T)

DAVID WAYNE HOOKS MEMORIAL (DWH)

AMDT 3 08157 (FAA)

TAKE-OFF MINIMUMS: **Rwys 17L, 35R**, NA - Environmental. **Waterways 17, 35**, NA - air traffic.

NOTE: **Rwy 17R**, multiple trees beginning 708' from departure end of runway, 68' left of centerline, up to 71' AGL/220' MSL. Multiple hangars beginning 433' from departure end of runway, 515' left of centerline, up to 37' AGL/182' MSL. DME antenna 653' from departure end of runway, 256' left of centerline, 13' AGL/162' MSL. Multiple trees and pole beginning 85' from departure end of runway, 294' right of centerline, up to 45' AGL/189' MSL. **Rwy 35L**, multiple trees and poles beginning 144' from departure end of runway, 32' left of centerline, up to 79' AGL/238' MSL. Multiple hangars and buildings beginning 85' from departure end of runway, 9' left of centerline, up to 53' AGL/202' MSL. Multiple trees, towers and pole beginning 100' from departure end of runway, 124' right of centerline, up to 93' AGL/247' MSL. Vehicle and road 315' from departure end of runway, on centerline 15' AGL/166' MSL. Building 894' from departure end of runway, 231' right of centerline, 23' AGL/173' MSL.

ELLINGTON FIELD (EFD)

AMDT 2 08157 (FAA)

NOTE: **Rwy 17R**, pole 1489' from departure end of runway, 817' right of centerline, 40' AGL/74' MSL.

Rwy 22, antenna on building 1998' from departure end of runway, 598' right of centerline, 54' AGL/83' MSL. Obstruction light on glide slope 327' from departure end of runway, 543' left of centerline, 39' AGL/68' MSL. **Rwy 35R**, tree 1597' from departure end of runway, 32' left of centerline, 33' AGL/80' MSL. **Rwy 35L**, multiple trees beginning 1118' from departure end of runway, 679' right of centerline, up to 37' AGL/77' MSL. Crane 2352' from departure end of runway, 1024' left of centerline, 37' AGL/97' MSL.

GEORGE BUSH INTERCONTINENTAL/ HOUSTON (IAH)

AMDT 2 08157 (FAA)

NOTE: **Rwy 8L**, tree 2866' from departure end of runway, 921' left of centerline, 107' AGL/201' MSL. Multiple trees beginning 2750' from departure end of runway, 106' right of centerline, up to 80' AGL/174' MSL. **Rwy 15L**, multiple trees 2638' from departure end of runway, 758' right of centerline, up to 76' AGL/160' MSL. **Rwy 15R**, tower 1431' from departure end of runway, 591' left of centerline, 48' AGL/133' MSL. Antenna on glideslope 1469' from departure end of runway, 621' left of centerline, 49' AGL/133' MSL. **Rwy 26R**, pole 950' from departure end of runway, 660' right of centerline, 40' AGL/129' MSL. **Rwy 33R**, tree 2868' from departure end of runway, 1027' right of centerline, 73' AGL/172' MSL.

HOUSTON EXECUTIVE (TME)

DEPARTURE PROCEDURE: **Rwy 36**, Climb heading 355° to 700 before turning east.

NOTE: **Rwy 36**, power poles from left to right beginning 703' from departure end of runway, 623' left to 685' right of centerline, up to 32' AGL/196' MSL.

11349

TAKEOFF MINIMUMS AND (OBSTACLE) DEPARTURE PROCEDURES

SC-5

Figure 260. Takeoff Minimums and (Obstacle) Departure Procedures.





 TAKEOFF MINIMUMS AND (OBSTACLE) DEPARTURE PROCEDURES 	
<p>11349 HOUSTON, TX (CON'T) HOUSTON-SOUTHWEST (AXH) AMDT 5 08157 (FAA) DEPARTURE PROCEDURE: Rwy 9, climb heading 089° to 2000 before turning left. Rwy 27, climb heading 269° to 2200 before turning right. NOTE: Rwy 9, multiple hangars beginning 239' from departure end of runway, 360' right of centerline, up to 42' AGL/106' MSL. Multiple trees beginning 501' from departure end of runway, 355' right of centerline, up to 43' AGL/111' MSL. Multiple hangars beginning 119' from departure end of runway, 498' left of centerline, up to 41' AGL/105' MSL. Pole 332' from departure end of runway, 299' left of centerline, 43' AGL/97' MSL. Antenna 1172' from departure end of runway, 658' left of centerline, 51' AGL/115' MSL. Multiple trees beginning 558' from departure end of runway, 68' left of centerline, up to 58' AGL/122' MSL. Rwy 27, multiple trees beginning 1050' from departure end of runway, 40' left of centerline, up to 71' AGL/140' MSL. Vehicle and road 99' from departure end of runway, 291' right of centerline, 15' AGL/83' MSL. Multiple trees beginning 873' from departure end of runway, 514' right of centerline, up to 59' AGL/130' MSL. Multiple transmission poles beginning 1304' from departure end of runway, 131' right of centerline, up to 41' AGL/110' MSL.</p> <p>LONE STAR EXECUTIVE (CXO) AMDT 3 10266 (FAA) NOTE: Rwy 1, trees beginning 194' from DER, 130' right of centerline, up to 100' AGL/374' MSL. Trees beginning 817' from DER, 15' left of centerline, up to 100' AGL/359' MSL. Rwy 14, trees and obstruction light on DME beginning 399' from DER, 80' right of centerline, up to 100' AGL/329' MSL. Trees beginning 640' from DER, 408' left of centerline, up to 100' AGL/329' MSL. Rwy 19, trees beginning 68' from DER, 64' right of centerline, up to 100' AGL/344' MSL. Trees beginning 1' from DER, 159' left of centerline, up to 100' AGL/339' MSL. Rwy 32, trees beginning 1785' from DER, 973' right of centerline, up to 100' AGL/339' MSL. Trees and vehicles on road beginning 603' from DER, 458' left of centerline, up to 100' AGL/354' MSL.</p> <p>PEARLAND RGNL DEPARTURE PROCEDURE: Rwy 14, climb heading 139° to 1600 before proceeding south through southwest. Rwy 32, climb heading 319° to 900 before proceeding on course. NOTE: Rwy 14, multiple trees beginning 199' from departure end of runway, 226' right of centerline, up to 66' AGL/100' MSL. Vehicle on road 398' from departure end of runway, 405' left of centerline, 9' AGL/55' MSL. Trees 1287' from departure end of runway, 453' left of centerline, up to 56' AGL/90' MSL. Rwy 32, multiple trees beginning 690' from departure end of runway, 81' left of centerline, up to 79' AGL/128' MSL. Multiple poles beginning 745' from departure end of runway, 24' left of centerline, up to 40' AGL/80' MSL. Multiple trees and poles beginning 29' from departure end of runway, 11' right of centerline, up to 64' AGL/104' MSL. Building 237' from departure end of runway, 520' right of centerline, 32' AGL/72' MSL.</p>	<p>HOUSTON, TX (CON'T) SUGAR LAND RGNL (SGR) AMDT 7 08157 (FAA) DEPARTURE PROCEDURE: Rwy 17, climb heading 170° to 1500 before turning eastbound. Rwy 35, climb heading 350° to 1100 before turning southbound. NOTE: Rwy 17, multiple poles beginning 436' from departure end of runway, 172' right of centerline, up to 44' AGL/124' MSL. Railroad 110' from departure end of runway, 10' left of centerline, 23' AGL/104' MSL. Multiple poles beginning 135' from departure end of runway, 270' left of centerline, up to 44' AGL/111' MSL. Rwy 35, vehicle and road 65' from departure end of runway, 2' right of centerline, 15' AGL/96' MSL. Multiple trees beginning 37' from departure end of runway, 275' right of centerline, up to 81' AGL/164' MSL. DME antenna 380' from departure end of runway, 253' right of centerline, 24' AGL/100' MSL. Multiple trees beginning 83' from departure end of runway, 65' left of centerline, up to 81' AGL/155' MSL.</p> <p>WEISER AIR PARK (EYQ) AMDT 2 08157 (FAA) TAKEOFF MINIMUMS: Rwy 9, 200-1 or std. w/ min. climb of 399' per NM to 400. NOTE: Rwy 9, tank 4127' from departure end of runway, 1455' left of centerline, 147' AGL/282' MSL. Rwy 27, railroad 462' from departure end of runway, 555' left of centerline, 23' AGL/165' MSL. Vehicle and road 650' from departure end of runway, 7' left of centerline, 17' AGL/159' MSL.</p> <p>WEST HOUSTON (IWS) AMDT 3 09295 (FAA) NOTE: Rwy 15, vehicles on roadway beginning abeam DER, left and right of centerline, up to 15' AGL/124' MSL. Building 177' from DER, 398' left of centerline, 18' AGL/126' MSL. Trees beginning 178' from DER, 289' right of centerline, up to 100' AGL/209' MSL. Rwy 33, building 265' from DER, 364' left of centerline, 33' AGL/143' MSL. Trees beginning 2706' from DER, 700' left of centerline, up to 100' AGL/214' MSL. Trees beginning 3159' from DER, 747' right of centerline, up to 100' AGL/216' MSL.</p>
<p>11349  TAKEOFF MINIMUMS AND (OBSTACLE) DEPARTURE PROCEDURES </p>	<p style="text-align: right;">SC-5</p>

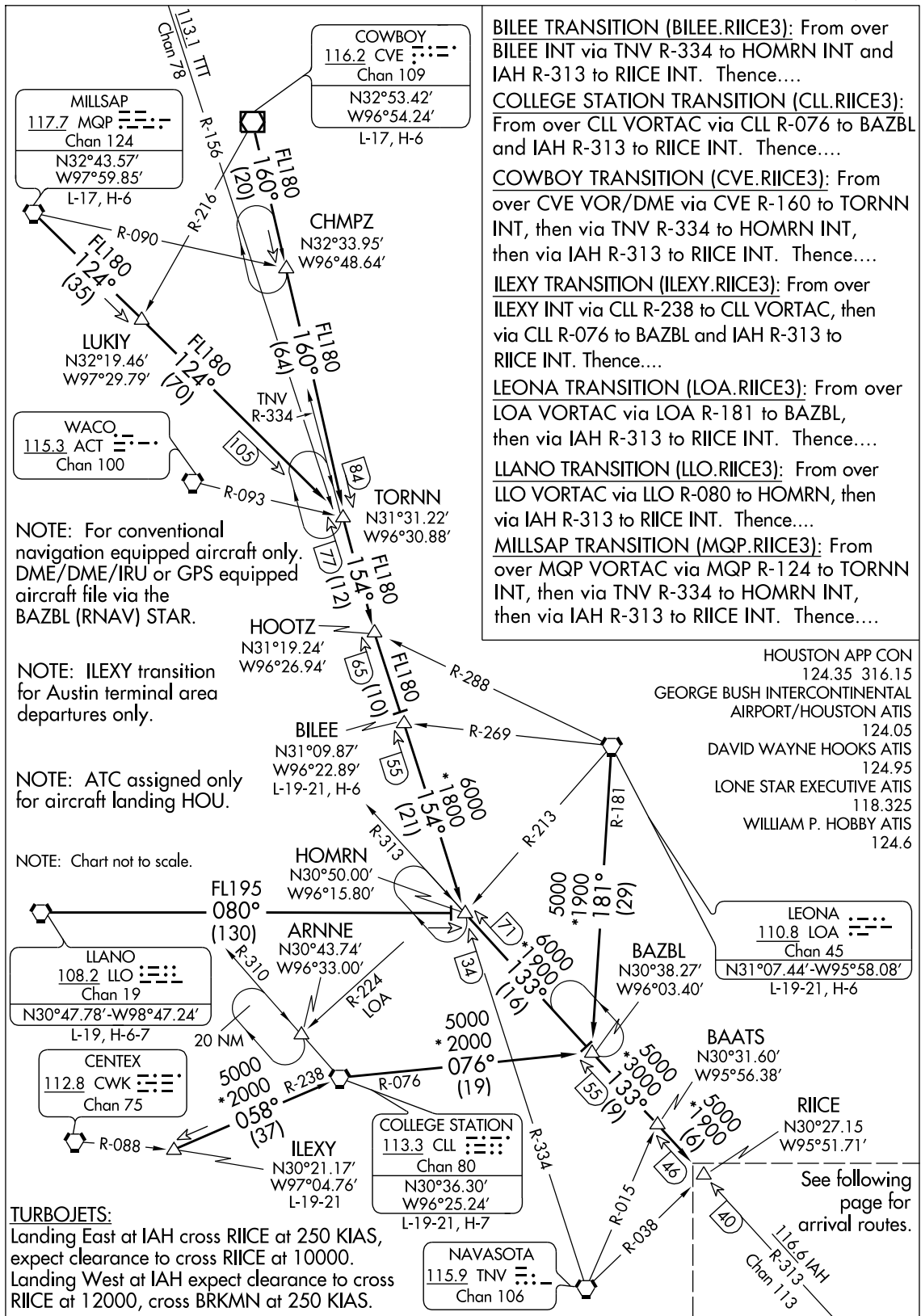
Figure 261. Takeoff Minimums and (Obstacle) Departure Procedures.

(RIICE.RIICE3) 12096

ST-5461 (FAA)

RIICE THREE ARRIVAL Transition Routes

HOUSTON, TEXAS



RIICE THREE ARRIVAL Transition Routes

HOUSTON, TEXAS

(RIICE.RIICE3) 12096

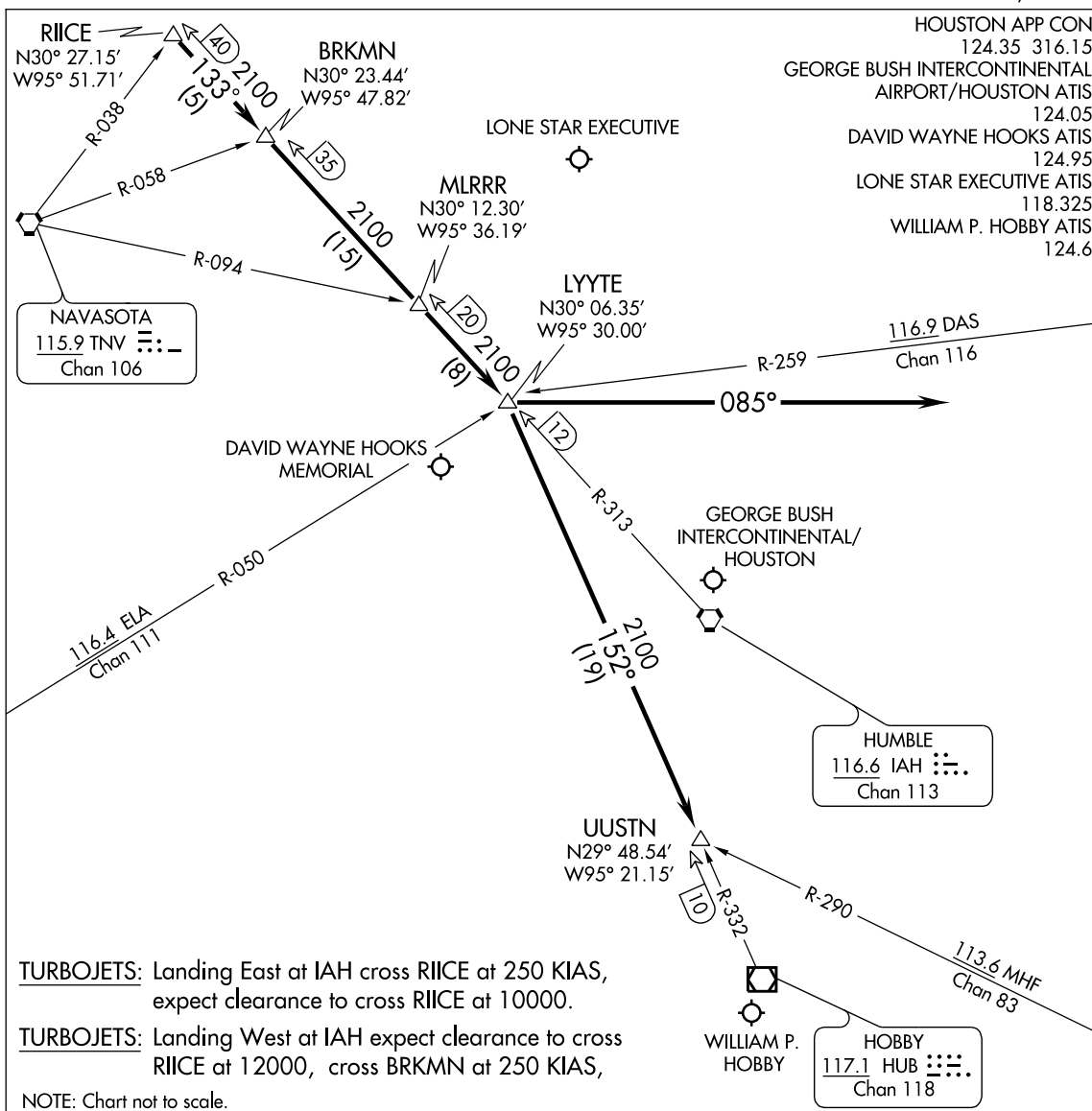
Figure 262. RIICE THREE ARRIVAL Transition Routes (RIICE.RIICE3).

(RIICE.RIICE3) 10210

ST-5461 (FAA)

RIICE THREE ARRIVAL Arrival Routes

HOUSTON, TEXAS



ARRIVAL ROUTE DESCRIPTION

GEORGE BUSH INTERCONTINENTAL/HOUSTON (IAH):

....From over RIICE INT via IAH R-313 to LYTE INT.

LANDING RUNWAYS 26L/26R, 27: Fly heading 085° for vectors to final approach course.

LANDING ALL OTHER RUNWAYS: Expect vectors to final approach course at or prior to LYTE INT.

WILLIAM P. HOBBY (HOU) (ATC ASSIGNED):

....From over RIICE INT via IAH R-313 to LYTE INT, then via HUB R-332 to UUSTN INT, expect vectors to final approach course at or prior to UUSTN INT.

DAVID WAYNE HOOKS MEMORIAL (DWH) and LONE STAR EXECUTIVE (CXO):

....From over RIICE INT via IAH R-313 to LYTE INT, expect vectors to final approach course at or prior to LYTE INT.

RIICE THREE ARRIVAL Arrival Routes

HOUSTON, TEXAS

(RIICE.RIICE3) 10210

Figure 263. RIICE THREE ARRIVAL Arrival Routes (RIICE.RIICE3).

HOUSTON, TEXAS

AL-5461 (FAA)

12040

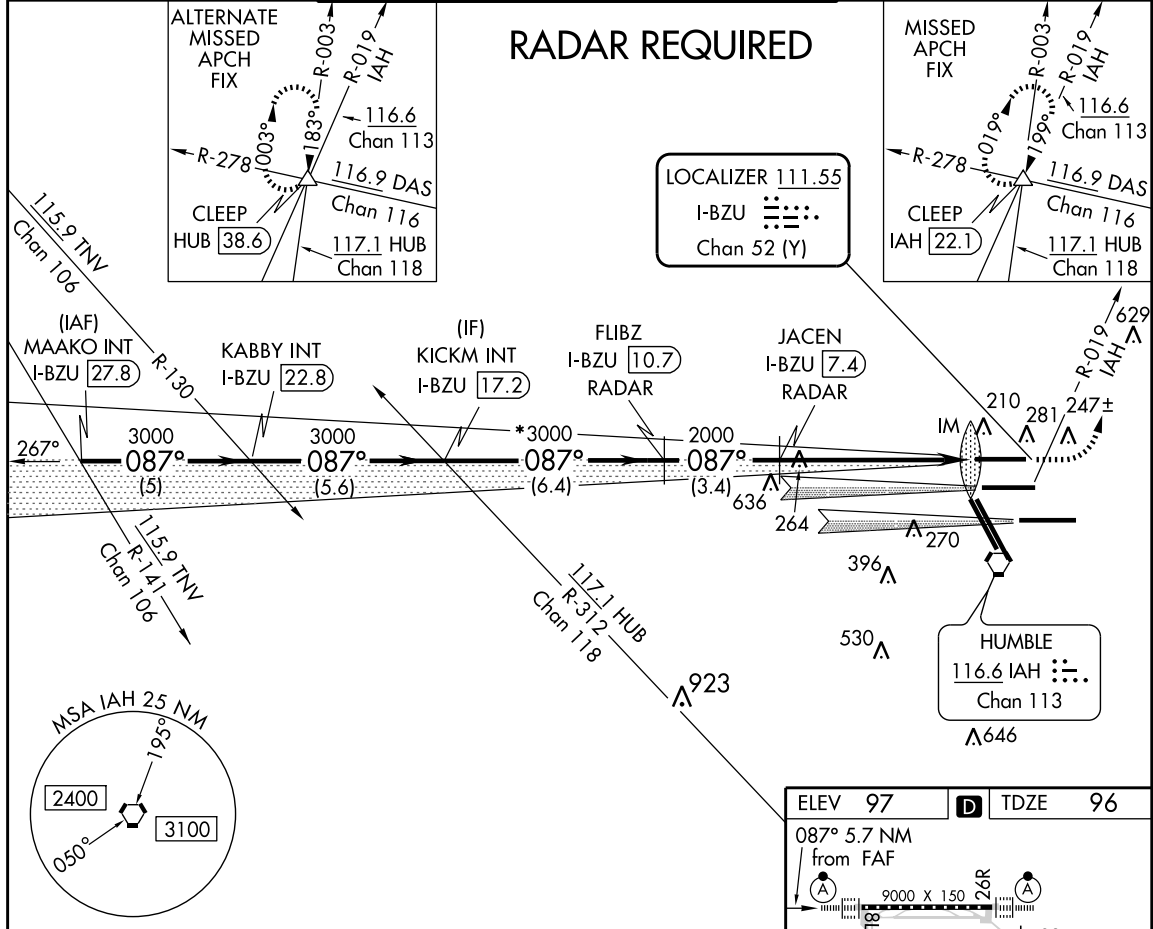
LOC/DME I-BZU 111.55 Chan 52 (Y)	APP CRS 087°	Rwy Idg 9000 TDZE 96 Apt Elev 97
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ILS or LOC RWY 8L

HOUSTON/GEORGE BUSH INTERCONTINENTAL/HOUSTON (IAH)

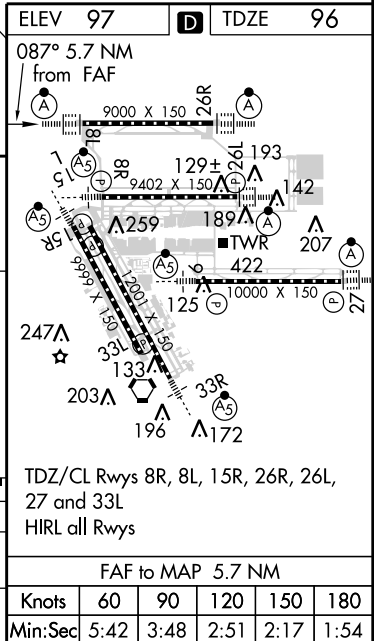
ALSF-2
MISSED APPROACH: Climb to 600 then climbing left turn to 4000 via IAH VORTAC R-019 to CLEEP INT/IAH 22.1 DME and hold.

ATIS 124.05	HOUSTON APP CON 120.05 379.15 EAST 316.15 WEST	HOUSTON TOWER 120.725 290.2 9/27 135.15 290.2 15L/R 127.3 288.25 33L/R	GND CON 121.7 8L/R 26L/R, 9/27 118.575 15L/R 33L/R	CLNC DEL 128.1
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*When assigned by ATC, intercept glidepath at 3000.

MAAKO INT I-BZU [27.8]	KABBY INT I-BZU [22.8]	KICKM INT I-BZU [17.2]	FLIBZ I-BZU [10.7] RADAR	JACEN I-BZU [7.4] RADAR	IAH R-019	CLEEP
3000	3000	3000	*3000	2000	2000	IM
GS 3.00°	GS 3.00°	GS 3.00°	GS 3.00°	GS 3.00°	GS 3.00°	GS 3.00°
5 NM	5.6 NM	6.4 NM	3.4 NM	4.3 NM	1.3	0.1
CATEGORY A	B	C	D	E		
S-ILS 8L	296/18 200 (200-½)					
S-LOC 8L	600/24 504 (600-½)	600/50 504 (600-1)	600/60 504 (600-1½)			



HOUSTON, TEXAS
Amdt 2A 16DEC10

HOUSTON/ GEORGE BUSH INTERCONTINENTAL/HOUSTON (IAH)
29°59'N-95°20'W

ILS or LOC RWY 8L

Figure 264. ILS or LOC RWY 8L (IAH).

HOUSTON, TEXAS

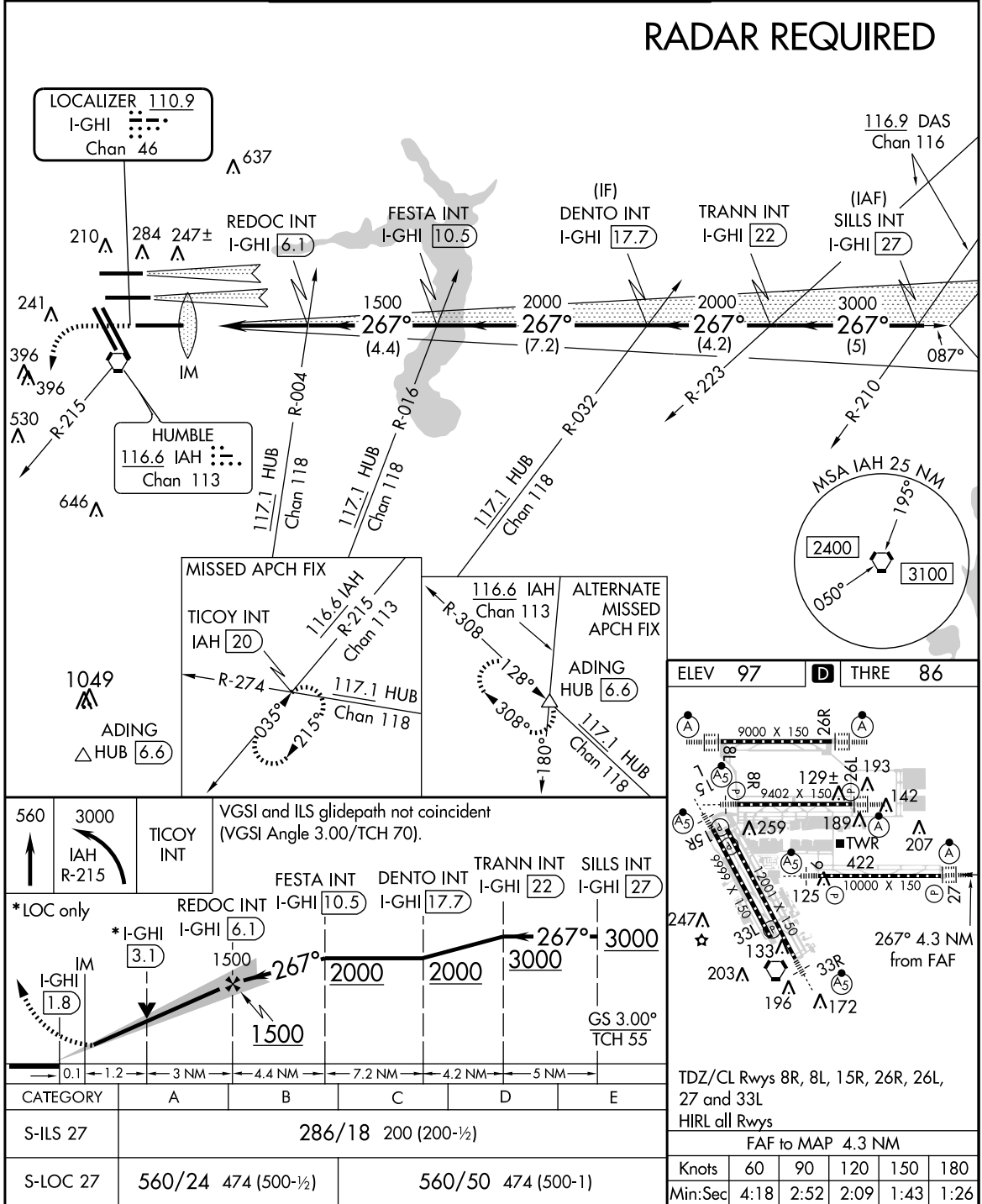
AL-5461 (FAA)

12040

LOC/DME I-GHI 110.9 Chan 46	APP CRS 267°	Rwy Idg 10000 THRE 86 Apt Elev 97	HOUSTON/ GEORGE BUSH INTERCONTINENTAL/HOUSTON (IAH)	ILS or LOC RWY 27
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<p>▼ For inoperative ALSF, increase S-ILS 27 Cat E visibility to RVR 4000 and S-LOC 27 Cat C-E visibility to 1%. Simultaneous approach authorized with Rwy 26L/R. LOC procedure NA during simultaneous operations.</p>	ALSF-2 A	MISSED APPROACH: Climb to 560 then climbing left turn to 3000 on IAH VORTAC R-215 to TICCOY INT/IAH 20 DME and hold.
	ATIS 124.05	HOUSTON APP CON 120.05 379.1 EAST 124.35 316.15 WEST

HOUSTON TOWER 9/27 135.15 290.2	GND CON 8L/R 26L/R, 9/27 121.7	CLNC DEL 128.1
8L/26R 120.725 290.2 8R/26L 125.35 290.2	15L/R 33L/R 127.3 288.25	15L/R 33L/R 118.575



HOUSTON, TEXAS
Amdt 9 09FEB12

HOUSTON/GEORGE BUSH INTERCONTINENTAL/HOUSTON (IAH)
29°59'N-95°20'W
ILS or LOC RWY 27

Figure 265. ILS or LOC RWY 27 (IAH).

HOUSTON, TEXAS

AL-5461 (FAA)

12040

WAAS CH 97726 W26A	APP CRS 265°	Rwy Idg THRE 95 Apt Elev 97	9000
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RNAV (GPS) Z RWY 26R

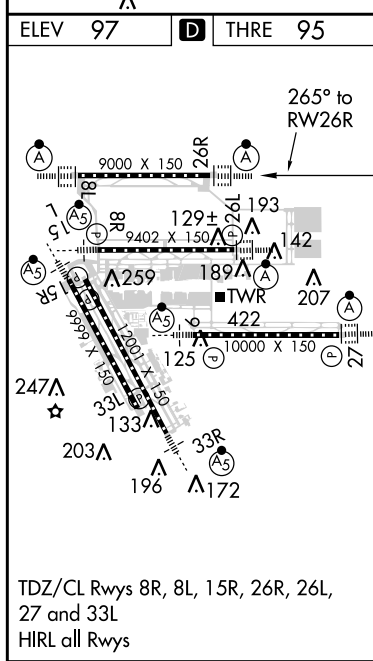
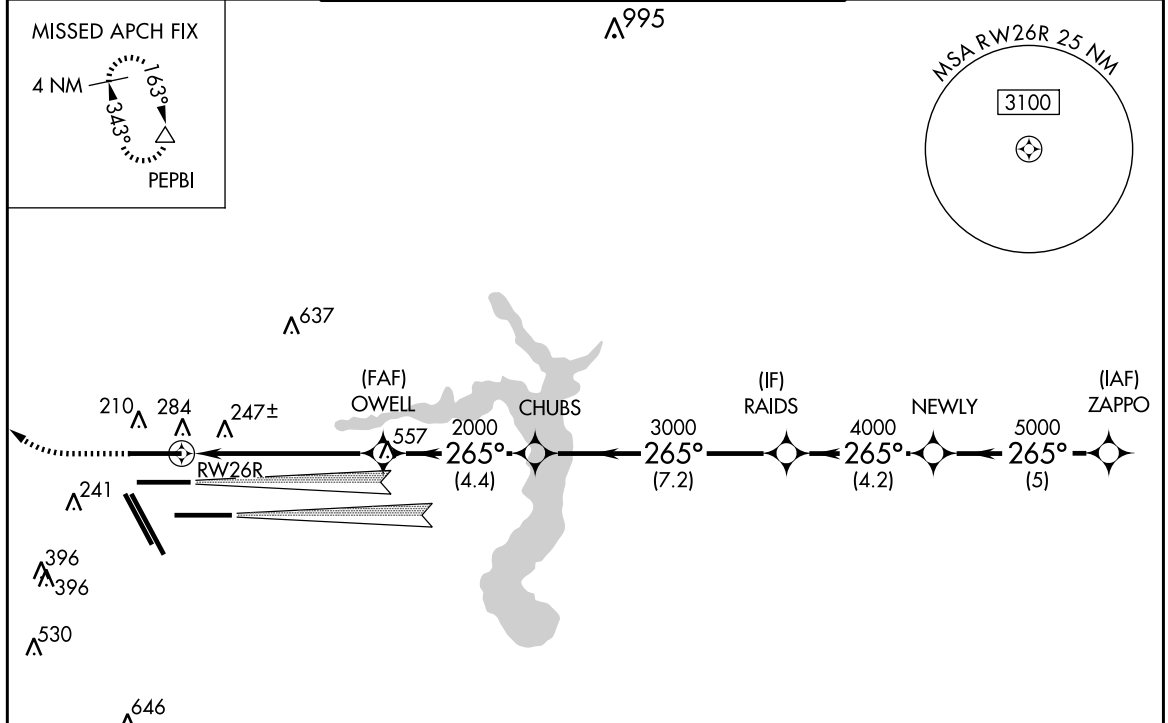
HOUSTON/GEORGE BUSH INTERCONTINENTAL/HOUSTON (IAH)

For uncompensated Baro-VNAV systems, LNAV/VNAV NA below -2°C (29°F) or above 39°C (101°F). For inoperative ALSF, increase LPV Cat E visibility to RVR 4000, LNAV/VNAV all Cats visibility to 1¼, and LNAV Cat C/D/E visibility to 1¾. DME/DME RNP-0.3 NA. Simultaneous approach authorized with Rwy 26L and Rwy 27. LNAV procedure NA during simultaneous operations. Use of FD or AP providing RNAV track guidance required during simultaneous operations.



MISSED APPROACH: Climb to 600 then climbing right turn to 3000 direct PEPBI and hold.

ATIS 124.05	HOUSTON APP CON 120.05 379.1 EAST 124.35 316.15 WEST	HOUSTON TOWER 8L/26R 120.725 290.2 9/27 135.15 290.2 8R/26L 125.35 290.2 15L/R 33L/R 127.3 288.25	GND CON 8L/R 26L/R, 9/27 121.7 15L/R 33L/R 118.575	CLNC DEL 128.1
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RADAR REQUIRED

ELEV 97	THRE 95	600	3000	PEPBI	NEWLY	ZAPPO
*LNAV only		RAIDS		265°	265°	5000
*1.4 NM to RW26R		OWELL	CHUBS	2000	3000	5000
RW26R		2000	4000	4000	5000	GS 3.00° TCH 59
1.4		4.4 NM	4.4 NM	7.2 NM	4.2 NM	5 NM
CATEGORY	A	B	C	D	E	
LPV DA	295/24		200 (200-½)			
LNAV/VNAV DA	492/45		397 (400-¾)			
LNAV MDA	600/24	505 (600-½)	600/55	505 (600-¼)		

HOUSTON, TEXAS
Amdt 3 09FEB12

HOUSTON/GEORGE BUSH INTERCONTINENTAL/HOUSTON (IAH)
29°59'N-95°20'W

RNAV (GPS) Z RWY 26R

Figure 266. RNAV (GPS) Z RWY 26R (IAH).

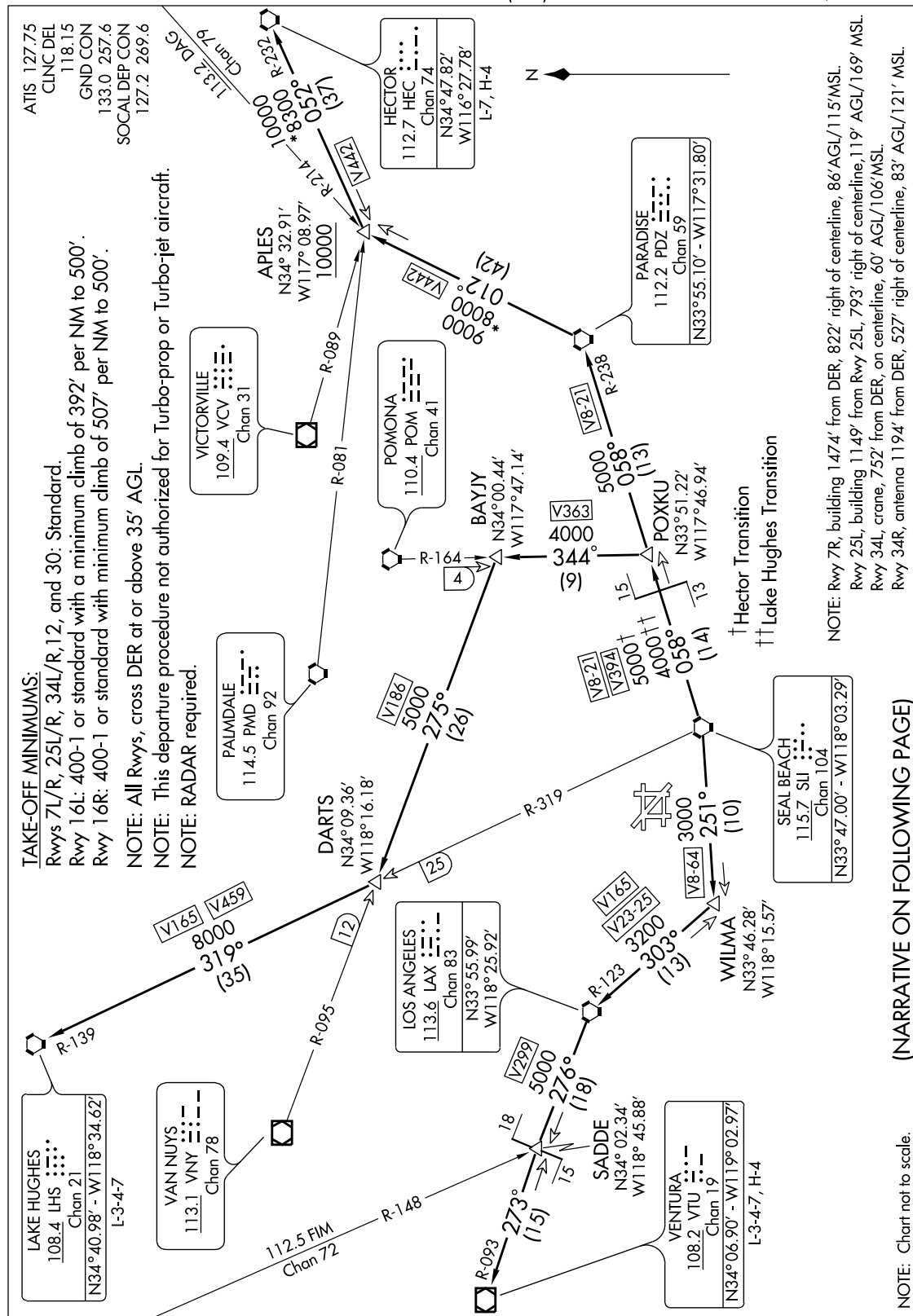
(ANAHM3.SLI) 12040

ANAHEIM THREE DEPARTURE

LONG BEACH (DAUGHERTY FIELD) (LGB)

SL-236 (FAA)

LONG BEACH, CALIFORNIA



ANAHEIM THREE DEPARTURE
 (ANAHM3.SLI) 12040

LONG BEACH, CALIFORNIA
 LONG BEACH (DAUGHERTY FIELD) (LGB)

Figure 267. ANAHEIM THREE Departure (ANAHM3.SLI)(LGB).

(ANAHM3.SLI) 08045

ANAHEIM THREE DEPARTURE

SL-236 (FAA)

LONG BEACH (DAUGHERTY FIELD) (LGB)

LONG BEACH, CALIFORNIA



DEPARTURE ROUTE DESCRIPTION

HECTOR or LAKE HUGHES TRANSITION: Climb runway heading to 800' then fly assigned heading for radar vectors to SLI VORTAC. Thence. . . .

VENTURA TRANSITION: Climb runway heading to 800' then fly assigned heading for radar vectors to LAX VORTAC. Thence. . . .

. . . .via (transition) or (assigned route). Maintain assigned altitude. Expect clearance to filed altitude 10 minutes after departure.

HECTOR TRANSITION (ANAHM3.HEC): From over SLI VORTAC via SLI R-058 and PDZ R-238 to PDZ VORTAC, then via PDZ R-012 and HEC R-232 to HEC VORTAC.

LAKE HUGHES TRANSITION (ANAHM3.LHS): From over SLI VORTAC via SLI R-058 and PDZ R-238 to POXKU INT, then via POM R-164 to BAYJY INT, then via VNY R-095 to DARTS INT. Thence via SLI R-319 and LHS R-139 to LHS VORTAC.

VENTURA TRANSITION (ANAHM3.VTU): From over SLI VORTAC via SLI R-251 to WILMA INT, then via LAX R-123 to LAX VORTAC, then via LAX R-276 and VTU R-093 to VTU VOR/DME.

ANAHEIM THREE DEPARTURE

(ANAHM3.SLI) 08045

LONG BEACH, CALIFORNIA

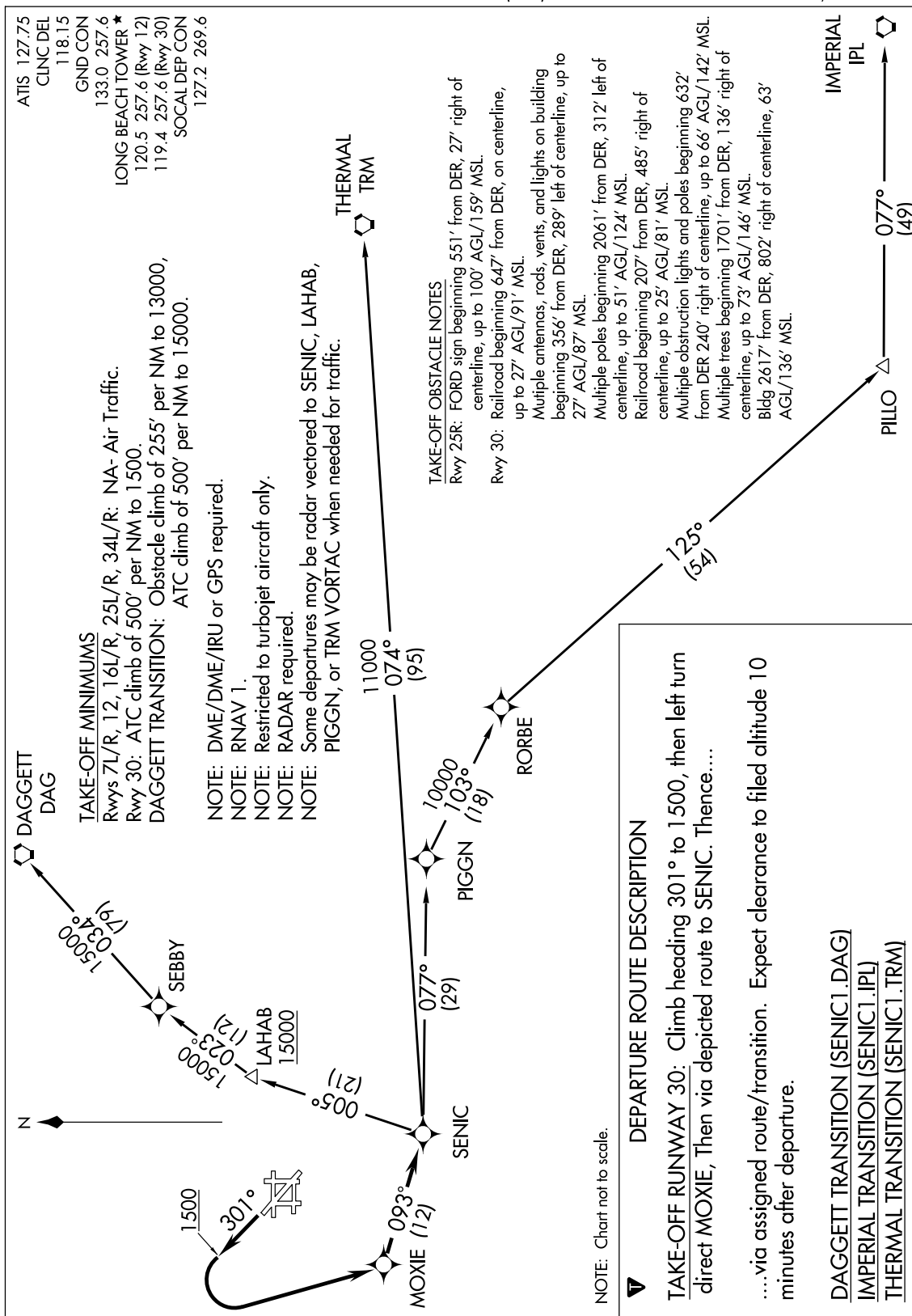
LONG BEACH (DAUGHERTY FIELD) (LGB)

Figure 268. ANAHEIM THREE Departure (ANAHM3.SLI)(LGB).

(SENIC1.SENIC) 07354
SENIC ONE DEPARTURE (RNAV)

LONG BEACH (DAUGHERTY FIELD) (LGB)
 LONG BEACH, CALIFORNIA

SL-236 (FAA)



SENIC ONE DEPARTURE (RNAV)
 (SENIC1.SENIC) 07354

LONG BEACH, CALIFORNIA
 LONG BEACH (DAUGHERTY FIELD) (LGB)

Figure 269. SENIC ONE Departure (RNAV) (SENIC1.SENIC).

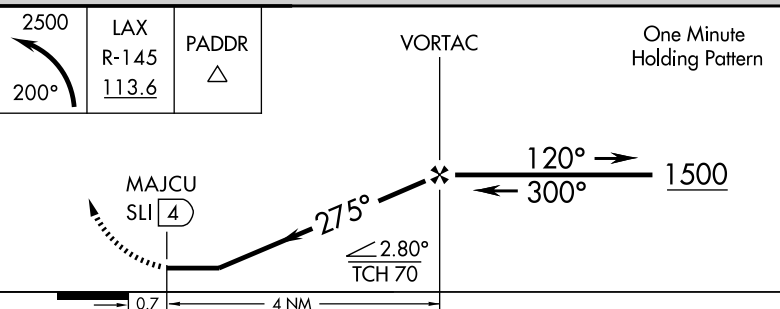
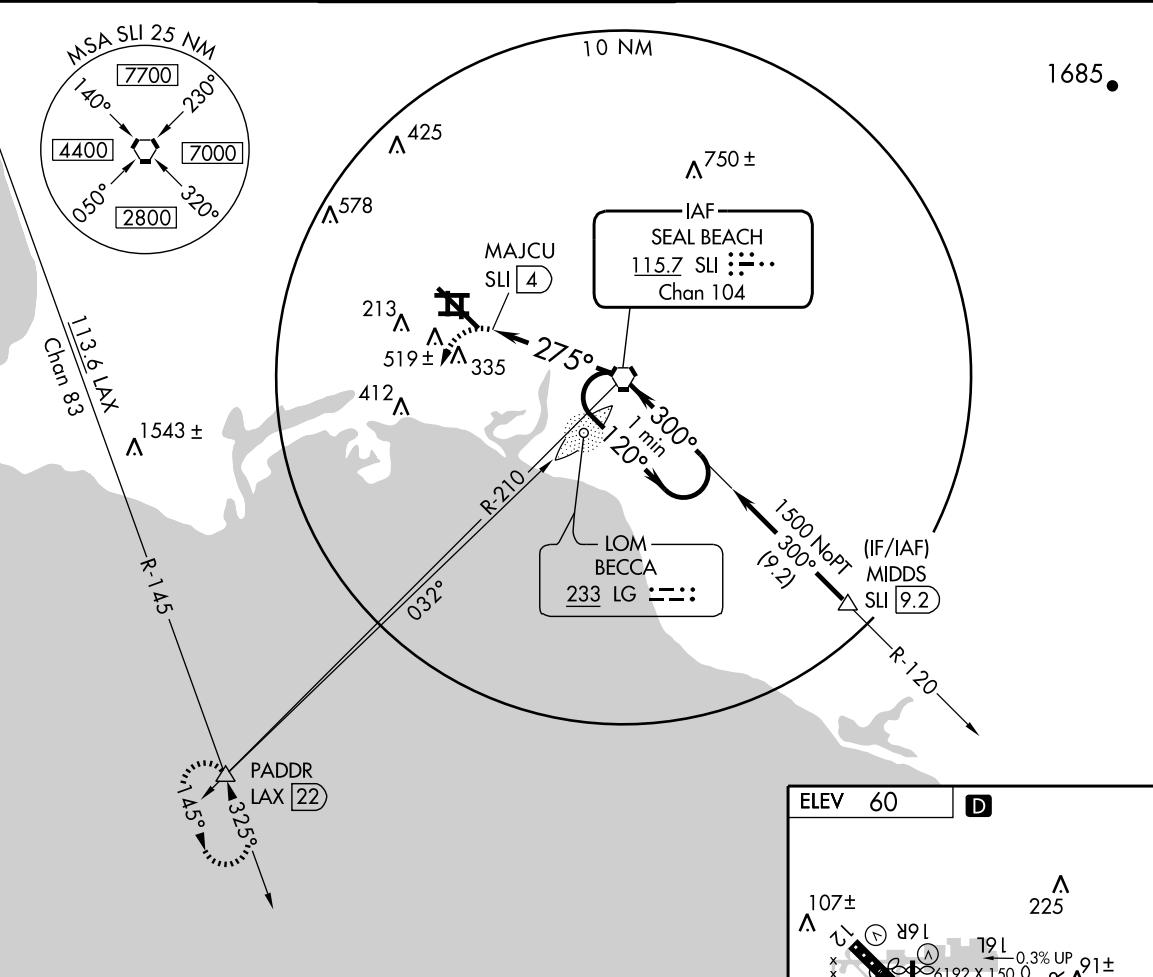
VORTAC SLI 115.7 Chan 104	APP CRS 275°	Rwy Idg TDZE Apt Elev	8000 38 60
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VOR or TACAN RWY 30

LONG BEACH (DAUGHERTY FIELD) (LGB)

Inoperative table does not apply.	MALS	MISSED APPROACH: Climbing left turn to 2500 via heading 200° and LAX R-145 to PADDR Int/LAX 22 DME and hold.
Visibility reduction by helicopters NA.		

ATIS 127.75	SOCAL APP CON 124.65 316.125	LONG BEACH TOWER★ 120.5 257.6 (Rwy 12) 119.4 (CTAF) 0 257.6 (Rwy 30)	GND CON 133.0 257.6	CLNC DEL 118.15	UNICOM 122.95
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ELEV 60	
TDZ/CL Rwy 30 MIRL Rwys 7L-25R REIL Rwys 12, 25L, and 25R HIRL Rwys 7R-25L and 12-30 FAF to MAP 4 NM	
Knots	60 90 120 150 180
Min:Sec	4:00 2:40 2:00 1:36 1:20

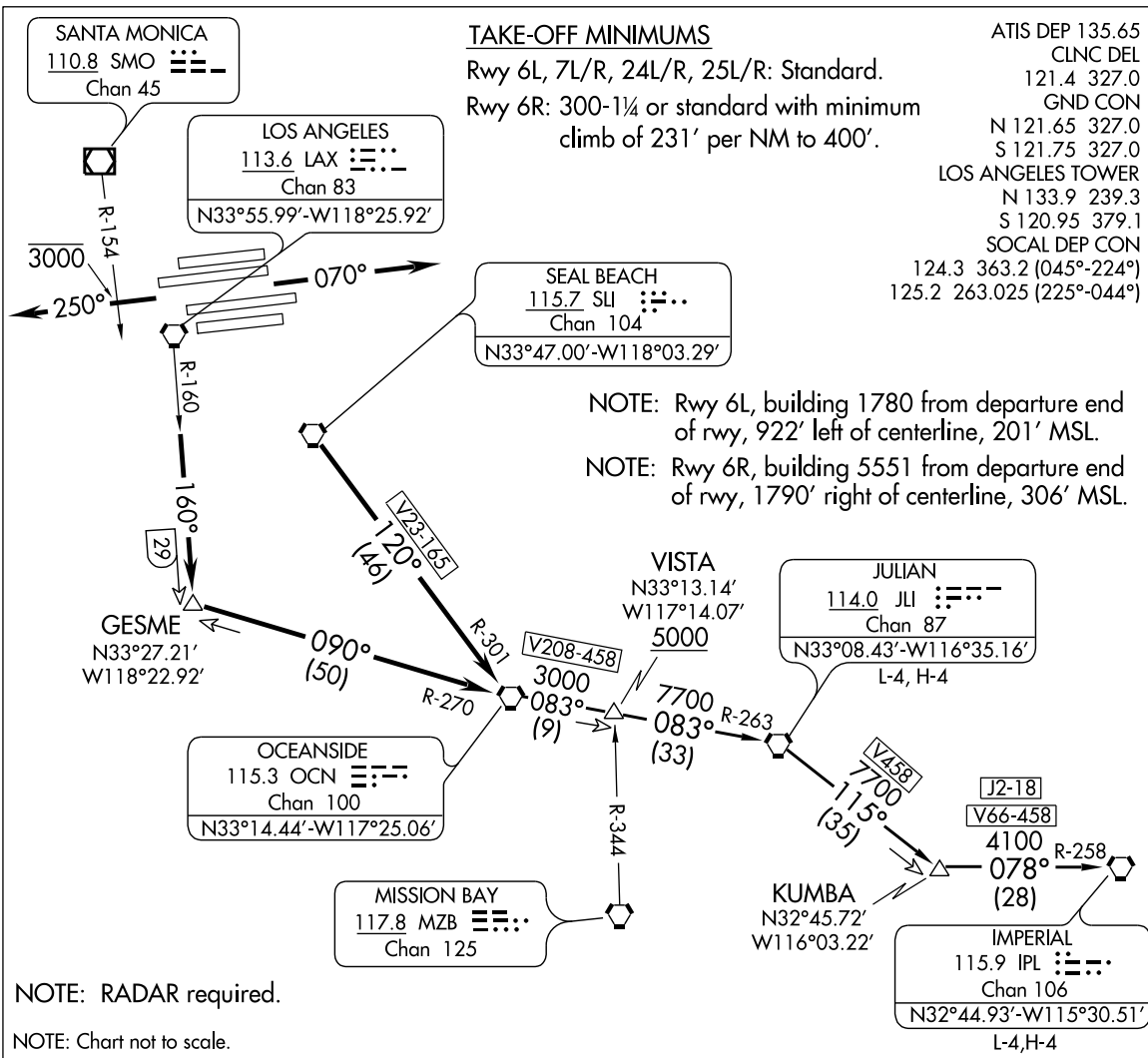
CATEGORY	A	B	C	D
S-30	640/50	602 (600-1)	640-1¾ 602 (600-1¾)	640-2 602 (600-2)
CIRCLING	880-1 820 (900-1)	880-1¼ 820 (900-1¼)	880-2½ 820 (900-2½)	880-2¾ 820 (900-2¾)

Figure 270. VOR or TACAN RWY 30 (LGB).

(IMPER1.IMPER) 11125
IMPER ONE DEPARTURE

SL-237 (FAA)

LOS ANGELES INTL (LAX)
 LOS ANGELES, CALIFORNIA



DEPARTURE ROUTE DESCRIPTION

TAKE-OFF RUNWAYS 6L/R, 7L/R: Climb via heading 070° for vector to SLI VORTAC, then via SLI R-120 and OCN R-301 to OCN VORTAC. Thence. . . .

TAKE-OFF RUNWAYS 24L/R, 25L/R: Climb via heading 250° to cross SMO R-154 at or below 3000. Then via radar vectors to join LAX R-160 to GESME INT. Then via OCN R-270 to OCN VORTAC. Thence. . . .

. . . .via (assigned transition) or (assigned route). All aircraft expect further clearance to filed flight level three minutes after departure.

LOST COMMUNICATIONS: If not in contact with Departure Control within five minutes after departure, climb to FL230 or filed altitude whichever is lower. Aircraft filing FL240 or above climb to filed altitude ten minutes after departure.

IMPERIAL TRANSITION (IMPER1.IPL): From over OCN VORTAC via OCN R-083 and JLI R-263 to JLI VORTAC. Then via JLI R-115 and IPL R-258 to IPL VORTAC.

JULIAN TRANSITION (IMPER1.JLI): From over OCN VORTAC via OCN R-083 and JLI R-263 to JLI VORTAC.

IMPER ONE DEPARTURE
 (IMPER1.IMPER) 11125

LOS ANGELES, CALIFORNIA
 LOS ANGELES INTL (LAX)

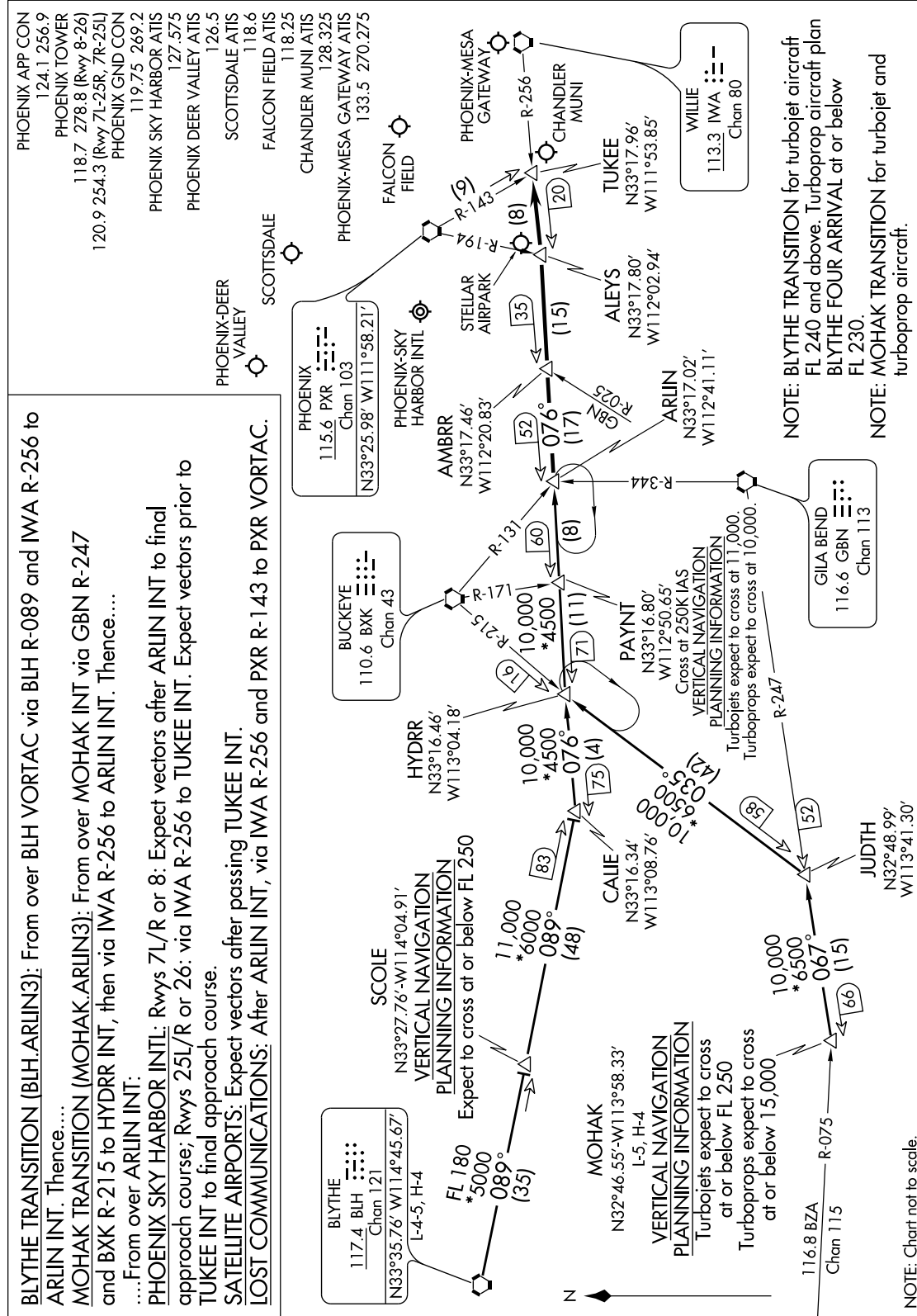
Figure 271. IMPER ONE Departure (IMPER1.IMPER)(LAX).

(ARLIN.ARLIN3) 09127

ARLIN THREE ARRIVAL

ST-322 (FAA)

PHOENIX, ARIZONA



ARLIN THREE ARRIVAL

PHOENIX, ARIZONA

(ARLIN.ARLIN3) 09127

Figure 272. ARLIN THREE Arrival (ARLIN.ARLIN3).

PHOENIX, ARIZONA

AL-322 (FAA)


12096

LOC/DME I-RJG 110.75 Chan 44 (Y)	APP CRS 258°	Rwy ldg TDZE Apt Elev 7800 1126 1135
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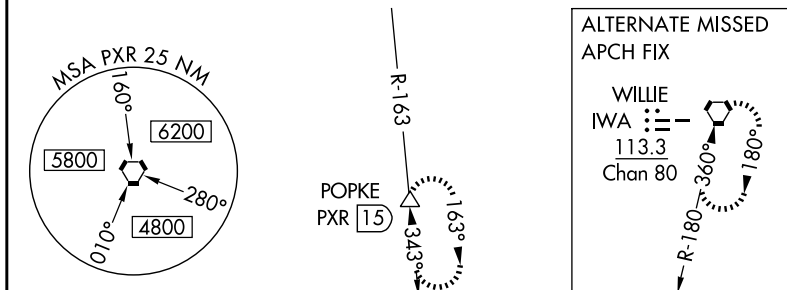
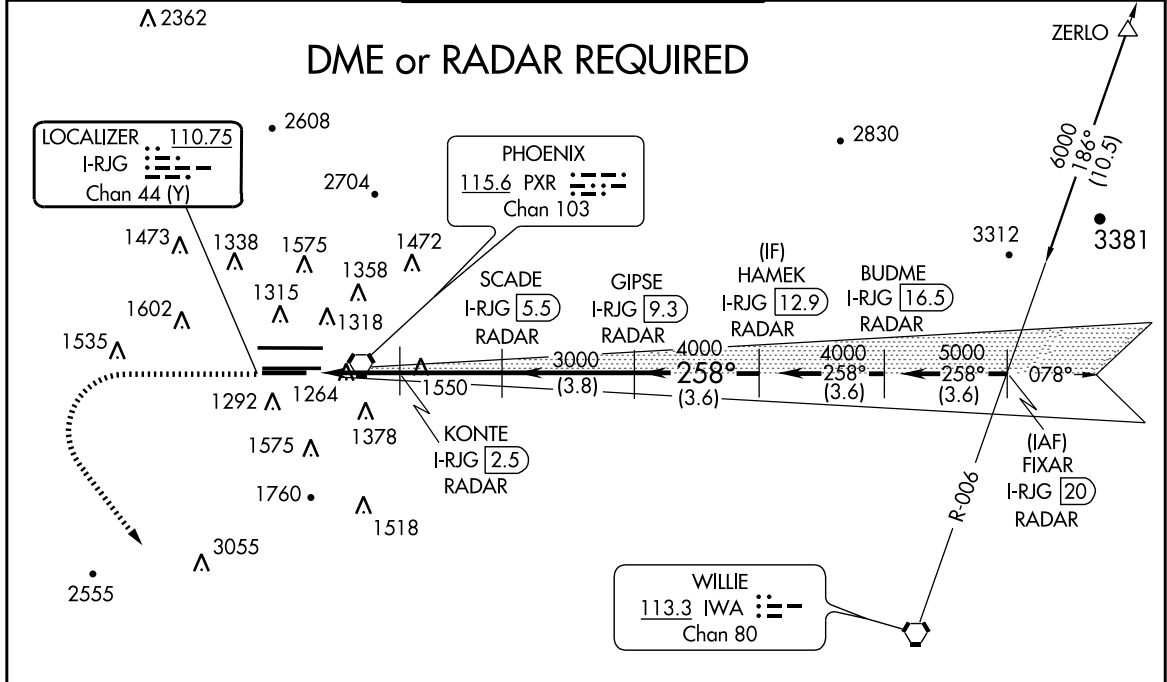
ILS or LOC RWY 25L

PHOENIX SKY HARBOR INTL (PHX)

Autopilot coupled approach NA below 1925.
Simultaneous approach authorized with Rwy 26.

MALSR
 MISSED APPROACH: Climb to 3000 then climbing left turn to 5000 on heading 130° and PXR R-163 to POPKE/15 DME and hold.

ATIS 127.575	PHOENIX APP CON 128.65 353.8	PHOENIX TOWER 118.7 278.8 (Rwy 8-26) 120.9 254.3 (Rwy 7L-25R, 7R-25L)	GND CON 119.75 269.2 (N) 132.55 269.2 (S)	CLNC DEL 118.1 269.2
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3000	5000	PXR R-163	POPKE	SCADE I-RJG 5.5 RADAR	GIPSE I-RJG 9.3 RADAR	HAMEK I-RJG 12.9 RADAR
Use I-RJG DME when on the localizer course.		KONTE I-RJG 2.5 RADAR		3000	4000	4000
I-RJG 0.2 *LOC only		2040*		3000	4000	GS 3.00° TCH 49
2.7 NM		3 NM		3.8 NM	3.6 NM	
CATEGORY	A		B		C	
S-ILS 25L	1326-1/2		200 (200-1/2)			
S-LOC 25L	1520-1/2		394 (400-1/2)		1520-3/4 394 (400-3/4)	
CIRCLING	1740-1 605 (700-1)		1740-1 3/4 605 (700-1 3/4)		1920-2 785 (800-2)	

ELEV 1135	TDZE 1126
1313A	
1266	
1150±	
1123	
10300 X 150	
7800 X 150	
7L 25R	
258° 5.6 NM from FAF	
HIRL Rws 8-26, 7L-25R and 7R-25L	
REIL Rwy 26	
FAF to MAP 5.6 NM	
Knots	60 90 120 150 180
Min:Sec	5:36 3:44 2:48 2:14 1:52

PHOENIX, ARIZONA
Amdt 1F 05APR12

33°26'N-112°01'W

ILS or LOC RWY 25L

Figure 273. ILS or LOC RWY 25L (PHX).

Appendix 2

PHOENIX, ARIZONA

AL-322 (FAA)

12096

WAAS CH 82211 W25B	APP CRS 258°	Rwy Idg 7800 TDZE 1126 Apt Elev 1135
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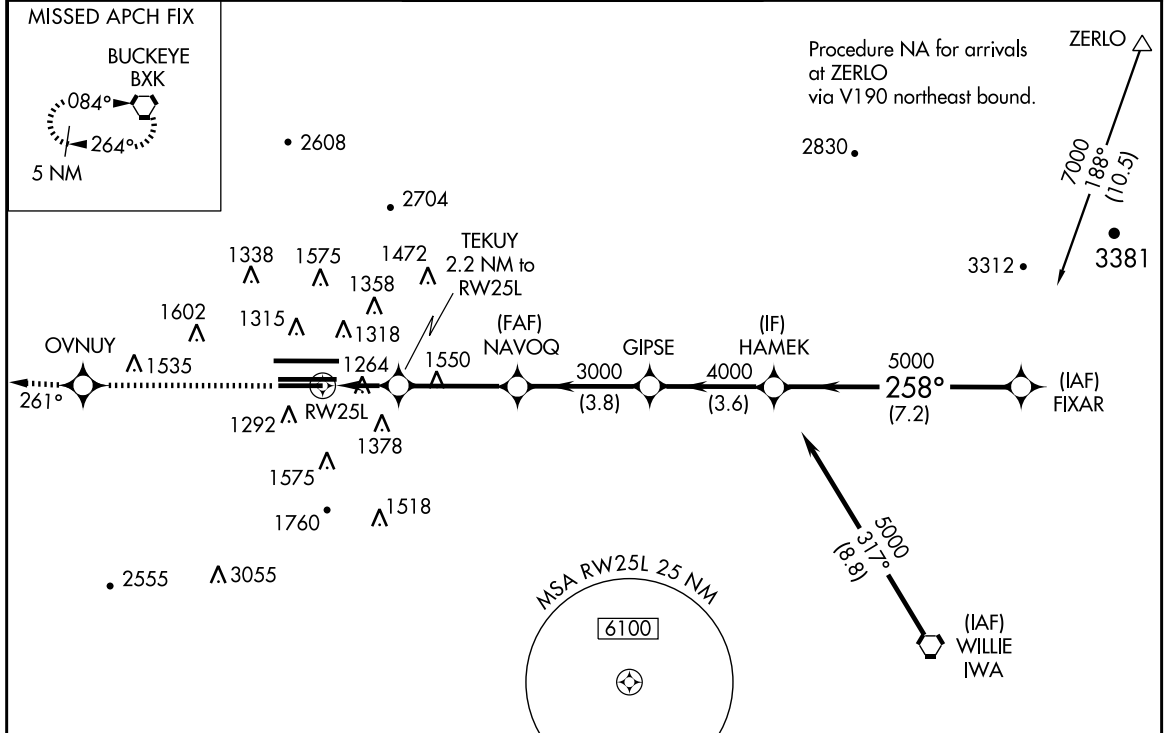
RNAV (GPS) Y RWY 25L
PHOENIX SKY HARBOR INTL (PHX)

▼ For inoperative MALS, increase LPV all Cats visibility to 1 ¼ For uncompensated Baro-VNAV systems, LNAV/VNAV NA below -17°C (2°F) or above 46°C (114°F).
▲ DME/DME RNP-0.3 NA. Simultaneous approach authorized with ILS or LOC Rwy 26. Use of FD or AP providing RNAV track guidance required during simultaneous operations. LNAV procedure NA during simultaneous operations.

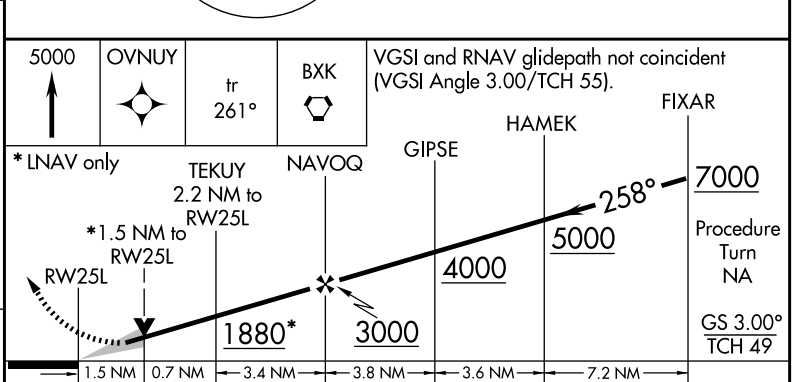
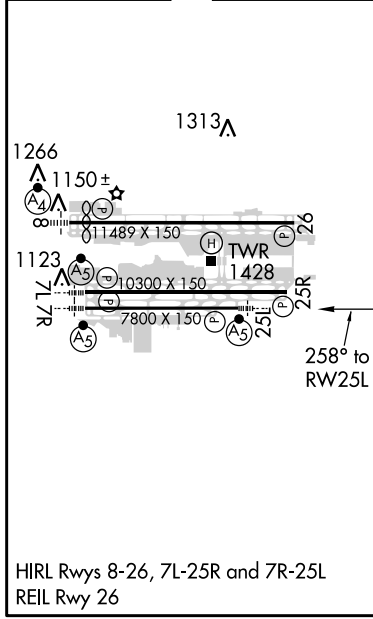
MALS R

MISSED APPROACH: Climb to 5000 direct OVNUY and via 261° track to BXK VORTAC and hold.

ATIS 127.575	PHOENIX APP CON 128.65 353.8	PHOENIX TOWER 118.7 278.8 (Rwy 8-26) 120.9 254.3 (Rwy 7L-25R, 7R-25L)	GND CON 119.75 269.2 (N) 132.55 269.2 (S)	CLNC DEL 118.1 269.2
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ELEV 1135	D	TDZE 1126
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CATEGORY	A	B	C	D
LPV DA		1482-¾	356 (400-¾)	
LNAV/VNAV DA		1613-1¼	487 (500-1¼)	
LNAV MDA	1680-½	554 (600-½)	1680-1 554 (600-1)	1680-1¼ 554 (600-1¼)
CIRCLING	1740-1	605 (700-1)	1740-1¾ 605 (700-1¾)	1920-2½ 785 (800-2½)

PHOENIX, ARIZONA
Amdt 1A 08MAR12

PHOENIX SKY HARBOR INTL (PHX)
33°26'N-112°01'W
RNAV (GPS) Y RWY 25L

Figure 274. RNAV (GPS) Y RWY 25L (PHX).

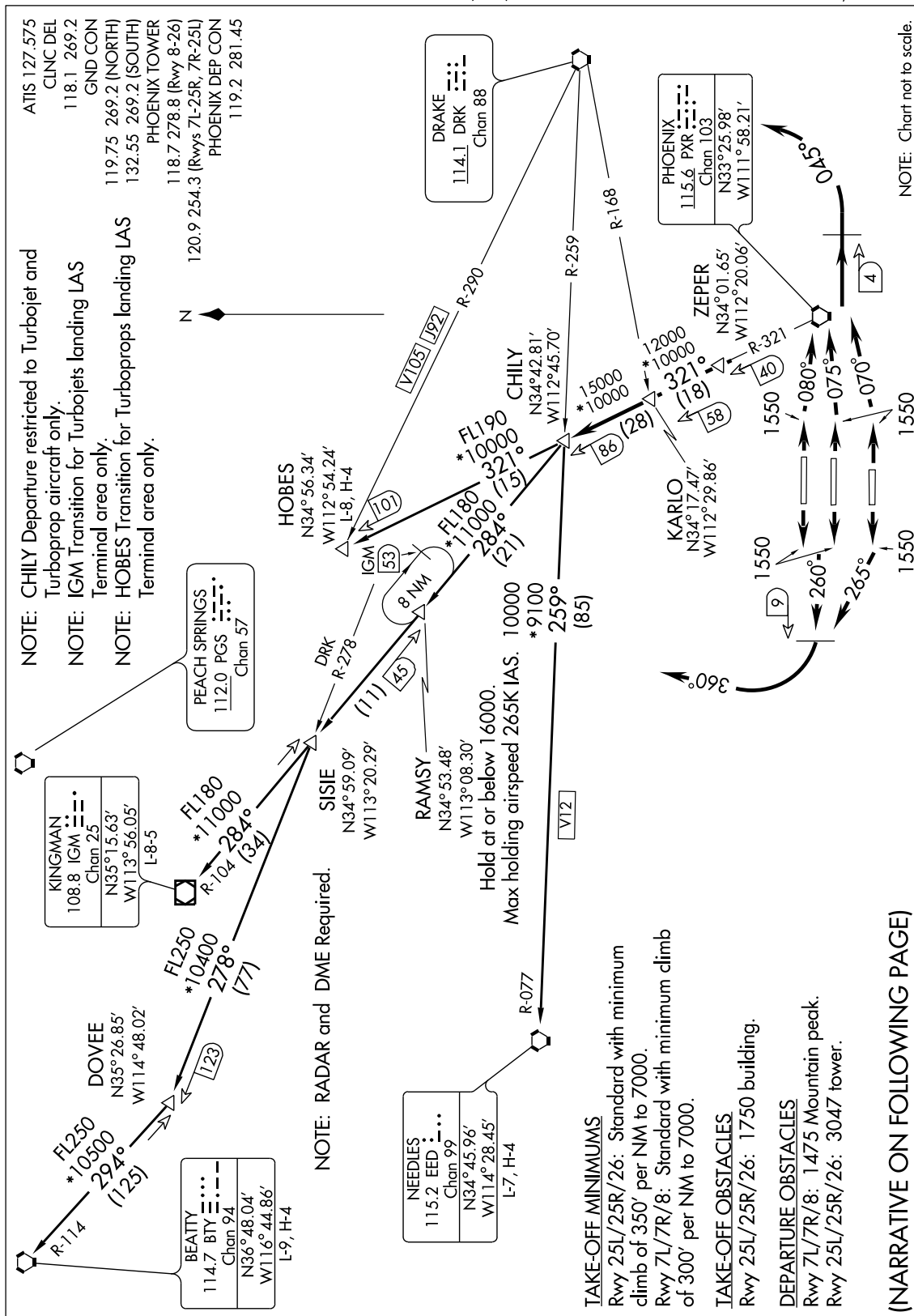
(CHILY1.CHILY) 09127

CHILY ONE DEPARTURE

SL-322 (FAA)

PHOENIX SKY HARBOR INTL (PHX)

PHOENIX, ARIZONA



CHILY ONE DEPARTURE
 (CHILY1.CHILY) 09127

PHOENIX, ARIZONA
 PHOENIX SKY HARBOR INTL (PHX)

Figure 276. CHILY ONE Departure (CHILY1.CHILY)(PHX).

(CHILY1.CHILY) 02052

CHILY ONE DEPARTURE

SL-322 (FAA)

PHOENIX SKY HARBOR (PHX)
PHOENIX, ARIZONA

DEPARTURE ROUTE DESCRIPTION

TAKE-OFF RUNWAY 7L: Climb runway heading to 1550, then climbing left turn heading 075°, at 4 DME east of PXR VORTAC, climbing left turn heading 045°. Thence....

TAKE-OFF RUNWAY 7R: Climb runway heading to 1550, then climbing left turn heading 070°, at 4 DME east of PXR VORTAC, climbing left turn heading 045°. Thence....

TAKE-OFF RUNWAY 8: Climb runway heading to 1550, then climbing right turn heading 080°, at 4 DME east of PXR VORTAC, climbing left turn heading 045°. Thence....

TAKE-OFF RUNWAY 25L: Climb runway heading to 1550, then climbing right turn heading 265°, at 9 DME west of PXR VORTAC, climbing right turn heading 360°. Thence....

TAKE-OFF RUNWAY 25R: Climb runway heading to 1550, then climbing right turn heading 260°, at 9 DME west of PXR VORTAC, climbing right turn heading 360°. Thence....

TAKE-OFF RUNWAY 26: Climb runway heading to 1550, then climbing right turn heading 260°, at 9 DME west of PXR VORTAC, climbing right turn heading 360°. Thence....

....maintain 7000. Expect radar vectors to PXR R-321 to ZEPER INT then CHILY INT. Then via (transition). Expect filed altitude 3 minutes after departure.

BEATTY TRANSITION (CHILY1.BTY): From over CHILY INT via IGM R-104 to SISIE INT, then via DRK R-278 to DOVEE INT, then via BTY R-114 to BTY VORTAC.

HOBES TRANSITION (CHILY1.HOBES): From over CHILY INT via PXR R-321 to HOBES INT.

KINGMAN TRANSITION (CHILY1.IGM): From over CHILY INT via IGM R-104 to IGM VOR/DME.

NEEDLES TRANSITION (CHILY1.EED): From over CHILY INT via DRK R-259 and EED R-077 to EED VORTAC.

CHILY ONE DEPARTURE
(CHILY1.CHILY) 02052

PHOENIX, ARIZONA
PHOENIX SKY HARBOR (PHX)

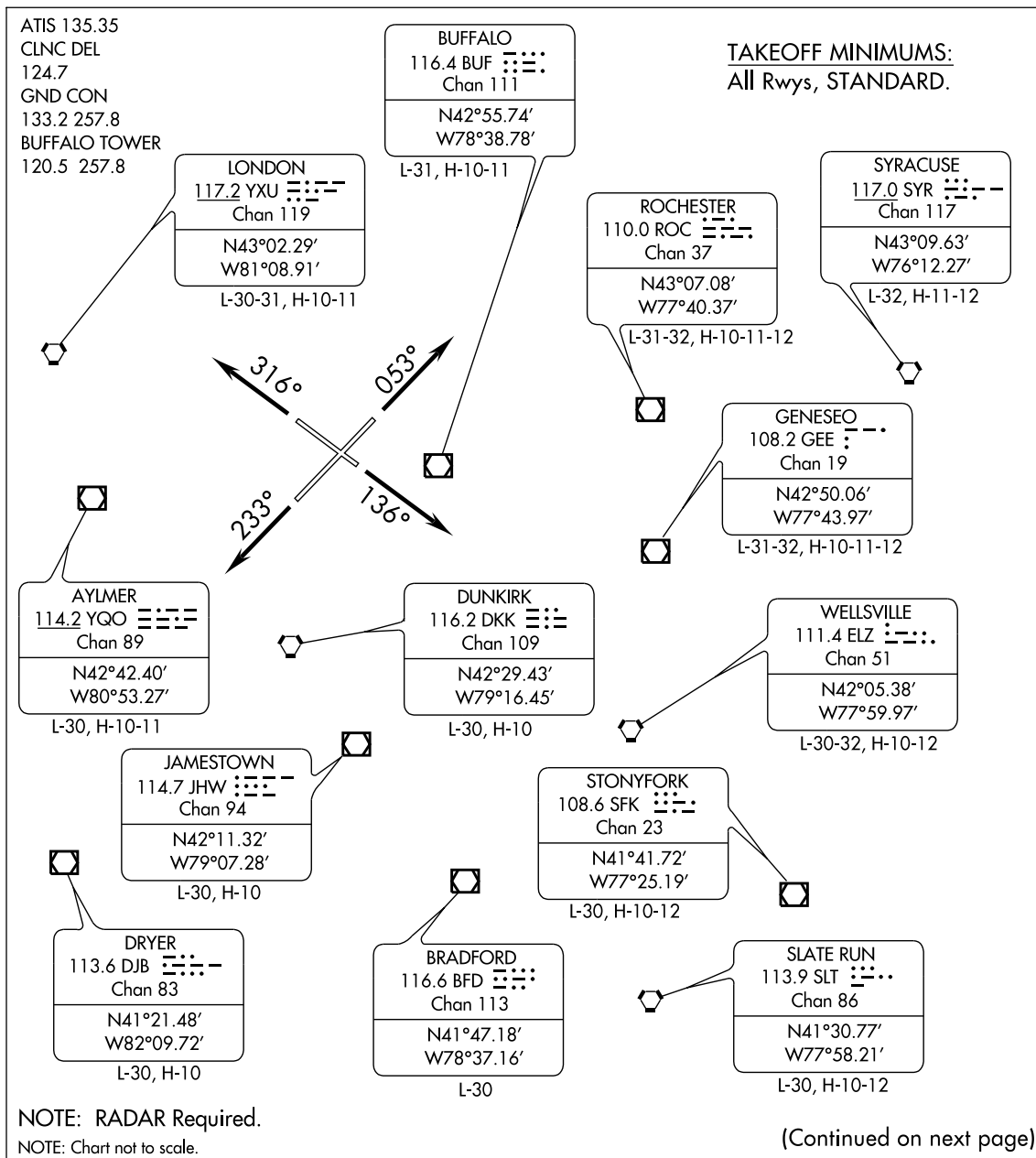
Figure 277. CHILY ONE Departure (CHILY1.CHILY)(PHX).

(BUF3.BUF) 09127

BUFFALO THREE DEPARTURE

SL-65 (FAA)

BUFFALO NIAGARA INTL (BUF)
BUFFALO, NEW YORK



DEPARTURE ROUTE DESCRIPTION

TURBOJET AIRCRAFT:
 TAKE-OFF RUNWAY 5: Climb via heading 053° until leaving 3000, thence. . . .
 TAKE-OFF RUNWAY 14: Climb via heading 136° until leaving 3000, thence. . . .
 TAKE-OFF RUNWAY 23: Climb via heading 233° until leaving 3000, thence. . . .
 TAKE-OFF RUNWAY 32: Climb via heading 316° until leaving 2000, thence. . . .

NON-TURBOJET AIRCRAFT ONLY: Climb on assigned heading, thence. . . .

. . . .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.

BUFFALO THREE DEPARTURE
(BUF3.BUF) 09127

BUFFALO, NEW YORK
BUFFALO NIAGARA INTL (BUF)

Figure 278. BUFFALO THREE Departure (BUF).

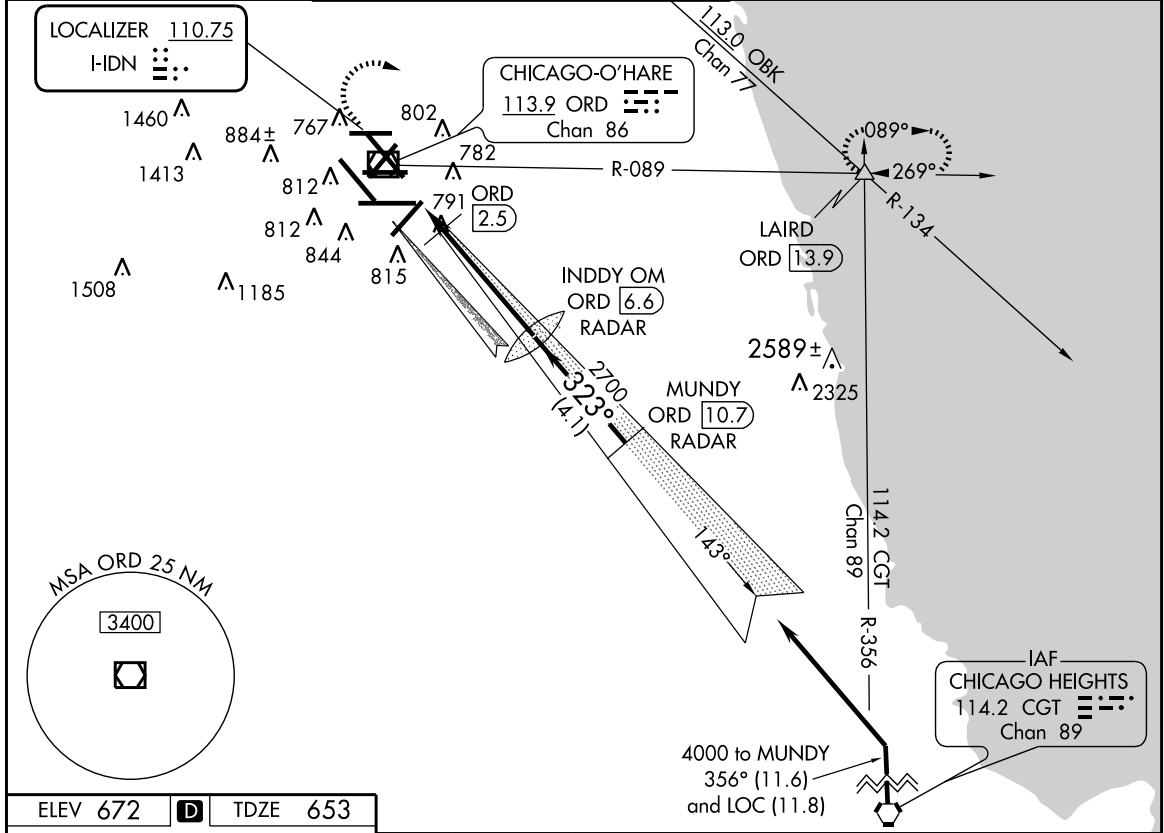
LOC I- IDN 110.75	APP CRS 323°	Rwy ldg 10003	TDZE 653
		Apt Elev 672	

ILS or LOC RWY 32R

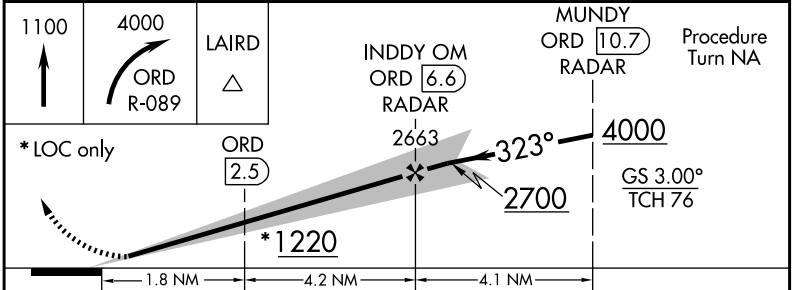
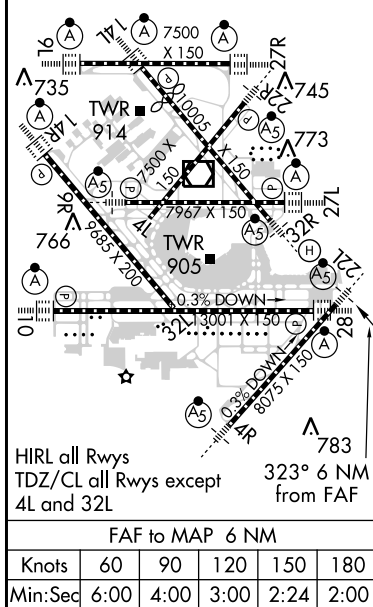
CHICAGO-O'HARE INTL (ORD)

▽ DME from ORD VOR/DME.	MALSR 	MISSED APPROACH: Climb to 1100, then climbing right turn to 4000 via ORD R-089 to LAIRD INT/ORD 13.9 DME and hold.
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ATIS 135.4 282.225	CHICAGO APP CON 119.0 393.1	O'HARE TOWERS (Rwy 9L/27R) 128.15 120.75 126.9 132.7 348.0 (CENTER)	(TWR NORTH) GND CON (TWR CENTER) 124.125 121.75 (OBND) 121.9 (IBND) 226.675	CLNC DEL 121.6
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ELEV 672	D	TDZE 653
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CATEGORY	A	B	C	D
S-ILS 32R	853/18 200 (200-½)			
S-LOC 32R	1220/24	567 (600-½)	1220/50 567 (600-1)	1220/60 567 (600-¼)
CIRCLING	1220-1	548 (600-1)	1220-1½ 548 (600-1½)	1240-2 568 (600-2)
DME MINIMUMS				
S-LOC 32R	1100/24	447 (500-½)	1100/40 447 (500-¾)	1100/50 447 (500-1)
CIRCLING	1220-1	548 (600-1)	1220-1½ 548 (600-1½)	1240-2 568 (600-2)

CHICAGO, ILLINOIS
Amdt 21E 08MAR12

41°59'N-87°54'W

CHICAGO-O'HARE INTL (ORD)

ILS or LOC RWY 32R

Figure 279. ILS or LOC RWY 32R (ORD).

CHICAGO, ILLINOIS

AL-166 (FAA)

12096

LOC/DME I-SAJ 111.75 Chan 54 (Y)	APP CRS 093°	Rwy ldg TDZE Apt Elev	7500 668 672
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ILS or LOC RWY 9L

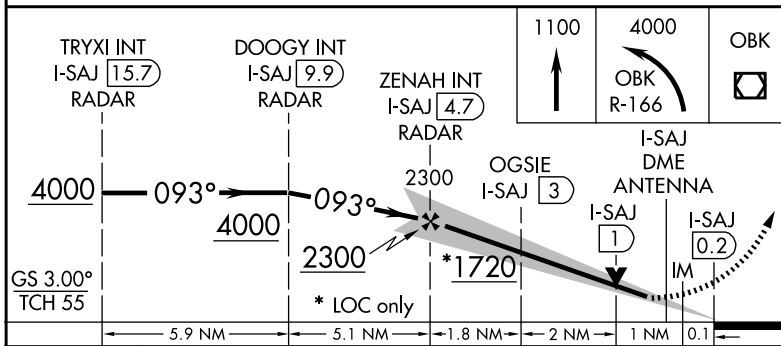
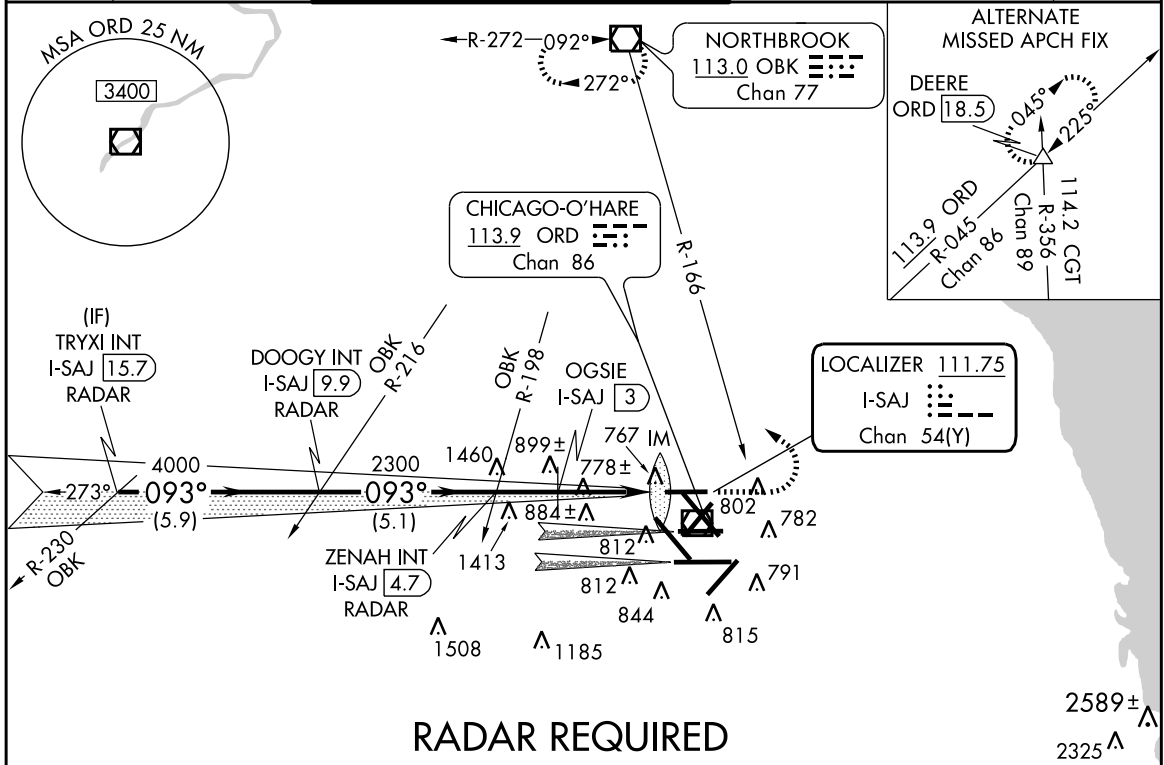
CHICAGO-O'HARE INTL (ORD)

Simultaneous approach authorized with Rwy 9R and 10.

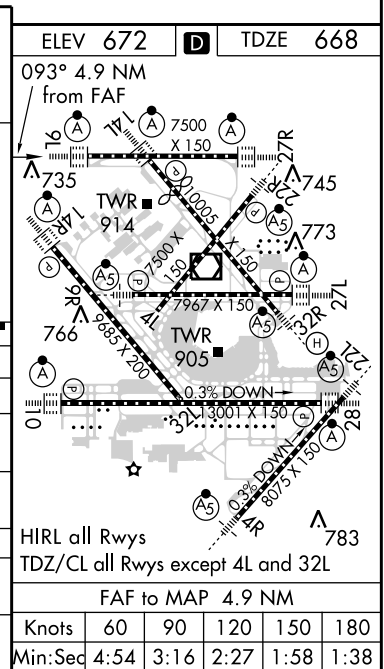
ALSIF-2

MISSED APPROACH: Climb to 1100 then climbing left turn to 4000 via OBK VOR/DME R-166 to OBK VOR/DME and hold.

ATIS 135.4 282.225	CHICAGO APP CON 119.0 393.1	O'HARE TOWERS (Rwy 9L/27R) 128.15 120.75 126.9 132.7 348.0 (CENTER)	(TWR NORTH) GND CON (TWR CENTER) 124.125 121.75 (OBND) 121.9 (IBND) 226.675	CLNC DEL 121.6
--	---------------------------------------	--	---	--------------------------



CATEGORY	A	B	C	D
S-ILS 9L	868/18 200 (200-1/2)			
S-LOC 9L	1720/40 1052 (1100-3/4)	1720/50 1052 (1100-1)	1720-2 1/2	1052 (1100-2 1/2)
CIRCLING	1720-1 1/4 1048 (1100-1 1/4)	1720-1 1/2 1048 (1100-1 1/2)	1720-3	1048 (1100-3)
OGSIE FIX MINIMUMS				
S-LOC 9L	1080/24	412 (500-1/2)	1080/40	412 (500-3/4)
CIRCLING	1220-1	548 (600-1)	1220-1 1/2 548 (600-1 1/2)	1240-2 568 (600-2)



CHICAGO, ILLINOIS
Orig-D 08MAR12

41°59'N-87°54'W

CHICAGO-O'HARE INTL (ORD)

ILS or LOC RWY 9L

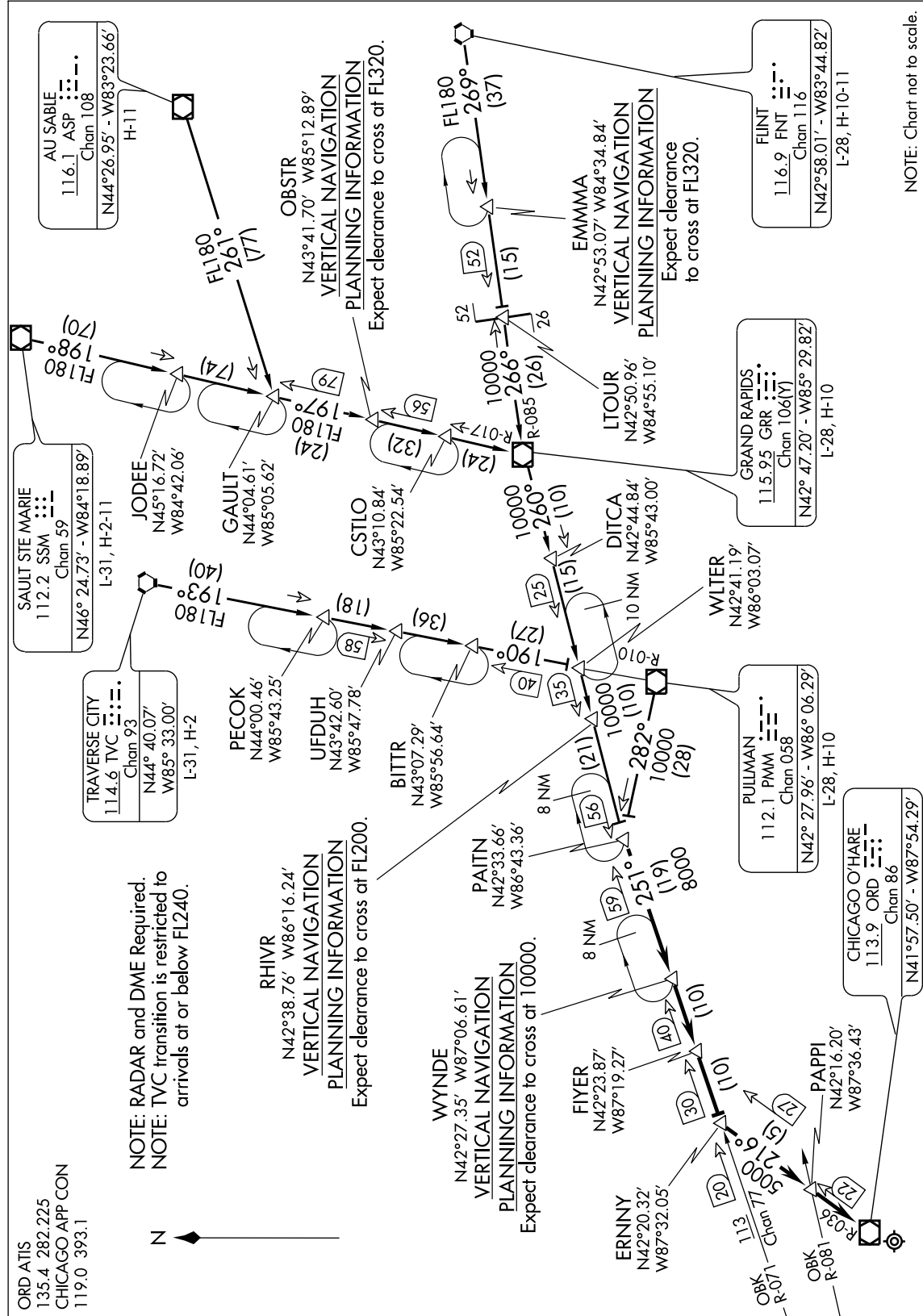
Figure 280. ILS or LOC RWY 9L (ORD).

(PAITN.PAITN2) 11349

PAITN TWO ARRIVAL

ST-166 (FAA)

CHICAGO O'HARE INTL
CHICAGO, ILLINOIS



PAITN TWO ARRIVAL

(PAITN.PAITN2) 11349

CHICAGO, ILLINOIS
CHICAGO O'HARE INTL

Figure 281. PAITN TWO Arrival (PAITN.PAITN2).

(PAITN.PAITN2) 11013

PAITN TWO ARRIVAL

ST-166 (FAA)

CHICAGO O'HARE INTL
CHICAGO, ILLINOIS

ARRIVAL ROUTE DESCRIPTION

AU SABLE TRANSITION (ASP.PAITN2): From over ASP VOR/DME via ASP R-261 to GAULT then via GRR R-017 to GRR VOR/DME then via GRR R-260 to PAITN. Thence....

FLINT TRANSITION (FNT.PAITN2): From over FNT VORTAC via FNT R-269 to LTOUR and GRR R-085 to GRR VOR/DME then via GRR R-260 to PAITN. Thence....

GRAND RAPIDS TRANSITION (GRR.PAITN2): From over GRR VOR/DME via GRR R-260 to PAITN. Thence....

PULLMAN TRANSITION (PMM.PAITN2): From over PMM VOR/DME via PMM R-282 to PAITN. Thence....

SAULT STE MARIE TRANSITION (SSM.PAITN2): From over SSM VOR/DME via SSM R-198 to GAULT then via GRR R-017 to GRR VOR/DME then via GRR R-260 to PAITN. Thence....

TRAVERSE CITY TRANSITION (TVC.PAITN2): From over TVC VORTAC via TVC R-193 to BITTR then via PMM R-010 to WALTER then via GRR R-260 to PAITN. Thence....

....From over PAITN via OBK VOR/DME R-071 to WYNDE/OBK 40 DME, then via OBK VOR/DME R-071 to FIYER/OBK 30 DME, then via OBK VOR/DME R-071 to ERNNY/OBK 20 DME, then via ORD VOR/DME R-036 to PAPP/ORD 22 DME, then via ORD VOR/DME R-036 to ORD VOR/DME. Expect radar vectors to final approach course.

PAITN TWO ARRIVAL

(PAITN.PAITN2) 11013

CHICAGO, ILLINOIS
CHICAGO O'HARE INTL


Figure 282. PAITN TWO Arrival (PAITN.PAITN2).

WAAS CH 40004 W10A	APP CRS 099°	Rwy Idg 11000 TDZE 24 Apt Elev 31
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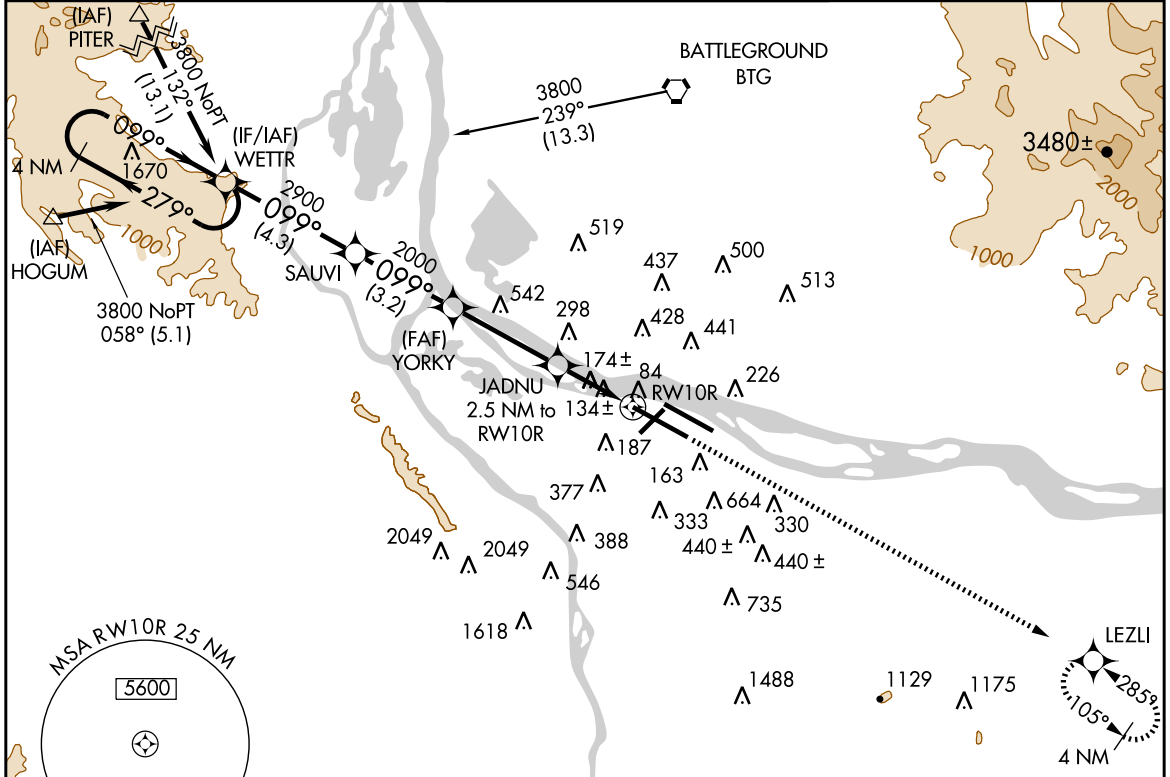
RNAV (GPS) RWY 10R

PORTLAND INTL (PDX)

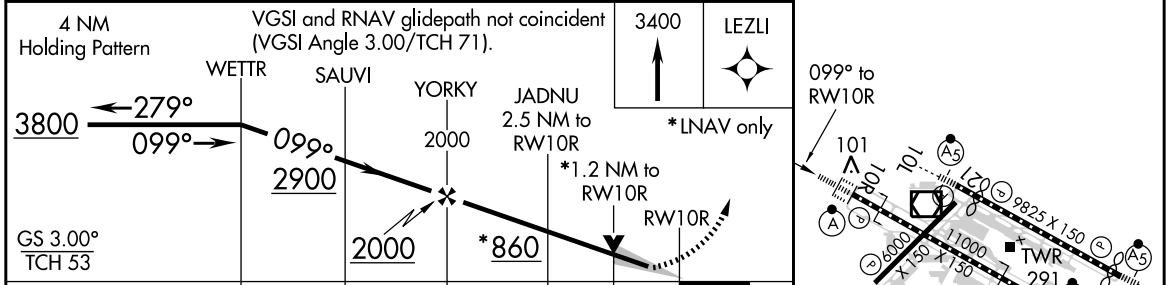
⚠ For uncompensated Baro-VNAV systems, LNAV/VNAV NA below -15°C (5°F) or above 49°C (120°F). DME/DME RNP-0.3 NA. Simultaneous approach authorized with ILS or LOC RWY 10L. Use of FD or AP providing RNAV track guidance required during simultaneous operations. LNAV procedure NA during simultaneous operations.

ALSF-2  MISSED APPROACH: Climb to 3400 direct LEZLI and hold.

ATIS 128.35 269.9	PORTLAND APP CON 124.35 299.2	PORTLAND TOWER Rwy 10L-28R 118.7 257.8 Rwys 3-21, 10R-28L 123.775 251.125	GND CON 121.9 348.6	CLNC DEL 120.125 318.1
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ELEV 31	D TDZE 24
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CATEGORY	A	B	C	D
LPV DA	224/24 200 (200-½)			
LNAV/VNAV DA	663-1¾ 639 (700-1¾)			
LNAV MDA	460/24 436 (500-½)	460/40 436 (500-¾)		460/50 436 (500-1)
CIRCLING	720-1 689 (700-1)	740-1 709 (800-1)	727 (800-1)	1000-3 709 (1000-3)

REIL Rwys 3 and 21
TDZ or CL Rwy 10L-28R and 10R-28L
MIRL Rwy 3-21
HIRL Rwys 10L-28R and 10R-28L

Figure 283. RNAV (GPS) RWY 10R (PDX).

PORTLAND, OREGON

AL-330 (FAA)

12096

LOC/DME I-GPO 108.9 Chan 26	APP CRS 205°	Rwy Idg 6000 TDZE 23 Apt Elev 31
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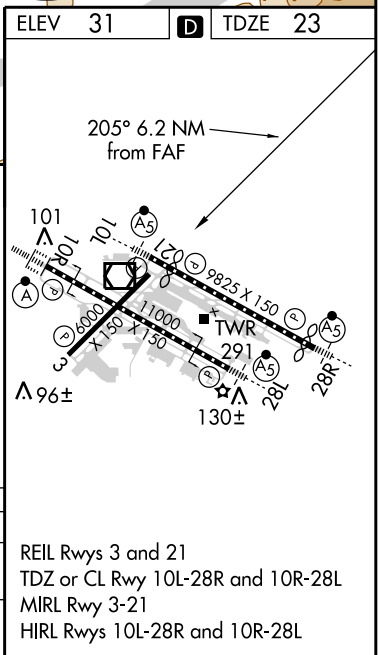
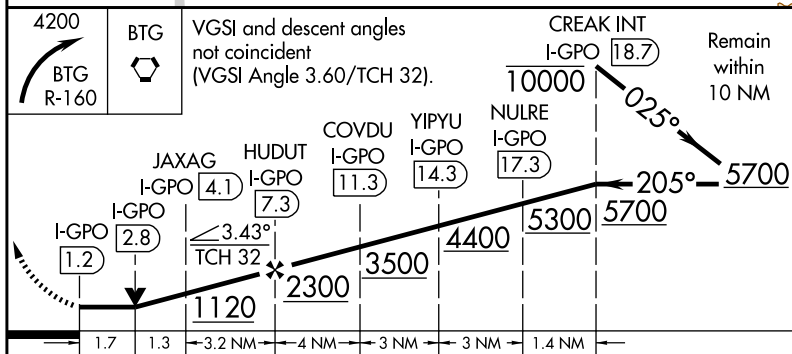
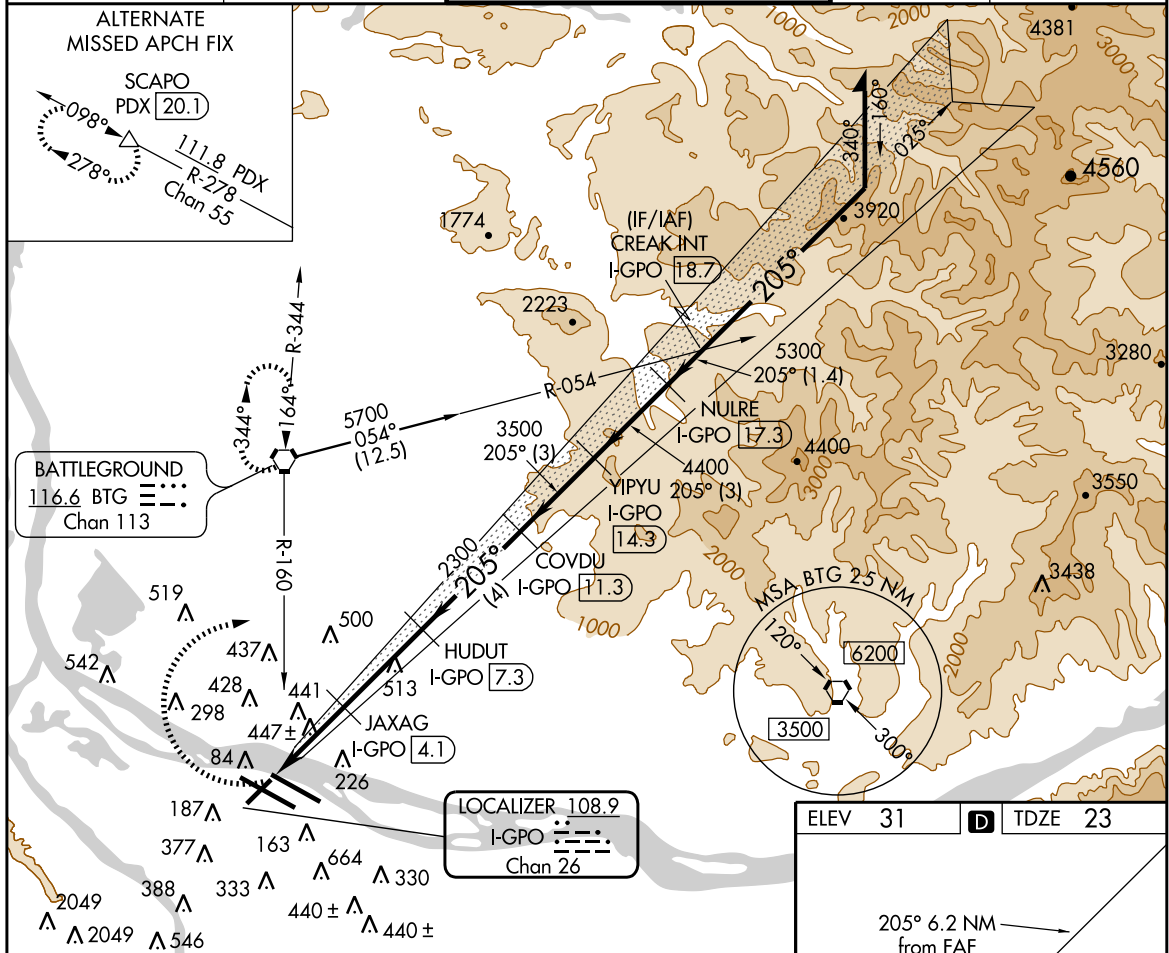
LOC/DME RWY 21

PORTLAND INTL (PDX)

Visibility reduction by helicopters NA.

 MISSED APPROACH: Climbing right turn to 4200 via BTG VORTAC R-160 to BTG VORTAC and hold, continue climb-in-hold to 4200.

ATIS 128.35 269.9	PORTLAND APP CON 124.35 299.2	PORTLAND TOWER Rwy 10L-28R 118.7 257.8	Rwys 3-21, 10R-28L 123.775 251.125	GND CON 121.9 348.6	CLNC DEL 120.125 318.1
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CATEGORY	A	B	C	D
S-21	700-1 677 (700-1)	700-2 677 (700-2)	700-2 677 (700-2)	700-2 1/4 677 (700-2 1/4)
CIRCLING	720-1 689 (700-1)	740-1 709 (800-1)	729 (800-2)	1,000-3 969 (1000-3)

PORTLAND, OREGON
Amdt 8 23SEP10

45°35'N-122°36'W

PORTLAND INTL (PDX)

LOC/DME RWY 21

Figure 284. LOC/DME RWY 21 (PDX).

Appendix 2

BURLINGTON, VERMONT

AL-70 (FAA)

RNAV (GPS) Y RWY 15
BURLINGTON INTL (BTV)

APP CRS 146°	Rwy Idg 7820
	TDZE 326
	Apt Elev 335

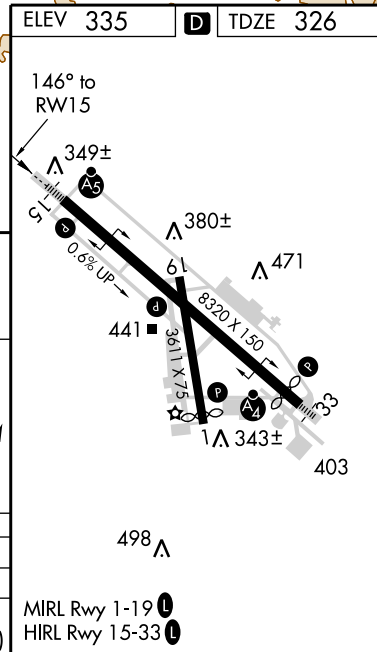
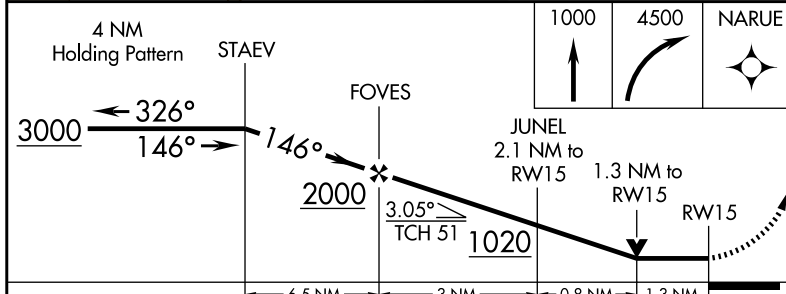
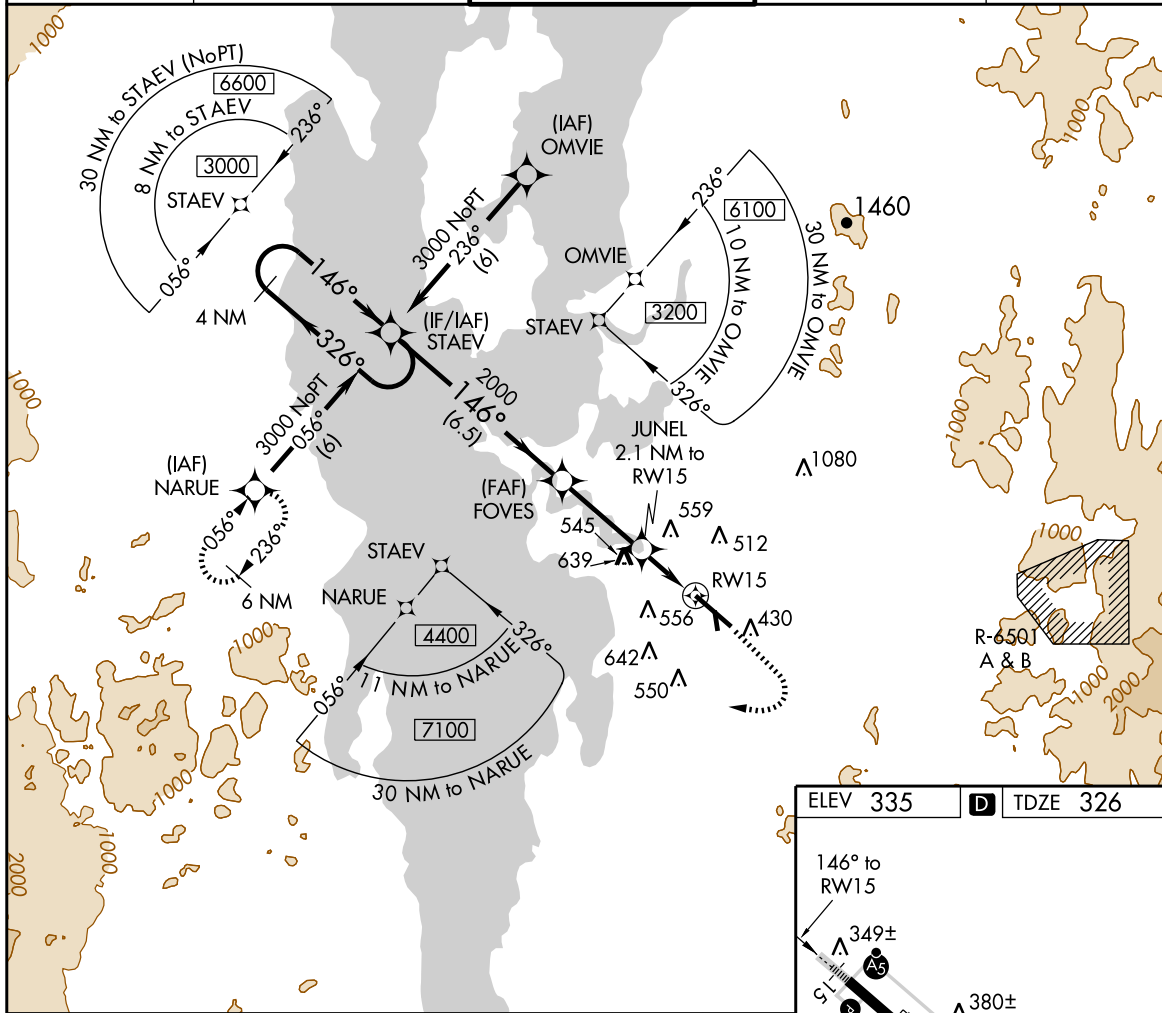
▼ For inoperative MALSR, increase LNAV Cat A and B visibility to RVR 5000 and Cat E visibility to 1½. When VGSI inoperative, Circling Rwy 1 NA at night. DME/DME RNP-0.3 NA.

MALSR



MISSED APPROACH: Climb to 1000 then climbing right turn to 4500 direct NARUE WP and hold.

ATIS 123.8 269.9	BURLINGTON APP CON ★ 121.1 278.8	BURLINGTON TOWER ★ 118.3 (CTAF) 257.8	BURLINGTON RADIO 122.6 255.4	GND CON 119.15 348.6
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CATEGORY	A	B	C	D	E
LNAV MDA	760/40		434 (500-¾)	760/50	434 (500-1)
CIRCLING	840-1 505 (600-1)	860-1 525 (600-1)	860-1½ 525 (600-1½)	665 (700-2)	1280-3 945 (1000-3)

BURLINGTON, VERMONT
Orig-A 12096

44°28'N - 73°09'W

BURLINGTON INTL (BTV)
RNAV (GPS) Y RWY 15

Figure 285. RNAV (GPS) Y RWY 15 (BTV).

BURLINGTON, VERMONT

AL-70 (FAA)

12096

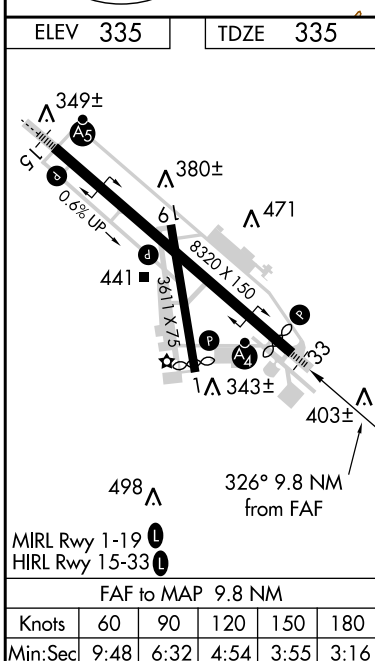
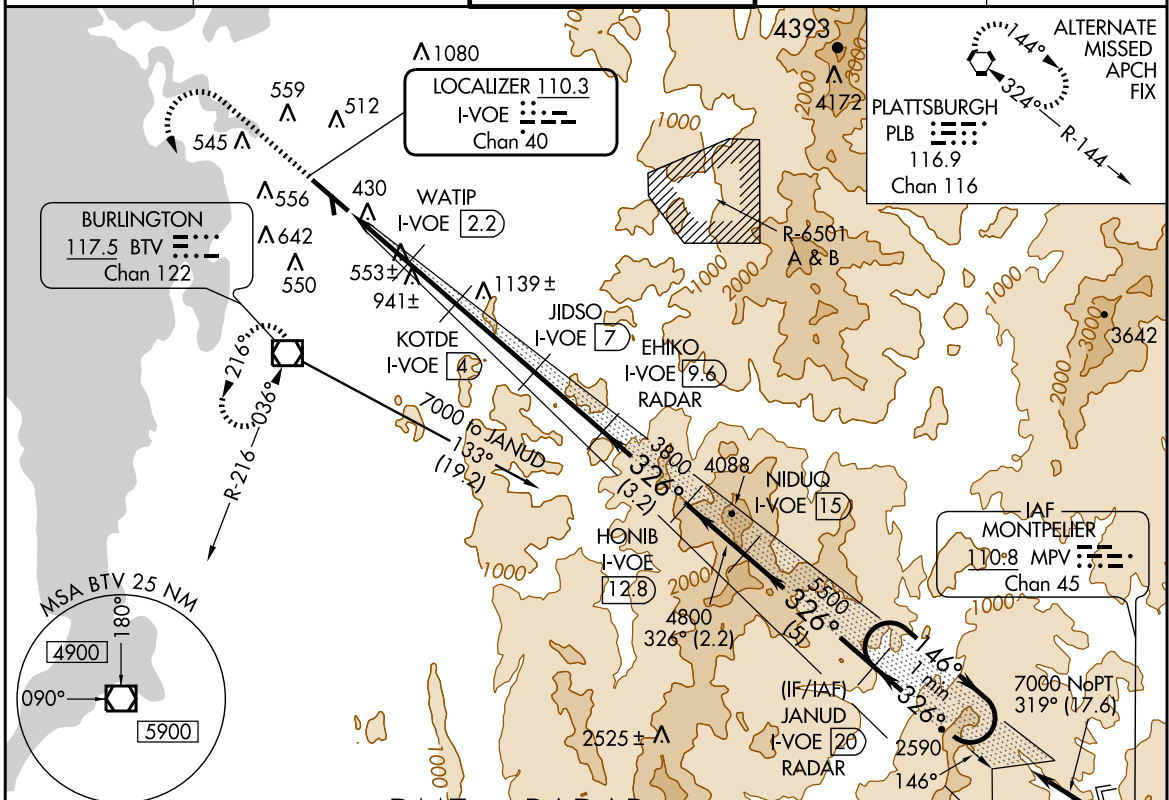
LOC/DME I-VOE 110.3 Chan 40	APP CRS 326°	Rwy Idg 7820 TDZE 335 Apt Elev 335
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ILS or LOC/DME RWY 33

BURLINGTON INTL (BTV)

<p>▽ Inoperative table does not apply to S-LOC 33 Cats C, D, and E. Inoperative table does not apply to S-ILS all Cats.</p>	<p>MALSF</p>	<p>MISSED APPROACH: Climb to 1200 then climbing left turn to 2800 direct BTV VOR/DME and hold, continue climb-in-hold to 2800.</p>
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<p>ATIS 123.8 269.9</p>	<p>BURLINGTON APP CON ★ 121.1 278.8</p>	<p>BURLINGTON TOWER ★ 118.3 (CTAF) 257.8</p>	<p>BURLINGTON RADIO 122.6 255.4</p>	<p>GND CON 119.15 348.6</p>
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DME or RADAR REQUIRED

1200	2800	BTV	JANUD	One Minute Holding Pattern
* LOC only				
WATIP I-VOE 2.2	JDSO I-VOE 7	EHIKO I-VOE 9.6	HONIB I-VOE 12.8	NIDUQ I-VOE 15
I-VOE DME Ant. 1	KOTDE I-VOE 4	JANUD I-VOE 20	RADAR	
1240	1800	3800	4800	5500
0.2 NM	1.2 NM	1.8 NM	2.6 NM	3.2 NM
CATEGORY	A	B	C	D
S-ILS 33	535/40 200 (200-¾)		585/50 250 (300-1)	NA
S-LOC 33	820/40 485 (500-¾)		820/60 485 (500-1¼) 485 (500-1½)	820-1¾ 485 (500-1¾)
CIRCLING	360-1 505 (600-1)	360-1 525 (600-1)	860-1½ 525 (600-1½)	1000-2 665 (700-2) 1280-3 945 (1000-3)

BURLINGTON, VERMONT
Amdt 1 13JAN11

BURLINGTON INTL (BTV)
44°28'N - 73°09'W

ILS or LOC/DME RWY 33

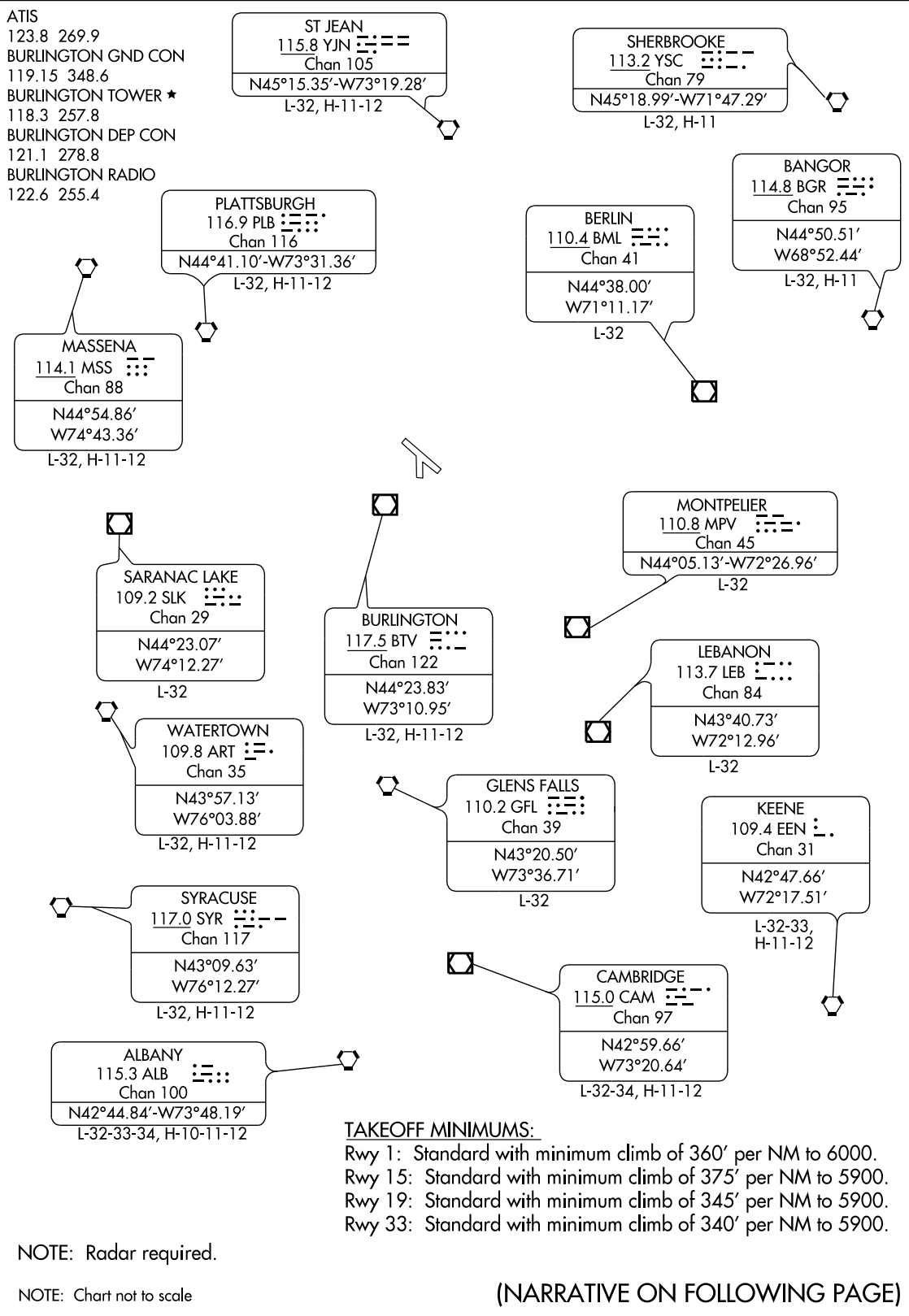
Figure 286. ILS or LOC/DME RWY 33 (BTV).

(BTV6.BTV) 12096

SL-70 (FAA)

BURLINGTON INTL (BTV)
BURLINGTON, VERMONT

BURLINGTON SIX DEPARTURE



BURLINGTON SIX DEPARTURE

(BTV6.BTV) 12096

BURLINGTON, VERMONT
BURLINGTON INTL (BTV)

Figure 288. BURLINGTON SIX Departure (BTV).

BURLINGTON SIX DEPARTUREBURLINGTON INTL (BTV)
BURLINGTON, VERMONT

DEPARTURE ROUTE DESCRIPTION

TAKEOFF RUNWAYS 1, 15, 19, 33: Climb on assigned heading for vectors to filed navaid, fix, or airway to 10000 or assigned lower altitude. Expect filed altitude ten minutes after departure.

TAKEOFF OBSTACLE NOTES:

- Rwy 1: Trees beginning 1396' from DER, 216' right of centerline, up to 64' AGL/384' MSL.
Trees 1694' from DER, 200' left of centerline, up to 80' AGL/380' MSL.
- Rwy 15: Bush 318' from DER, 292' left of centerline, up to 23' AGL/343' MSL.
Trees beginning 1418' from DER, 358' right of centerline, up to 27' AGL/387' MSL.
Hopper and trees beginning 1801' from DER, 377' left of centerline, up to 63' AGL/403' MSL.
Building 3453' from DER, 1145' left of centerline, 110' AGL/430' MSL.
- Rwy 19: Trees beginning 168' from DER, 24' right of centerline, up to 56' AGL/436' MSL.
Trees beginning 172' from DER, 184' left of centerline, up to 93' AGL/413' MSL.
- Rwy 33: Pole and trees beginning 971' from DER, 755' left of centerline, up to 97' AGL/357' MSL.
Trees beginning 1091' from DER, 590' right of centerline, up to 34' AGL/334' MSL.

BURLINGTON SIX DEPARTURE

(BTV6.BTV) 10210

BURLINGTON, VERMONT
BURLINGTON INTL (BTV)**Figure 289.** BURLINGTON SIX Departure (BTV).

PHILADELPHIA, PENNSYLVANIA

AL-320 (FAA)

ILS PRM RWY 26

(SIMULTANEOUS CLOSE PARALLEL)

PHILADELPHIA INTL (PHL)

LOC/DME I-LLH 111.55 Chan 52(Y)	APP CRS 263°	Rwy Idg 5000 THRE 36 Apt Elev 36
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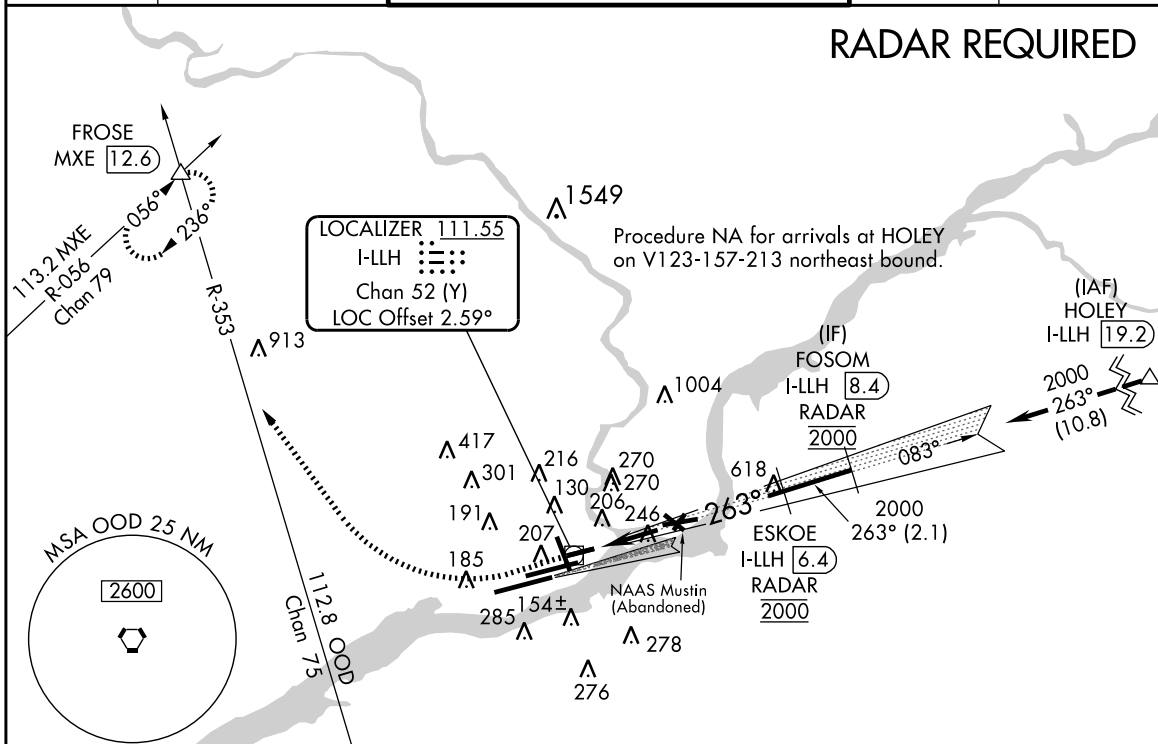
Simultaneous Close Parallel approach authorized with ILS PRM Rwy 27L. Procedure NA when glideslope not available. Dual VHF Comm Required. See additional requirements on AAUP. Visibility reduction by helicopters NA.



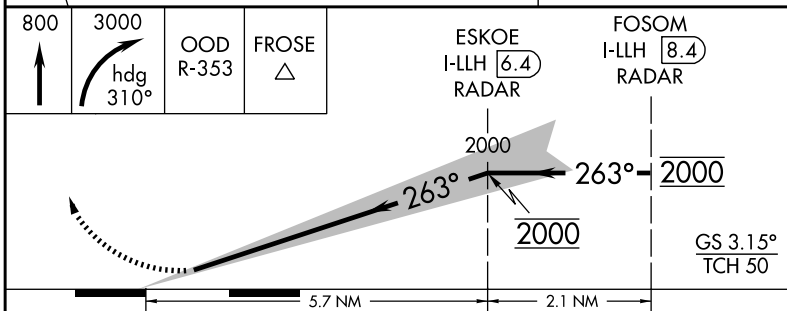
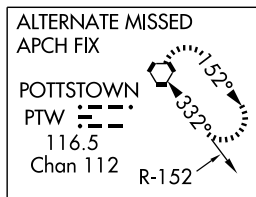
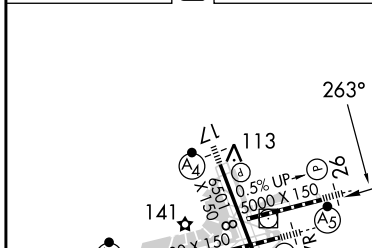
MISSED APPROACH: Climb to 800 then climbing right turn to 3000 on heading 310° and OOD VORTAC R-353 to FROSE INT/MXE VORTAC 12.6 DME and hold.

ATIS ARR 133.4 DEP 135.925	PHILADELPHIA APP CON 124.35 319.15	PHILADELPHIA TOWER 118.5 327.05 (Rwys 9L/27R, 8/26 and 17/35) 135.1 327.05 (Rwy 9R/27L) PRM 123.6	GND CON 121.9 348.6	CLNC DEL 118.85 348.6
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RADAR REQUIRED



ELEV 36	D	THRE 36
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REIL Rwys 9L and 35
TDZ/CL Rwy 9R
HIRL all Rwys

CATEGORY	A	B	C	D
S-ILS 26	299/40 263 (300-34)			NA

PHILADELPHIA, PENNSYLVANIA

39°52'N - 75°14'W

PHILADELPHIA INTL (PHL)

Amdt 4 25AUG11

ILS PRM RWY 26 (SIMULTANEOUS CLOSE PARALLEL)

Figure 290. ILS PRM RWY 26 (Simultaneous Close Parallel) (PHL).

ILS PRM RWY 26 Amdt 4 11237

(SIMULTANEOUS CLOSE PARALLEL) AL-320 (FAA)

PHILADELPHIA INTL (PHL)

PHILADELPHIA, PENNSYLVANIA

ATTENTION ALL USERS OF ILS PRECISION RUNWAY MONITOR (PRM)

Condensed Briefing Point:

*When instructed, immediately switch to the tower frequency and select the monitor frequency audio.

1. **ATIS.** When the ATIS broadcast advises that simultaneous ILS/PRM and LDA/PRM approaches are in progress, pilots should brief to fly the ILS/PRM 26 approach. If later advised to expect an ILS 26 approach, the ILS/PRM 26 chart may be used after completing the following briefing items:

- (a) Minimums and missed approach procedures are unchanged.
- (b) Monitor frequency no longer required.

2. **Dual VHF Communication required.** To avoid blocked transmissions, each runway will have two frequencies, a primary and a monitor frequency. The tower controller will transmit on both frequencies. The monitor controller's transmissions, if needed, will override both frequencies. Pilots will ONLY transmit on the tower controller's frequency, but will listen to both frequencies. Select the monitor frequency audio only when instructed by ATC to contact the tower. The volume levels should be set about the same on both radios so that the pilots will be able to hear transmissions on at least one frequency if the other is blocked.

3. **ALL "Breakouts"** are to be hand flown to assure that the maneuver is accomplished in the shortest amount of time. Pilots, when directed by ATC to break off an approach, must assume that an aircraft is blundering toward their course and a breakout must be initiated immediately.

- (a) ATC Directed "Breakouts": ATC directed breakouts will consist of a turn and a climb or descent. Pilots must always initiate the breakout in response to an air traffic controller instruction. Controllers will give a descending breakout only when there are no other reasonable options available, but in no case will the descent be below minimum vectoring altitude (MVA) which provides at least 1000 feet required obstruction clearance. The MVA in the final approach segment is 1800 feet at Philadelphia Intl Airport.
- (b) Phraseology - "TRAFFIC ALERT": If an aircraft enters the "NO TRANSGRESSION ZONE" (NTZ), the controller will breakout the threatened aircraft on the adjacent approach. The phraseology for the breakout will be:

"TRAFFIC ALERT, (aircraft call sign) TURN (left/right) IMMEDIATELY, HEADING (degrees), CLIMB/DESCEND AND MAINTAIN (altitude)".

4. **ILS Navigation** Descending on ILS glideslope ensures complying with any charted crossing restrictions.

Special pilot training required. Pilots who are unable to participate will be afforded appropriate arrival services as operational conditions permit and must notify the controlling ARTCC as soon as practical, but at least 100 miles from destination.

(SIMULTANEOUS CLOSE PARALLEL)

39° 52'N-75° 14'W

PHILADELPHIA, PENNSYLVANIA

PHILADELPHIA INTL (PHL)

ILS PRM RWY 26 Amdt 4 11237

Figure 291. ILS PRM RWY 26 (Simultaneous Close Parallel) (PHL).

NEW YORK, NEW YORK

AL-289 (FAA)

12040

LOC/DME I-GDI 108.5 Chan 22	APP CRS 134°	Rwy Idg TDZE Apt Elev	7003 12 21
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ILS or LOC RWY 13

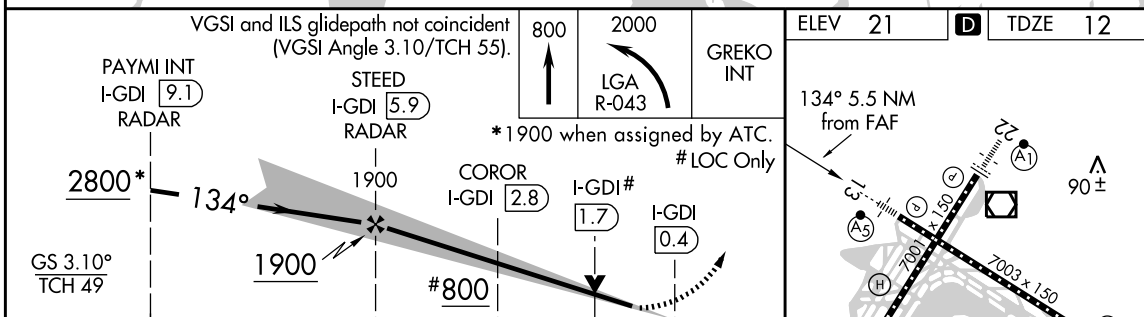
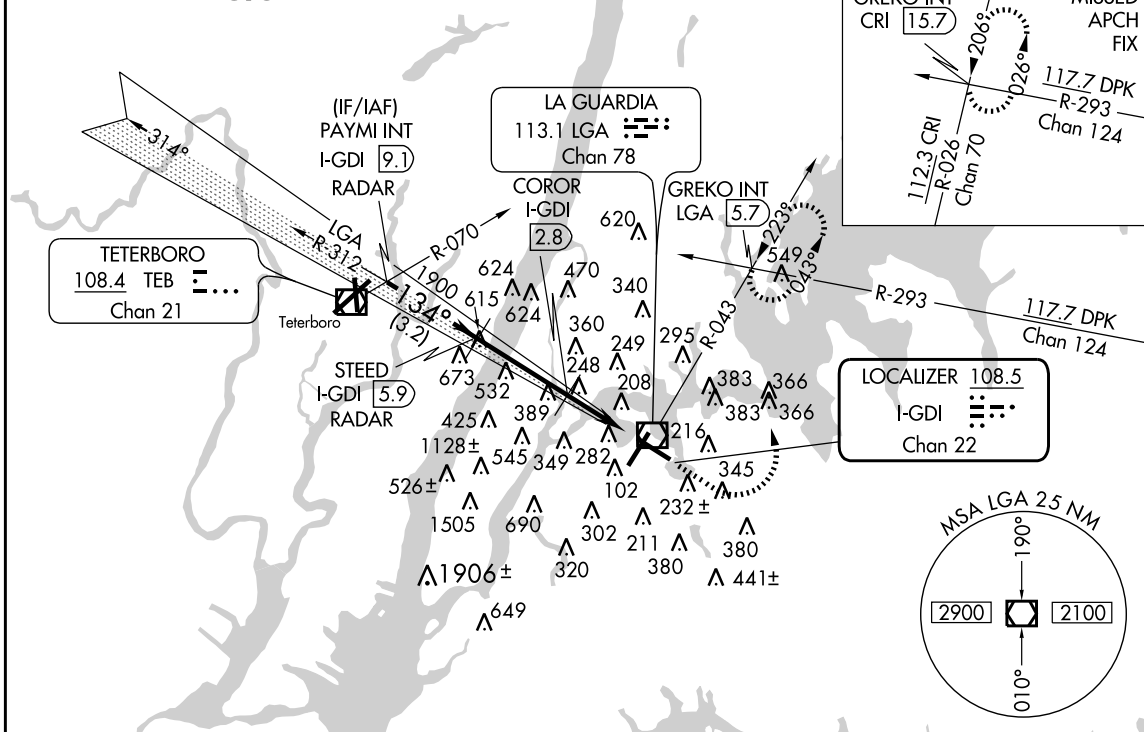
NEW YORK/LA GUARDIA (LGA)

⚠ When VGSI inoperative, Circling Rwy 31 NA at night.
⚠ DME or RADAR required.
****** RVR 1800 authorized with use of FD or AP or HUD to DA.

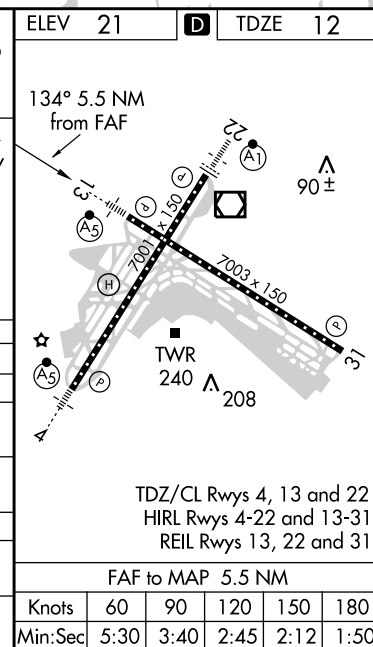
MALSR MISSED APPROACH: Climb to 800 then climbing left turn to 2000 via LGA VOR/DME R-043 to GREKO INT/LGA 5.7 DME and hold, continue climb-in-hold to 2000.

ATIS ARR 125.95	NEW YORK APP CON 120.8 263.0	LA GUARDIA TOWER 118.7 263.0	GND CON 121.7 263.0	CLNC DEL 135.2
ATIS DEP 127.05				

RADAR REQUIRED



CATEGORY	A	B	C	D
S-ILS 13		** 214/24	202 (200-½)	
S-LOC 13	800/24 788 (800-½)	800/40 788 (800-¾)	800-1¾ 788 (800-1¾)	800-2 788 (800-2)
CIRCLING	800-1 779 (800-1)	800-1¼ 779 (800-1¼)	800-2¼ 779 (800-2¼)	800-2½ 779 (800-2½)
COROR FIX MINIMUMS				
S-LOC 13	500/24	488 (500-½)	500/40 488 (500-¾)	500/50 488 (500-1)
CIRCLING	640-1	619 (700-1)	640-1¾ 619 (700-1¾)	700-2¼ 679 (700-2¼)



NEW YORK, NEW YORK
Amdt 1 18NOV10

40°47'N-73°52'W

NEW YORK/LA GUARDIA (LGA) ILS or LOC RWY 13

Figure 292. ILS or LOC RWY 13 (LGA).

Appendix 2

NEW YORK, NEW YORK

AL-610 (FAA)

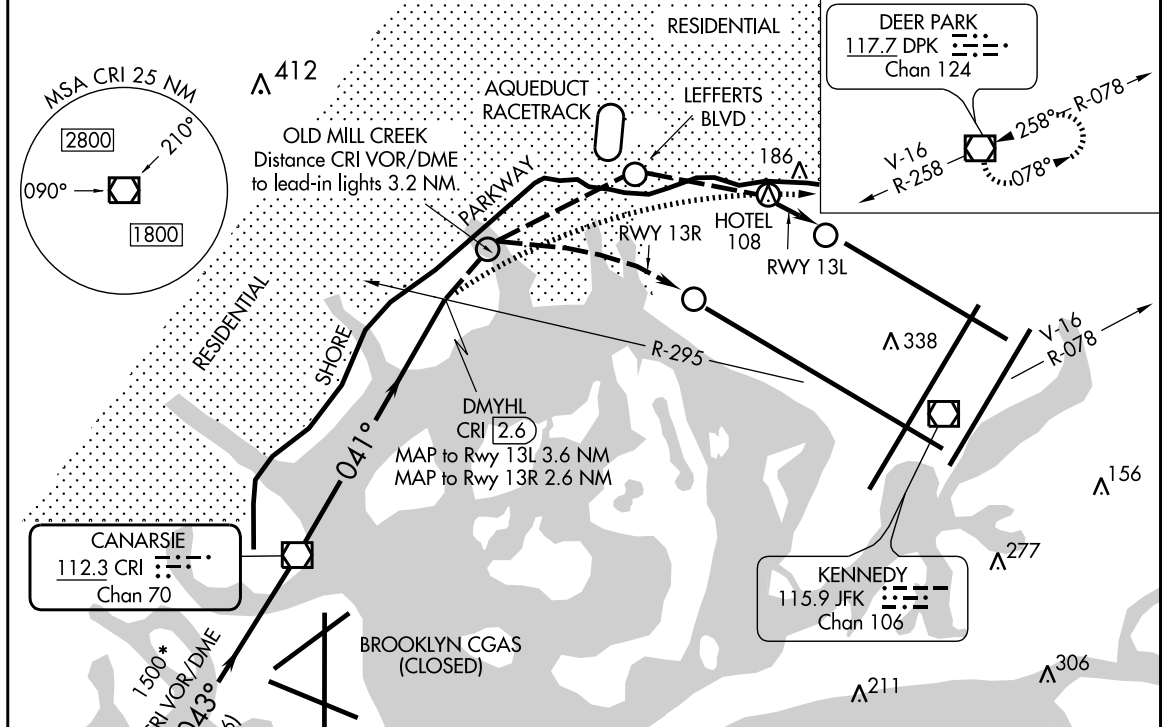
VOR/DME CRI 112.3 Chan 70	APP CRS 041°	Rwy ldg 13R 12468 13L 9095 TDZE 13 Apt Elev 13
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VOR or GPS RWY 13L/13R

NEW YORK / JOHN F. KENNEDY INTL (JFK)

▽ ▲	For inoperative LDIN, procedure not authorized.	Rwy 13L ALSF-2	MISSED APPROACH: At or beyond MAP, climbing right turn to 4000 via heading 100° and V-16 to DPK VOR/DME and hold.
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ATIS (ARR-NE) 128.725	(ARR-SW) 117.7	NEW YORK APP CON 127.4	NEW YORK APP CON 269.0	KENNEDY TOWER Rwys 4R/22L and 13L/31R 119.1	Rwys 4L/22R and 13R/31L 123.9	GND CON 121.9	CLNC DEL 135.05
						348.6	348.6



DME or RADAR REQUIRED

ELEV 13 **TDZE 13**

ASALT INT CRI 6

↑ 3000

043°

CRI VOR/DME

*1500

041°

DMYHL CRI 2.6 JFK R-295

4000 DPK

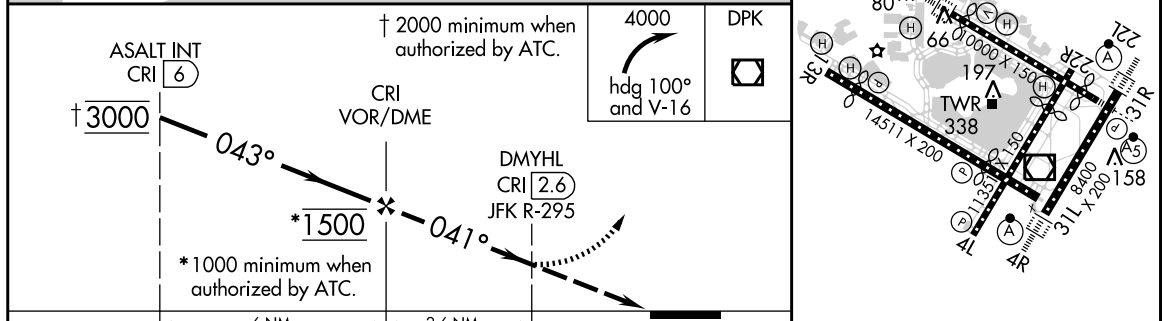
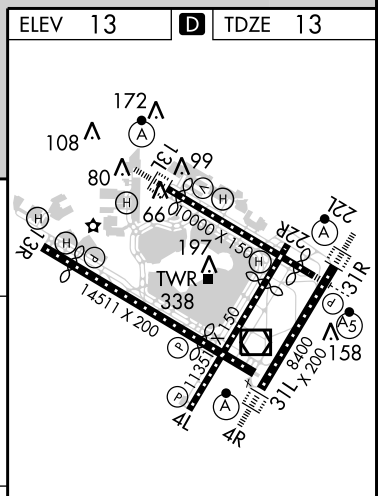
hdg 100° and V-16

When visual reference established, fly visual to airport via lead-in lights to Rwy 13L or 13R. Close adherence to flight track required for noise abatement.

○ Lead-in light clusters

*1000 minimum when authorized by ATC.

† 2000 minimum when authorized by ATC.



CATEGORY	A	B	C	D	HIRL all Rwys
LDIN-13L	800-2	787 (800-2)	800-2 ¼ 787 (800-2 ¼)	800-2 ½ 787 (800-2 ½)	TDZ/CL Rwys 4R, 13L, 31R and 22L
LDIN-13R	800-2	787 (800-2)	800-2 ¼ 787 (800-2 ¼)	800-2 ½ 787 (800-2 ½)	FAF to MAP 2.6 NM
					Knots 60 90 120 150 180
					Min:Sec 2:36 1:44 1:18 1:02 0:52

NEW YORK, NEW YORK
Amdt 18B 12096

40°38'N-73°47'W

VOR or GPS RWY 13L/13R

Figure 293. VOR or GPS RWY 13L/13R (JFK).

NEW YORK, NEW YORK

AL-610 (FAA)

COPTER RNAV (GPS) 028°

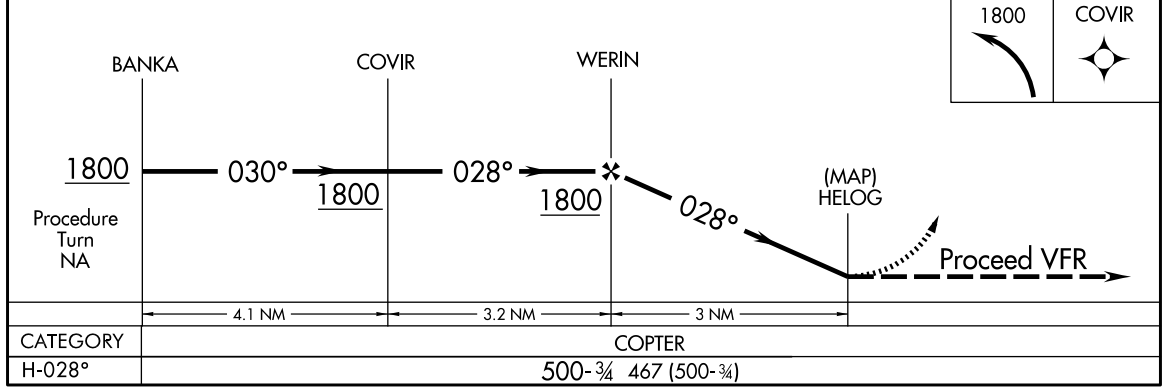
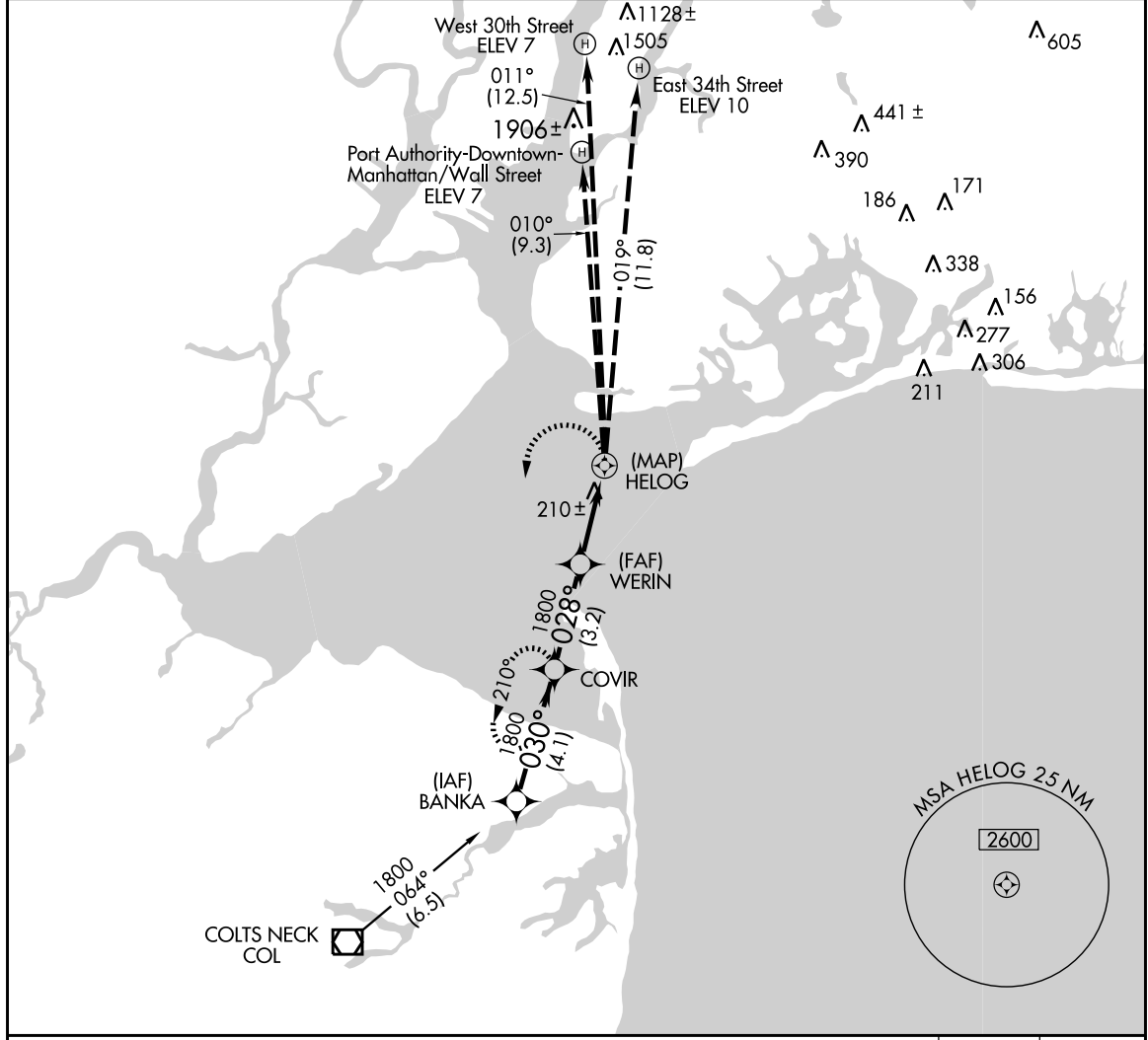
NEW YORK/ JOHN F. KENNEDY INTL (JFK)

APP CRS 028°	Rwy Idg TDZE Apt Elev	N/A N/A N/A
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NA Proceed VFR from HELOG WP or conduct the specified missed approach. Limit final and missed approach airspeed to 70 KIAS. Use John F. Kennedy Intl altimeter setting.

MISSED APPROACH: Climbing left turn to 1800 direct COVIR WP and hold.

ATIS ARR-NE 128.725	ARR-SW 117.7	ARR-SW 115.4	NEW YORK APP CON 127.4 269.0
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CATEGORY	COPTER
H-028°	500-¾ 467 (500-¾)

NEW YORK, NEW YORK

40°38'N - 73°47'W

COPTER RNAV (GPS) 028°

Figure 294. COPTER RNAV (GPS) 028° (JFK).

Appendix 2

TUCSON, ARIZONA

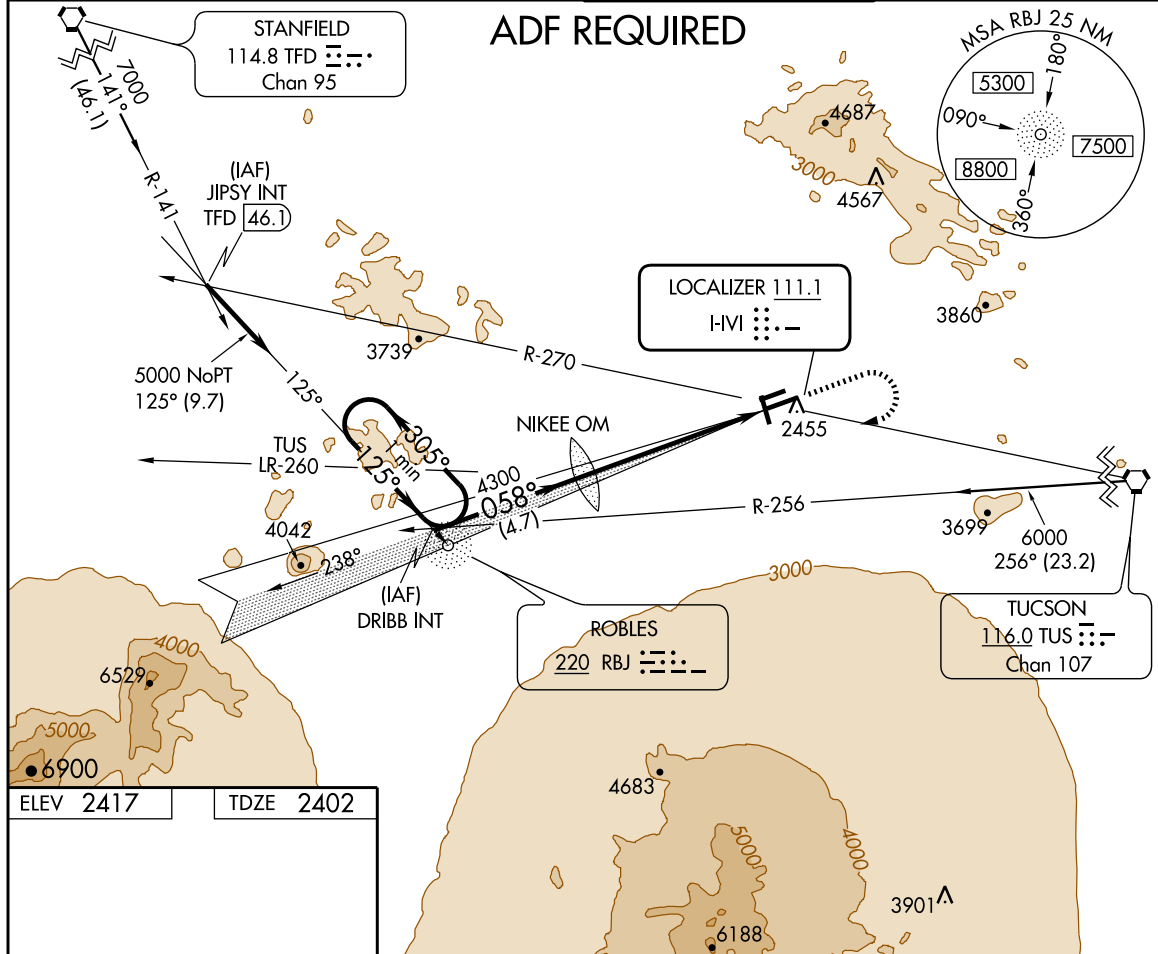
AL-6513 (FAA)

LOC I-IVI 111.1	APP CRS 058°	Rwy Idg TDZE Apt Elev	5500 2402 2417
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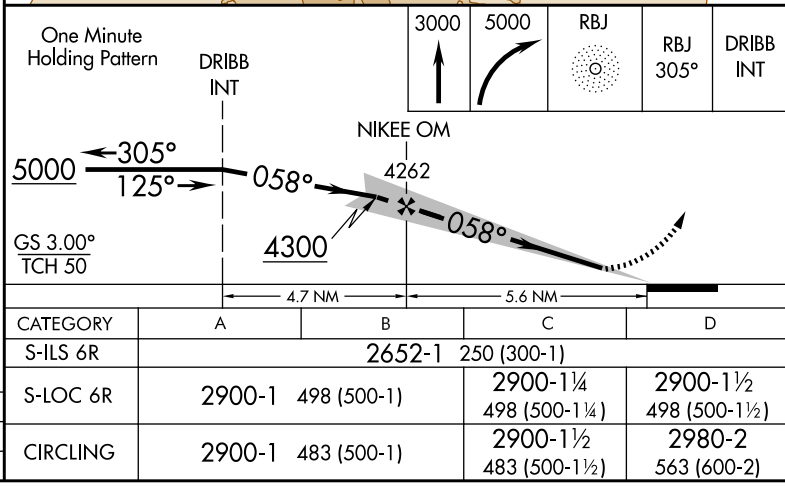
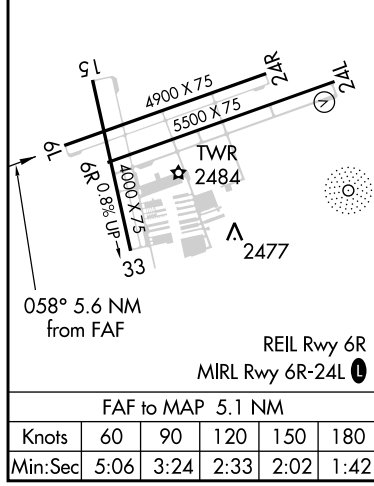
ILS or LOC RWY 6R
TUCSON/RYAN FIELD (RYN)

NA MISSED APPROACH: Climb to 3000, then climbing right turn to 5000 via direct RBJ NDB and 305° bearing RBJ to DRIBB Int and hold.

AWOS-3 133.35	TUCSON APP CON 128.5 395.9	RYAN TOWER★ 125.8 (CTAF)	GND CON 118.2
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ELEV 2417	TDZE 2402
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TUCSON, ARIZONA
Amdt 5C 12096

32°09'N-111°10'W

TUCSON/RYAN FIELD (RYN)
ILS or LOC RWY 6R

Figure 295. ILS or LOC RWY 6R (RYN).

TUCSON, ARIZONA

AL-6513 (FAA)

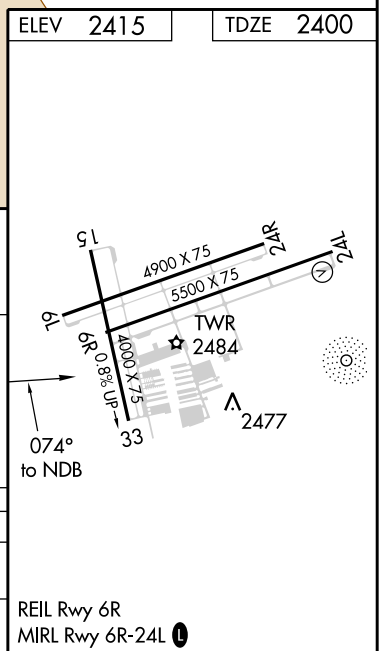
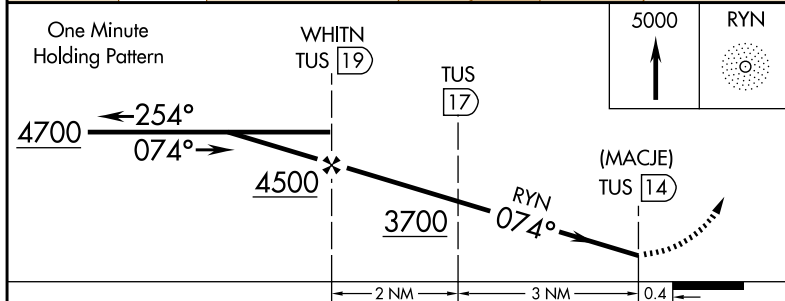
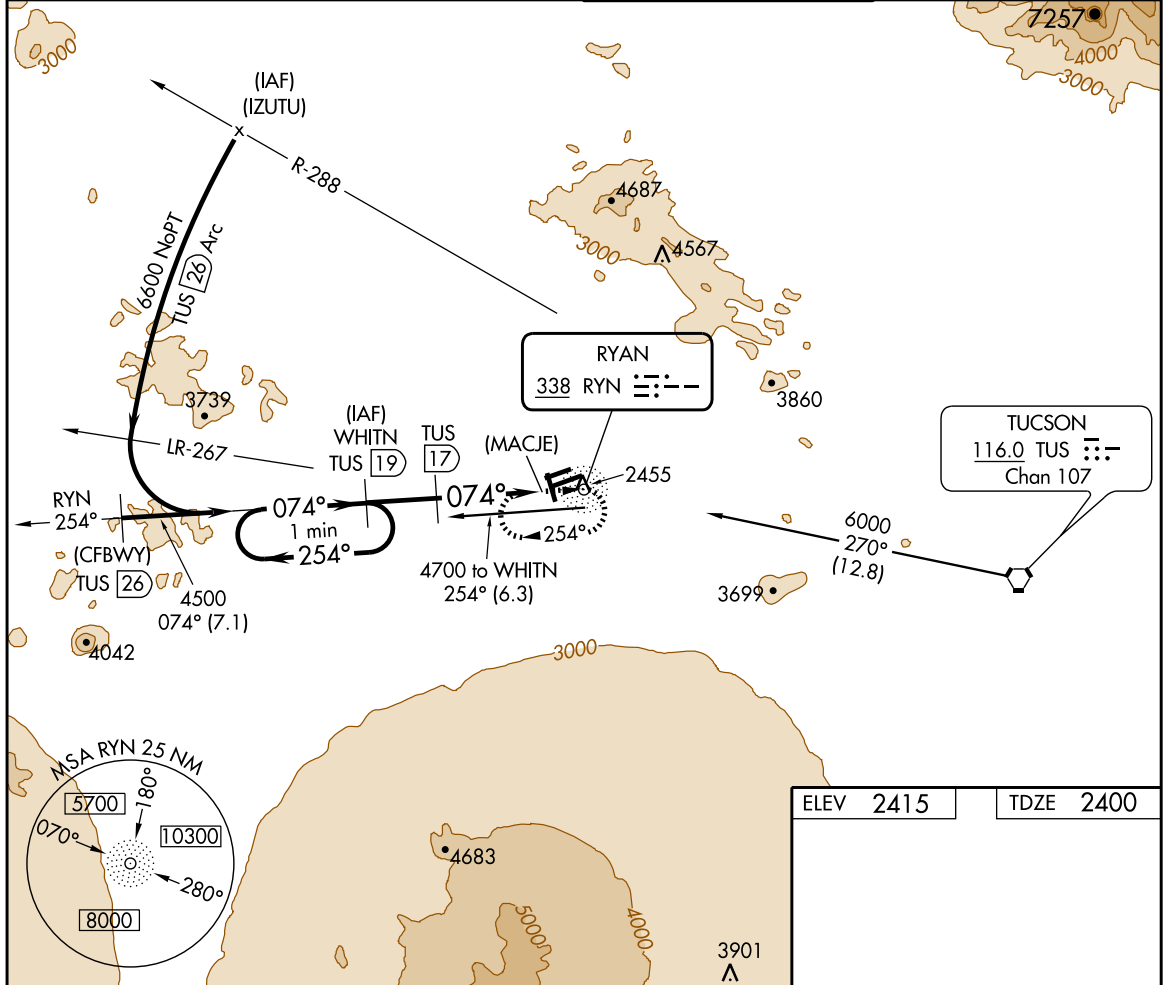
NDB RYN 338	APP CRS 074°	Rwy Idg TDZE Apt Elev	5500 2400 2415
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NDB/DME or GPS RWY 6R

TUCSON/ RYAN FIELD (RYN)

NA DME from TUS VORTAC. Simultaneous reception of RYN NDB and TUS DME required. MISSED APPROACH: Climb to 5000 direct RYN NDB and hold.

AWOS-3 133.35	TUCSON APP CON 128.5 395.9	RYAN TOWER* 125.8 (CTAF) 0	GND CON 118.2
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CATEGORY	A	B	C	D
S-6R	3300-1 1/4 900 (900-1 1/4)		3300-2 3/4 900 (900-2 3/4)	3300-3 900 (900-3)
CIRCLING	3300-1 1/4 885 (900-1 1/4)		3300-2 3/4 885 (900-2 3/4)	3300-3 885 (900-3)

TUCSON, ARIZONA
Amdt 1A 12096

32°09'N-111°10'W

NDB/DME or GPS RWY 6R

Figure 296. NDB/DME or GPS RWY 16R (RYN).

ALBUQUERQUE, NEW MEXICO

AL-12 (FAA)

12068

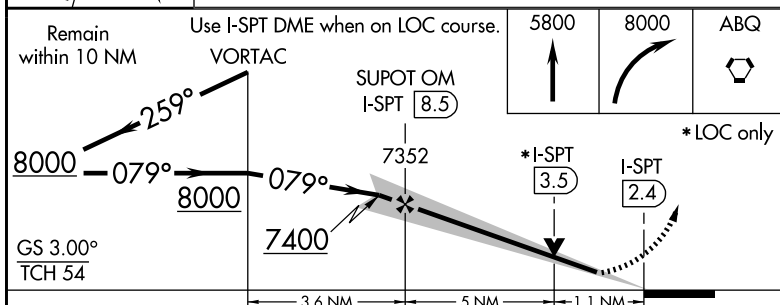
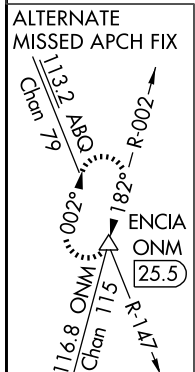
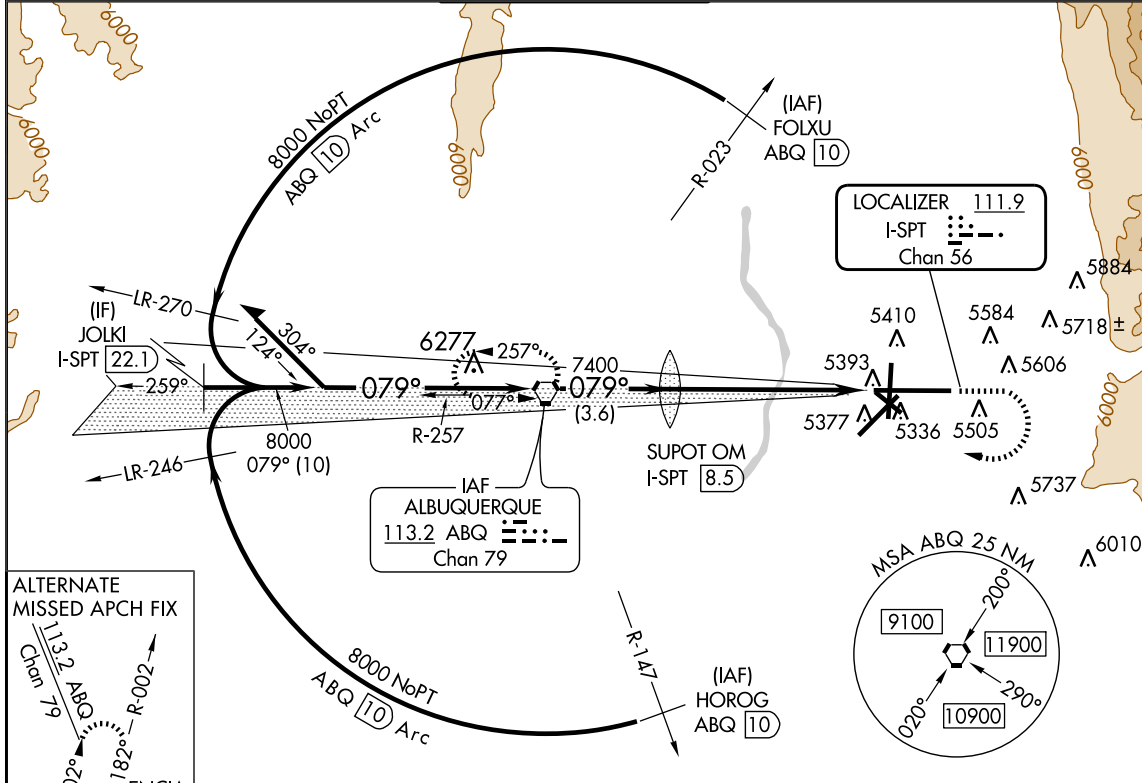
LOC/DME I-SPT 111.9 Chan 56	APP CRS 079°	Rwy Idg 12793 TDZE 5320 Apt Elev 5355
---	------------------------	--

ILS or LOC RWY 8

ALBUQUERQUE INTL SUNPORT (ABQ)

ASR	MALSR	MISSED APPROACH: Climb to 5800 then climbing right turn to 8000 direct ABQ VORTAC and hold.
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ATIS 118.0 257.7	ALBUQUERQUE APP CON 123.9 354.1	ALBUQUERQUE TOWER 120.3 351.9	GND CON 121.9 348.6	CLNC DEL 119.2 259.3
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ELEV 5355	TDZE 5320
079° 6.1 NM from FAF 10010 X 150 10000 X 150 6000 X 150 5367 35 30 13793 X 150 0.5% DOWN 20	
TDZ/CL Rwy 3 and 8 HIRL Rwy 3-21 and 8-26 MIRL Rwy 12-30 and 17-35 REIL Rwy 3, 17, 21, 26, 30 and 35 FAF to MAP 6.1 NM	
Knots	60 90 120 150 180
Min:Sec	6:06 4:04 3:03 2:26 2:02

CATEGORY	A	B	C	D
S-ILS 8	5522/18 202 (200-½)			
S-LOC 8	5720/24 400 (400-½)		5720/40 400 (400-¾)	
CIRCLING	5840-1 485 (500-1)		5900-1½ 545 (600-1½)	
			5920-2 565 (600-2)	

ALBUQUERQUE, NEW MEXICO
 Amdt 5G 08MAR12

35°02'N-106°37'W

ALBUQUERQUE INTL SUNPORT (ABQ)

ILS or LOC RWY 8

Figure 297. ILS or LOC RWY 8 (ABQ).

ALBUQUERQUE, NEW MEXICO

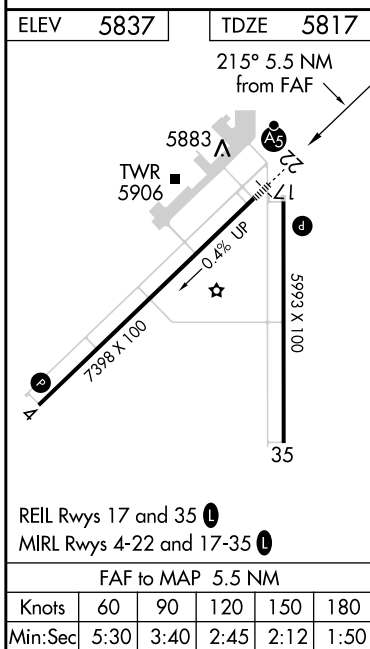
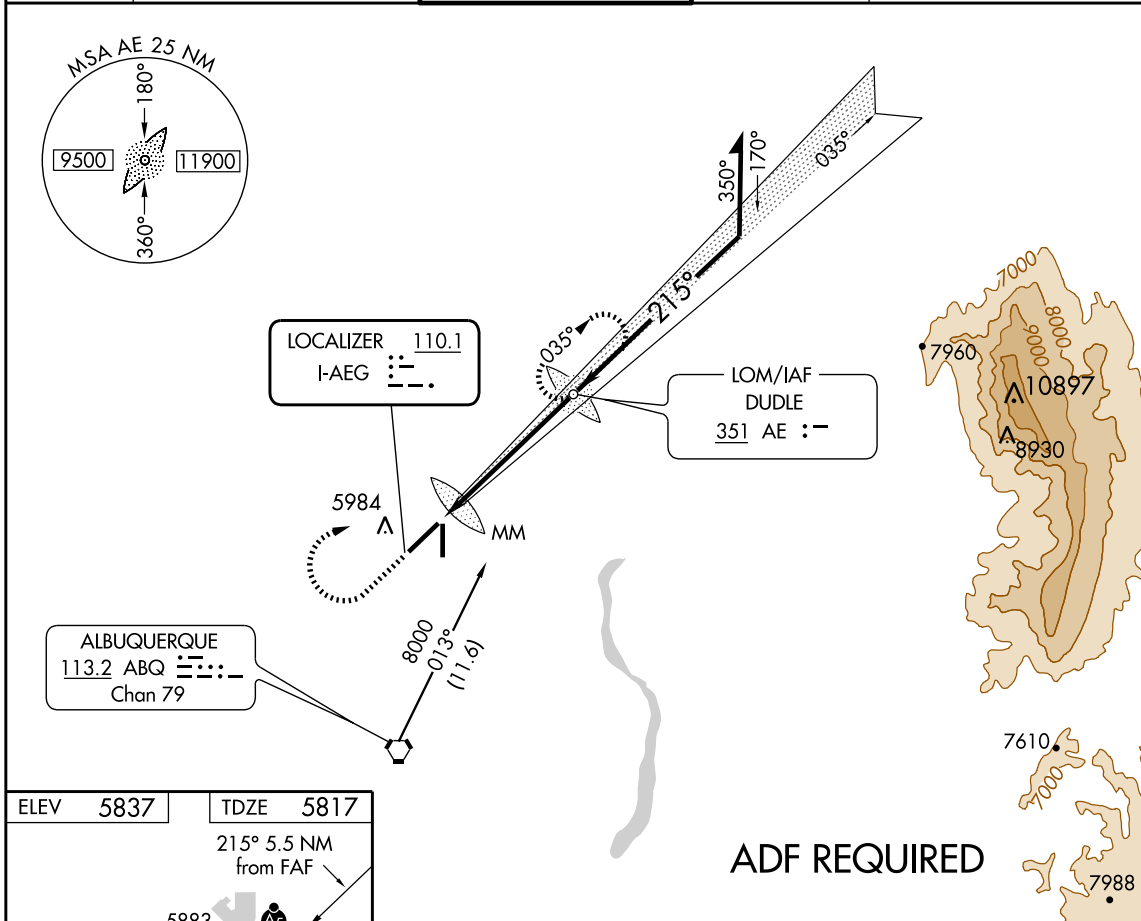
AL-6859 (FAA)

LOC I-AEG 110.1	APP CRS 215°	Rwy Idg TDZE Apt Elev	7398 5817 5837
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ILS RWY 22
ALBUQUERQUE/ DOUBLE EAGLE II (AEG)

⚠ Autopilot coupled approaches not authorized.	MALSR 	MISSED APPROACH: Climb to 6500 then climbing right turn to 8000 direct Dudle LOM and hold.
⚠ NA For inoperative MALSR, increase S-LOC 22 Cat D visibility to 1.		

AWOS-3 119.025	ALBUQUERQUE APP CON 127.4 253.5	DOUBLE EAGLE II TOWER ★ 120.15 (CTAF)	GND CON 121.625	ALBUQUERQUE CLNC DEL 124.8 (When tower closed)
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	6500	8000	AE	
	LOM 7629			
	8000			
	7700			
	GS 3.00° TCH 55			
CATEGORY	A	B	C	D
S-ILS 22	6017-½ 200 (200-½)			
S-LOC 22	6140-½ 323 (400-½)			6140-¾ 323 (400-¾)
CIRCLING	6400-1	563 (600-1)	6400-1½ 563 (600-1½)	6400-2 563 (600-2)

ALBUQUERQUE, NEW MEXICO
Amdt 2B 11293

35°09'N-106°48'W

ALBUQUERQUE/ DOUBLE EAGLE II (AEG)
ILS RWY 22

Figure 298. ILS RWY 22 (AEG).

Appendix 2

CHICAGO/PROSPECT HEIGHTS/WHEELING, ILLINOIS

AL-5028 (FAA)

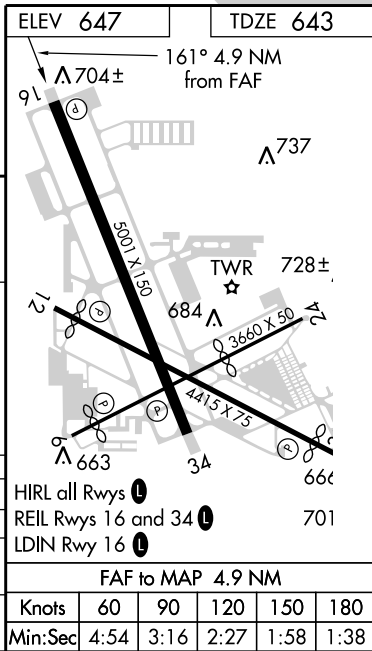
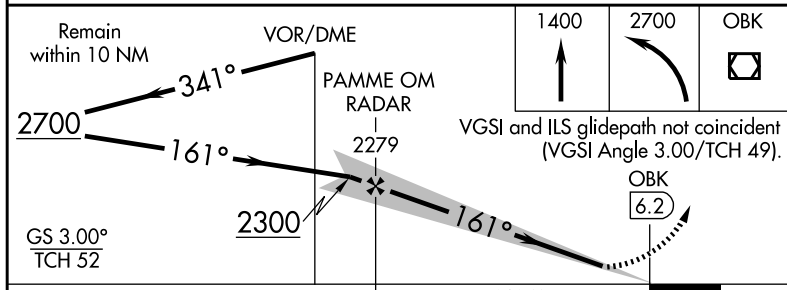
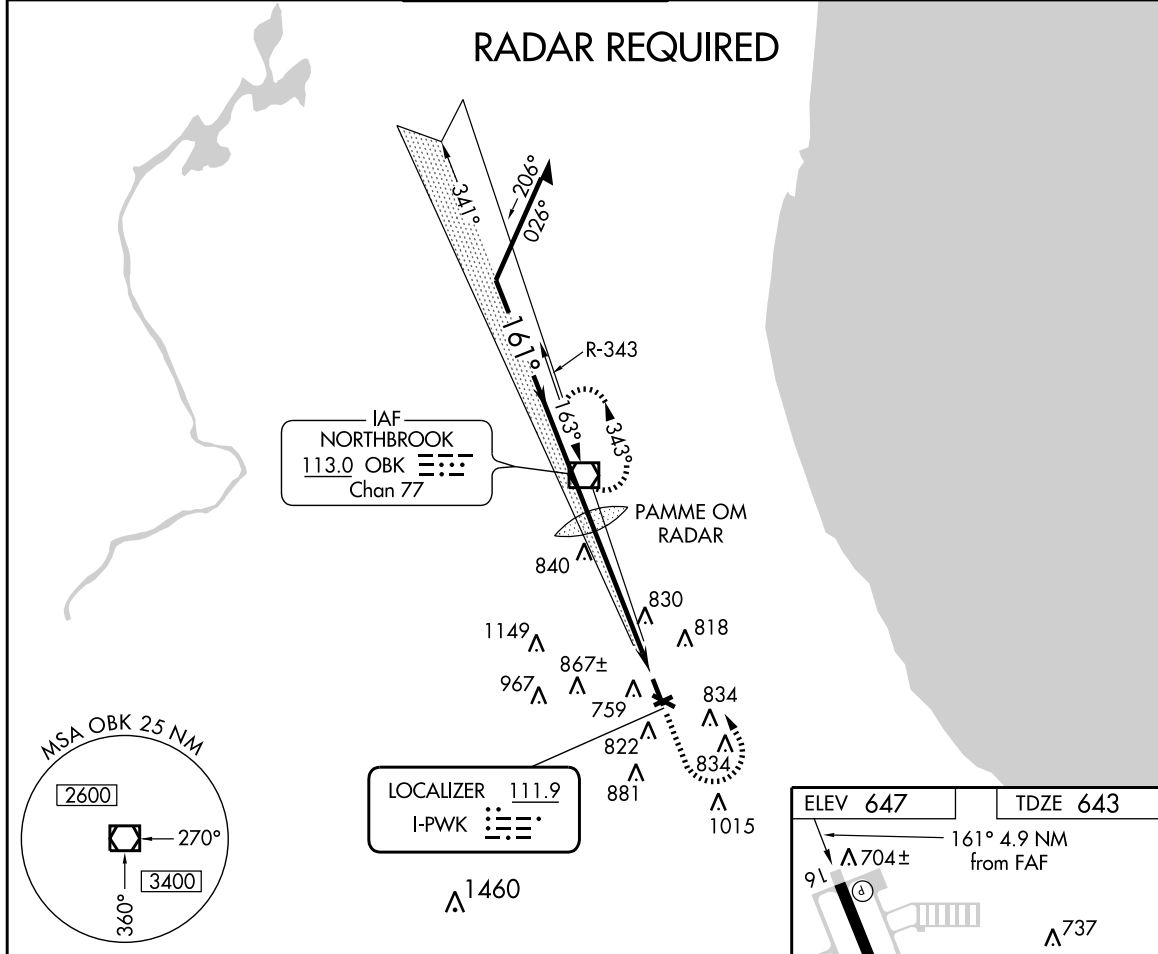
LOC I-PWK 111.9	APP CRS 161°	Rwy Idg 5001
		TDZE 643
		Apt Elev 647

ILS or LOC RWY 16
CHICAGO EXECUTIVE (PWK)

▼ If local altimeter setting not received, use Chicago-O'Hare Intl altimeter setting and increase all DAs 22 feet, and all visibilities ¼ mile; increase all MDAs 40 feet, and S-LOC Cat C and D visibilities ¼ mile. Visibility reduction by helicopters NA.

MISSED APPROACH: Climb to 1400 then climbing left turn to 2700 direct OBK VOR/DME and hold.

ATIS 124.2	CHICAGO APP CON 120.55 290.2	EXECUTIVE TOWER ★ 119.9 (CTAF) 0	GND CON 121.7	CLNC DEL 124.7	UNICOM 122.95
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CATEGORY	A	B	C	D
S-ILS 16	893-¾ 250 (300-¾)			
S-LOC 16	1140-1 497 (500-1)	1140-1¼ 497 (500-1¼)		1140-1½ 497 (500-1½)
CIRCLING	1140-1 493 (500-1)	1140-1½ 493 (500-1½)		1200-2 553 (600-2)

CHICAGO/PROSPECT HEIGHTS/WHEELING, ILLINOIS
Amdt 2 12096

42°07'N-87°54'W

CHICAGO EXECUTIVE (PWK)
ILS or LOC RWY 16

Figure 299. ILS or LOC RWY 16 (PWK).

BUFFALO, NEW YORK

AL-65 (FAA)

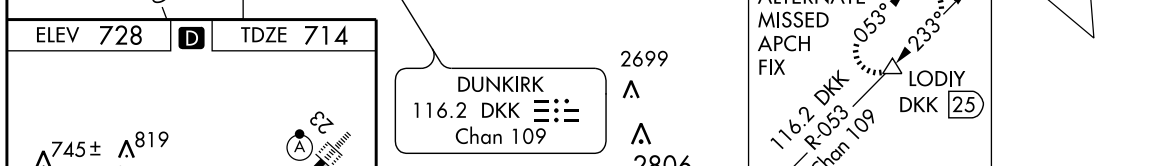
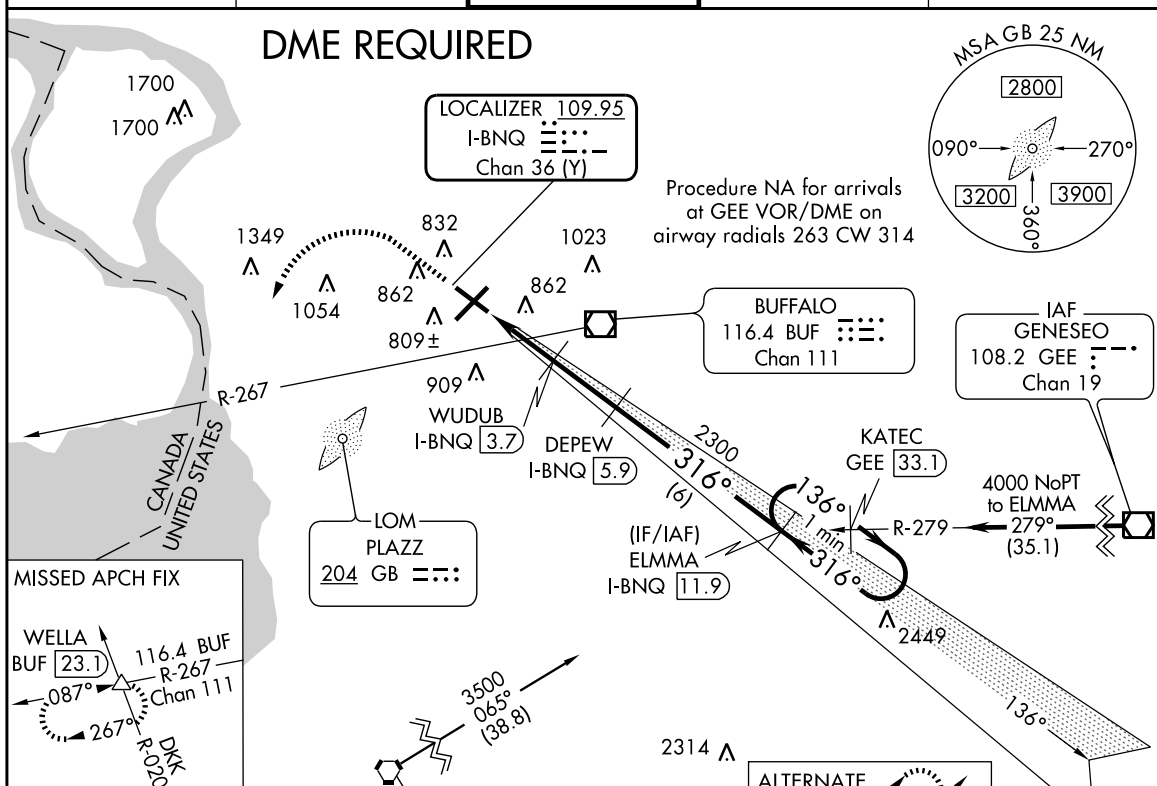
11293

LOC/DME I-BNQG 109.95 Chan 36 (Y)	APP CRS 316°	Rwy Idg TDZE Apt Elev 6121 714 728
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ILS or LOC/DME RWY 32

BUFFALO NIAGARA INTL (BUF)

ATIS 135.35	BUFFALO APP CON 126.15 263.125	BUFFALO TOWER 120.5 257.8	GND CON 133.2 257.8	CLNC DEL 124.7 257.8
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1200	3000	WELLA	DEPEW I-BNQG 5.9	ELMMA I-BNQG 11.9	One Minute Holding Pattern
↑	hdg 245°	BUF R-267	I-BNQG 2.2	WUDUB I-BNQG 3.7	2300
			I-BNQG 1.2		1560
					2300
					136° → 3500
					← 316°
					GS 3.00° TCH 54
					Use I-BNQG DME when on Localizer course.
CATEGORY	A	B	C	D	
S-ILS 32	938-1/2 224 (300-1/2)				
S-LOC 32	1100-1/2 386 (400-1/2)			1100-3/4 386 (400-3/4)	
CIRCLING	1200-1 472 (500-1)	1200-1 1/2 472 (500-1 1/2)		1280-2 552 (600-2)	

BUFFALO, NEW YORK 42°56'N-78°44'W BUFFALO NIAGARA INTL (BUF)
Orig-B 23SEP10 ILS or LOC/DME RWY 32

Figure 300. ILS or LOC/DME RWY 32 (BUF).

SYRACUSE, NEW YORK

AL-411 (FAA)

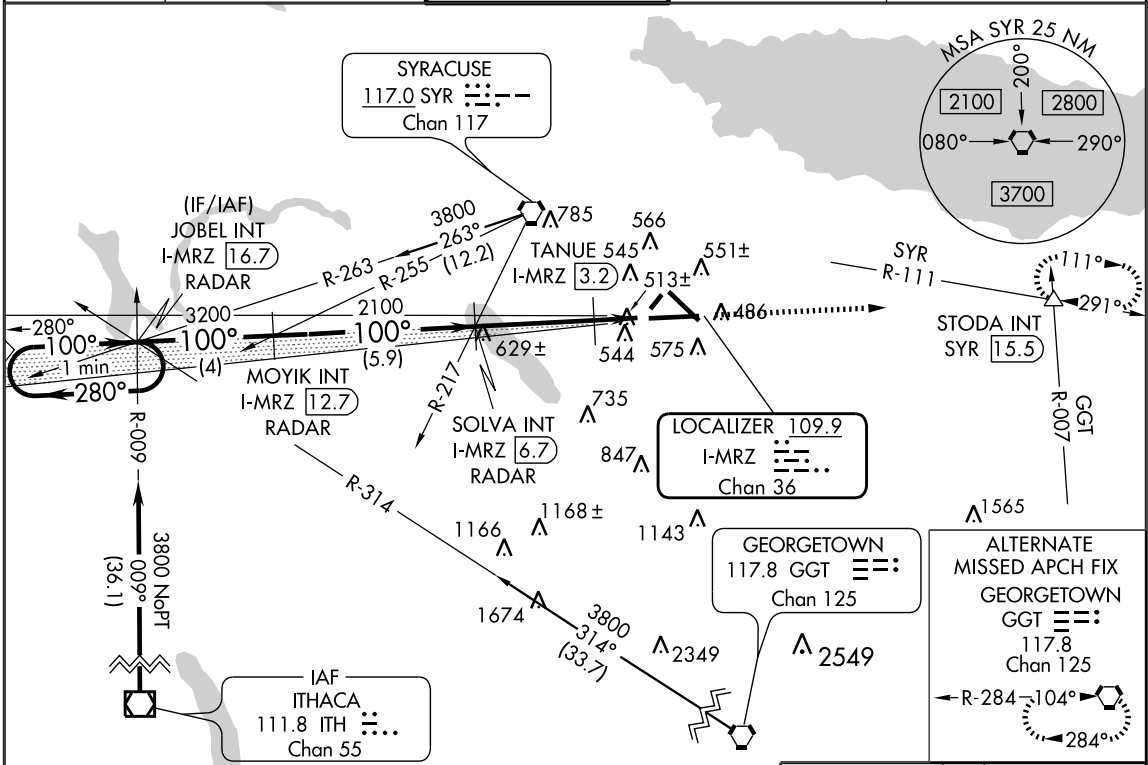
12068

LOC/DME I-MRZ 109.9 Chan 36	APP CRS 100°	Rwy Idg THRE Apt Elev	9003 419 421
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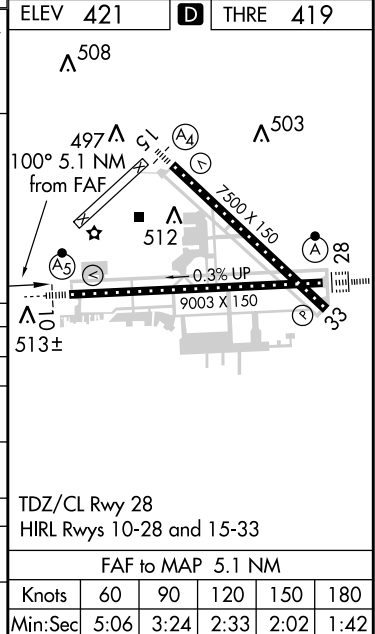
ILS or LOC RWY 10

SYRACUSE HANCOCK INTL (SYR)

▽ **RVR 1800 authorized with the use of FD or AP or HUD to DA. For inoperative MALS, increase S-LOC 10 Cats A and B visibility to RVR 5500 and Cats C and D visibility to 1¼. TANUE fix minimums, for inoperative MALS, increase S-LOC 10 all Cats visibility to RVR 5500.		MALS 	MISSED APPROACH: Climb to 3000 via SYR VORTAC R-111 to STODA Int/SYR 15.5 DME and hold.	
ATIS 124.225	SYRACUSE APP CON 134.275 279.6	SYRACUSE TOWER 120.3 239.0	GND CON 121.7 348.6	CLNC DEL 125.05 257.775



One Minute Holding Pattern	JOBEL INT I-MRZ 16.7	MOYIK INT I-MRZ 12.7	SOLVA INT I-MRZ 6.7	TANUE I-MRZ 3.2	STODA
3800 ← 280°	← 100°	← 100°	← 100°	← 100°	← 100°
GS 3.00°	3200	2100	*840	1.6	1.6
TCH 55	4 NM	5.9 NM	3.5 NM	0.6	1 NM
CATEGORY	A	B	C	D	
S-ILS 10	**619/24		200 (200-½)		
S-LOC 10	840/24	421 (500-½)	840/40	421 (500-¾)	
CIRCLING	880-1	459 (500-1)	900-1½ 479 (500-1½)	980-2 559 (600-2)	
TANUE FIX MINIMUMS					
S-LOC 10	780/24	361 (400-½)	780/35	361 (400-¾)	
CIRCLING	880-1	459 (500-1)	900-1½ 479 (500-1½)	980-2 559 (600-2)	



SYRACUSE, NEW YORK
Amdt 13 07APR11

43°07'N - 76°06'W

SYRACUSE HANCOCK INTL (SYR)

ILS or LOC RWY 10

Figure 301. ILS RWY 10 (SYR).

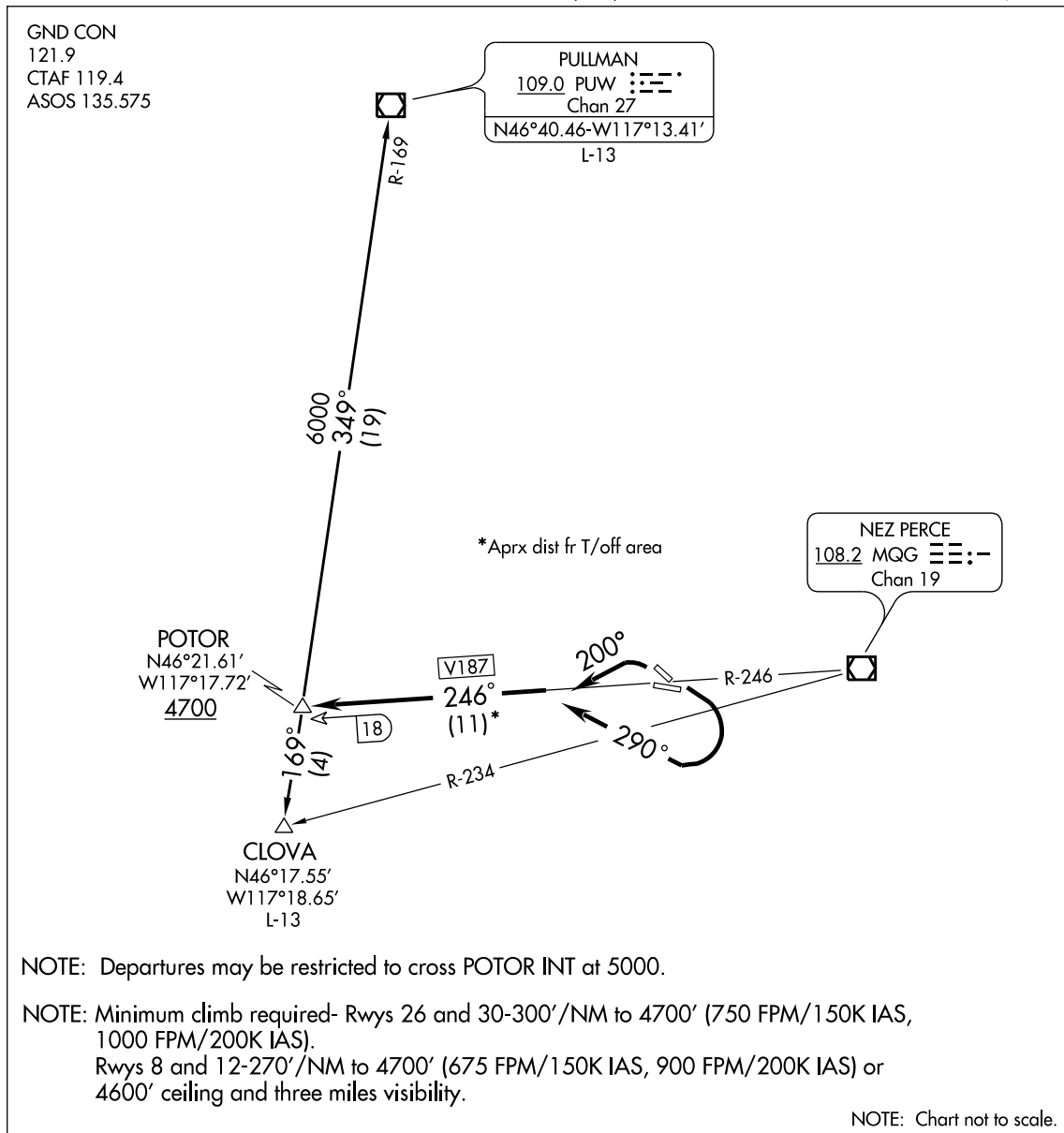
(POTOR2.POTOR) 10154

POTOR TWO DEPARTURE

SL-515 (FAA)

LEWISTON-NEZ PERCE COUNTY (LWS)

LEWISTON, IDAHO



DEPARTURE ROUTE DESCRIPTION

TAKE-OFF RUNWAYS 8, 12: Turn right heading 290°. Thence....

TAKE-OFF RUNWAYS 26, 30: 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

(POTOR2.POTOR) 10154

LEWISTON, IDAHO
LEWISTON-NEZ PERCE COUNTY (LWS)

Figure 302. POTOR TWO Departure (POTOR2.POTOR) (LWS).

Appendix 2

LEWISTON, IDAHO

AL-515 (FAA)

12040

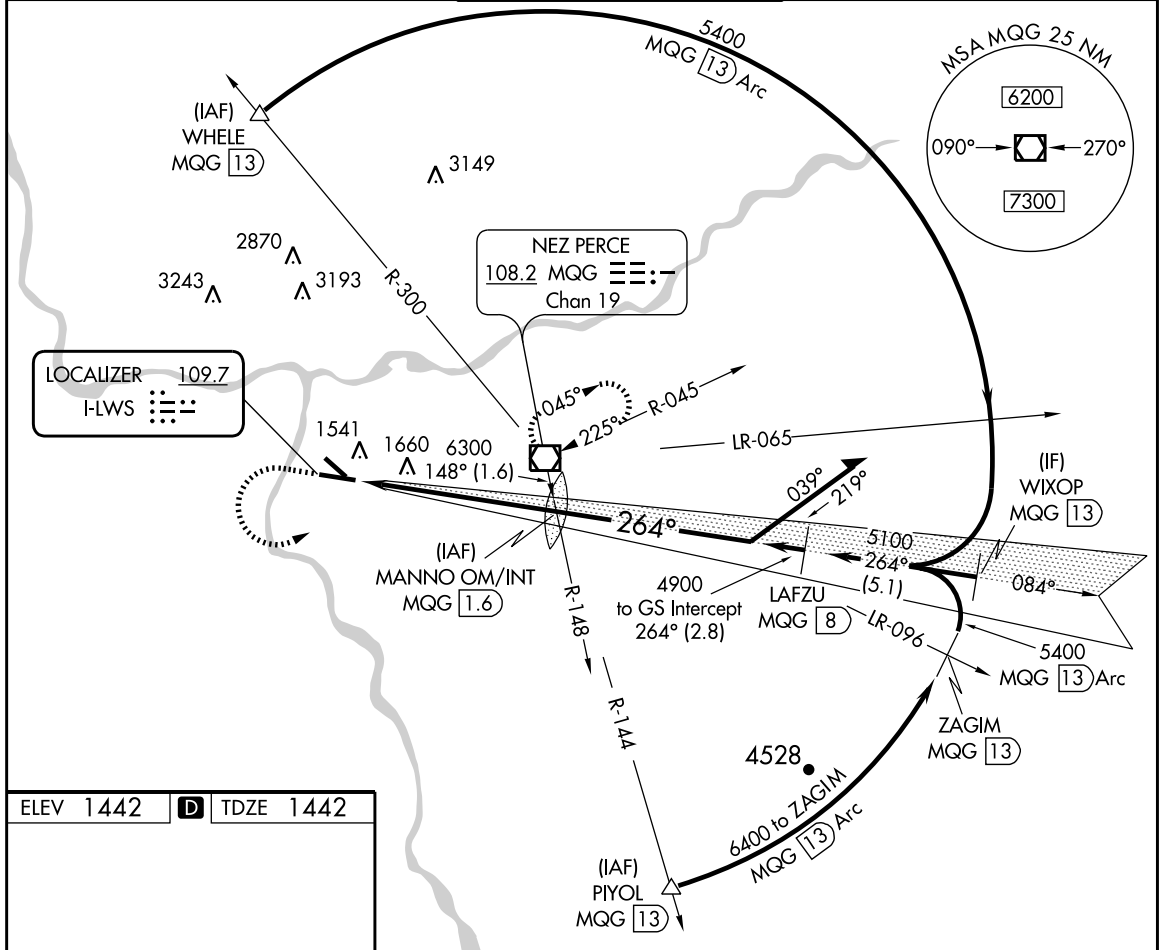
LOC I-LWS 109.7	APP CRS 264°	Rwy Idg TDZE Apt Elev	6511 1442 1442
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ILS RWY 26

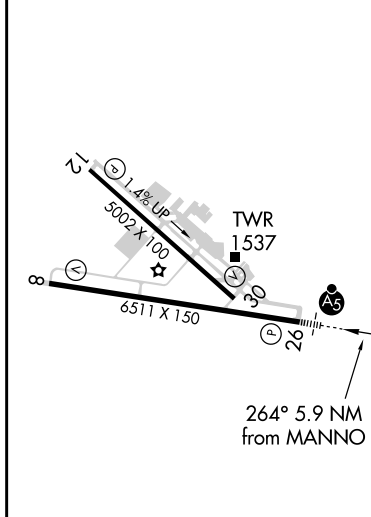
LEWISTON-NEZ PERCE COUNTY (LWS)

When local altimeter setting not received, procedure NA. Autopilot coupled approach NA below 2500. MALSRL MISSED APPROACH: Climb to 3000 then climbing left turn to 5300 direct MQG VOR/DME and hold, continue climb-in-hold to 5300.

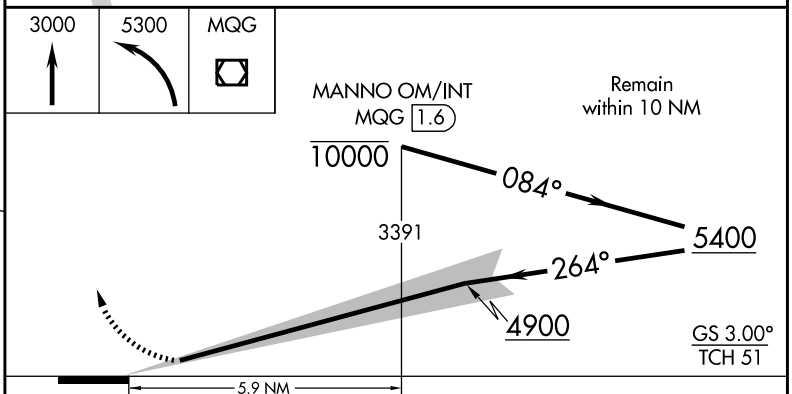
ASOS 135.575	SEATTLE CENTER 123.95 290.55	LEWISTON TOWER ★ 119.4 (CTAF) 318.8	GND CON 121.9	UNICOM 122.95
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ELEV 1442	D	TDZE 1442
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REIL Rwy 8
HIRL Rwy 8-26
MIRL Rwy 12-30



CATEGORY	A	B	C	D
S-ILS 26	1642-½ 200 (200-½)			

LEWISTON, IDAHO
Amdt 12A 29JUL10

46°22'N-117°01'W

LEWISTON-NEZ PERCE COUNTY (LWS)
ILS RWY 26

Figure 303. ILS RWY 26 (LWS).

HOQUIAM, WASHINGTON

AL-889 (FAA)

12040

LOC/DME I-HQM 108.7 Chan 24	APP CRS 241°	Rwy Idg 5000 THRE 15 Apt Elev 18
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ILS or LOC/DME RWY 24

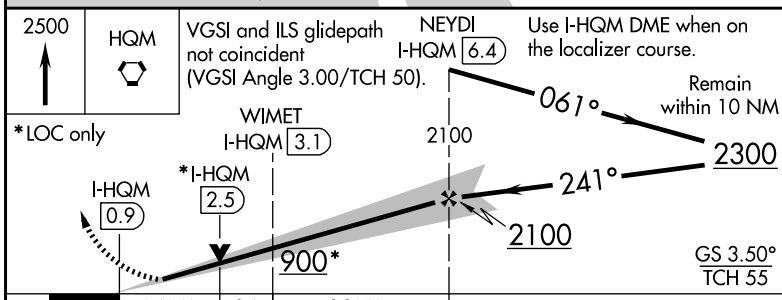
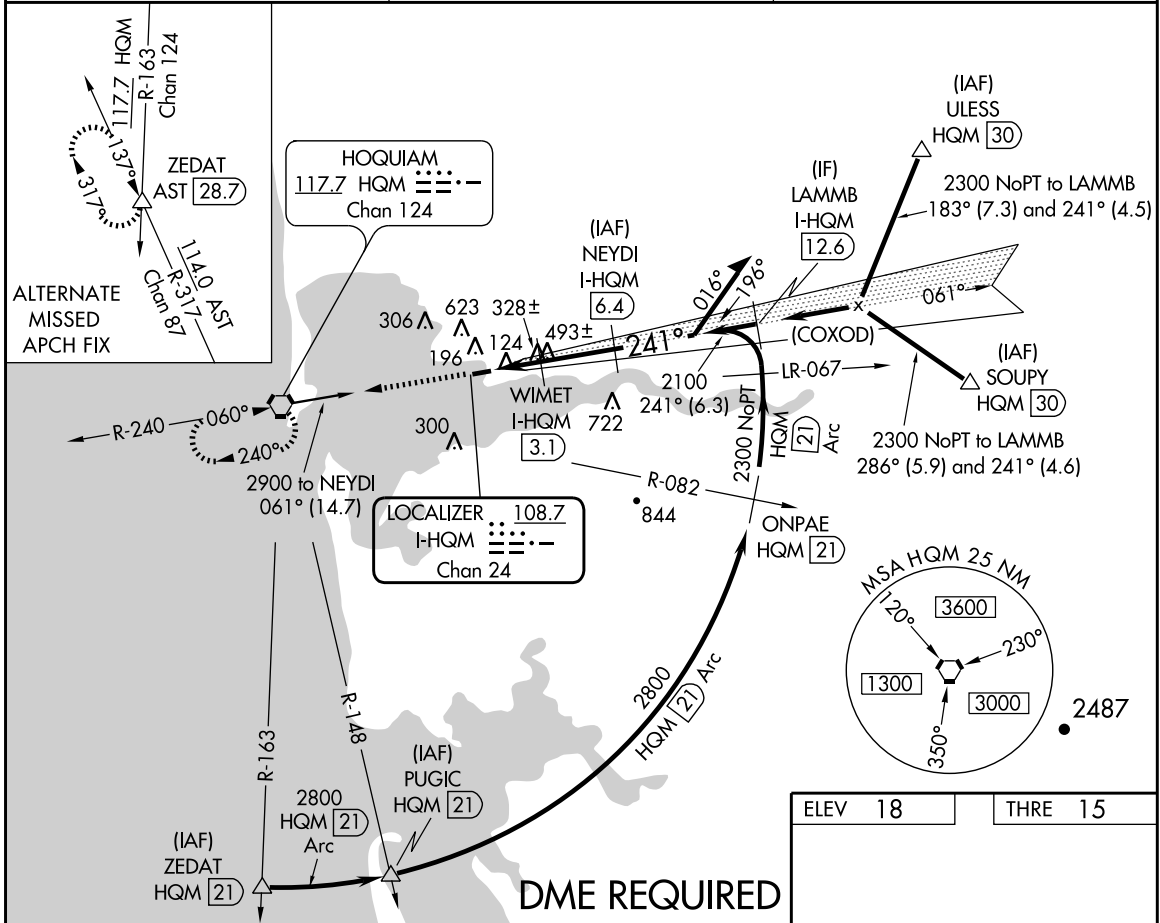
HOQUIAM/BOWERMAN (HQM)

When local altimeter setting not received, procedure NA. For inop MALSR, increase S-ILS Cat C visibility to 7/8 mile and S-LOC Cat C visibility to 1 1/8 mile. Circling NA northwest of Rwy 6-24.

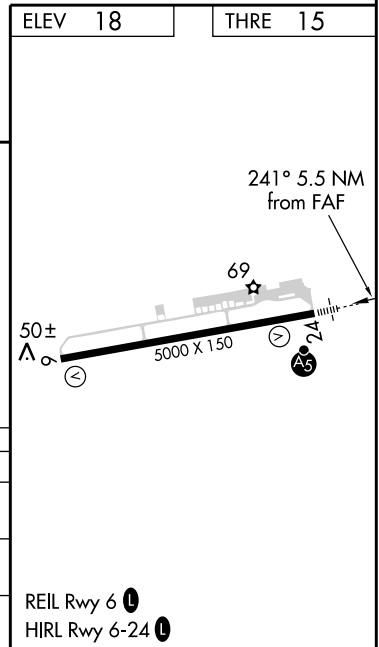


MISSED APPROACH: Climb to 2500 direct HQM VORTAC and hold.

ASOS 135.775	SEATTLE CENTER 128.3 269.0	UNICOM 122.7 (CTAF)
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CATEGORY	A	B	C	D
S-ILS 24	215-1/2 200 (200-1/2)		285-1/2 270 (300-1/2)	NA
S-LOC 24	580-1/2 565 (600-1/2)		580-1 565 (600-1 1/4)	NA
CIRCLING	580-1 562 (600-1)		580-1 5/8 562 (600-1 5/8)	NA



HOQUIAM, WASHINGTON
Amdt 4 09FEB12

46°58'N-123°56'W

ILS or LOC/DME RWY 24

Figure 304. ILS or LOC/DME RWY 24 (HQM)

Appendix 2

OLYMPIA, WASHINGTON


AL-645 (FAA)

12096

LOC I-OLM 111.9	APP CRS 172°	Rwy Idg 5501
		TDZE 207
		Apt Elev 209

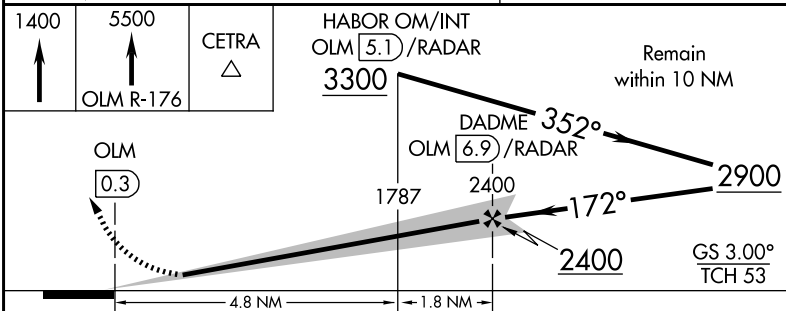
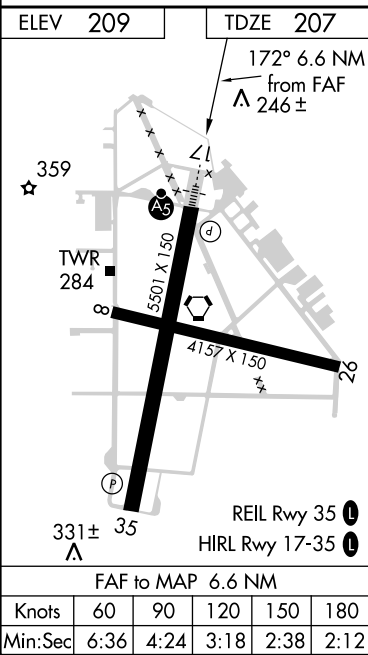
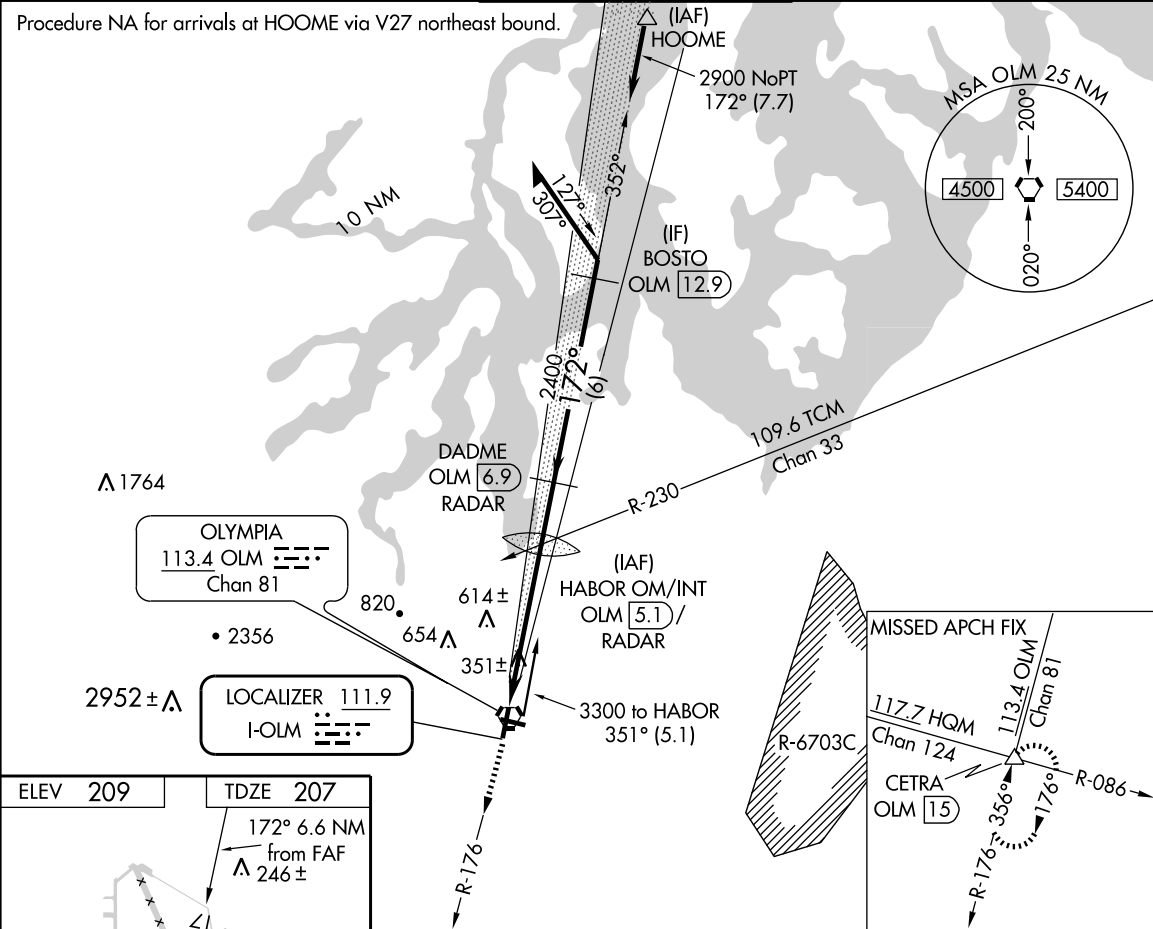
ILS or LOC RWY 17
OLYMPIA RGNL (OLM)

⚠ DME or RADAR required. When local altimeter setting not received, use Sanderson Field altimeter setting and increase all DA 53 feet and all MDA 60 feet, and increase circling Cats C and D visibility ¼ mile. For inoperative MALSRS, when using Sanderson Field altimeter setting, increase S-ILS 17 all Cats visibility to 1 mile.

MALSRS 

MISSED APPROACH: Climb to 1400, then continue climb to 5500 via OLM VORTAC R-176 to CETRA INT/OLM VORTAC 15 DME and hold, continue climb-in-hold to 5500.

ATIS 135.725	SEATTLE APP CON 121.1 290.9	OLYMPIA TOWER* 124.4 (CTAF) 254.25	GND CON 121.6	UNICOM 122.95
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CATEGORY	A	B	C	D
S-ILS 17	414-½ 207 (300-½)			
S-LOC 17	640-½	433 (500-½)	640-¾ 433 (500-¾)	640-1 433 (500-1)
CIRCLING	720-1	511 (600-1)	820-1¾ 611 (700-1¾)	860-2 651 (700-2)

OLYMPIA, WASHINGTON
Amdt 11 11FEB10

46°58'N-122°54'W

OLYMPIA RGNL (OLM)
ILS or LOC RWY 17

Figure 305. ILS or LOC RWY 17 (OLM).

NEWPORT NEWS, VIRGINIA


AL-957 (FAA)

12096

LOC/DME I-PHF 110.1 Chan 38	APP CRS 067°	Rwy Idg 8003 TDZE 39 Apt Elev 42
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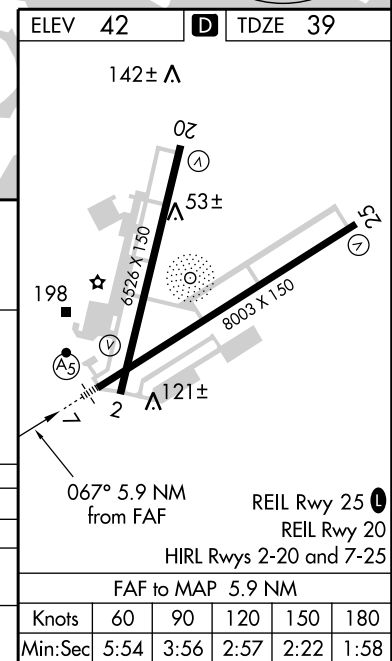
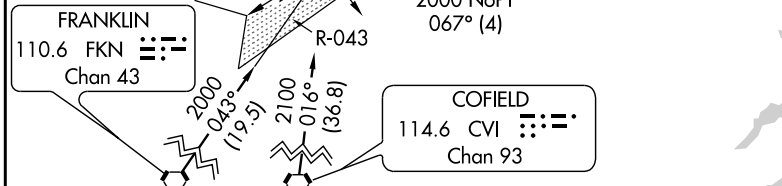
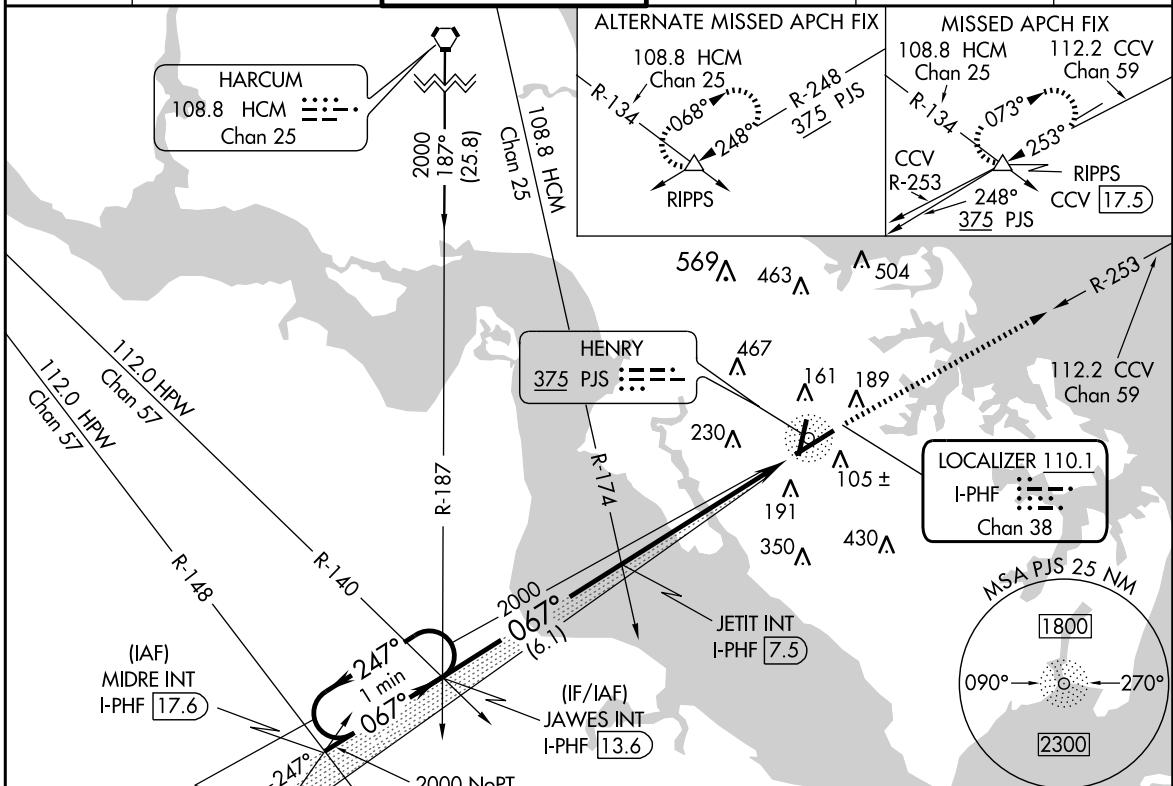
ILS or LOC RWY 7
NEWPORT NEWS/ WILLIAMSBURG INTL (PHF)

V VDP NA with Norfolk Intl altimeter setting. When local altimeter not received, use Norfolk Intl altimeter setting and increase all DA 49 feet and all MDA 60 feet; increase S-LOC 7 Cat C visibility to RVR 5000. **RVR 1800 authorized with the use of FD or AP or HUD to DA.

MALSR 

MISSED APPROACH: Climb to 2500 on heading 067° and on CCV VORTAC R-253 to RIPPS INT/ CCV 17.5 DME and hold.

ATIS 128.65	NORFOLK APP CON 125.7	NEWPORT NEWS TOWER* 118.7 (CTAF) 257.9	GND CON 121.9 348.6	CLNC DEL 121.65 225.4	UNICOM 122.95
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One Minute Holding Pattern	JAWES INT I-PHF 13.6	JETIT INT I-PHF 7.5	2500 hdg 067°	CCV R-253	RIPPS
GS 3.00° TCH 51	2000	2000	*I-PHF 2.8	I-PHF 1.6	
	6.1 NM	4.7 NM	1.2 NM		
CATEGORY	A	B	C	D	
S-ILS 7	**239/24 200 (200-½)				
S-LOC 7	480/24	441 (500-½)	480/40 441 (500-¾)	480/50 441 (500-1)	
CIRCLING	520-1	478 (500-1)	520-1½ 478 (500-1½)	600-2 558 (600-2)	

NEWPORT NEWS, VIRGINIA

NEWPORT NEWS/ WILLIAMSBURG INTL (PHF)

Amdt 33 13JAN11

37°08'N-76°30'W

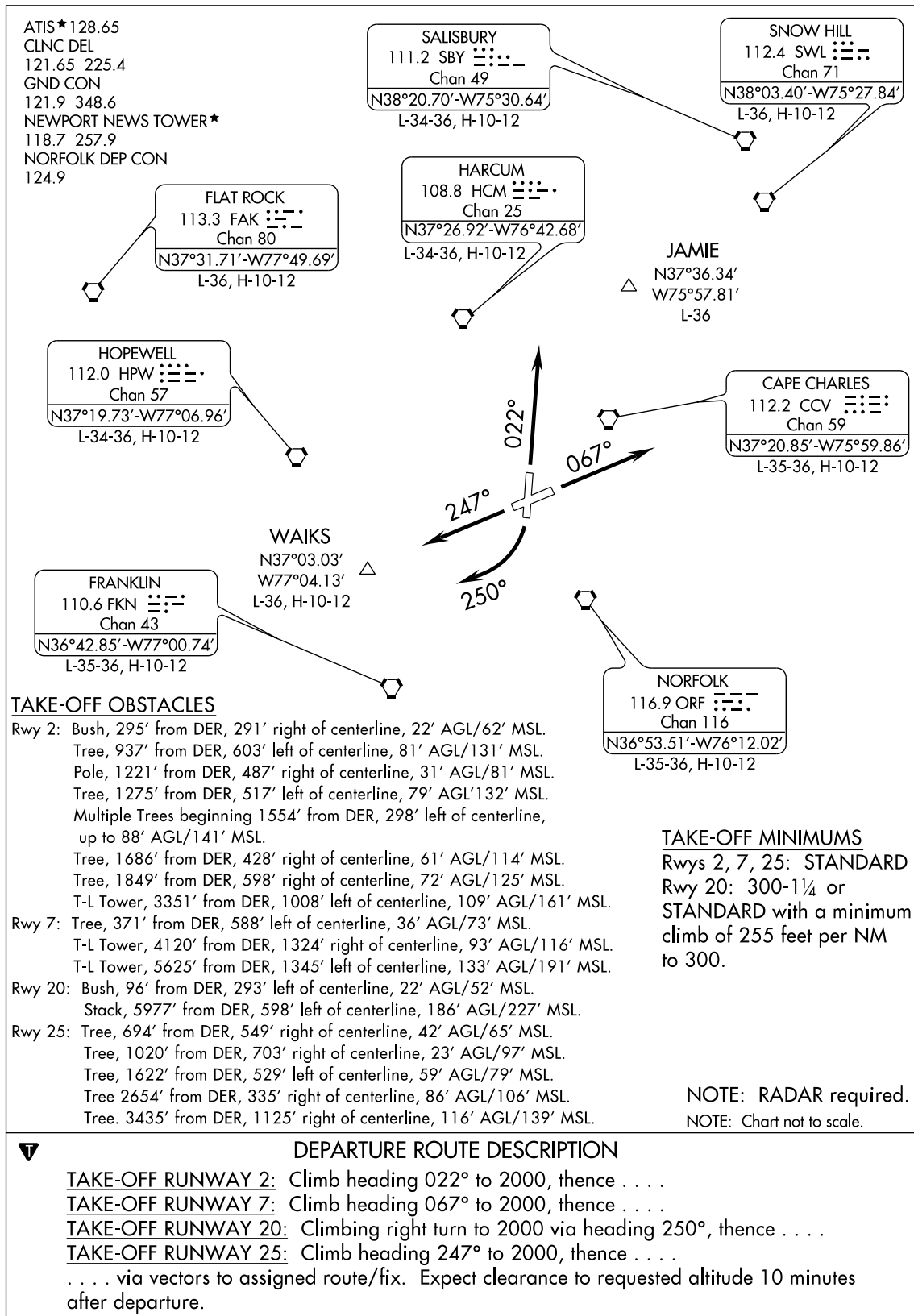
ILS or LOC RWY 7

Figure 306. ILS or LOC RWY 7 (PHF).

(HENRY2.PHF) 08213

HENRY TWO DEPARTURE

NEWPORT NEWS/WILLIAMSBURG INTL (PHF)
NEWPORT NEWS, VIRGINIA
SL-957 (FAA)



HENRY TWO DEPARTURE

(HENRY2.PHF) 08213

NEWPORT NEWS, VIRGINIA
NEWPORT NEWS/WILLIAMSBURG INTL (PHF)

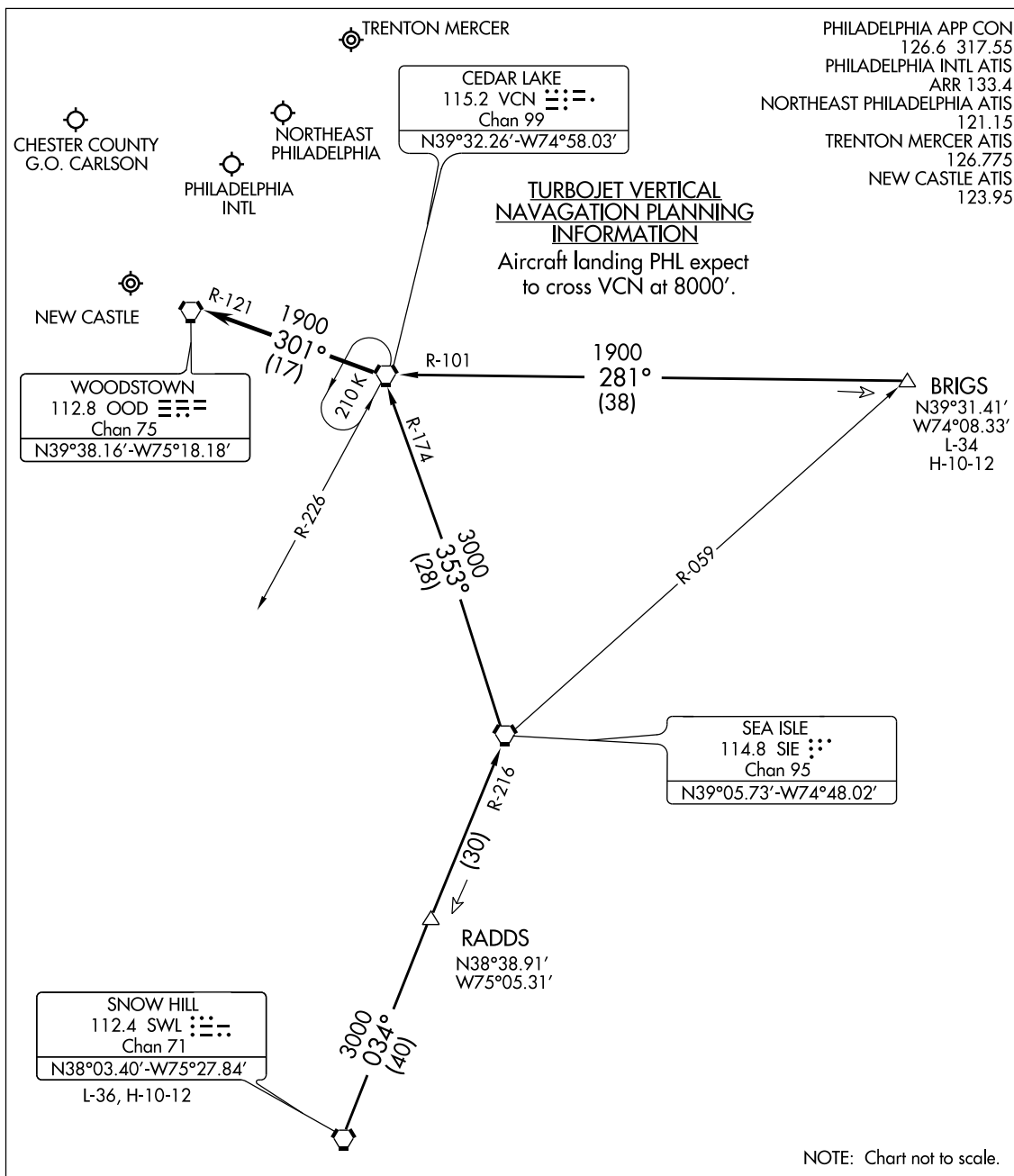
Figure 307. HENRY TWO Departure (HENRY2.PHF).

(VCN.VCN8) 12040

ST-320 (FAA)

CEDAR LAKE EIGHT ARRIVAL

PHILADELPHIA, PENNSYLVANIA



BRIGS TRANSITION (BRIGS.VCN8): From over BRIGS INT via VCN R-101 to VCN VORTAC. Thence. . . .

SNOW HILL TRANSITION (SWL.VCN8): From over SWL VORTAC via SWL R-034 and SIE R-216 to SIE VORTAC, then via the SIE R-353 and VCN R-174 to VCN VORTAC. Thence. . . .

. . . .From over VCN VORTAC: Turbojets expect radar vectors to final approach course. Non-Turbojets continue via the VCN R-301 and the OOD R-121 to OOD VORTAC; expect radar vectors to final approach course.

CEDAR LAKE EIGHT ARRIVAL

PHILADELPHIA, PENNSYLVANIA

(VCN.VCN8) 12040

Figure 308. CEDAR LAKE EIGHT Arrival (VCN.VCN8).

Appendix 2

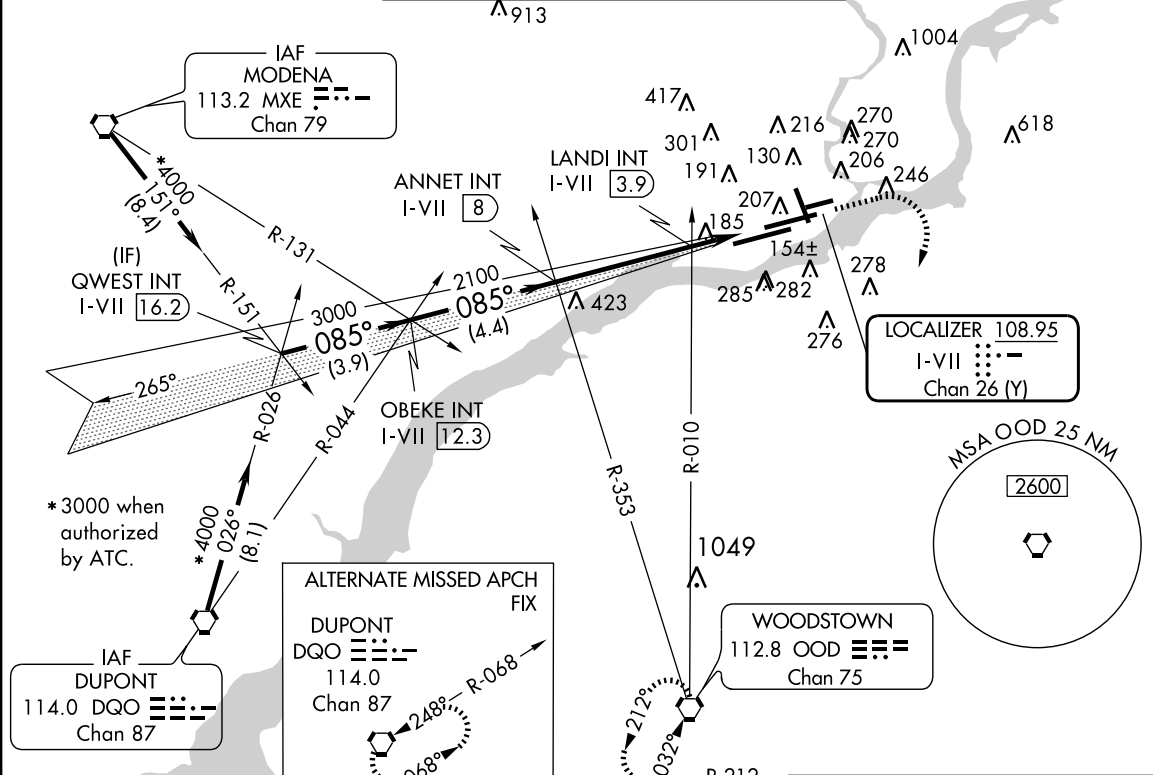
PHILADELPHIA, PENNSYLVANIA

AL-320 (FAA)

LOC/DME I-VII 108.95 Chan 26 (Y)	APP CRS 085°	Rwy Idg 9500 TDZE 13 Apt Elev 36
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ILS or LOC RWY 9L
PHILADELPHIA INTL (PHL)

▽ ▲	** RVR 1800 authorized with use of FD or AP or HUD to DA.	MALSR 	MISSED APPROACH: Climb to 1500, then climbing right turn to 3000 direct OOD VORTAC and hold.
ATIS ARR 133.4 DEP 135.925	PHILADELPHIA APP CON 124.35 319.15	PHILADELPHIA TOWER 118.5 327.05 (Rwys 9L/27R, 8/26 and 17/35) 135.1 327.05 (Rwy 9R/27L)	GND CON 121.9 348.6 CLNC DEL 118.85 348.6



	ELEV 36	D	TDZE 13
VGSI and ILS glidepath not coincident (VGSI Angle 3.00/TCH 71). QWEST INT I-VII 16.2 OBEKE INT I-VII 12.3 ANNET INT I-VII 8 LANDI INT I-VII 3.9 I-VII 1.7 Procedure Turn NA GS 3.00° TCH 58 *3000 when authorized by ATC. †LOC only.			
CATEGORY	A	B	C
S-ILS 9L	** 213/24 200 (200-½)		
S-LOC 9L	760/24 747 (800-½)	760/40 747 (800-¾)	760-1¾ 747 (800-1¾)
CIRCLING	760-1 724 (800-1)	760-1¼ 724 (800-1¼)	760-2¼ 724 (800-2¼)
LANDI FIX MINIMUMS			
S-LOC 9L	440/24 504 (600-1)	427 (500-½)	440/40 427 (500-¾)
CIRCLING	640-1 604 (700-1)	640-1¼ 604 (700-1¾)	640-2 604 (700-2)
REIL Rwys 9L and 35 TDZ/CL Rwy 9R HIRL all Rwys FAF to MAP 6.3 NM			
	Knots	60	90
	Min:Sec	6:18	4:12
		120	150
		3:09	2:31
		180	2:06

PHILADELPHIA, PENNSYLVANIA
Amdt 4C 11181

39°52'N - 75°14'W

PHILADELPHIA INTL (PHL)
ILS or LOC RWY 9L

Figure 310. ILS or LOC RWY 9L (PHL).

ATLANTIC CITY, NEW JERSEY

AL-669 (FAA)

LOC/DME I-PVO 109.1 Chan 28	APP CRS 128°	Rwy ldg 10000 TDZE 75 Apt Elev 75
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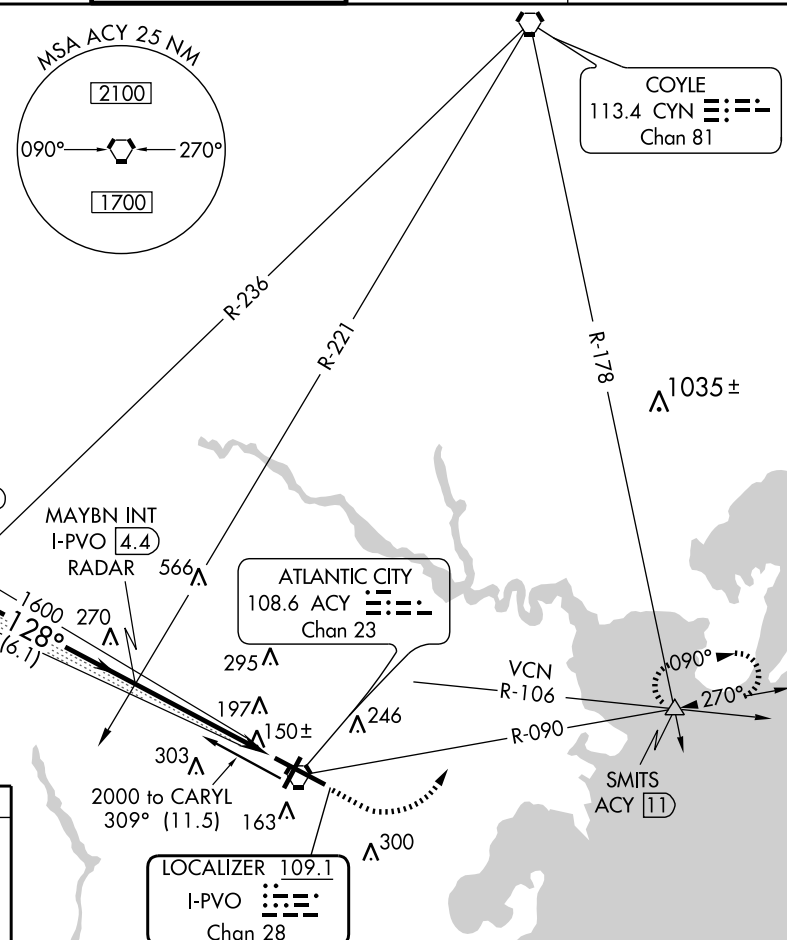
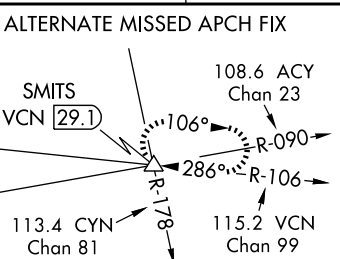
ILS or LOC RWY 13

ATLANTIC CITY INTL (ACY)

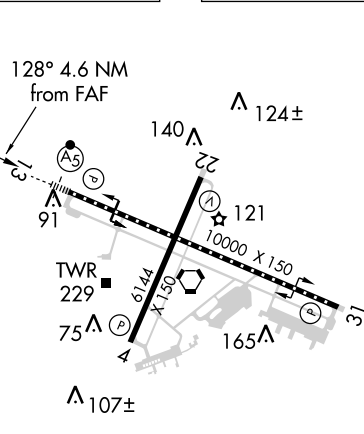
▲ For inoperative MALSR, increase S-ILS 13 Cat E visibility to RVR 4000, increase S-LOC 13 Cat D visibility to RVR 5000, and Cat E to RVR 6000.

▲ MALSR MISSED APPROACH: Climb to 600 then climbing left turn to 2000 via ACY R-090 to SMITS INT/ACY 11 DME and hold.

ATIS 108.6 316.15	ATLANTIC CITY APP CON 124.6 327.125	ATLANTIC CITY TOWER 120.3 239.0	GND CON 121.9 284.6	CLNC DEL 127.85 353.775
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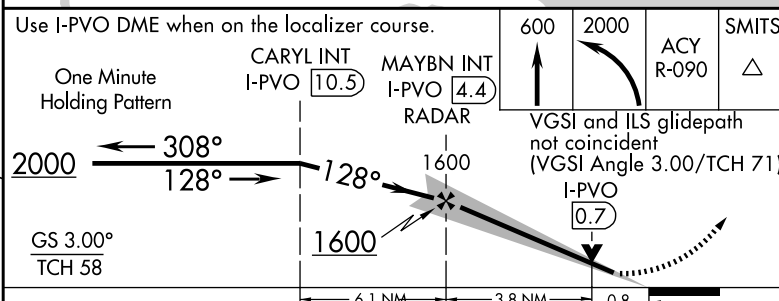
ELEV 75 TDZE 75



TDZ/CL Rwy 13
HIRL Rwy 4-22 and 13-31
REIL Rwy 31

FAF to MAP 4.6 NM

Knots	60	90	120	150	180
Min:Sec	4:36	3:04	2:18	1:50	1:32



CATEGORY	A	B	C	D	E
S-ILS 13	275/18 200 (200-½)				275/24 200 (200-½)
S-LOC 13	400/24 325 (400-½)		400/40 325 (400-¾)		
CIRCLING	540-1 465 (500-1)		540-1½ 465 (500-1½)		640-2 760-2½ 565 (600-2) 685 (700-2½)

ATLANTIC CITY, NEW JERSEY
Amdt 8 11181

39°27'N-74°35'W

ATLANTIC CITY INTL (ACY)

ILS or LOC RWY 13

Figure 311. ILS or LOC RWY 13 (ACY).

Appendix 2

GRAHAM, TEXAS

AL-5535 (FAA)

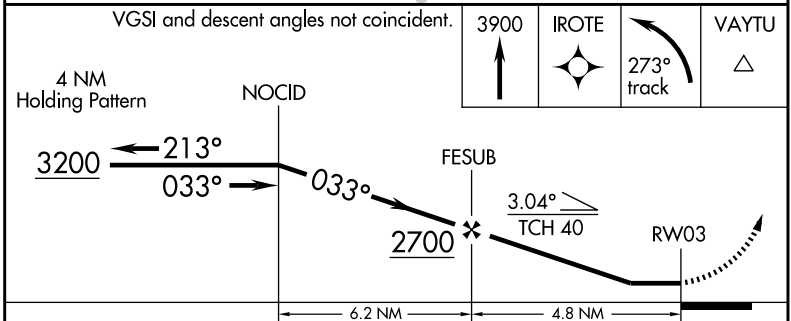
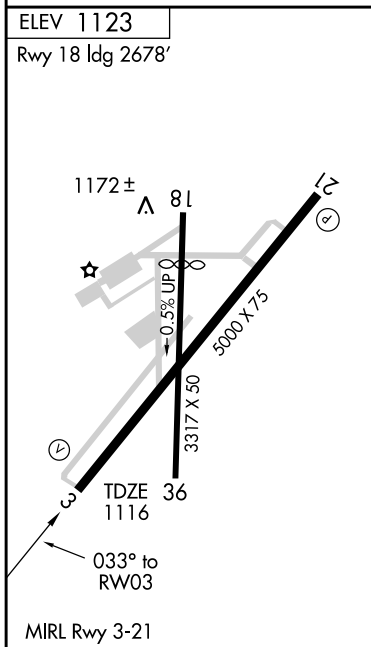
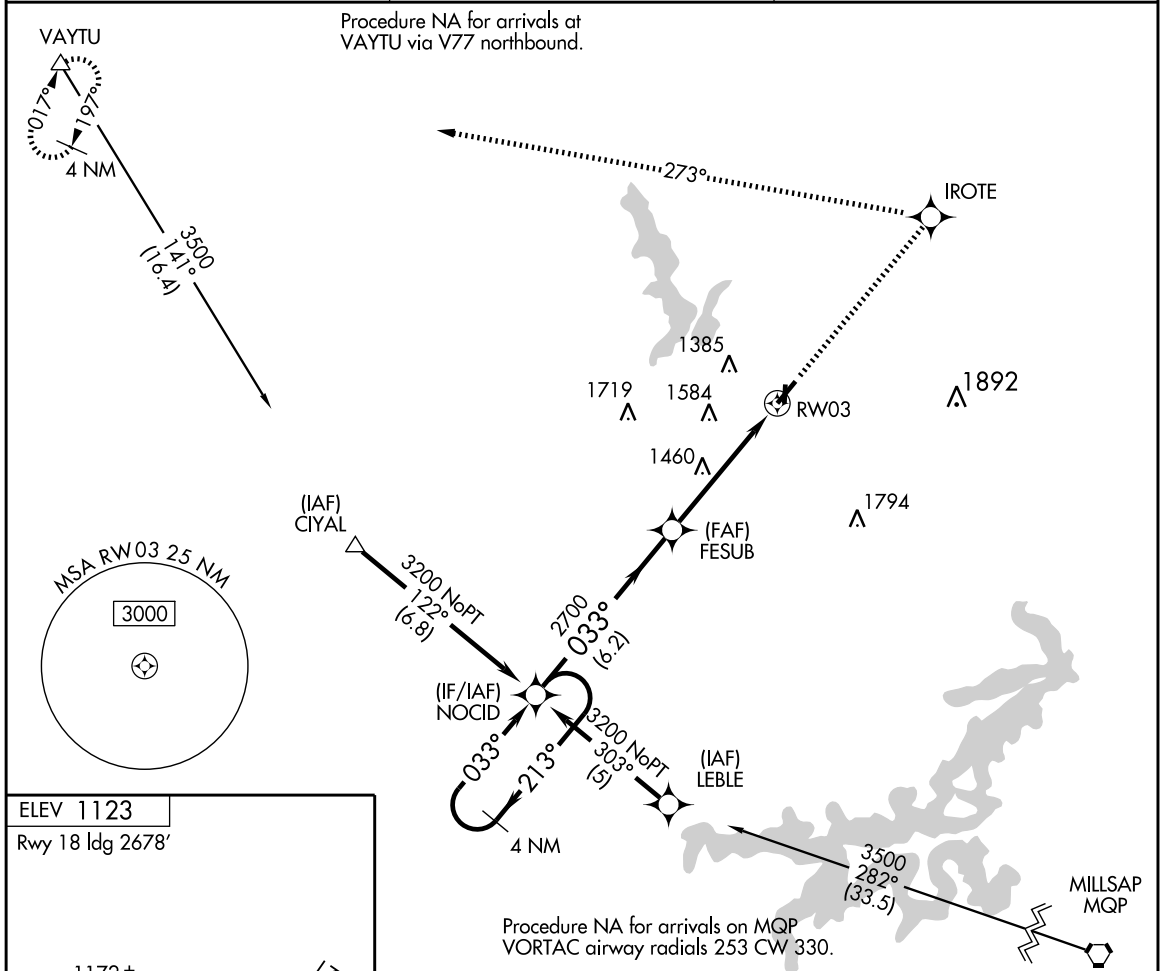
RNAV (GPS) RWY 3

GRAHAM MUNI (RPH)

APP CRS 033°	Rwy ldg 5000
	TDZE 1116
	Apt Elev 1123

▼ When local altimeter setting not received, use Mineral Wells altimeter setting and increase all MDAs 100 feet and increase LNAV and circling CAT B visibility ¼ mile.
 ▲ Visibility reduction by helicopters NA. DME/DME RNP-0.3 NA.

AWOS-3 118.025	FORT WORTH CENTER 127.0 360.6	UNICOM 122.975 (CTAF)
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CATEGORY	A	B	C	D
LNAV MDA	1760-1	644 (700-1)	NA	
CIRCLING	1760-1	637 (700-1)	NA	

GRAHAM, TEXAS
Orig 10042

33°07'N-98°33'W

RNAV (GPS) RWY 3

Figure 312. RNAV (GPS) RWY 3 (RPH).

**TAKE-OFF MINIMUMS AND (OBSTACLE) DEPARTURE PROCEDURES**

12096

FORT WORTH, TX (CON'T)**FORT WORTH SPINKS**

TAKE-OFF MINIMUMS: **Rwys 17L, 35R**, NA.
(Environmental)

DEPARTURE PROCEDURE: **Rwy 17R** climb heading
173° to 1200 before turning right.

NOTE: **Rwy 17R**, tree 4909' from departure end of runway,
1556' left of centerline, 60' AGL/830' MSL.

**FORT WORTH NAS JRB (CARSWELL
FLD)(KNFW)**

FORT WORTH, TX 10014

Rwy 17, Cross DER at or above 6' AGL/656' MSL.

TAKE-OFF OBSTACLES: **Rwy 17**, rising terrain up to 670'
MSL, 200'-600' from DER, 500'-560' right of centerline.

GAINESVILLE, TX**GAINESVILLE MUNI (GLE)**

ORIG 09127 (FAA)

NOTE: **Rwy 17**, trees and poles beginning 1' from DER,
472' right and left of centerline, up to 25' AGL/819' MSL.

Rwy 30, taxiways beginning 651' from DER, crossing
centerline left to right 859' MSL. Trees and terrain
beginning 2' from DER, 14' left and right of centerline, up
to 64' AGL/890' MSL. **Rwy 35**, terrain, trees, poles, road,
and vehicle beginning 149' from DER, 51' left of
centerline, up to 95' AGL/940' MSL. Terrain and poles
beginning 13' from DER, 85' right of centerline, up to 37'
AGL/882' MSL.

GILMER, TX**FOX STEPHENS FIELD-GILMER MUNI (JXJ)**

ORIG 11293 (FAA)

DEPARTURE PROCEDURE: **Rwy 18**, climb heading 177°
to 1000 before turning left.

NOTE: **Rwy 18**, trees beginning abeam the DER left and
right of centerline, up to 100' AGL/500' MSL. **Rwy 36**,
trees beginning abeam the DER left and right of
centerline, up to 50' AGL/505' MSL.

GLADEWATER, TX**GLADEWATER MUNI (07F)**

AMDT 1 11153 (FAA)

TAKE-OFF MINIMUMS: **Rwy 17**, 300-1¼ or std. w/min.
climb of 285' per NM to 600. **Rwy 32**, 300-1. **Rwy 35**,
Std. w/min. climb of 280' per NM to 1300 or 1100-2 ½
for climb in visual conditions.

DEPARTURE PROCEDURE: **Rwy 32**, climb heading
320° to 1100 before turning right. **Rwy 35**, for climb in
visual conditions cross Gladewater Municipal Airport at
or above 1200 before proceeding on course.

NOTE: **Rwy 14**, vehicles on roadway beginning 450' from
DER, left and right of centerline, up to 17' AGL/311'
MSL. Trees beginning 770' from DER, left and right of
centerline, up to 100' AGL/394' MSL. Power lines 3524'
from DER, left to right of centerline, 150' AGL/420'
MSL. **Rwy 17**, vehicles on roadway beginning 212' from
DER, left and right of centerline, up to 17' AGL/311'
MSL. Trees beginning 624' from DER, left and right of
centerline, up to 100' AGL/509' MSL. Power lines 1807'
from DER, left to right of centerline, 150' AGL/439'
MSL. **Rwy 32**, trees beginning 12' from DER, left and
right of centerline, up to 100' AGL/429' MSL. **Rwy 35**,
trees beginning 47' from DER, left and right of
centerline, up to 100' AGL/429' MSL. Power lines 1.4
NM from DER, 844' right of centerline, 75' AGL/520'
MSL.

12096

**TAKE-OFF MINIMUMS AND (OBSTACLE) DEPARTURE PROCEDURES****GRAFORD, TX****POSSUM KINGDOM (F35)**

ORIG-A 10154 (FAA)

TAKE-OFF MINIMUMS: **Rwy 20**, 400-2½ or std. w/a
min. climb of 212' per NM to 1500 or alternatively, with
standard takeoff minimums and a normal 200' per NM
climb gradient, takeoff must occur no later than 1600'
prior to DER.

DEPARTURE PROCEDURE: **Rwy 20**, climb heading
204° to 1500 before turning left.

NOTE: **Rwy 2**, trees beginning 31' from DER, 22' left of
centerline, up to 100' AGL/1099' MSL. Trees beginning
1023' from DER, 114' right of centerline, up to 100'
AGL/1129' MSL. **Rwy 20**, vehicle on roadway 116' from
DER, 498' right of centerline, 15' AGL/1024' MSL.
Trees beginning 494' from DER, 126' right of
centerline, up to 100' AGL/1109' MSL. Trees beginning
977' from DER, 115' left of centerline, up to 100' AGL/
1109' MSL. Trees beginning 2.29 miles from DER,
1679' left of centerline, up to 100' AGL/1329' MSL.

GRAHAM, TX**GRAHAM MUNI**

DEPARTURE PROCEDURE: **Rwys 17, 21**, climb
runway heading to 2000 before proceeding on course.

NOTE: **Rwy 17**, light pole 21' from departure end of
runway, 195' left of centerline, 30' AGL/1141' MSL.
Light pole 86' from departure end of runway, 381' left of
centerline, 50' AGL/1168' MSL.

GRANBURY, TX**GRANBURY RGNL (GDJ)**

AMDT 2 11125 (FAA)

TAKE-OFF MINIMUMS: **Rwy 14**, 300-1.

DEPARTURE PROCEDURE: **Rwy 14**, climb heading
144° to 1700 before turning right.

NOTE: **Rwy 14**, vehicles on road beginning 1020' from
DER, on centerline, 15' AGL/814' MSL. Trees and
power poles beginning at DER, 75' right of centerline,
up to 100' AGL/879' MSL. Trees, power poles, light
poles and vehicles on road beginning at DER, 251' left
of centerline, up to 100' AGL/899' MSL. **Rwy 32**, train
on railroad tracks, transmission poles and tree
beginning 339' from DER, 107' right of centerline,
76' AGL/845' MSL. Trees, vehicles on road and bush
beginning 14' from DER, 198' left of centerline, up to
46' AGL/815' MSL.

GRAND PRAIRIE, TX**GRAND PRAIRIE MUNI (GPM)**

AMDT 4 09295 (FAA)

DEPARTURE PROCEDURE: **Rwy 17**, climbing right
turn to 2000 via heading 200° and TTT R-180 to NINAE/
TTT 24 DME before proceeding on course. DME
Required. **Rwy 35**, climb heading 356° to 1400 before
turning south.

NOTE: **Rwy 17**, antenna 190' from DER, 456' right of
centerline, 26' AGL/615' MSL. Road, multiple poles and
signs beginning 570' from DER, 410' right of
centerline, up to 31' AGL/620' MSL. Tree 1506' from
DER, 517' right of centerline, 37' AGL/617' MSL.
Rwy 35, tree 837' from DER, 204' left of centerline, up
to 100' AGL/665' MSL. Pole 2687' from DER, 122' left of
centerline, up to 75' AGL/653' MSL.

Figure 314. Takeoff Minimums and (Obstacle) Departure Procedures.

Appendix 2

PROVO, UTAH

AL-683 (FAA)

12040

LOC/DME I-PVU 110.3 Chan 40	APP CRS 134°	Rwy Idg THRE Apt Elev 8599 4497 4497
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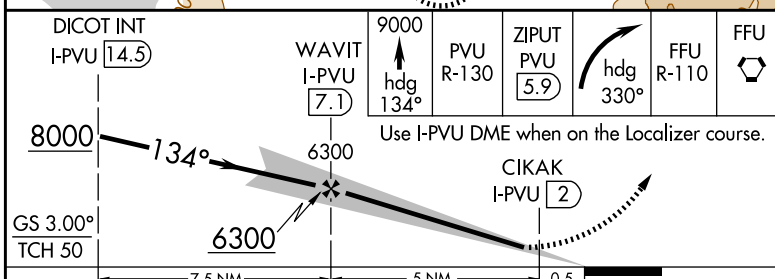
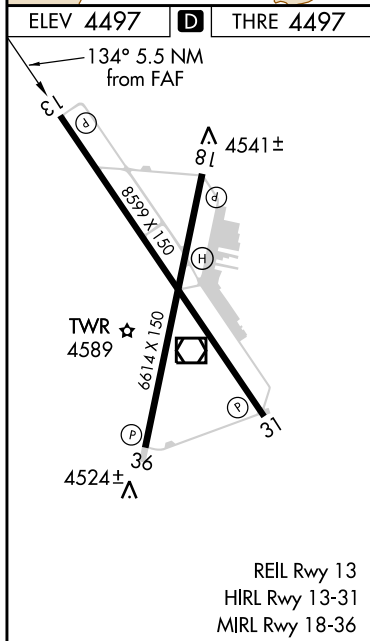
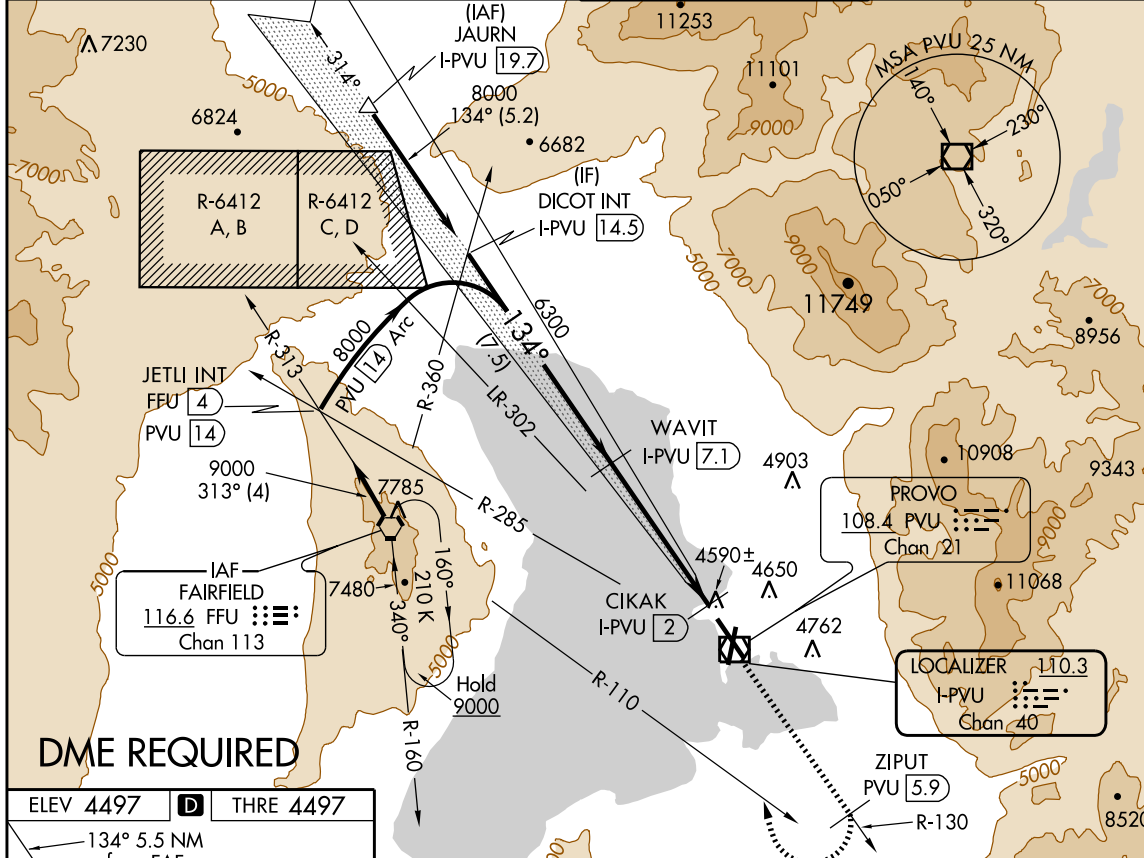
ILS or LOC/DME RWY 13

PROVO MUNI (PVU)

⚠ Circling NA east of Rwy 18 and 31.
⚠ *Missed approach requires minimum climb of 315 feet per NM to 8600.

MISSED APPROACH: Climb to 9000 on heading 134° to intercept PVU VOR/DME R-130 to ZIPUT/PVU 5.9 DME then climbing right turn on heading 330° and on FFU VORTAC R-110 to FFU VORTAC and hold.

ATIS 135.175	SALT LAKE CITY APP CON 124.3 322.3	PROVO TOWER 125.3 (CTAF)	GND CON 119.4
------------------------	--	------------------------------------	-------------------------



CATEGORY	A	B	C	D
S-ILS 13*	4697-¾ 200 (200-¾)			
S-LOC 13*	4820-1 323 (400-1)			
CIRCLING*	4940-1 443 (500-1)	4960-1 463 (500-1)	4980-1½ 483 (500-1½)	5060-2 563 (600-2)
S-ILS 13	4947-1½ 450 (500-1½)			
S-LOC 13	5100-1	603 (700-1)	5100-1¾	603 (700-1¾)
CIRCLING	5100-1	603 (700-1)	5100-1¾ 603 (700-1¾)	5100-2 603 (700-2)

PROVO, UTAH

PROVO MUNI (PVU)

Amdt 2 15DEC11

40°13'N-111°43'W

ILS or LOC/DME RWY 13

Figure 316. ILS or LOC/DME RWY 13 (PVU).

(PROVO4.FFU) 09239

SL-683 (FAA)

PROVO MUNI (PVU)
PROVO, UTAH

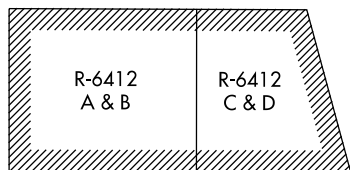
PROVO FOUR DEPARTURE (OBSTACLE)

ATIS 135.175
GND CON 119.4
PROVO TOWER ★
125.3 (CTAF)
SALT LAKE CITY DEP CON
118.85

TAKE-OFF MINIMUMS

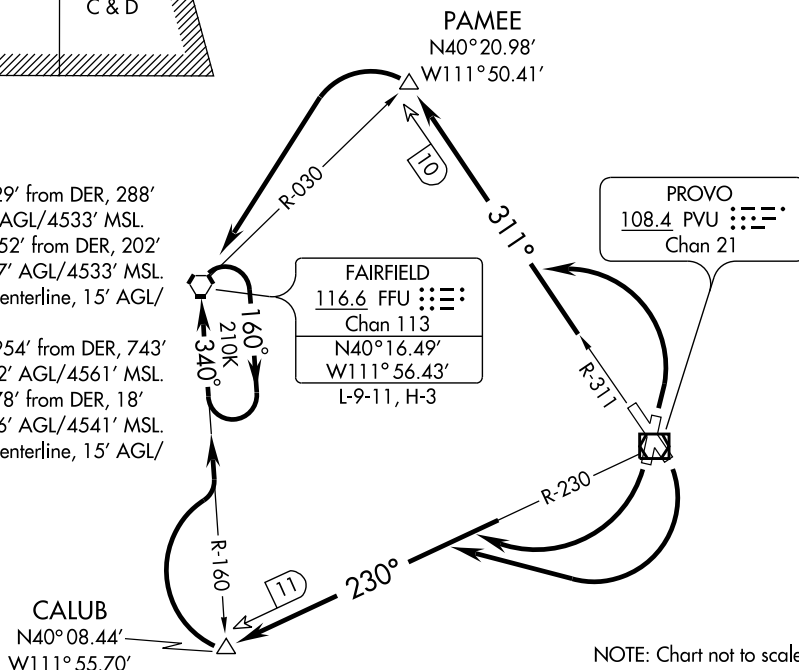
- Rwy 13: Standard with a minimum climb of 400' per NM to 9000, or 3100-3 for climb in visual conditions.
- Rwy 18: Standard with a minimum climb of 350' per NM to 9000, or 3100-3 for climb in visual conditions.
- Rwy 31: Standard with a minimum climb of 380' per NM to 9000, or 3100-3 for climb in visual conditions.
- Rwy 36: Standard with a minimum climb of 365' per NM to 9000, or 3100-3 for climb in visual conditions.

NOTE: Climb in visual conditions NA at night.



TAKE-OFF OBSTACLE NOTES

- Rwy 18: Multiple trees beginning 429' from DER, 288' left of centerline, up to 57' AGL/4533' MSL.
Multiple trees beginning 852' from DER, 202' right of centerline, up to 57' AGL/4533' MSL.
Road 775' from DER, on centerline, 15' AGL/4518' MSL.
- Rwy 31: Multiple trees beginning 1954' from DER, 743' right of centerline, up to 72' AGL/4561' MSL.
- Rwy 36: Multiple trees beginning 978' from DER, 18' right of centerline, up to 46' AGL/4541' MSL.
Road 210' from DER, on centerline, 15' AGL/4516' MSL.



DEPARTURE ROUTE DESCRIPTION

TAKE-OFF RUNWAYS 13, 18: Climbing right turn to 9000 via PVU VOR/DME R-230 to CALUB INT/PVU 11 DME and a right turn via FFU VORTAC R-160 to FFU VORTAC and hold. Thence... or climb in visual conditions to cross Provo Muni Airport southwest bound at or above 7400, climb to 9000 via PVU R-230 to CALUB INT/PVU 11 DME and right turn via FFU R-160 to FFU VORTAC and hold. Thence...

TAKE-OFF RUNWAY 31: Climb to 9000 via PVU VOR/DME R-311 to PAMEE INT/PVU 10 DME and left turn direct FFU VORTAC and hold. Thence... or climb in visual conditions to cross Provo Muni Airport northwest bound at or above 7400, climb to 9000 via PVU R-311 to PAMEE INT/PVU 10 DME and left turn direct FFU VORTAC and hold. Thence...

TAKE-OFF RUNWAY 36: Climbing left turn to 9000 via PVU VOR/DME R-311 to PAMEE INT/PVU 10 DME and left turn direct FFU VORTAC and hold. Thence... or climb in visual conditions to cross Provo Muni Airport northwest bound at or above 7400, climb to 9000 via PVU R-311 to PAMEE INT/PVU 10 DME, and left turn direct FFU VORTAC and hold. Thence...

...Expect clearance for filed route and altitude within 10 minutes after departure.

PROVO FOUR DEPARTURE (OBSTACLE)

PROVO, UTAH
PROVO MUNI (PVU)

(PROVO4.FFU) 09239

Figure 317. PROVO FOUR Departure (Obstacle) (PROVO4.FFU) (PVU).

Appendix 2

SALT LAKE CITY, UTAH

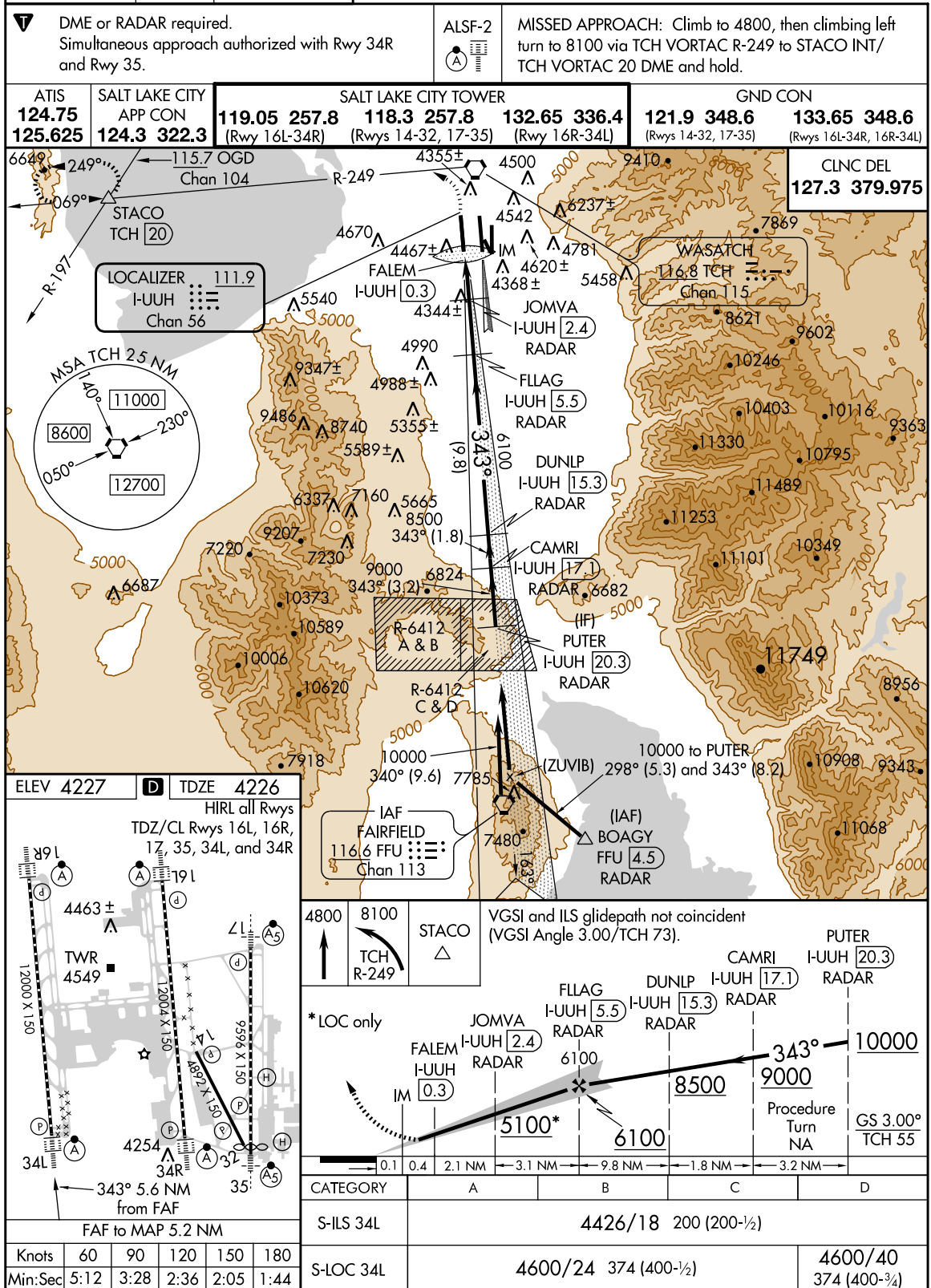
AL-365 (FAA)

12096

LOC/DME I-UUH 111.9 Chan 56	APP CRS 343°	Rwy Idg TDZE 4226 Apt Elev 4227
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ILS or LOC RWY 34L

SALT LAKE CITY INTL (SLC)



SALT LAKE CITY, UTAH
Amdt 2A 08MAR12

40°47'N-111°59'W

SALT LAKE CITY INTL (SLC)

ILS or LOC RWY 34L

Figure 318. ILS or LOC RWY 34L (SLC).

(SAYGE.SAYGE7) 12096

SAYGE SEVEN ARRIVAL

ST-9077 (FAA)

DENVER, COLORADO

ARRIVAL ROUTE DESCRIPTION

GOODLAND TRANSITION (GLD.SAYGE7): From over GLD VORTAC via GLD R-306 and FQF R-038 to SAYGE INT. Thence....

HAYES CENTER TRANSITION (HCT.SAYGE7): From over HCT VORTAC via HCT R-266 and FQF R-038 to SAYGE INT. Thence....

NORTH PLATTE TRANSITION (LBF.SAYGE7): From over LBF VORTAC via LBF R-247 and FQF R-038 to SAYGE INT. Thence....

SIDNEY TRANSITION (SNY.SAYGE7): 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 FQF VORTAC. Expect RADAR vectors to the final approach course at or before FQF VORTAC.

SAYGE SEVEN ARRIVAL

DENVER, COLORADO

(SAYGE.SAYGE7) 12096

Figure 320. SAYGE SEVEN Arrival (SAYGE.SAYGE7).

EAGLE, COLORADO

AL-6403 (FAA)

RNAV (GPS) -D

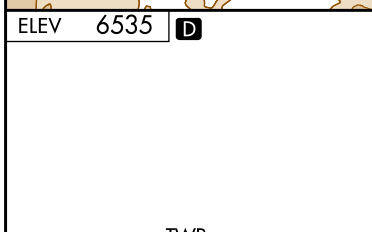
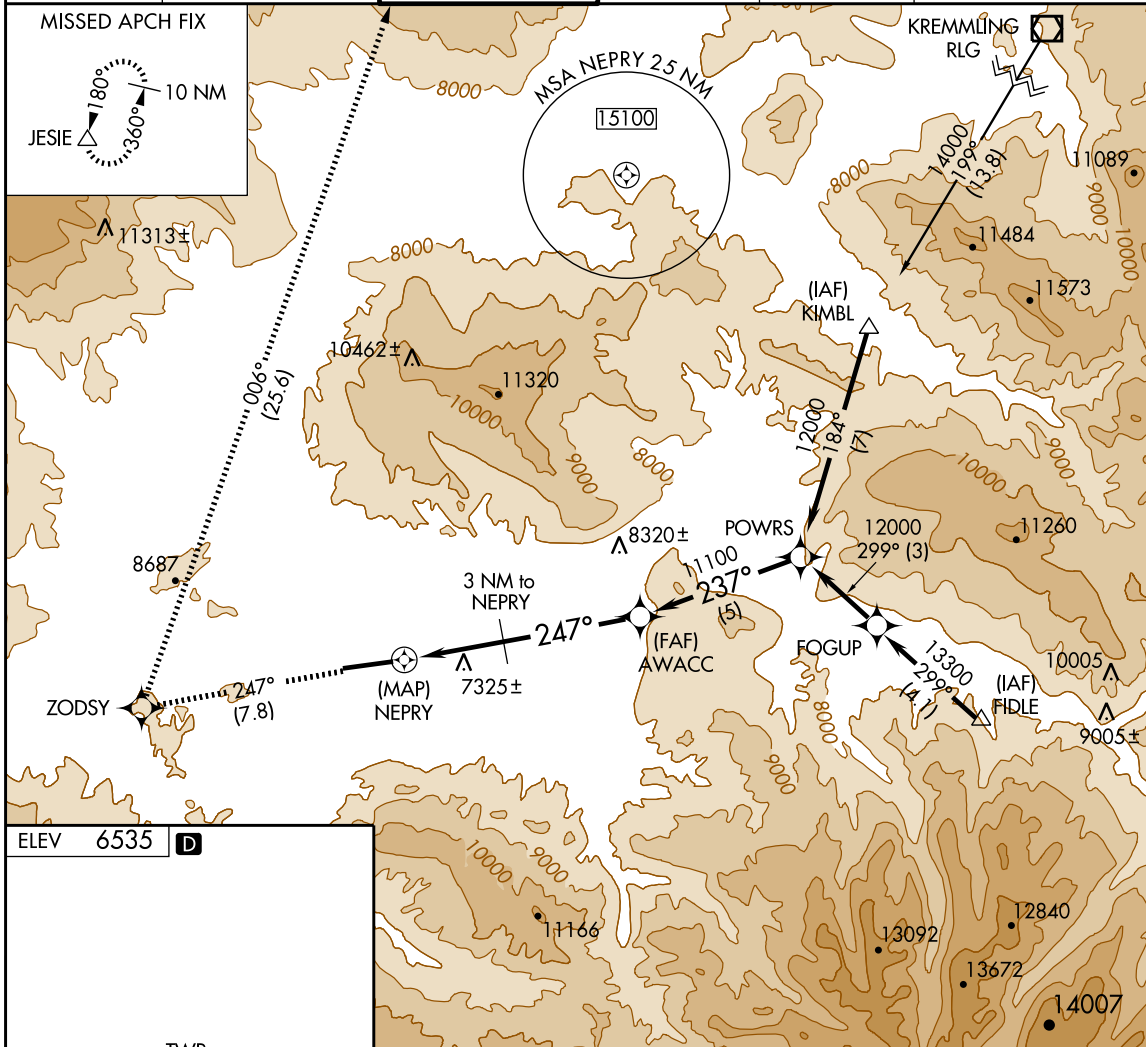
EAGLE COUNTY RGNL (EGE)

APP CRS 247°	Rwy Idg TDZE Apt Elev	N/A N/A 6535
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▽ GPS or RNP-0.3 required. DME/DME RNP-0.3 NA.
▲NA Circling south of Rwy 7-25 not authorized for Cat. C and D at night.

MISSED APPROACH: Climb to 14500 via 247° course to ZODSY WP, then via 006° course to JESIE WP and hold.

ATIS 135.575	DENVER CENTER 128.65 282.2	EAGLE TOWER ★ 119.8 (CTAF) Ⓛ	GND CON 121.8	CLNC DEL 124.75	DENVER CLNC DEL 124.75 (When tower closed)
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ELEV 6535 D	<table border="1"> <tr> <td>14500</td> <td>ZODSY</td> <td>JESIE</td> </tr> <tr> <td>↑</td> <td>✧</td> <td>△</td> </tr> <tr> <td>247° crs</td> <td>006° crs</td> <td></td> </tr> </table>		14500	ZODSY	JESIE	↑	✧	△	247° crs	006° crs		<table border="1"> <tr> <td>AWACC</td> <td>POWRS</td> </tr> <tr> <td>11100</td> <td>12000</td> </tr> <tr> <td>Procedure Turn NA</td> <td></td> </tr> </table>		AWACC	POWRS	11100	12000	Procedure Turn NA	
14500	ZODSY	JESIE																	
↑	✧	△																	
247° crs	006° crs																		
AWACC	POWRS																		
11100	12000																		
Procedure Turn NA																			
CATEGORY	A	B	C	D															
CIRCLING	8900-1¼ 2365 (2400-1¼)	8900-1½ 2365 (2400-1½)	8900-3 2365 (2400-3)																

EAGLE, COLORADO
 Orig 11293

39°39'N-106°55'W

EAGLE COUNTY RGNL (EGE)

RNAV (GPS) -D

Figure 321. RNAV (GPS) -D (EGE).

Appendix 2

EAGLE, COLORADO

AL-6403 (FAA)

LDA/DME RWY 25
EAGLE COUNTY RGNL (EGE)

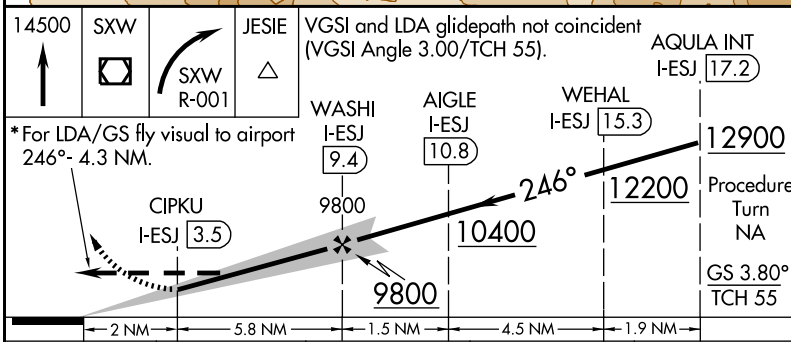
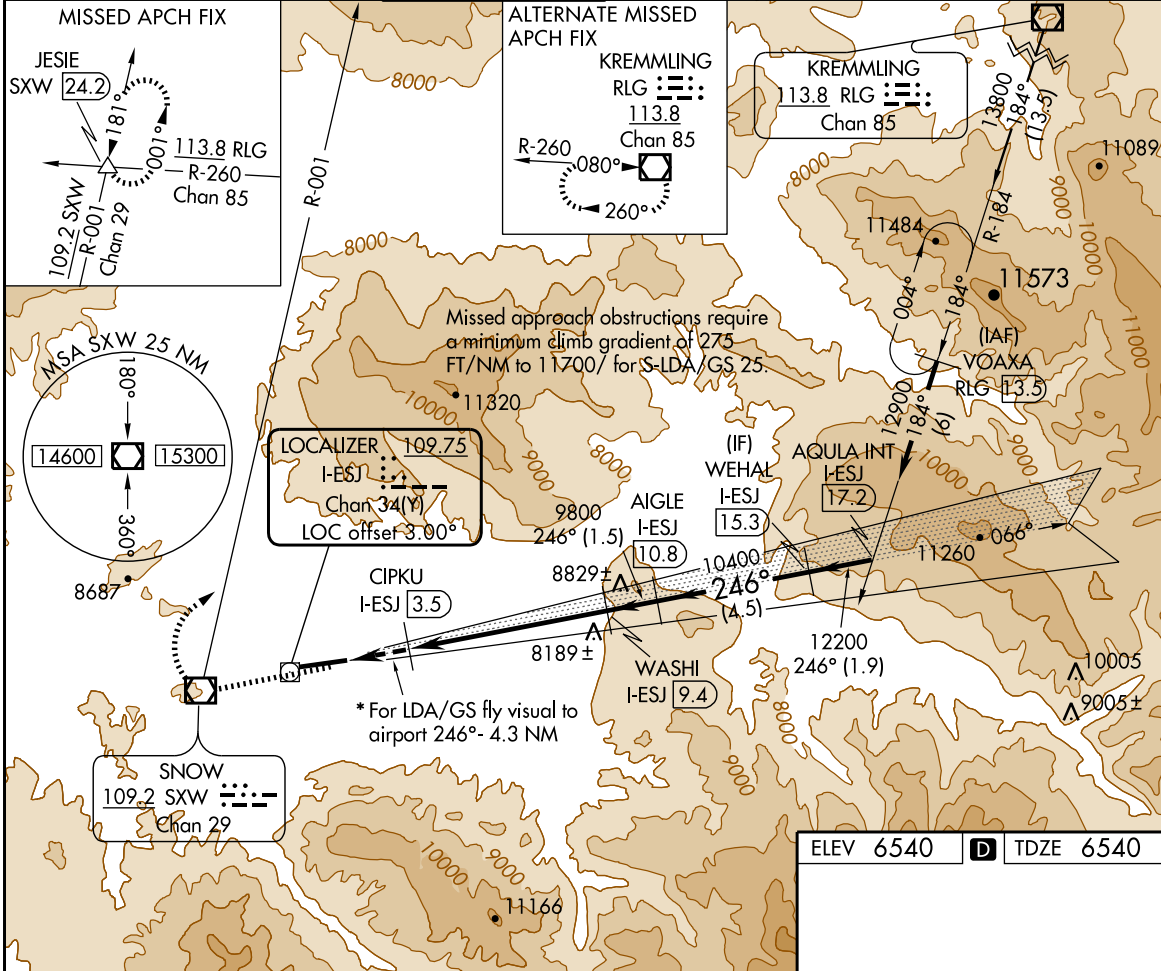
LOC/DME I-ESJ 109.75 Chan 34 (Y)	APP CRS 246°	Rwy ldg TDZE Apt Elev 8000 6540 6540
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▼ Inoperative table does not apply.
▲ At night increase LDA/GS visibility to 5 miles.
* Fly visual to airport authorized during day only.



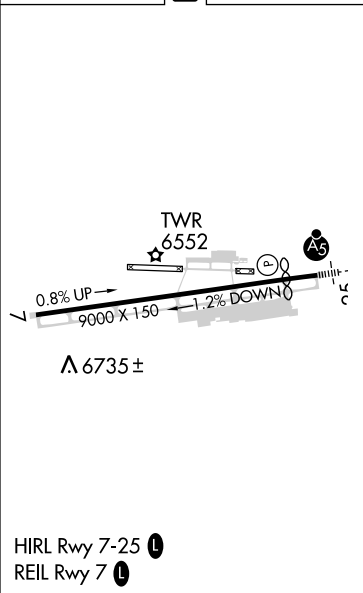
MISSED APPROACH: Climb to 14500 direct SXW
VOR/DME and climbing right turn via SXW R-001
to JESIE INT/SXW 24.2 DME and hold.

ATIS 135.575	DENVER CENTER 128.65 282.2	EAGLE TOWER★ 119.8 (CTAF) 0	GND CON 121.8	CLNC DEL 124.75	DENVER CLNC DEL 124.75 (When tower closed)
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CATEGORY	A	B	C	D
S-LDA/GS 25	8330-3	1790 (1800-3)		NA
S-LDA 25	8620-2½	2080 (2100-2½)	2080 (2100-3)	NA

ELEV 6540	D	TDZE 6540
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EAGLE, COLORADO
Orig-C 11293

39°39'N-106°55'W

EAGLE COUNTY RGNL (EGE)
LDA/DME RWY 25

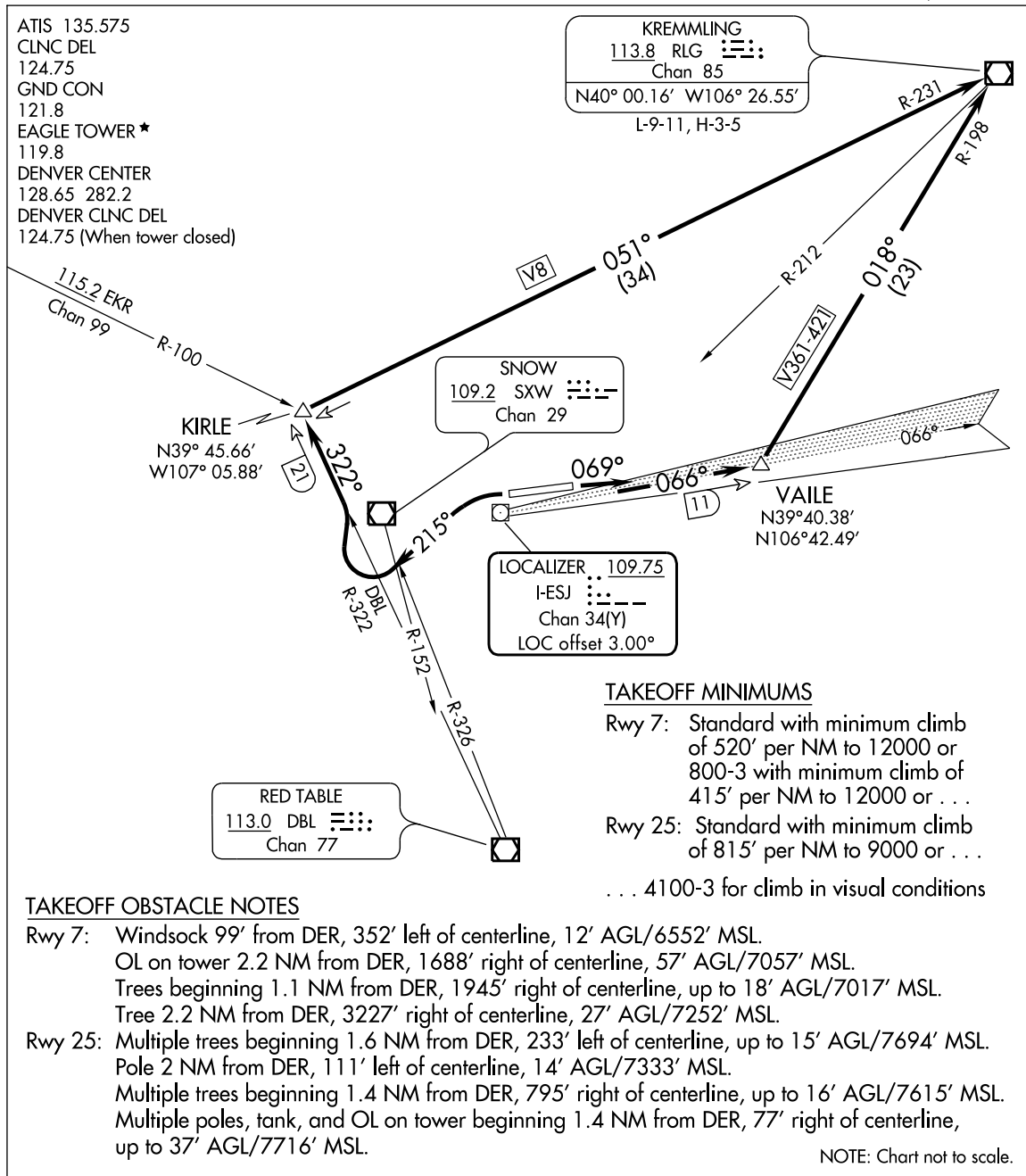
Figure 322. LDA/DME RWY 25 (EGE).

(GYPSM4.RLG) 12096

SL-6403 (FAA)

EAGLE COUNTY RGNL (EGE)
EAGLE, COLORADO

GYPSUM FOUR DEPARTURE (OBSTACLE)



TAKEOFF OBSTACLE NOTES

Rwy 7: Windsock 99' from DER, 352' left of centerline, 12' AGL/6552' MSL.
OL on tower 2.2 NM from DER, 1688' right of centerline, 57' AGL/7057' MSL.
Trees beginning 1.1 NM from DER, 1945' right of centerline, up to 18' AGL/7017' MSL.
Tree 2.2 NM from DER, 3227' right of centerline, 27' AGL/7252' MSL.

Rwy 25: Multiple trees beginning 1.6 NM from DER, 233' left of centerline, up to 15' AGL/7694' MSL.
Pole 2 NM from DER, 111' left of centerline, 14' AGL/7333' MSL.
Multiple trees beginning 1.4 NM from DER, 795' right of centerline, up to 16' AGL/7615' MSL.
Multiple poles, tank, and OL on tower beginning 1.4 NM from DER, 77' right of centerline, up to 37' AGL/7716' MSL.

DEPARTURE ROUTE DESCRIPTION

TAKEOFF RUNWAY 7: Climb heading 069° and I-ESJ northeast course to VAILE INT/I-ESJ 11 DME then turn left via RLG R-198 to RLG VOR/DME or . . .

TAKEOFF RUNWAY 25: Climbing left turn heading 215°, upon crossing SXW R-152 or DBL R-326 turn right via DBL R-322 to KIRLE INT/DBL 21 DME then turn right via RLG R-231 to RLG VOR/DME or . . .

. . . Climb in visual conditions to cross Eagle County Rgnl Airport northeast bound at or above 10500, then via RLG R-212 to RLG VOR/DME.

GYPSUM FOUR DEPARTURE (OBSTACLE)

EAGLE, COLORADO
EAGLE COUNTY RGNL (EGE)

(GYPSM4.RLG) 12096

Figure 323. GYPSUM FOUR Departure (Obstacle) (EGE).

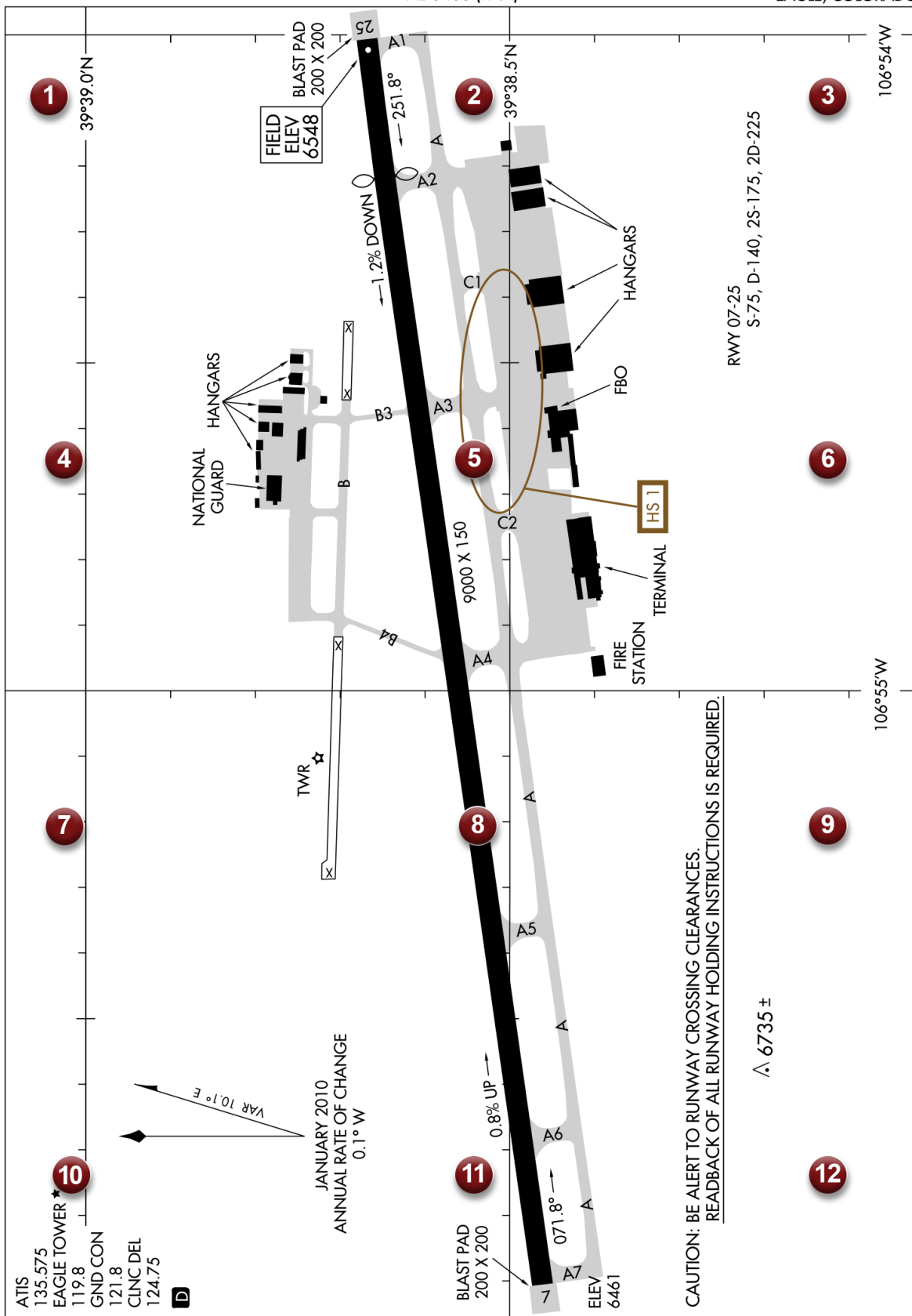
12096

AIRPORT DIAGRAM

AL-6403 (FAA)

EAGLE COUNTY RGNL (EGE)

EAGLE, COLORADO



AIRPORT DIAGRAM

EAGLE, COLORADO

EAGLE COUNTY RGNL (EGE)

12096

Figure 325. Airport Diagram (EGE).

GUNNISON, COLORADO

AL-517 (FAA)


10266

LOC/DME I-GUC 110.5 Chan 42	APP CRS 062°	Rwy Idg TDZE Apt Elev	9400 7667 7680
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
ILS or LOC RWY 6

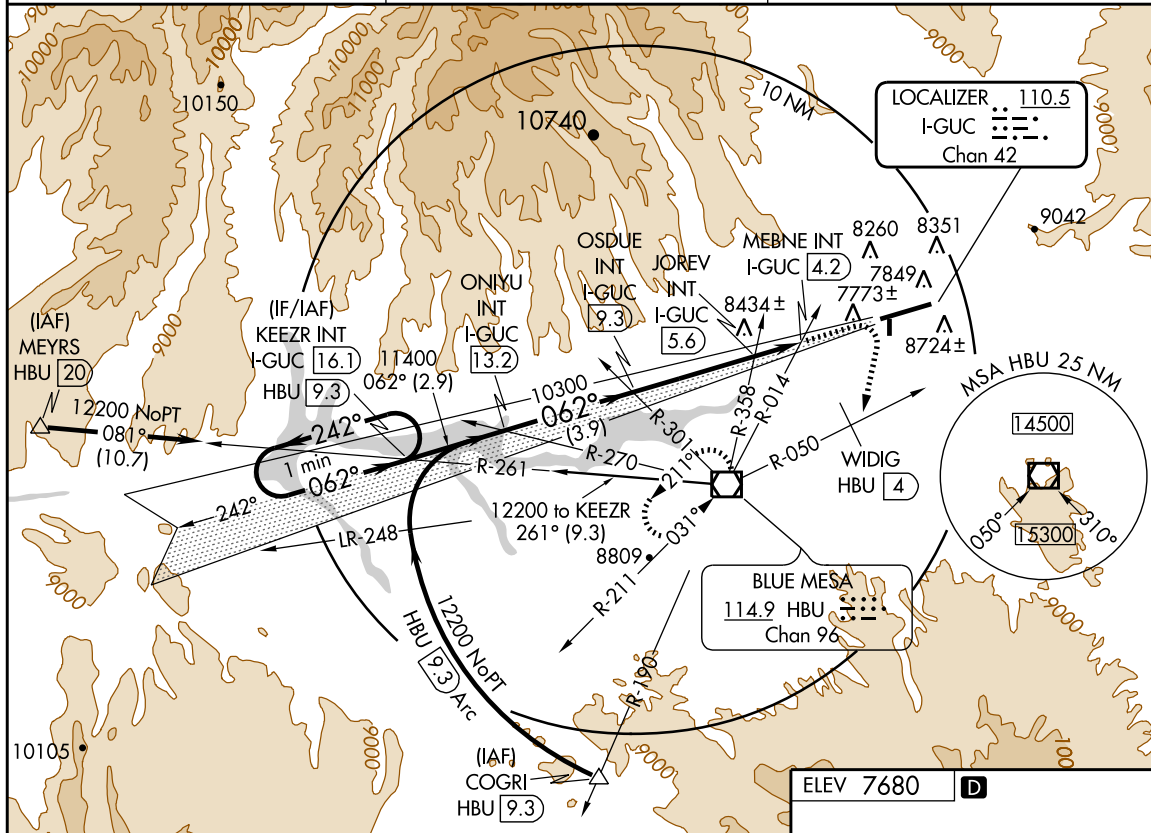
GUNNISON-CRESTED BUTTE RGNL (GUC)

⚠ Circling NA at night. Inoperative table does not apply.
⚠ When local altimeter setting not received, procedure NA.
 DME required. Visibility reduction by helicopters NA.
 Procedure NA when airport closed except by prior arrangement.

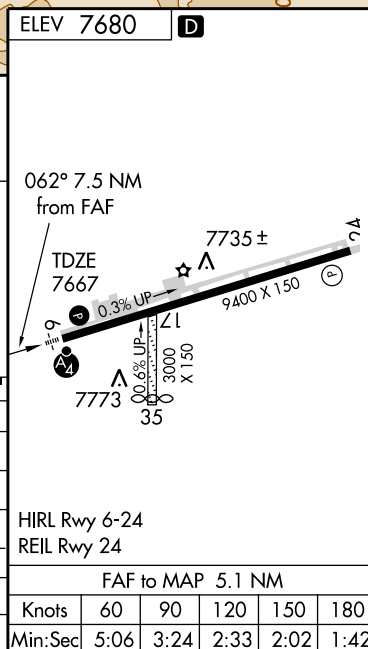
MALSF


MISSED APPROACH: Climb to 10000 then climbing right turn to 12000 via heading 180° and HBU VOR/DME R-050 to WIDIG/HBU 4 DME continue via HBU VOR/DME R-050 to HBU VOR/DME and hold.

AWOS-3 135.075	DENVER CENTER 125.35 354.05	UNICOM 122.7 (CTAF) 
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	KEEZR INT I-GUC 16.1	ONIYU INT I-GUC 13.2	OSDUE INT I-GUC 9.3	JOREV INT I-GUC 5.6	MEBNE INT I-GUC 4.2	WIDIG HBU 4
One Minute Holding Pattern						
12200	← 242°	→ 062°	11400	10300	*9020	
GS 3.20°						
TCH 49						
CATEGORY	A	B	C	D		
S-ILS 6	8590-3 923 (1000-3)			NA		
S-LOC 6	9020-3 1353 (1400-3)					
CIRCLING	9260-3 1580 (1600-3)					
	JOREV FIX MINIMUMS					
S-LOC 6	8640-3 973 (1000-3)					
CIRCLING	9260-3 1580 (1600-3)					



GUNNISON, COLORADO
 Amdt 5 22OCT09

38°32'N-106°56'W

GUNNISON-CRESTED BUTTE RGNL (GUC) ILS or LOC RWY 6

Figure 327. ILS or LOC RWY 6 (GUC).

APP CRS	Rwy Idg	9400
242°	TDZE	7680
	Apt Elev	7680

RNAV (RNP) RWY 24

GUNNISON-CRESTED BUTTE RGNL (GUC)

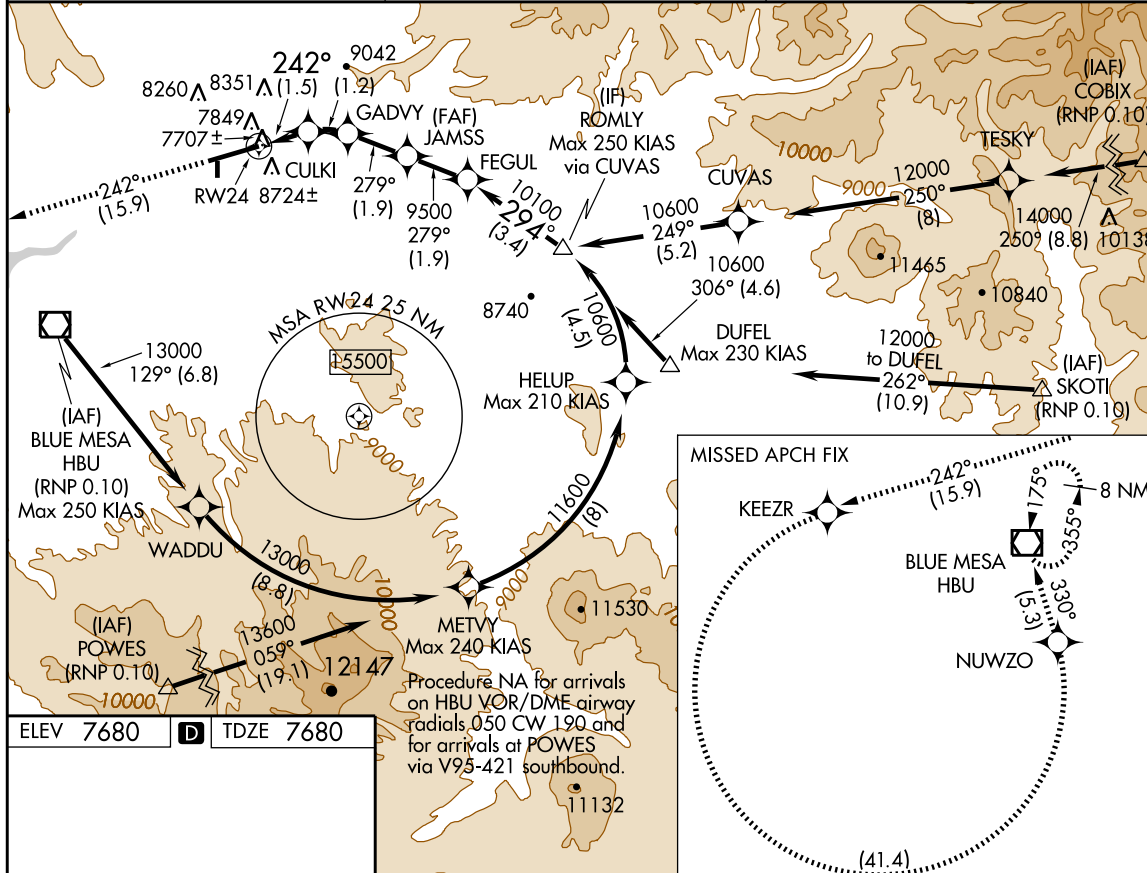
RF and GPS required.
 When local altimeter setting not received, procedure NA.
 Procedure NA for aircraft with wingspan greater than 136 feet.
 For uncompensated Baro-VNAV systems, procedure NA below -29°C (-20°F) or above 24°C (75°F).
 When VGSI inoperative, procedure NA at night.
 Missed approach requires minimum climb of 425 feet per NM to 9000.

MISSED APPROACH: Climb to 14000 on track 242° to KEEZR, and left turn to NUWZO, and on track 330° to HBU VOR/DME and hold.

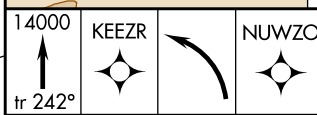
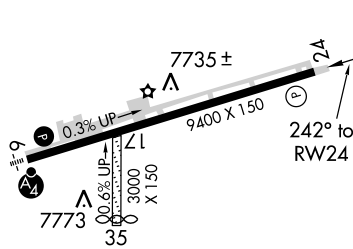
AWOS-3
135.075

DENVER CENTER
125.35 354.05

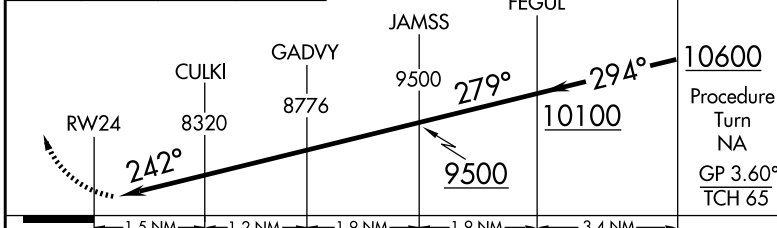
UNICOM
122.7 (CTAF)



ELEV 7680 **D** TDZE 7680



VGSI and RNAV glidepath not coincident (VGSI Angle 3.10/TCH 50).



CATEGORY	A	B	C	D
RNP 0.10 DA	7989-1 309 (400-1)			NA

AUTHORIZATION REQUIRED

GUNNISON, COLORADO
Orig-A 30JUN11

GUNNISON-CRESTED BUTTE RGNL (GUC)
38°32'N-106°56'W

GUNNISON-CRESTED BUTTE RGNL (GUC)
RNAV (RNP) RWY 24

Figure 328. RNAV (RNP) RWY 24 (GUC).

OGDEN, UTAH

AL-297 (FAA)

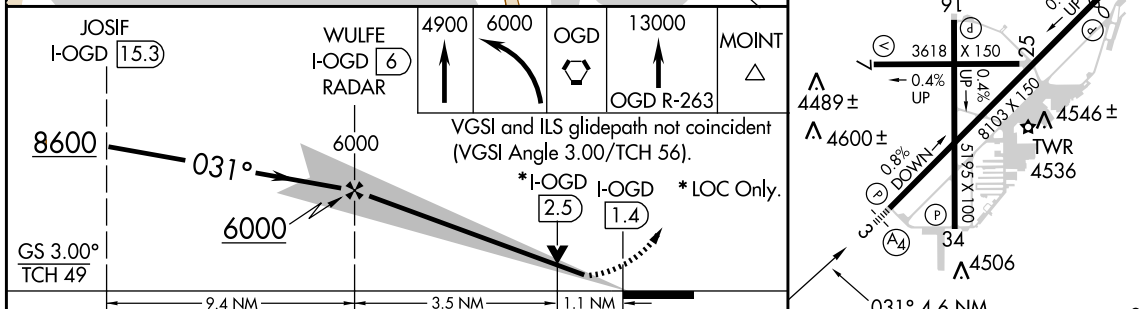
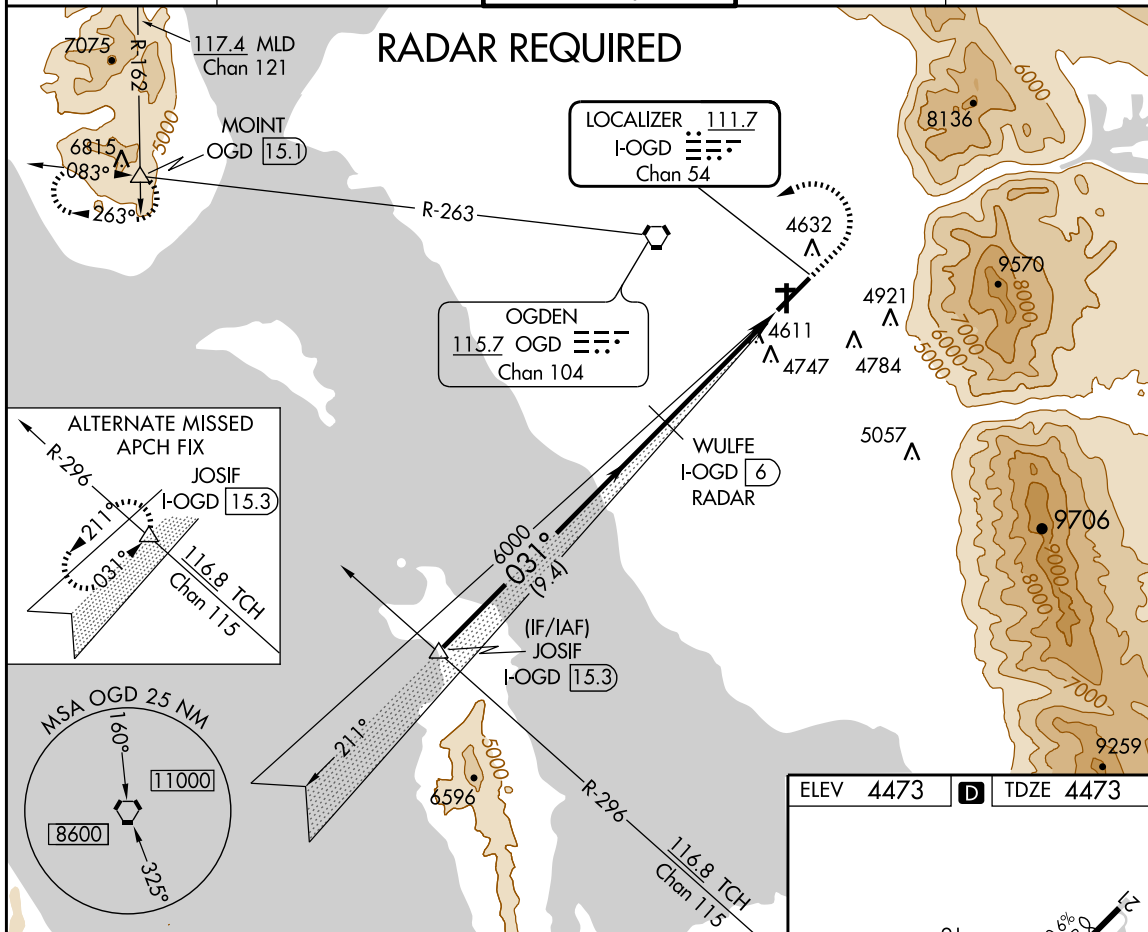
11349

LOC/DME I-OGD 111.7 Chan 54	APP CRS 031°	Rwy Idg TDZE Apt Elev 7252 4473 4473	ILS or LOC RWY 3 OGDEN-HINCKLEY (OGD)	
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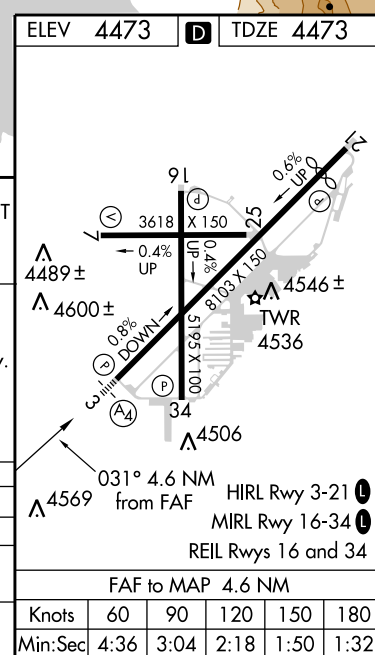
▼ When local altimeter setting not received, use Hill AFB altimeter setting.
▲ When VGSI inoperative, circling Rwy 7 and 16 NA at night. Inoperative table does not apply to S-LOC 3 and Cat C. DME or RADAR required.

MALS MISSED APPROACH: Climb to 4900, then climbing left turn to 6000 direct OGD VORTAC, then climb to 13000 on OGD R-263 to MOINT INT/OGD 15.1 DME and hold, continue climb-in-hold to 13000.

ATIS 125.55	SALT LAKE CITY APP CON 121.1 319.25	OGDEN TOWER* 118.7 (CTAF) 253.5	GND CON 121.7	UNICOM 122.95
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CATEGORY	A	B	C	D
S-ILS 3	4673-1/2 200 (200-1/2)			
S-LOC 3	4880-3/4	407 (500-3/4)	4880-1/4	407 (500-1/4)
CIRCLING	4980-1 507 (600-1)	5060-1 587 (600-1)	5060-1/2 587 (600-1/2)	5100-2 627 (700-2)



OGDEN, UTAH

Amdt 4C 25AUG11

41°12'N-112°01'W

OGDEN-HINCKLEY (OGD)
ILS or LOC RWY 3

Figure 329. ILS or LOC RWY 3 (OGD).

SAN FRANCISCO, CALIFORNIA

AL-375 (FAA)

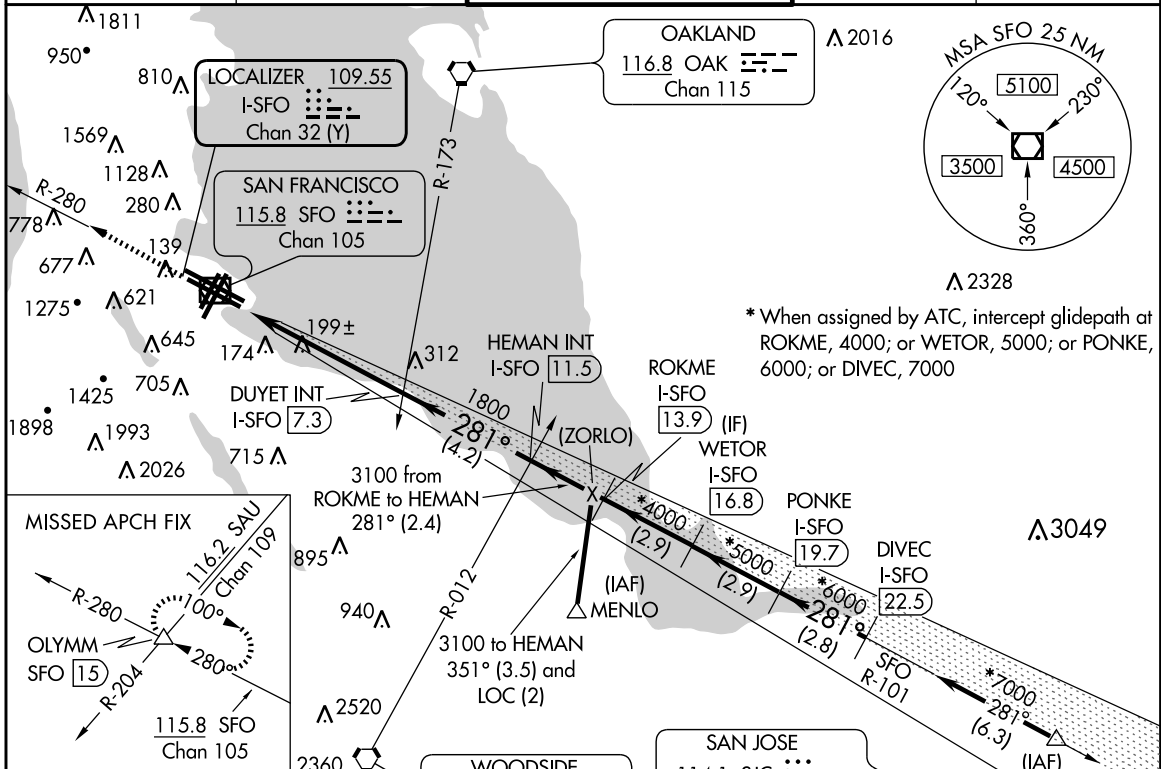
LOC/DME I-SFO 109.55 Chan 32 (Y)	APP CRS 281°	Rwy 28L Idg 10602 TDZE 13 Apt Elev 13	Rwy 28R Idg 11870 TDZE 13 Apt Elev 13	ILS or LOC RWY 28L SAN FRANCISCO INTL (SFO)
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⚠ Inoperative table does not apply to sidestep 28R Cat A and B. Disregard IM and MM indications. #RVR 1800 authorized with the use of FD or AP or HUD to DA.

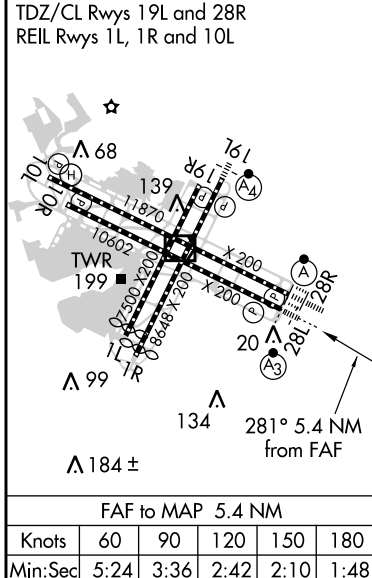
SSALR Rwy 28L ALSF-2 Rwy 28R

MISSED APPROACH: Climb to 600 then climbing right turn to 3000 via heading 285° and SFO VOR/DME R-280 to OLYMM INT 15 DME and hold.

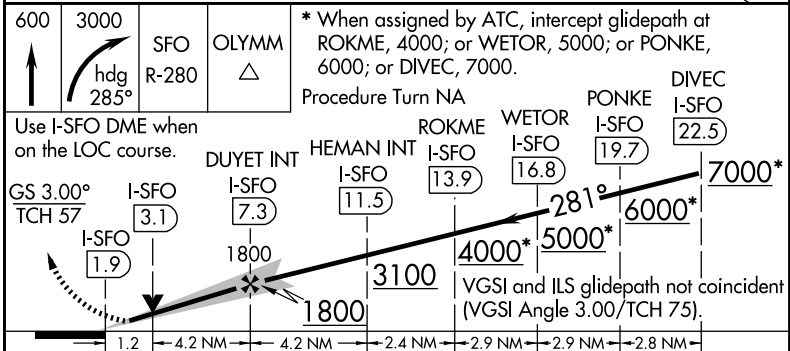
ATIS 113.7 115.8 118.85 135.45	NORCAL APP CON 134.5 338.2	SAN FRANCISCO TOWER 120.5 269.1	GND CON 121.8	CLNC DEL 118.2
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ELEV 13	TDZE 28L 13
HIRL all Rwys	TDZE 28R 13
TDZ/CL Rwys 19L and 28R	
REIL Rwys 1L, 1R and 10L	



600	3000	SFO	OLYMM	* When assigned by ATC, intercept glidepath at ROKME, 4000; or WETOR, 5000; or PONKE, 6000; or DIVEC, 7000.
↑	hdg 285°	R-280	△	Procedure Turn NA



CATEGORY	A	B	C	D
S-ILS 28L	#213/24 200 (200-1/2)			
S-LOC 28L	460/24	447 (500-1/2)	460/40 447 (500-3/4)	460/50 447 (500-1)
SIDESTEP RWY 28R	460/50 447 (500-1)			460-1 1/2 447 (500-1 1/2)
CIRCLING	760-1 747 (800-1)	940-1 1/4 927 (1000-1 1/4)	1040-3 1027 (1100-3)	1160-3 1147 (1200-3)

SAN FRANCISCO, CALIFORNIA
Amdt 22A 11181

SAN FRANCISCO INTL (SFO)
37°37'N-122°22'W
ILS or LOC RWY 28L

Figure 331. ILS or LOC RWY 28L (SFO).


SAN FRANCISCO, CALIFORNIA

AL-375 (FAA)

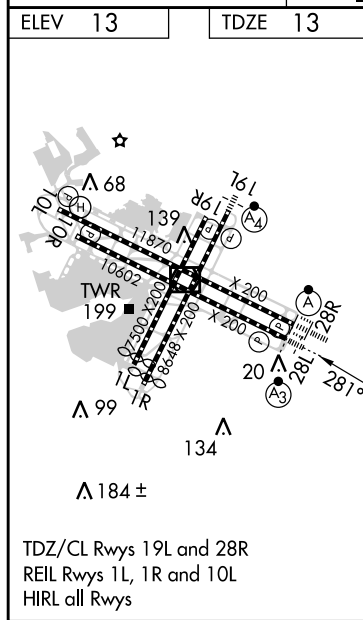
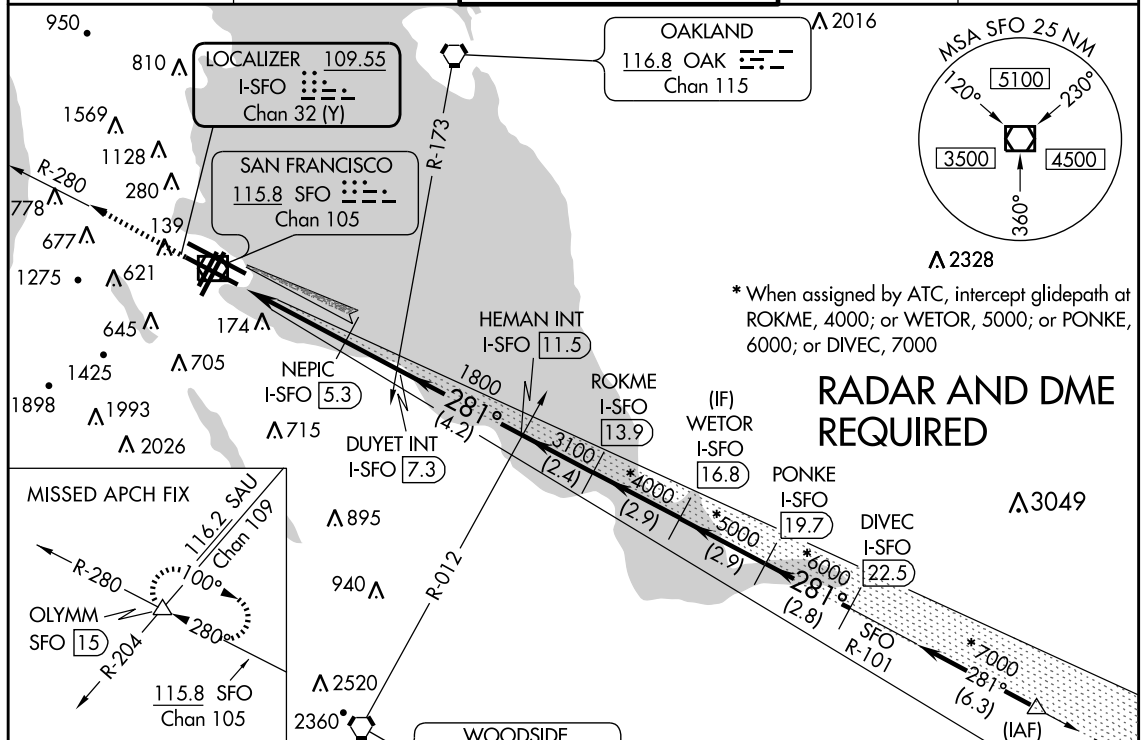
ILS PRM RWY 28L
(SIMULTANEOUS CLOSE PARALLEL)
SAN FRANCISCO INTL (SFO)

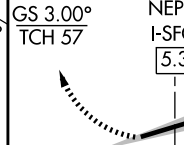
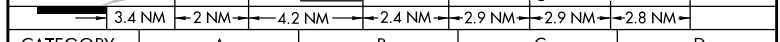
LOC/DME I-SFO 109.55 Chan 32 (Y)	APP CRS 281°	Rwy Idg 10602
		TDZE 13
		Apt Elev 13

Simultaneous close parallel approach authorized with LDA PRM Rwy 28R.
 Localizer only not authorized during close-parallel operations.
 Dual VHF comm required. Disregard IM and MM indications.
 See additional requirements on AAUP.
 Runway 28L and 28R separated by 750' centerline to centerline.

SSALR

 MISSED APPROACH: Climb to 600 then climbing right turn to 3000 via heading 285° and SFO VOR/DME R-280 to OLYMM INT/SFO VOR/DME 15 DME and hold.

ATIS 113.7 115.8 118.85 135.45	NORCAL APP CON 134.5 338.2	SAN FRANCISCO TOWER 120.5 269.1 PRM 125.15	GND CON 121.8	CLNC DEL 118.2
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600	3000	SFO R-280	OLYMM	* When assigned by ATC, intercept glidepath at ROKME, 4000; or WETOR, 5000; or PONKE, 6000; or DIVEC, 7000.		
↑	hdg 285°		△	Procedure Turn NA		
Use I-SFO DME when on the LOC course.				HEMAN INT I-SFO 11.5	ROKME I-SFO 13.9	DIVEC I-SFO 22.5
GS 3.00°	NEPIC I-SFO 5.3	DUYET INT I-SFO 7.3	HEMAN INT I-SFO 11.5	ROKME I-SFO 13.9	WETOR I-SFO 16.8	PONKE I-SFO 19.7
TCH 57			3203	4000*	5000*	6000*
VGSI and ILS glidepath not coincident (VGSI Angle 3.00/TCH 75).						
						
						
CATEGORY	A		B		D	
S-ILS 28L	213/24 200 (200-½)					

SAN FRANCISCO, CALIFORNIA
 Amdt 1B 10MAR11

37°37'N-122°22'W

SAN FRANCISCO INTL (SFO)
(SIMULTANEOUS CLOSE PARALLEL)
ILS PRM RWY 28L

Figure 332. ILS PRM RWY 28L (Simultaneous Close Parallel) (SFO).

ILS PRM RWY 28L Amdt 1B 11069 AL-375 (FAA)
 (SIMULTANEOUS CLOSE PARALLEL)

SAN FRANCISCO INTL (SFO)
 SAN FRANCISCO, CALIFORNIA

ATTENTION ALL USERS PAGE (AAUP)

Condensed Briefing Points:

- Listen to the PRM monitor frequency when communicating with NORCAL approach control (135.65), no later than LOC intercept.
- Expect to be switched to SFO Tower (120.5) at NEPIC (I-SFO 5.3 DME).
- PRM monitor frequency may be de-selected after determining that the aircraft is on the tower frequency.

1. **ATIS.** When the ATIS broadcast advises that simultaneous ILS/PRM and LDA/PRM approaches are in progress, pilots should brief to fly the ILS/PRM 28L approach. If later advised to expect an ILS 28L approach, the ILS/PRM 28L chart may be used after completing the following briefing items:

- (a) Minimums and missed approach procedures are unchanged.
- (b) Monitor frequency no longer required.
- (c) A different glideslope intercept altitude may be assigned when advised to expect the ILS 28L approach.

Simultaneous parallel approaches will only be offered/conducted when the weather is at least 2100 feet (ceiling) and 4 miles (visibility).

2. **Dual VHF Communication required.** To avoid blocked transmissions, each runway will have two frequencies, a primary and a PRM monitor frequency. The NORCAL approach controller will transmit on both frequencies. The PRM Monitor controller's transmissions, if needed, will override both frequencies. Pilots will ONLY transmit on the approach controller's frequency (135.65), but will listen to both frequencies. Select the PRM monitor frequency audio only when in contact with NORCAL approach control (135.65). The volume levels should be set about the same on both radios so that the pilots will be able to hear transmissions on at least one frequency if the other is blocked. The PRM monitor frequency may be de-selected passing NEPIC.

3. **ALL "Breakouts"** are to be hand flown to assure that the maneuver is accomplished in the shortest amount of time. Pilots, when directed by ATC to break off an approach, must assume that an aircraft is blundering toward their course and a breakout must be initiated immediately.

- (a) ATC Directed "Breakouts:" ATC directed breakouts will consist of a turn and a climb or descent. Pilots must always initiate the breakout in response to an air traffic controller instruction. Controllers will give a descending breakout only when there are no other reasonable options available, but in no case will the descent be below minimum vectoring altitude (MVA) which provides at least 1000 feet required obstruction clearance. The MVA in the final approach segment is 1600 feet at San Francisco International Airport.
- (b) Phraseology - "TRAFFIC ALERT:" If an aircraft enters the "NO TRANSGRESSION ZONE" (NTZ), the controller will breakout the threatened aircraft on the adjacent approach. The phraseology for the breakout will be:

"TRAFFIC ALERT, (aircraft call sign) TURN (left/right) IMMEDIATELY, HEADING (degrees), CLIMB/DESCEND AND MAINTAIN (altitude)".

4. Descending on (not above) the ILS glideslope ensures complying with any charted crossing restrictions and assists traffic on the LDA PRM 28R approach to mitigate possible wake turbulence encounters without destabilizing the LDA approach and creating a go-around.

5. **LDA Traffic:** While conducting this ILS/PRM approach to Runway 28L, other aircraft may be conducting the offset LDA/PRM approach to Runway 28R. These aircraft will approach from the right-rear and will re-align with 28R after making visual contact with the ILS traffic.

Special pilot training required. Pilots who are unable to participate will be afforded appropriate arrival services as operational conditions permit and must notify the controlling ARTCC as soon as practical, but at least 100 miles from destination.

(SIMULTANEOUS CLOSE PARALLEL)

ILS PRM RWY 28L Amdt 1B 11069 37°37'N-122°22'W

SAN FRANCISCO, CALIFORNIA
 SAN FRANCISCO INTL (SFO)

Figure 333. ILS PRM RWY 28L (Simultaneous Close Parallel) (SFO).

OAKLAND, CALIFORNIA

AL-294 (FAA)

LOC I-OAK	APP CRS	Rwy Idg	27R	27L
109.9	276°	TDZE	5454	6213
		Apt Elev	7	9
			9	9

ILS or LOC/DME RWY 27R

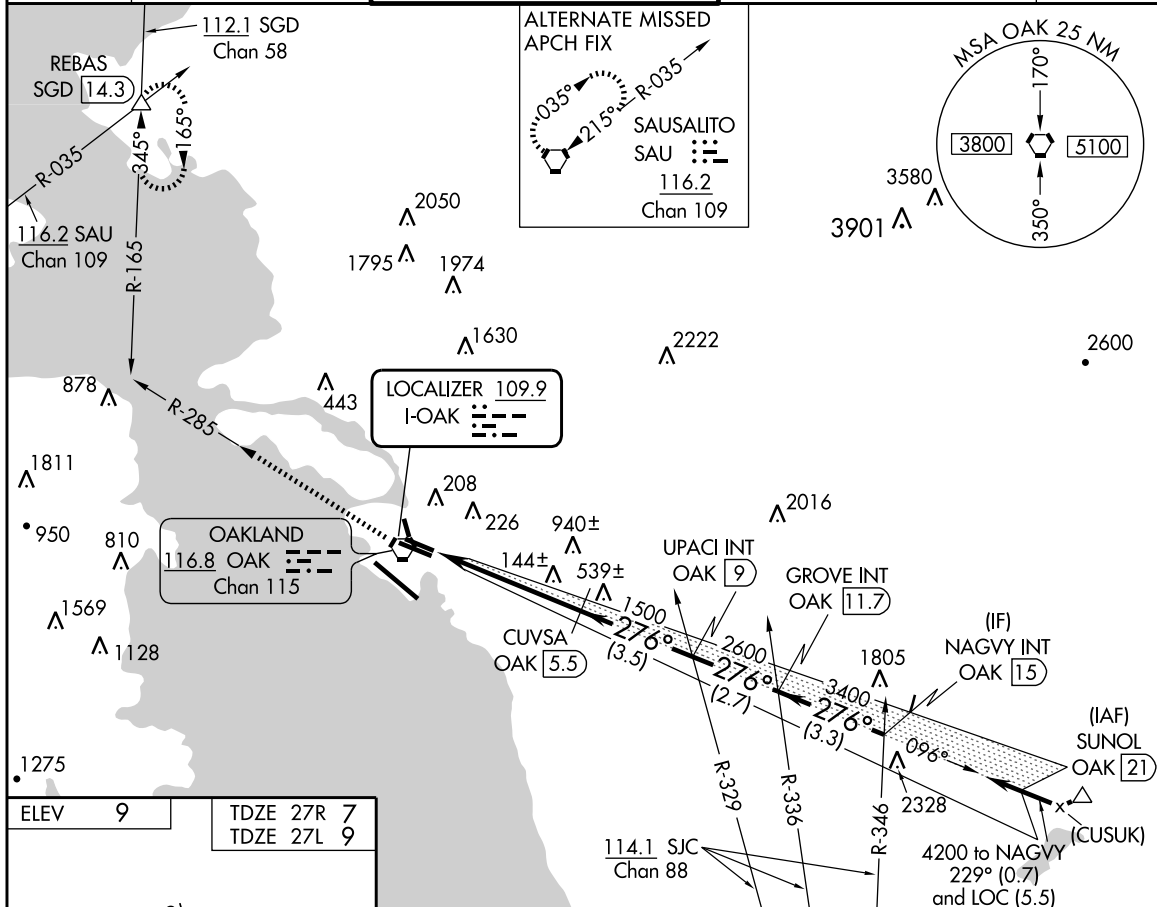
OAKLAND/METROPOLITAN OAKLAND INTL (OAK)

▽ *RVR 1800 authorized with the use of FD or AP or HUD to DA.

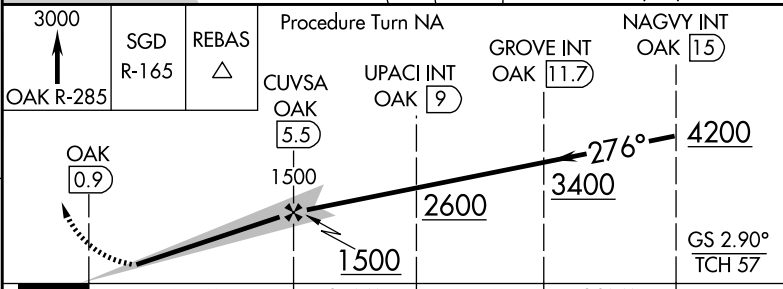
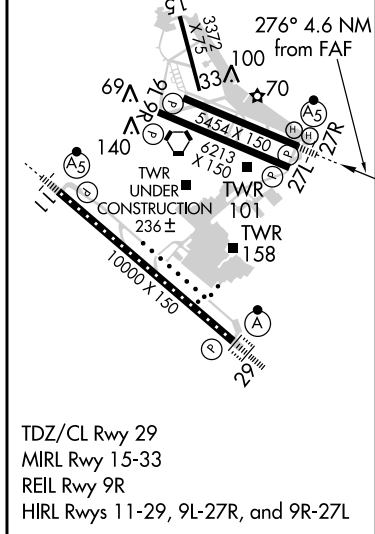
MALS Rwy 27R

MISSED APPROACH: Climb to 3000 via OAK R-285 to intercept SGD R-165 to REBAS INT/SGD 14.3 and hold.

ATIS	NORCAL APP CON	OAKLAND TOWER	GND CON	CLNC DEL
133.775	125.35 310.8 354.1	(Rwys 9-27, 15-33) 118.3 291.65 127.2 256.9 (Rwy 11-29)	(Rwys 9-27, 15-33) 121.9 (Rwy 11-29) 121.75	121.1



ELEV	9	TDZE 27R	7
		TDZE 27L	9



CATEGORY	A	B	C	D
S-ILS 27R	*207/24 200 (200-½)			
S-LOC 27R	400/24 393 (400-½)			400/40 393 (400-¾)
SIDESTEP RWY 27L	420/50 411 (500-1)		420-1½ 411 (500-1½)	420-2 411 (500-2)
CIRCLING	520-1 511 (600-1)	540-1 531 (600-1)	540-1½ 531 (600-1½)	560-2 551 (600-2)

OAKLAND, CALIFORNIA
Amdt 35A 11349

ILS or LOC/DME RWY 27R

OAKLAND/METROPOLITAN OAKLAND INTL (OAK)

37°43'N-122°13'W

Figure 336. ILS or LOC/DME RWY 27R (OAK).

Appendix 2

KEY WEST, FLORIDA

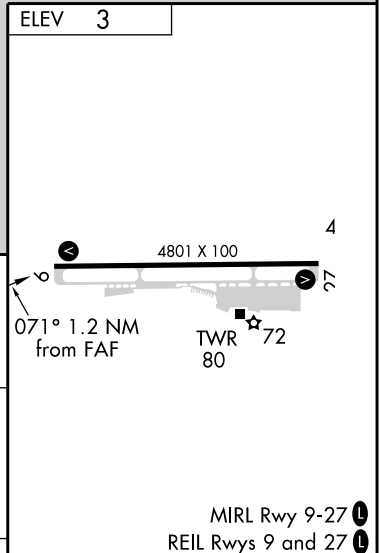
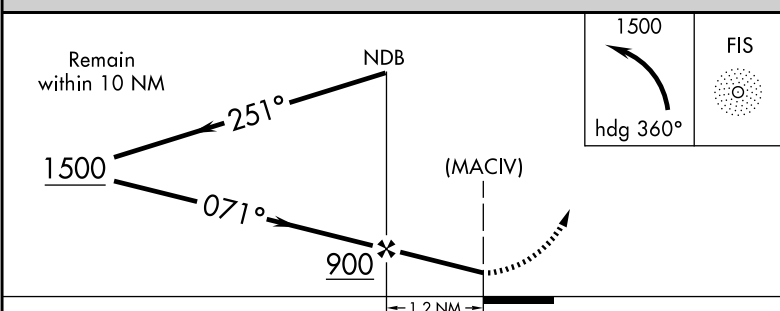
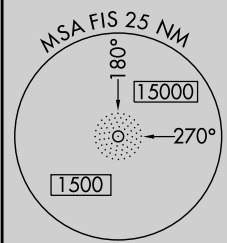
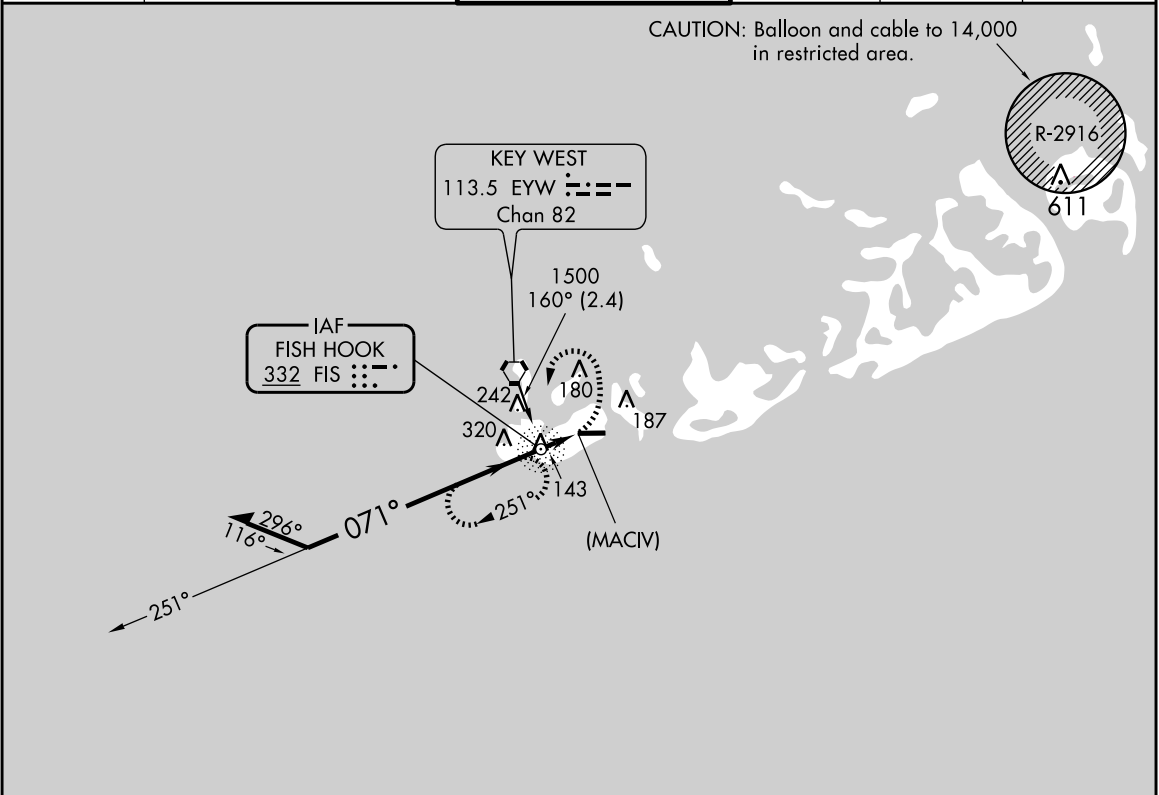
AL-606 (FAA)

NDB FIS 332	APP CRS 071°	Rwy Idg TDZE Apt Elev	N/A N/A 3
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NDB or GPS-A
KEY WEST INTL (EYW)

ASR	MISSED APPROACH: Climbing left turn to 1500 via heading 360°, then left turn direct FIS NDB and hold.				
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ATIS 119.675	NAVY KEY WEST APP CON ★ 124.025 313.7	KEY WEST TOWER ★ 118.2 (CTAF) 257.8	GND CON 121.9	CLNC DEL 121.9	UNICOM 122.95
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CATEGORY	A	B	C	D	FAF to MAP 1.2 NM					
CIRCLING	500-1	497 (500-1)	500-1½ 497 (500-1½)	620-2 617 (700-2)	Knots	60	90	120	150	180
					Min:Sec	1:12	0:48	0:36	0:29	0:24

KEY WEST, FLORIDA
Amdt 15B 12096

24°33'N-81°46'W

KEY WEST INTL (EYW)
NDB or GPS-A

Figure 337. NDB or GPS-A (EYW).

KEY WEST, FLORIDA

AL-606 (FAA)

RNAV (GPS) RWY 27

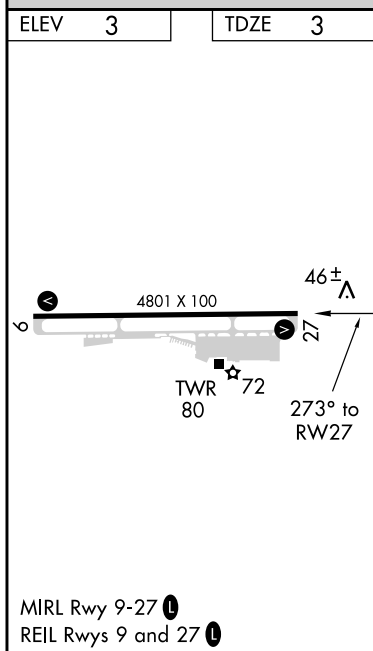
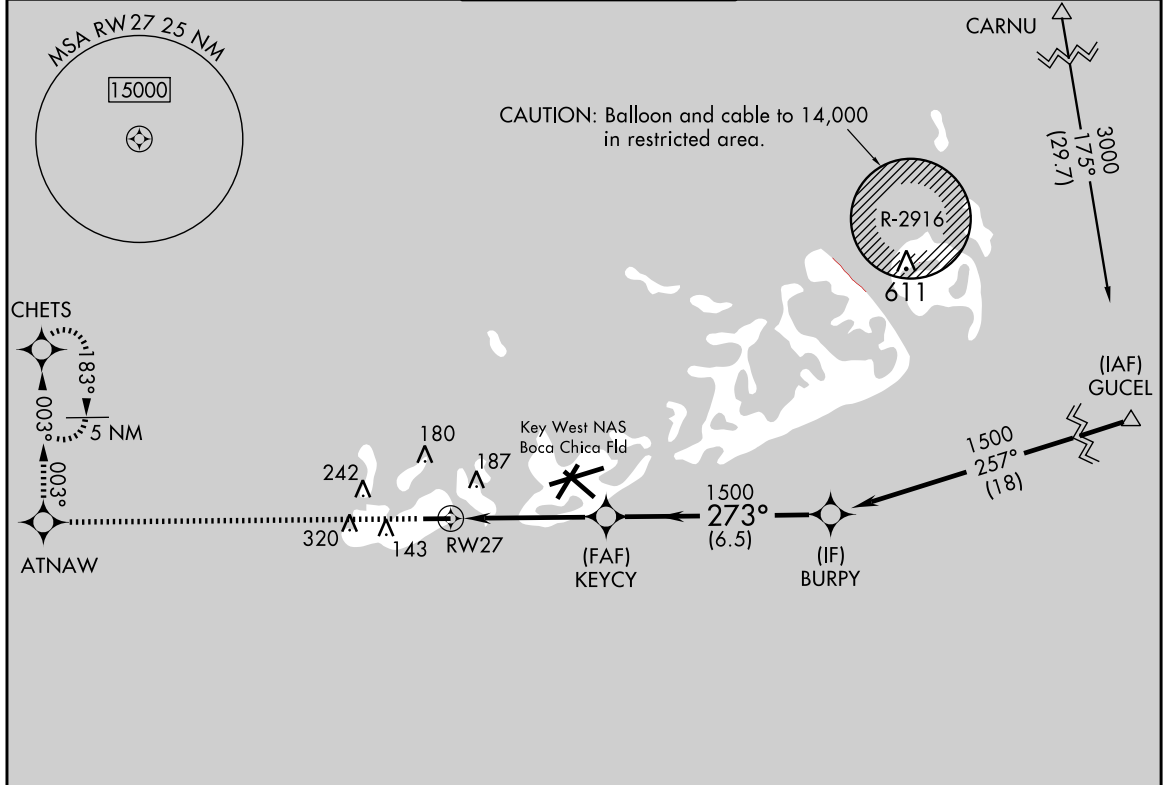
KEY WEST INTL (EYW)

WAAS CH 82100 W27A	APP CRS 273°	Rwy Idg 4801 TDZE 3 Apt Elev 3
--	------------------------	---

W DME/DME RNP-0.3 NA. If local altimeter setting not received, use Key West NAS/Boca Chica Fld altimeter setting.
A ASR

MISSED APPROACH: Climb to 2400 direct ATNAW and via 003° track to CHETS and hold.

ATIS 119.675	NAVY KEY WEST APP CON * 124.025 313.7	KEY WEST TOWER * 118.2 (CTAF) 257.8	GND CON 121.9	CLNC DEL 121.9	UNICOM 122.95
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2400	ATNAW	003° tr	CHETS	VGSi and RNAV glidepath not coincident (VGSi Angle 3.00/TCH 34).	
			KEYCY	BURPY	Procedure Turn NA
			1500	1500	
			4.5 NM	6.5 NM	
CATEGORY	A	B	C	D	
LPV DA	253-1 250 (300-1)				
LNAV MDA	420-1 417 (500-1)		420-1¼ 417 (500-1¼)		
CIRCLING	500-1 497 (500-1)		500-1½ 497 (500-1½)		620-2 617 (700-2)

KEY WEST, FLORIDA
Orig 12096

24°33'N-81°46'W

RNAV (GPS) RWY 27

KEY WEST INTL (EYW)

Figure 338. RNAV (GPS) RWY 27 (EYW).

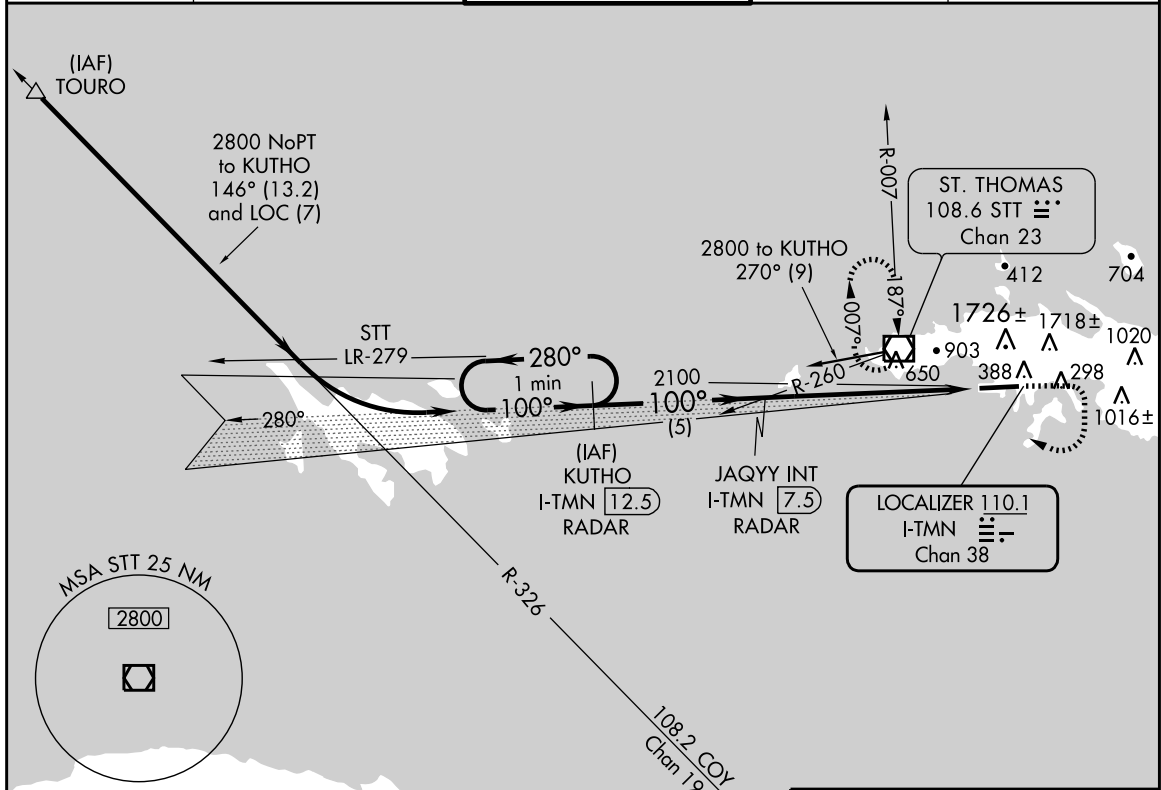
CHARLOTTE AMALIE, ST. THOMAS, VIRGIN ISLANDS AL-5005 (FAA)

LOC/DME I-TMN 110.1 Chan 38	APP CRS 100°	Rwy ldg 7000 TDZE 23 Apt Elev 23	ILS RWY 10 CHARLOTTE AMALIE/ CYRIL E KING (STT)(TIST)
---	------------------------	---	---

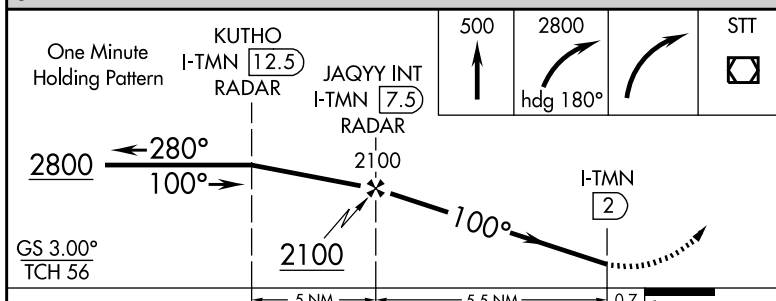
Procedure not authorized when control tower closed.
 Circling not authorized north of Runway 10-28.
 Circling not authorized at night.

MISSED APPROACH: Climb to 500 then climbing right turn to 2800 via heading 180° then right turn direct STT VOR/DME and hold.

ATIS 124.0	SAN JUAN CENTER 128.65 279.6	ST. THOMAS TOWER★ 118.8 (CTAF) 0 257.6 118.1 (NORTH OF ISLAND)	GND CON 121.9	UNICOM 122.95
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CAUTION: Pilots may encounter false illusory indications during night approaches to Runway 10 when using outside visual cues for vertical guidance.



ELEV 23	D	TDZE 23			
REIL Rwy 10 MIRL Rwy 10-28 0					
FAF to MAP 5.5 NM					
Knots	60	90	120	150	180
Min:Sec	5:30	3:40	2:45	2:12	1:50

CATEGORY	A	B	C	D
S-ILS 10	372-1¼		349 (400-1¼)	
S-LOC 10	620-1	597 (600-1)	620-1½ 597 (600-1½)	620-1¾ 597 (600-1¾)
CIRCLING	660-1¼	637 (700-1¼)	660-1¾ 637 (700-1¾)	660-2 637 (700-2)

CHARLOTTE AMALIE, ST. THOMAS, VIRGIN ISLANDS
Amdt 1A 11181

CHARLOTTE AMALIE/ CYRIL E KING (STT)(TIST)
18°20'N - 64°58'W
ILS RWY 10

Figure 340. ILS RWY 10 (STT) (TIST).

Appendix 2

ST. AUGUSTINE, FLORIDA

AL-692 (FAA)

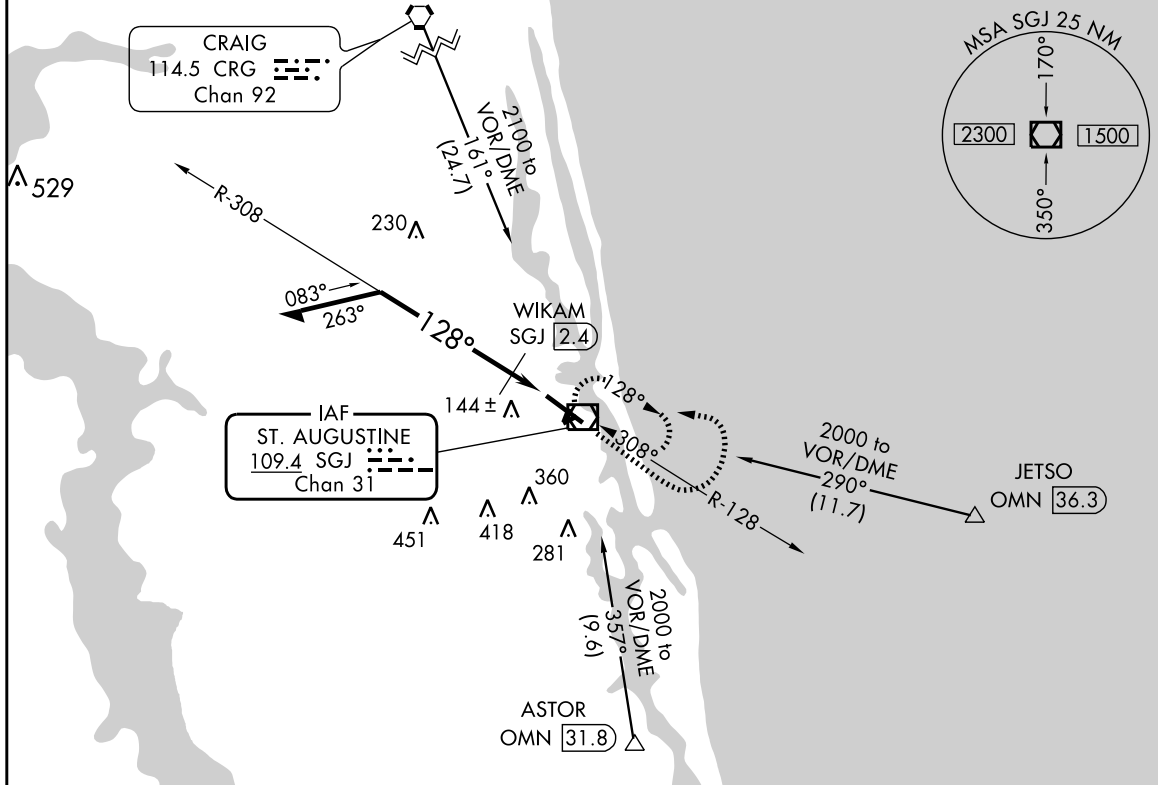
VOR RWY 13

ST. AUGUSTINE / NORTHEAST FLORIDA RGNL (SGJ)

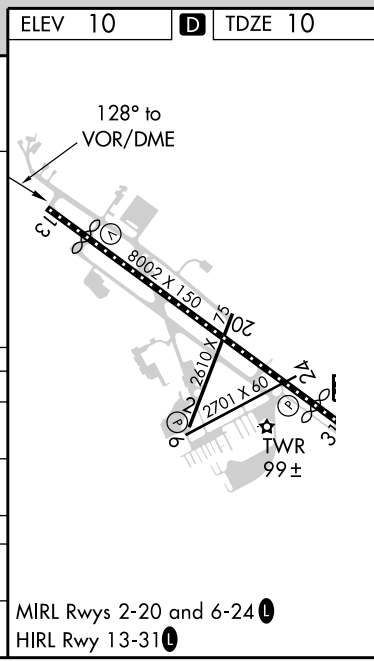
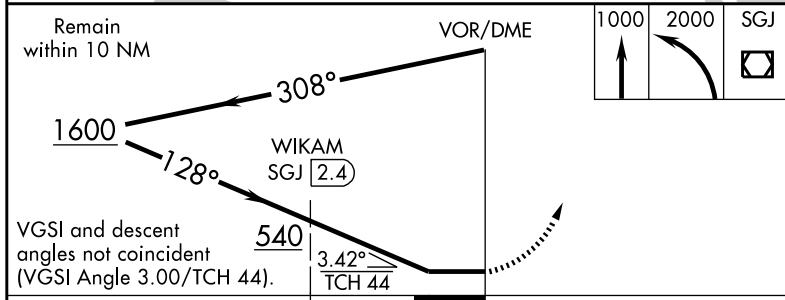
VOR/DME SGJ	APP CRS	Rwy Idg	6144
109.4	128°	TDZE	10
Chan 31		Apt Elev	10

▽ ▲	Circling NA at night to Rwy 2,6,20,24. Visibility reduction by helicopters NA.	MISSED APPROACH: Climb to 1000 then climbing left turn to 2000 direct SGJ VOR/DME and hold.
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ATIS 119.625	JACKSONVILLE APP CON 120.75 308.4	ST AUGUSTINE TOWER ★ 127.625 (CTAF) 269.475	GND CON 121.175 251.125	UNICOM 122.95
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ELEV 10	D	TDZE 10
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CATEGORY	A	B	C	D
S-13	540-1	530 (600-1)	540-1½ 530 (600-1½)	540-1¾ 530 (600-1¾)
CIRCLING	540-1	530 (600-1)	540-1½ 530 (600-1½)	560-2 550 (600-2)
WIKAM FIX MINIMUMS				
S-13	400-1 390 (400-1)		400-1¼ 390 (400-1¼)	
CIRCLING	460-1	450 (500-1)	460-1½ 450 (500-1½)	560-2 550 (600-2)

ST. AUGUSTINE, FLORIDA
Orig-B 11349

ST. AUGUSTINE / NORTHEAST FLORIDA RGNL (SGJ)
29°58'N-81°20'W

VOR RWY 13

Figure 341. VOR RWY 13 (SGJ).

ST. AUGUSTINE, FLORIDA

AL-692 (FAA)

RNAV (GPS) RWY 13

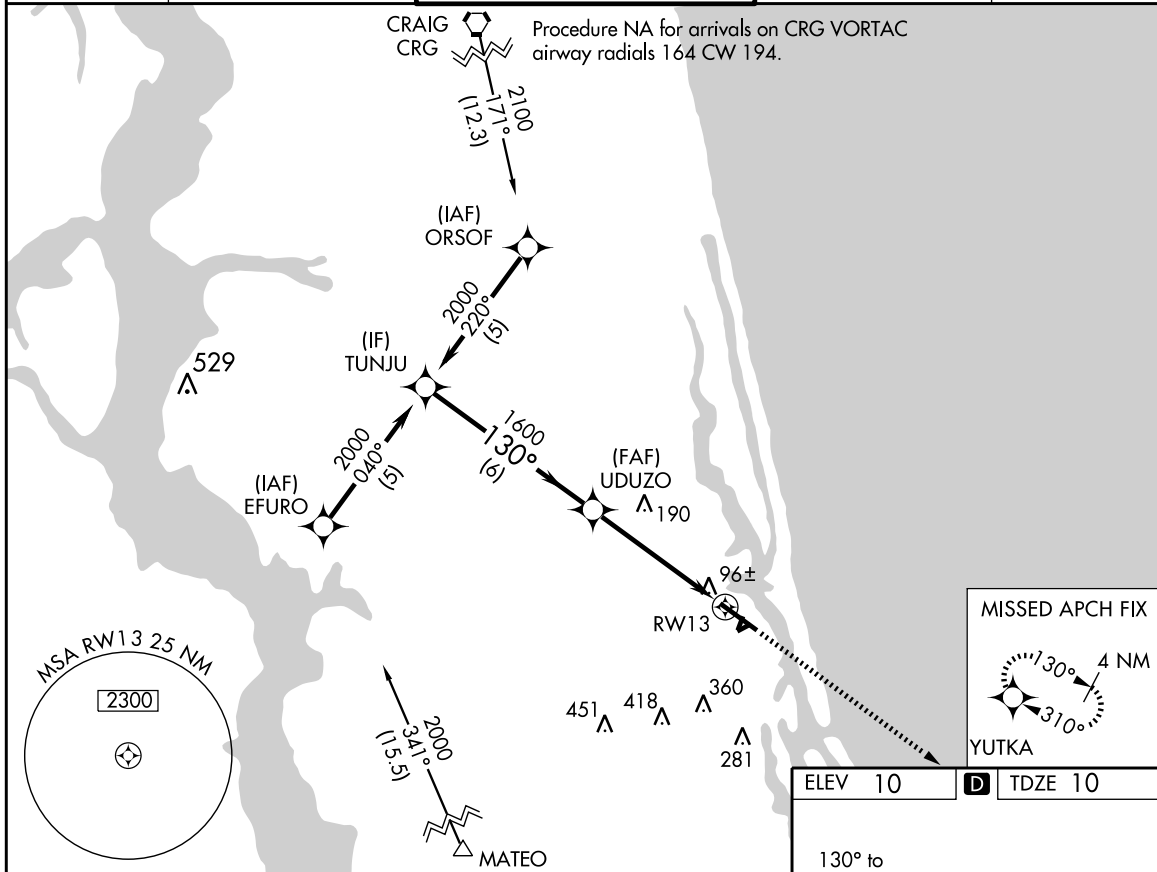
ST. AUGUSTINE / NORTHEAST FLORIDA RGNL (SGJ)

WAAS CH 77711 W13A	APP CRS 130°	Rwy Idg 6144 TDZE 10 Apt Elev 10
--	------------------------	---

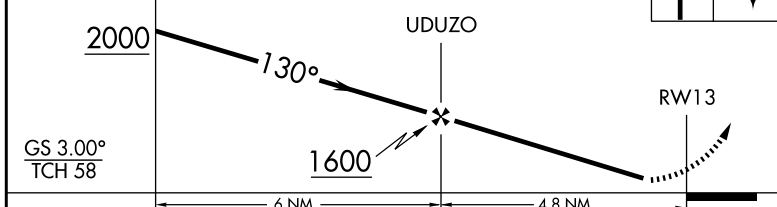
⚠ Baro-VNAV NA when using Jacksonville NAS/Towers Field altimeter setting. For uncompensated Baro-VNAV systems, LNAV/VNAV NA below -15°C (5°F) or above 48°C (118°F). DME/DME RNP-0.3 NA. Visibility reduction by helicopters NA. When local altimeter setting not received, use Jacksonville NAS/Towers Field altimeter setting and increase all DA 57 feet and all MDA 60 feet, increase LPV and LNAV/VNAV all Cats. visibility ¼ mile.

MISSED APPROACH:
Climb to 2000 direct YUTKA and hold.

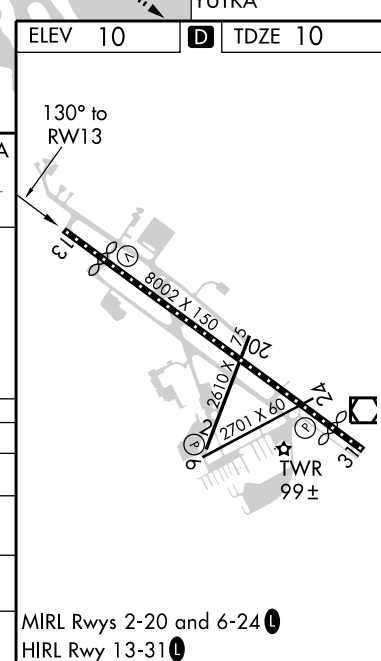
ATIS 119.625	JACKSONVILLE APP CON 120.75 308.4	ST AUGUSTINE TOWER ★ 127.625 (CTAF) 269.475	GND CON 121.175 251.125	UNICOM 122.95
------------------------	---	---	-----------------------------------	-------------------------



Procedure Turn NA TUNJU
 VGSI and RNAV glidepath not coincident (VGSI Angle 3.00/TCH 44).
 2000 YUTKA



CATEGORY	A	B	C	D
LPV DA	357-1¼		347 (400-1¼)	
LNAV/VNAV DA	391-1¼		381 (400-1¼)	
LNAV MDA	440-1	430 (500-1)	440-1¼ 430 (500-1¼)	440-1½ 430 (500-1½)
CIRCLING	460-1	450 (500-1)	460-1½ 450 (500-1½)	580-2 570 (600-2)



ST. AUGUSTINE, FLORIDA
 Orig 11349

ST. AUGUSTINE / NORTHEAST FLORIDA RGNL (SGJ)
 29°58'N-81°20'W

RNAV (GPS) RWY 13

Figure 342. RNAV (GPS) RWY 13 (SGJ).

LOC/DME I-BDL 111.1 Chan 48	APP CRS 058°	Rwy Idg THRE Apt Elev 9509 173 173
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ILS or LOC RWY 6

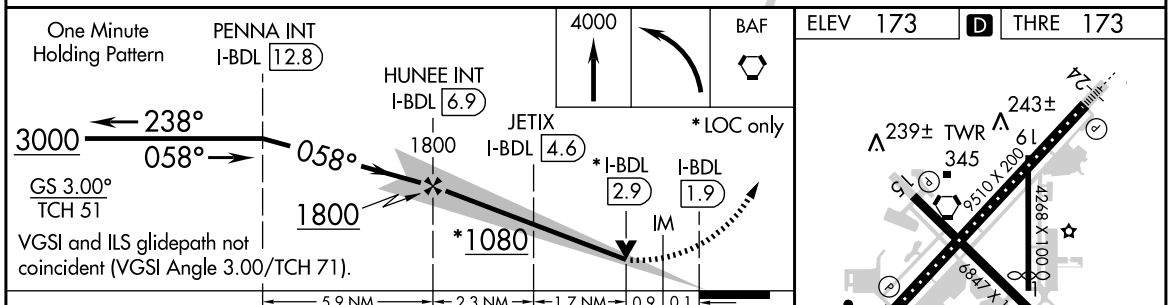
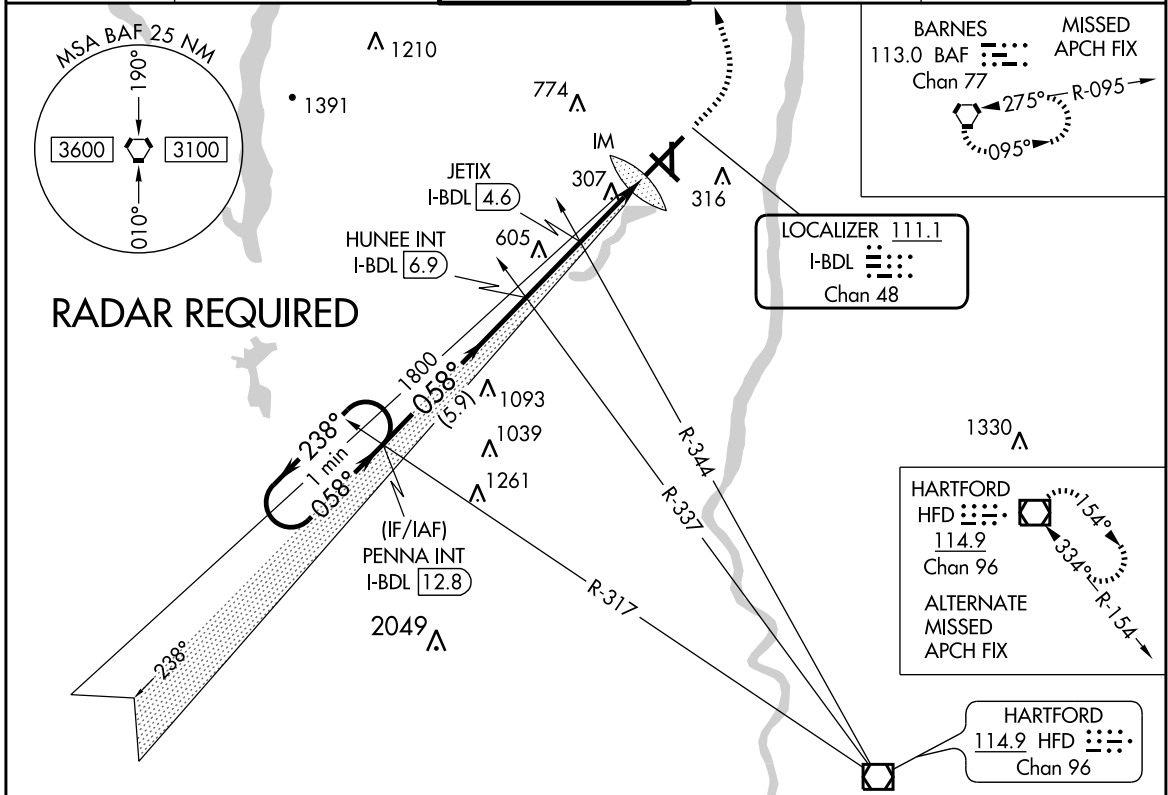
WINDSOR LOCKS / BRADLEY INTL (BDL)

▲ For inoperative ALSF-2, increase S-ILS 6 all Cats visibility to RVR 4000. JETIX Fix Minimums: For inoperative ALSF-2, increase S-LOC 6 Cat C, D visibility to RVR 6000.

ALSF-2

MISSED APPROACH: Climb to 4000 then left turn direct BAF VORTAC and hold.

ATIS 118.15	BRADLEY APP CON 127.225 323.2	BRADLEY TOWER 120.3 351.8	GND CON 121.9 348.6	CLNC DEL 121.75 322.3
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CATEGORY	A	B	C	D
S-ILS 6	373/18 200 (200-½)			
S-LOC 6	1080/40	907 (1000-¾)	1080-2	907 (1000-2)
CIRCLING	1080-1¼	907 (1000-1¼)	1080-2¾	1080-3
JETIX FIX MINIMUMS				
S-LOC 6	560/24	387 (400-½)	560/35	387 (400-¾)
CIRCLING	680-1	507 (600-1)	680-1½	940-2½
			507 (600-1½)	767 (800-2½)

FAF to MAP 5 NM					
Knots	60	90	120	150	180
Min:Sec	5:00	3:20	2:30	2:00	1:40

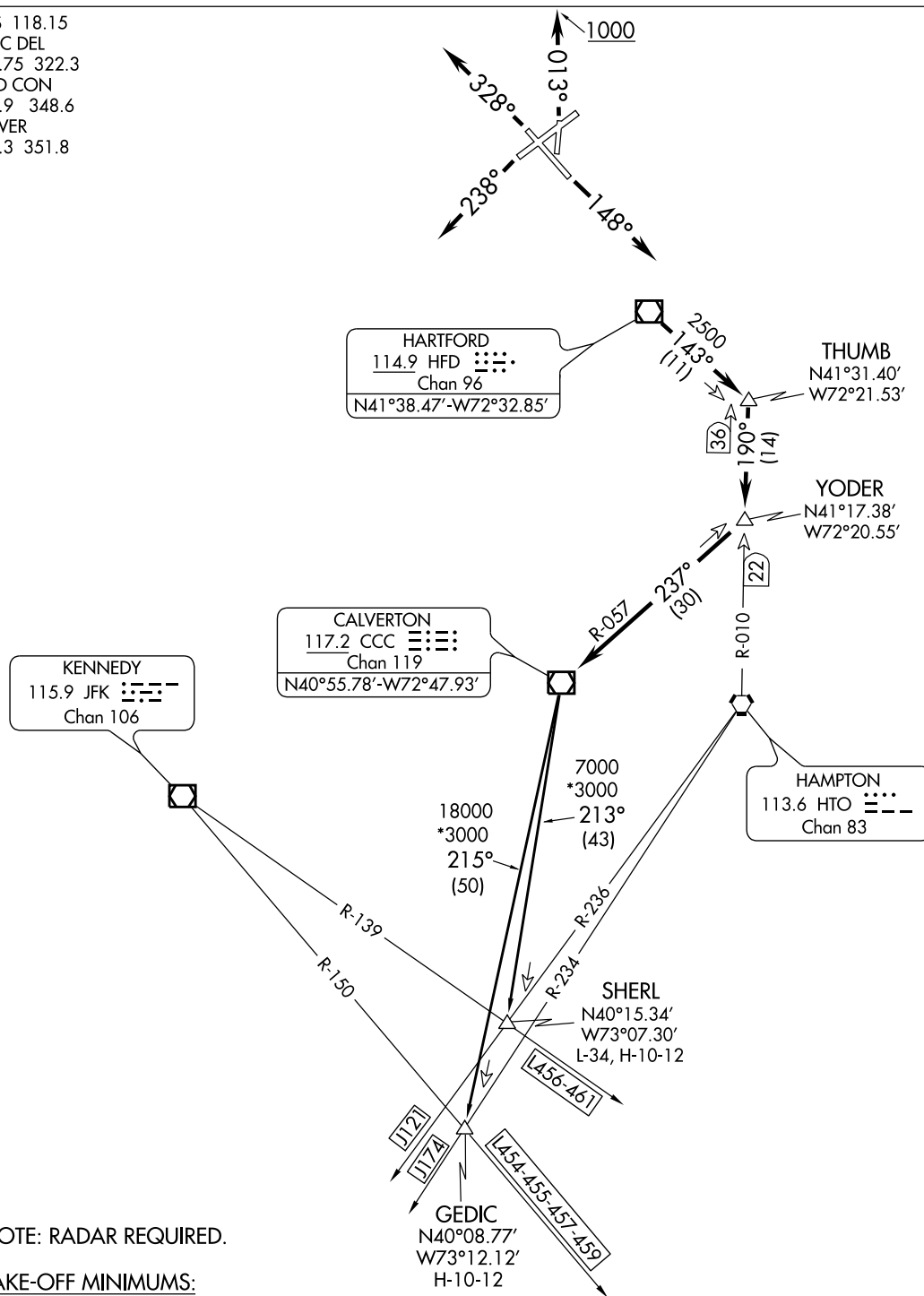
Figure 345. ILS or LOC RWY 6 (BDL).

(CSTL3.CCC) 11237
COASTAL THREE DEPARTURE

SL-460 (FAA)

WINDSOR LOCKS/ BRADLEY INTL (BDL)
 WINDSOR LOCKS, CONNECTICUT

ATIS 118.15
 CLNC DEL
 121.75 322.3
 GND CON
 121.9 348.6
 TOWER
 120.3 351.8



NOTE: RADAR REQUIRED.

TAKE-OFF MINIMUMS:

Rwy 19 NA.
 Rwy 01, 06, 15, 24 STANDARD.
 Rwy 33 STANDARD with minimum climb of 326 feet per NM to 1000.

NOTE: Chart not to scale.

(NARRATIVE ON FOLLOWING PAGE)

COASTAL THREE DEPARTURE
 (CSTL3.CCC) 11237

WINDSOR LOCKS, CONNECTICUT
 WINDSOR LOCKS/ BRADLEY INTL (BDL)

Figure 346. COASTAL THREE Departure (CSTL3.CCC).

(CSTL3.CCC) 10154

SL-460 (FAA)

WINDSOR LOCKS/ BRADLEY INTL (BDL)
WINDSOR LOCKS, CONNECTICUT**COASTAL THREE DEPARTURE****DEPARTURE ROUTE DESCRIPTION**

NOTE: INITIAL DEPARTURE HEADINGS ARE PREDICATED ON AVOIDING NOISE SENSITIVE AREAS. FLIGHT CREW AWARENESS AND COMPLIANCE IS IMPORTANT IN MINIMIZING NOISE IMPACTS ON SURROUNDING COMMUNITIES.

NOTE: APPROPRIATE DEPARTURE CONTROL FREQUENCY TO BE ASSIGNED BY ATC.

TAKE-OFF RWY 1: Climb heading 013° to 1000 or as assigned for radar vectors to HFD VOR/DME, thence . . .

TAKE-OFF RWY 6: Fly assigned heading for radar vectors to HFD VOR/DME, thence . . .

TAKE-OFF RWY 15: Climb heading 148° or as assigned for radar vectors to HFD VOR/DME, thence . . .

TAKE-OFF RWY 24: Climb heading 238° or as assigned for radar vectors to HFD VOR/DME, thence . . .

TAKE-OFF RWY 33: Climb heading 328° or as assigned for radar vectors to HFD VOR/DME, thence . . .

. . . . From over HFD VOR/DME proceed via HFD R-143 to THUMB INT, then proceed via HTO R-010 to YODER INT, then proceed via CCC R-057 to CCC VOR/DME. Then via (transition) or (assigned route). Maintain 4000 or assigned altitude. Expect clearance to requested flight level ten minutes after departure.

GEDIC TRANSITION (CSTL3.GEDIC): From over CCC VOR/DME via CCC R-215 to GEDIC.

SHERL TRANSITION (CSTL3.SHERL): From over CCC VOR/DME via CCC R-213 to SHERL.

TAKE-OFF OBSTACLE NOTES:

Rwy 1: Vehicle on road 342' from DER, 564' left of centerline, 15' AGL/184' MSL. Trees beginning 441' from DER, 493' left of centerline, up to 100' AGL/269' MSL. Trees beginning 1884' from DER, 45' right of centerline, up to 100' AGL/299' MSL.

Rwy 6: Trees beginning 21' from DER, 464' left of centerline, up to 100' AGL/249' MSL. Trees beginning 1956' from DER, 921' right of centerline, up to 100' AGL/239' MSL.

Rwy 15: Vehicle on roadway 531' from DER, 606' left of centerline, up to 15' AGL/186' MSL. Trees beginning 2341' from DER, 767' left of centerline, up to 100' AGL/244' MSL. Vehicle on roadway 429' from DER, 572' right of centerline, up to 15' AGL/186' MSL. Tree 1520' from DER, 786' right of centerline, up to 100' AGL/259' MSL.

Rwy 24: Trees beginning 3066' from DER, 599' left of centerline, up to 100' AGL/269' MSL. OL on fence 1239' DER, 784' left of centerline, up to 45' AGL/215' MSL. Trees beginning 2345' from DER, 489' right of centerline, up to 100' AGL/299' MSL.

Rwy 33: Trees beginning 1590' from DER, 275' left of centerline, up to 100' AGL/256' MSL. Tower 2.4 NM from DER, 3534' left of centerline, 104' AGL/774' MSL. Trees beginning 1618' from DER, 264' right of centerline, up to 100' AGL/263' MSL.

COASTAL THREE DEPARTURE

(CSTL3.CCC) 10154

WINDSOR LOCKS, CONNECTICUT
WINDSOR LOCKS/ BRADLEY INTL (BDL)**Figure 347.** COASTAL THREE Departure (CSTL3.CCC).

64

ARIZONA

TUCSON INTL (TUS) 6 S UTC-7 N32°06.97' W110°56.46'
 2643 B S4 **FUEL** 100LL, JET A OX 1, 2, 3, 4 TPA—See Remarks AOE Class I, ARFF Index C
 NOTAM FILE TUS

PHOENIX

H-4J, L-5C

IAP, AD

RWY 11L-29R: H10996X150 (ASPH-GRVD) S-160, D-200, 2S-175,
 2D-350, 2D/2D2-585 HIRL

RWY 11L: MALSR. PAPI(P4L)—GA 3.0° TCH 55'. 0.7% up..

RWY 29R: REIL. PAPI(P4L)—GA 3.0° TCH 76'. Ground. 0.5% down..

RWY 11R-29L: H8408X75 (ASPH) S-120, D-140, 2S-175, 2D-220
 MIRL

RWY 11R: PAPI(P4L)—GA 3.0° Thld dsplcd 1410'. Rgt tfc. 0.7% up..

RWY 29L: REIL. Pole. 0.6% down..

RWY 03-21: H7000X150 (ASPH-GRVD) S-105, D-137, 2S-174,
 2D-230, 2D/2D2-500 MIRL

RWY 03: Thld dsplcd 841'. Railroad.

RWY 21: REIL. PAPI(P4L)—GA 3.0° TCH 55'. Rgt tfc.

RUNWAY DECLARED DISTANCE INFORMATION

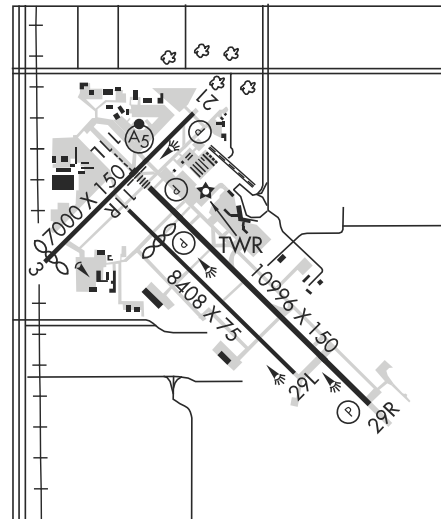
RWY 03: TORA-7000 TODA-7000 ASDA-7000 LDA-6160

RWY 21: TORA-6000 TODA-7000 ASDA-6000 LDA-6000

ARRESTING GEAR/SYSTEM

RWY 03 ← HOOK E5 (403')

RWY 11L HOOK BAK-12B(B) (1220' OVRN) BAK-14 BAK-12B(B)
 (1000')



BAK-14 BAK-12B(B) (1215') HOOK BAK-12B(B) (128' OVRN) **RWY 29L**

AIRPORT REMARKS: Attended continuously. Air carriers use Rwy 11L-29R. Rwy 11R-29L rstd to acft with wing span less than 73' and ldg speed less than 120 kt. Acft dep Rwy 11R required to attain at least 400' AGL prior to starting turn. No B-747 training except PPR; no flight training 0500-1300Z except PPR, call Flightline Office 520-573-8128. 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. Helicopter ops located south of Rwy 11R-29L and west of Twy A13. TPA-3443 (800) small acft, 4043 (1400) large/heavy turbojet acft. B-747 acft taxi with inboard engines only. Rwy 11L touchdown runway visual range avbl. Twy T-general aviation twy 30,000 lbs. or less. Portions of Twy D not visible from twr due to hangars. Twy A5 limited to 70,000 lbs or less. REIL Rwy 29L and Rwy 29R dalgt hrs only. Ldg fee. Flight Notification Service (ADCUS) avbl. NOTE: See Special Notices—Glider Operations Northwest of Tucson, Arizona, U.S. Special Customs Requirement.

WEATHER DATA SOURCES: ASOS (520) 889-7236. **HIWAS** 116.0 TUS.LLWAS.

COMMUNICATIONS: ATIS 123.8 520-741-1177 **UNICOM** 122.95

TUCSON RCO 122.2 (PRESCOTT RADIO)

MOUNT LEMMON RCO 122.4 (PRESCOTT RADIO)

Ⓡ **APP/DEP CON** 125.1 (Rwy 11 090°-285°) (Rwy 29 275°-065°) 119.4 (Rwy 11 286°-089°) (Rwy 29 066°-274°)

TOWER 118.3 119.0 **GND CON** 124.4 **CLNC DEL** 126.65

AIRSPACE: CLASS C svc etc **APP CON**

RADIO AIDS TO NAVIGATION: NOTAM FILE TUS.

(H) **VORTACW** 116.0 TUS Chan 107 N32°05.71' W110°54.89' 301° 1.8 NM to fld. 2672/12E. **HIWAS.**

VORTAC unusable:

050°-080° byd 30 NM blo 13,000'

350°-020° byd 30 NM blo 13,000'

DME unusable:

155°-165° byd 35 NM blo 13,000'

ILS/DME 111.7 I-TUS Chan 54 Rwy 11L. Localizer backcourse unusable byd 15 NM blo 7,200'. Backcourse unusable byd 10° right of course.

VALLE (See GRAND CANYON on page 39)

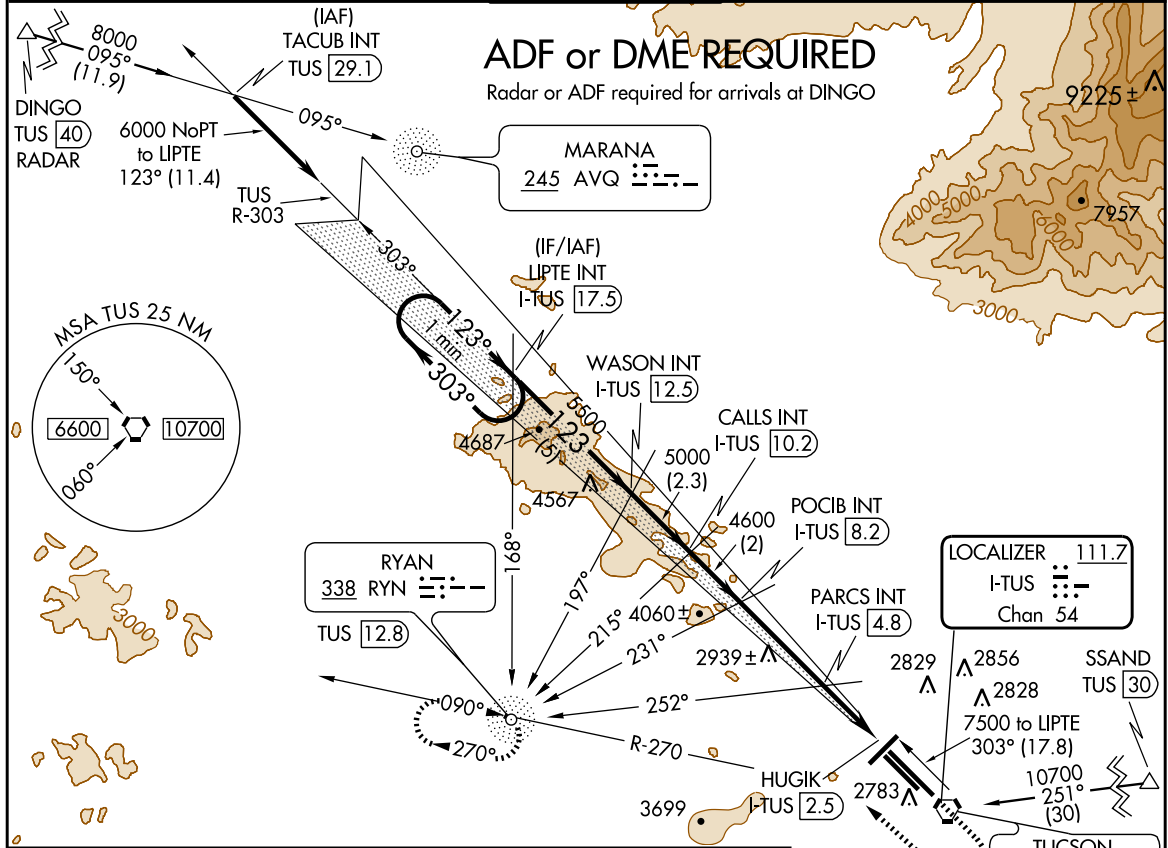
Figure 348. Excerpt from Chart Supplement.

TUCSON, ARIZONA

AL-430 (FAA)

ILS or LOC RWY 11L TUCSON INTL (TUS)

LOC/DME I-TUS 111.7 Chan 54	APP CRS 123°	Rwy Idg 10996 TDZE 2599 Apt Elev 2643	MALSRS 	MISSED APPROACH: Climb to 4000 then climbing right turn to 6000 via heading 300° and TUS R-270 to RYN NDB/TUS 12.8 DME and hold.
 For inoperative MALSRS, increase S-ILS 11L Cat E visibility to RVR 5000, S-LOC 11L Cat D and Cat E visibility to RVR 5000. ADF or DME required.				
ATIS 123.8 279.65	TUCSON APP CON 119.4 318.1	TUCSON TOWER 118.3 257.8	GND CON 124.4 348.6	CLNC DEL 126.65 326.2



LIPTO INT I-TUS 17.5	WASON INT I-TUS 12.5	CALLS INT I-TUS 10.2	POCIB INT I-TUS 8.2	PARCS INT I-TUS 4.8	HUGIK I-TUS 2.5	RYN NDB TUS 12.8	TUCSON 116.0 TUS Chan 107
One Minute Holding Pattern		4000		6000		TUS R-270	ELEV 2643 TDZE 2599
6000 ← 303°		5500		5000		123° 6.1 NM from FAF	
GS 3.00° TCH 55		4600		3480			
CATEGORY	A	B	C	D	E		
S-ILS 11L	2800/24		201 (200-½)				
S-LOC 11L	3480-1¼	881 (900-1¼)	3480-2¾ 881 (900-2¾)	3480-3	881 (900-3)		
CIRCLING	3480-1¼	837 (900-1¼)	3480-2¾ 837 (900-2¾)	3480-3	3740-3		
PARCS FIX MINIMUMS							
S-LOC 11L	2900/24		301 (300-½)		2900/40	301 (300-¾)	
CIRCLING	3100-1 457 (500-1)	3220-1 577 (600-1)	3220-1½ 577 (600-1½)	3220-2 577 (600-2)	3740-3	FAF to MAP 5.7 NM	
	Knots	60	90	120	150	180	
	Min:Sec	5:42	3:48	2:51	2:17	1:54	

TUCSON, ARIZONA
Amdt 14 11237

32°07'N-110°56'W

TUCSON INTL (TUS) ILS or LOC RWY 11L

Figure 349. ILS or LOC RWY 11L (TUS).

TUCSON, ARIZONA

AL-430 (FAA)

VOR or TACAN RWY 11L TUCSON INTL (TUS)

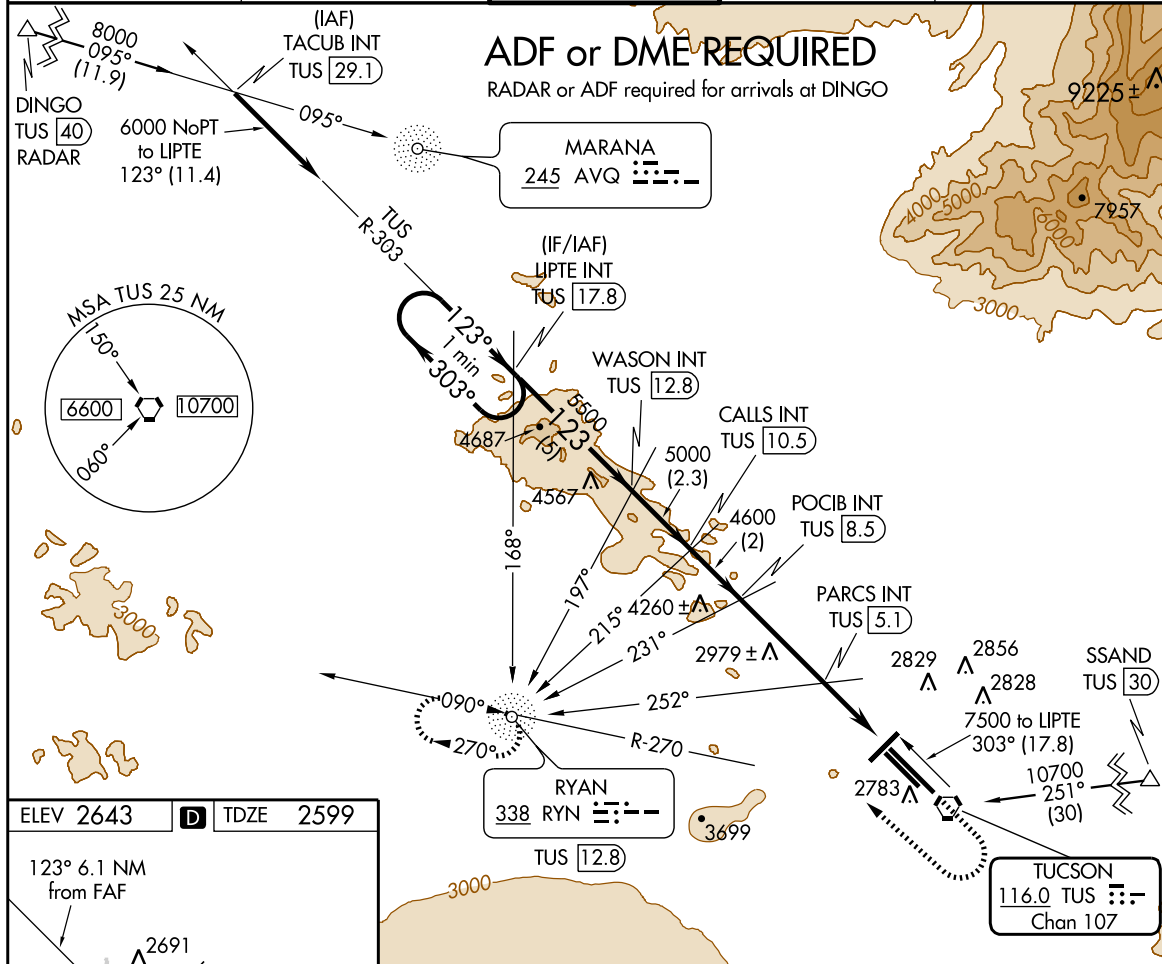
VORTAC TUS 116.0 Chan 107	APP CRS 123°	Rwy Idg 10996 TDZE 2599 Apt Elev 2643
--	------------------------	--

⚠ For inoperative MALS, increase S-11L Cats. D and E visibility to RVR 6000. ADF or DME required.

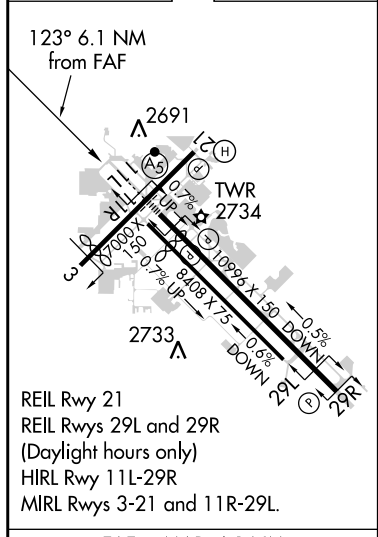


MISSED APPROACH: Climb to 4000 then climbing right turn to 6000 (Cat. E 8000) via heading 300° and TUS R-270 to RYN NDB/TUS 12.8 DME and hold.

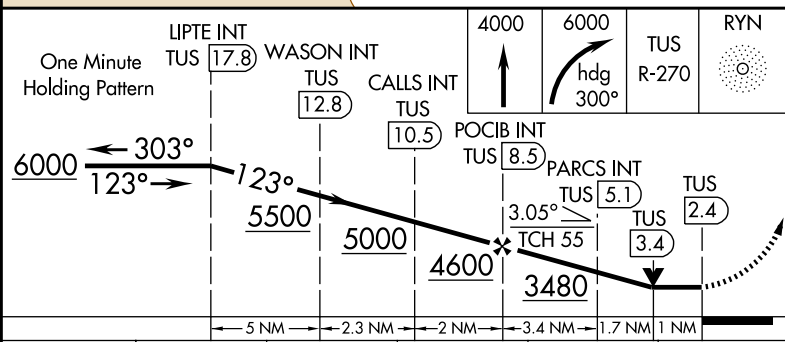
ATIS 123.8 279.65	TUCSON APP CON 119.4 318.1	TUCSON TOWER 118.3 257.8	GND CON 124.4 348.6	CLNC DEL 126.65 326.2
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ELEV 2643	D TDZE 2599
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FAF to MAP 6.1 NM					
Knots	60	90	120	150	180
Min:Sec	6:06	4:04	3:03	2:26	2:02



CATEGORY	A	B	C	D	E
S-11L	2960/24	361 (400-½)		2960/50	361 (400-1)
CIRCLING	3100-1 457 (500-1)	3220-1 577 (600-1)	3220-1½ 577 (600-1½)	3220-2 577 (600-2)	3740-3 1097 (1100-3)

TUCSON, ARIZONA
Amdt 1A 11237

32°07'N-110°56'W

TUCSON INTL (TUS) VOR or TACAN RWY 11L

Figure 350. VOR or TACAN RWY 11L (TUS).

(GATWY9.TWILA) 17229

GATEWAY NINE DEPARTURE

AL-360 (FAA)

ST LOUIS LAMBERT INTL (STL)

ST. LOUIS, MISSOURI



DEPARTURE ROUTE DESCRIPTION

Climb on assigned heading for vector to appropriate route.

JETS: Maintain 5000 or assigned altitude, thence. . . .

PROPS: Maintain 3000 or assigned altitude, thence. . . .

. . . .from over CSX R-087 or over TOY VORTAC on TOY R-076 or over STL VORTAC on STL R-094 to TWILA INT. Then on (transition), expect clearance to filed altitude 10 minutes after departure.

BIBLE GROVE TRANSITION (GATWY9.BIB): From over TWILA on TOY R-076 to JIGSY, then on BIB R-258 to BIB VORTAC.

BRICKYARD TRANSITION (GATWY9.VHP): From over TWILA on TOY R-076 to JIGSY, then on BIB R-258 to BIB VORTAC, then on BIB R-067 to WORKE, then on BIB R-067 and SHB R-251 to KELLY, then on VHP R-209 to VHP VORTAC.

CREEP TRANSITION (GATWY9.CREEP): From over TWILA on TOY R-076 to JIGSY, then on BIB R-258 to BIB VORTAC, then on BIB R-067 to WORKE, then on BIB R-067 and SHB R-251 to KELLY, then on SHB R-251 to SHB VOR/DME, then on SHB R-075 to CREEP.

JIGSY TRANSITION (GATWY9.JIGSY): From over TWILA on TOY R-076 to JIGSY.

ROSEWOOD TRANSITION (GATWY9.ROD): From over TWILA on TOY R-076 to JIGSY, then on BIB R-258 to BIB VORTAC, then on BIB R-067 to WORKE, then on BIB R-067 and SHB R-251 to KELLY, then on SHB R-251 to SHB VOR/DME, then on SHB R-063 and ROD R-250 to ROD VORTAC.

GATEWAY NINE DEPARTURE
(GATWY9.TWILA) 17AUG17

ST. LOUIS, MISSOURI
ST LOUIS LAMBERT INTL (STL)

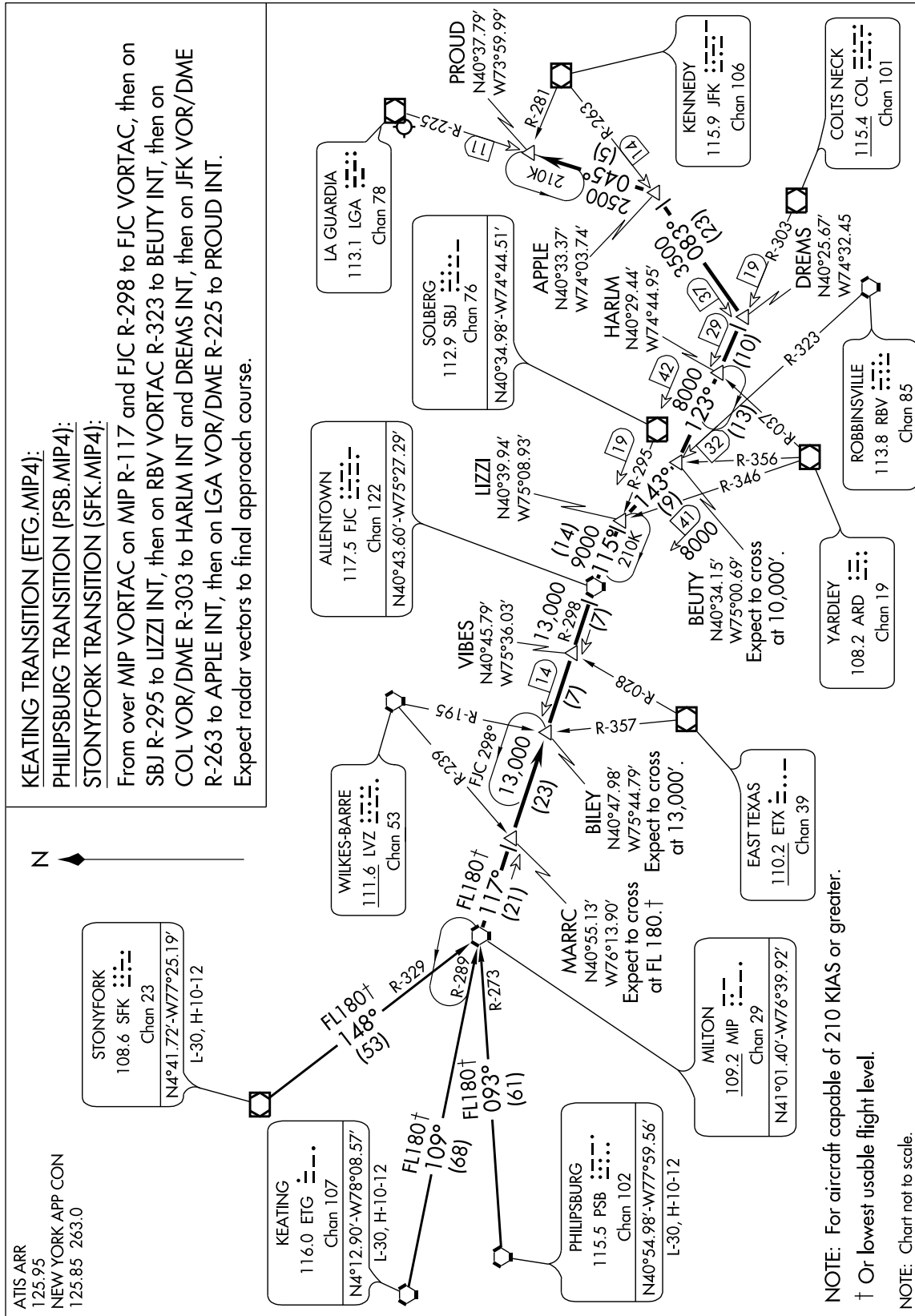
Figure 351A. GATEWAY NINE Departure (GATWY9.TWILA).

(MIP.MIP4) 11293

ST-289 (FAA)

MILTON FOUR ARRIVAL

LA GUARDIA
NEW YORK, NEW YORK



MILTON FOUR ARRIVAL

(MIP.MIP4) 11293

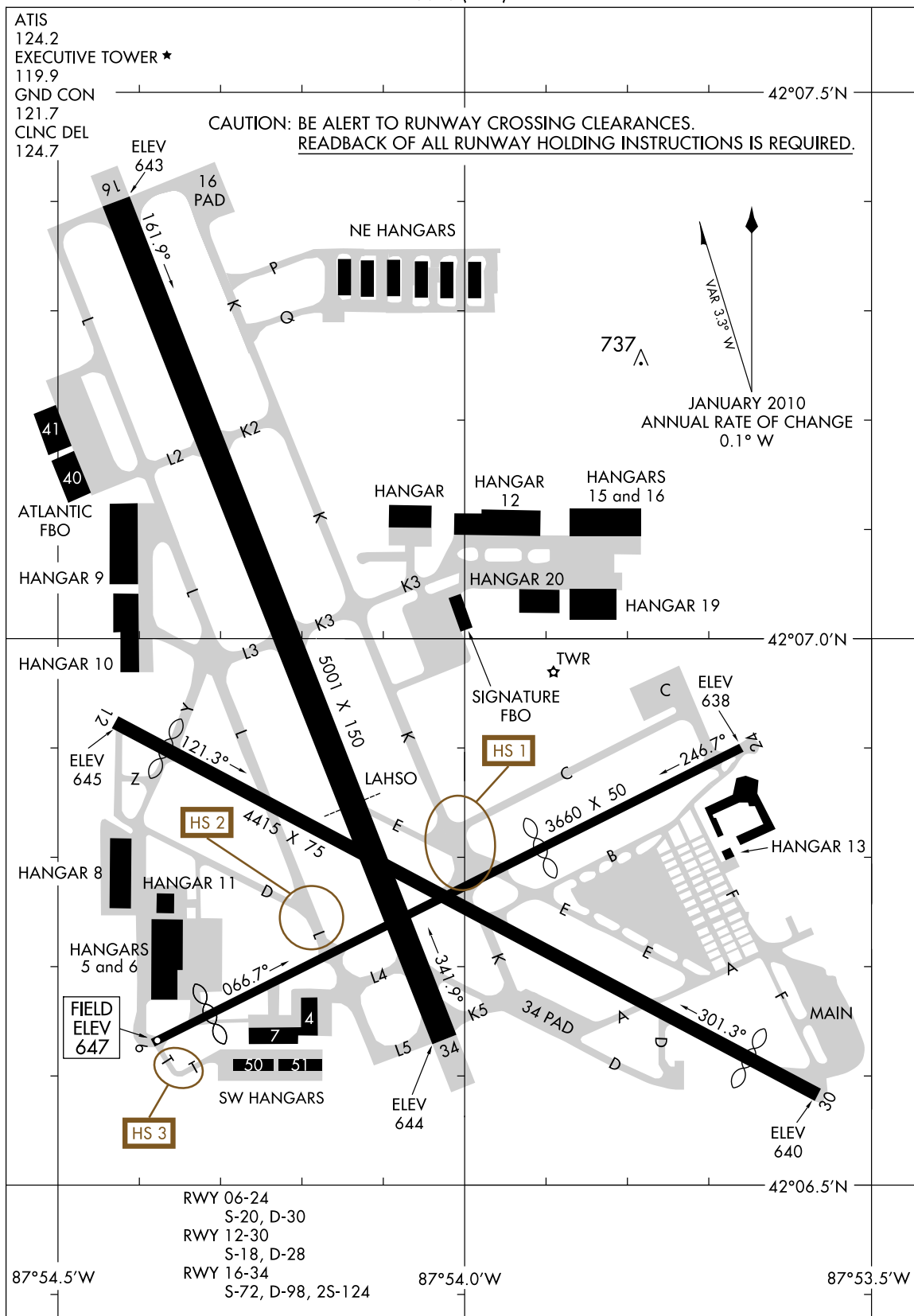
NEW YORK, NEW YORK
LA GUARDIA

Figure 352. MILTON FOUR Arrival (MIP.MIP4).

12096

AIRPORT DIAGRAM

AL-5028 (FAA) CHICAGO/PROSPECT HEIGHTS/WHEELING, ILLINOIS
CHICAGO EXECUTIVE (PWK)



AIRPORT DIAGRAM

CHICAGO/PROSPECT HEIGHTS/WHEELING, ILLINOIS
CHICAGO EXECUTIVE (PWK)

12096

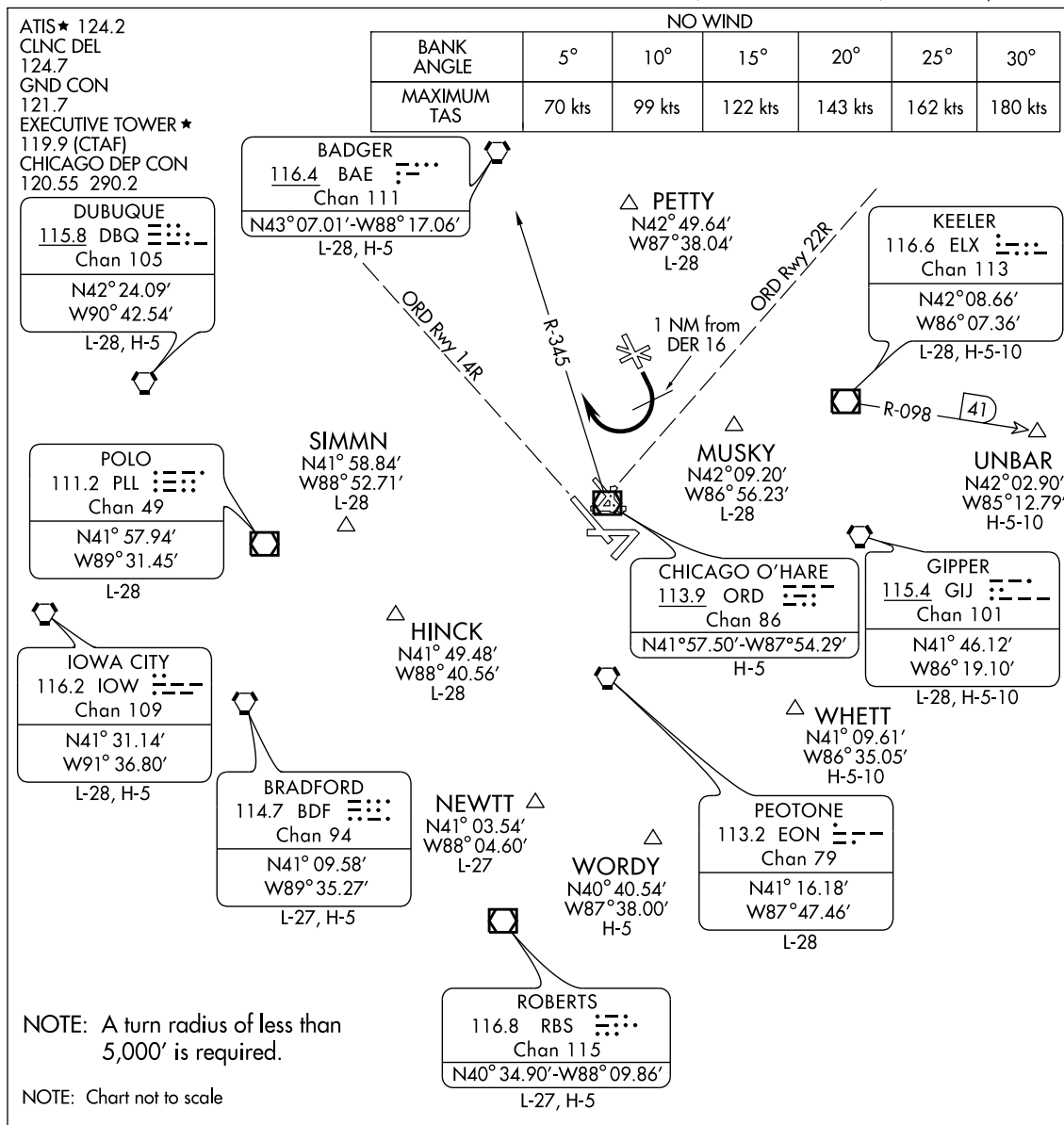
Figure 353. Airport Diagram (PWK).

12096

SL-5028 (FAA)

PAL-WAUKEE TWO DEPARTURE

CHICAGO EXECUTIVE (PWK)
CHICAGO/PROSPECT HEIGHTS/WHEELING, ILLINOIS



DEPARTURE ROUTE DESCRIPTION

All aircraft expect radar vectors to appropriate navaid/fix; maintain 3000 feet or assigned altitude. Expect clearance to requested altitude/flight level (three minutes for jet/turbo engine or five minutes for piston engines) after departure.

TAKE-OFF RUNWAY 16: Start right turn within 1 NM of departure end of runway and complete turn to assigned heading east of R-345 of the ORD VOR/DME. This will insure separation from the runway 14R final approach course at O'Hare Intl. If unable to comply, advise Executive Tower prior to take-off.

PAL-WAUKEE TWO DEPARTURE

CHICAGO/PROSPECT HEIGHTS/WHEELING, ILLINOIS
CHICAGO EXECUTIVE (PWK)

12096

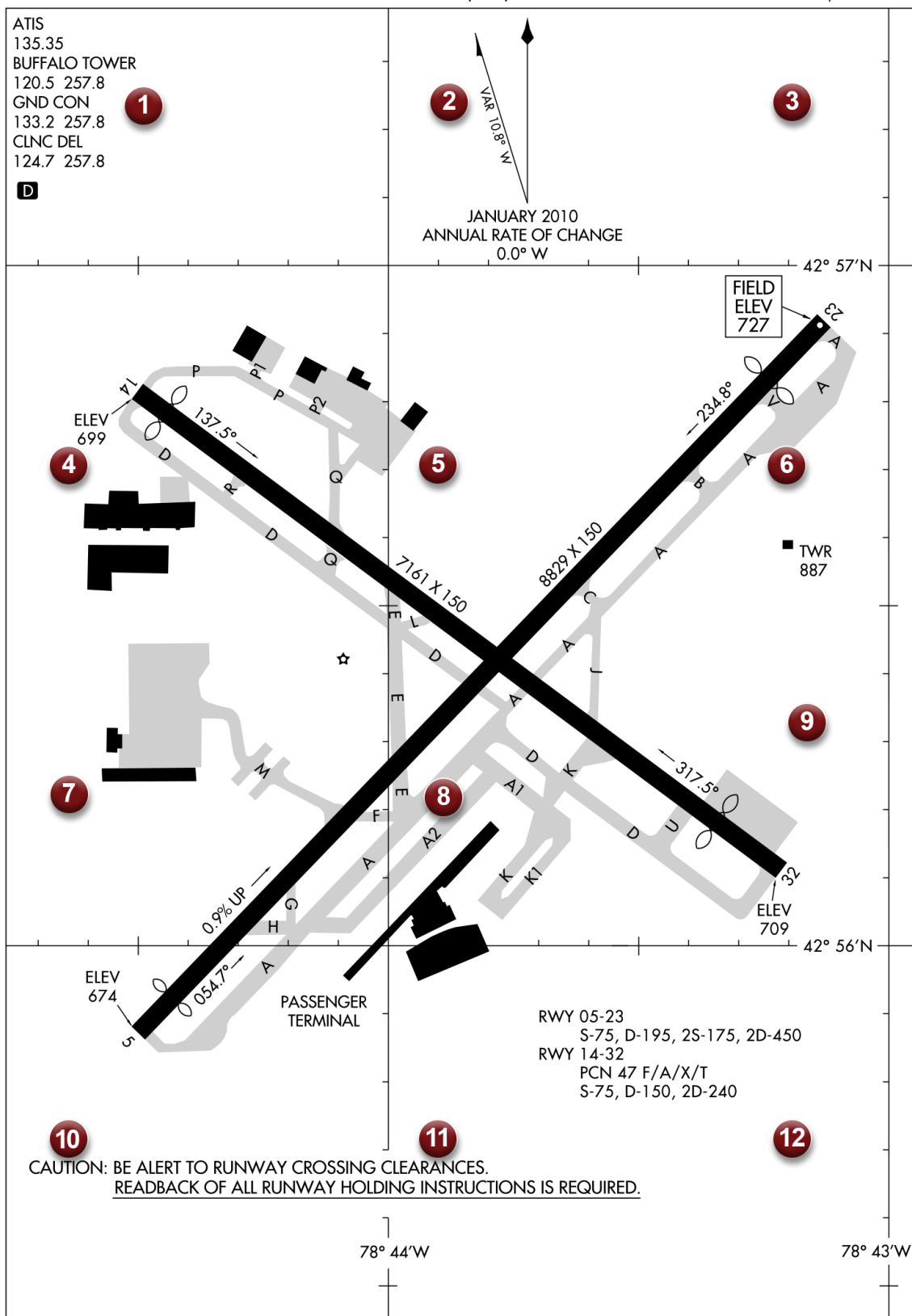
Figure 354. PAL-WAUKEE TWO Departure (PWK).

11293

AIRPORT DIAGRAM

AL-65 (FAA)

BUFFALO NIAGARA INTL (BUF)
BUFFALO, NEW YORK



AIRPORT DIAGRAM

11293

BUFFALO, NEW YORK
BUFFALO NIAGARA INTL (BUF)

Figure 355. Airport Diagram (BUF).

158

NEW YORK

BUFFALO NIAGARA INTL (BUF) 5 E UTC - 5(- 4DT) N42°56.43' W78°43.84'

DETROIT

727 B S4 FUEL 100LL, JET A OX 1, 2, 3, 4 LRA Class I, ARFF Index D

H-10H, 11B, L-31E

NOTAM FILE BUF

IAP, AD

RWY 05-23: H8829X150 (ASPH-GRVD) S-75, D-195, 2S-175, 2D-450 HIRL CL

RWY 05: MALSR. TDZL. Thld dsplcd 535'. Bldg. 0.9% up.

RWY 23: ALSF2. TDZL. Thld dsplcd 725'. Tree.

RWY 14-32: H7161X150 (ASPH-GRVD) S-75, D-150, 2D-240 PCN 47 F/A/X/T HIRL

RWY 14: REIL. PAPI(P4L)—GA 3.0° TCH 45'. Thld dsplcd 320'. Tree.

RWY 32: MALSR. REIL. PAPI(P4L)—GA 3.0° TCH 54'. Thld dsplcd 720'. Sign.

RUNWAY DECLARED DISTANCE INFORMATION

RWY 05: TORA-8827 TODA-8827 ASDA-8292 LDA-7757

RWY 14: TORA-7161 TODA-7161 ASDA-6441 LDA-6121

RWY 23: TORA-8827 TODA-8827 ASDA-8292 LDA-7567

RWY 32: TORA-7161 TODA-7161 ASDA-6841 LDA-6121

AIRPORT REMARKS: Attended continuously. Heavy concentration of gulls,

blackbirds, and starlings up to 5000 ft on and invof arpt. Deer on and invof arpt. Twy K1 clsd 0200-1300Z± daily. Twy A SW runup area/holding bay marked design group 3 acft (generally B727 or smaller), unavbl design group 4 (includes but not limited to B757, DC8). For fixed-base operator svcs ctc 131.75; for cargo svcs ctc 122.95. Rwy 23 ALSF2 unmonitored. Ldg fee. Flight Notification Service (ADCUS) available.

WEATHER DATA SOURCES: ASOS (716) 635-0532. WSP.

COMMUNICATIONS: D-ATIS 135.35

RCO 122.6 122.2 122.1R (BUFFALO RADIO)

Ⓡ APP DEP/CON 126.15 (053°-233°) 126.5 (234°-052°)

TOWER 120.5 GND CON 133.2 CLNC DEL 124.7 PRE-TAXI CLNC 124.7

AIRSPACE: CLASS C svc continuous, ctc APP CON

RADIO AIDS TO NAVIGATION: NOTAM FILE BUF.

(H) VOR/DME 116.4 BUF Chan 111 N42°55.74' W78°38.78' 288° 3.8 NM to fld. 730/08W.

VOR/DME unusable:

036°-261° blo 11,000'

276°-305° blo 6000'

262°-275° blo 2300'

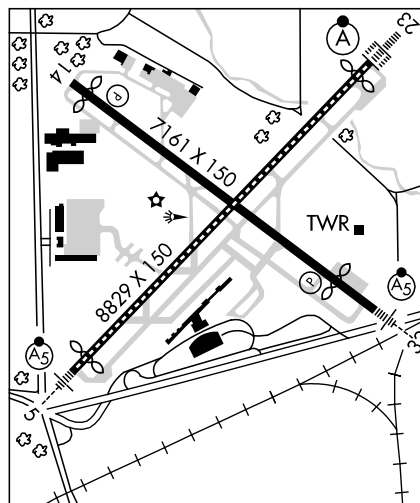
KLUMP NDB (LOM) 231 BU N43°00.02' W78°39.05' 233° 5.0 NM to fld.

PLAZZ NDB (LOM) 204 GB N42°52.43' W78°48.99' 053° 5.5 NM to fld.

ILS 111.3 I-BUF Rwy 23. Class IE. LOM KLUMP NDB. Glideslope unusable byd 5° rgt of course.

ILS 108.5 I-GBI Rwy 05. Class IA. LOM PLAZZ NDB.

ILS/DME 109.95 I-BNQ Chan 36(Y) Rwy 32.



CLARENCE AERODROME (D51) 5 NE UTC - 5(- 4DT) N43°04.00' W78°40.99'

DETROIT

589 NOTAM FILE BUF

RWY 10-28: 2500X67 (TURF) LIRL

RWY 10: Fence. **RWY 28:** Trees.

AIRPORT REMARKS: Unattended. Ultralights on and invof arpt. Rwy 10-28 outlined with cones. ACTIVATE LIRL Rwy 10-28-122.7.

COMMUNICATIONS: CTAF/UNICOM 122.7

BUFFALO-LANCASTER RGNL (See LANCASTER)

BURRELLO-MECHANICVILLE (See MECHANICVILLE)

CALVERTON N40°55.78' W72°47.93' NOTAM FILE ISP.

NEW YORK

(L) VOR/DME 117.2 CCC Chan 119 219° 7.2 NM to Brookhaven. 85/13W.

COPTER

VOR portion unusable 280°-290° byd 25 NM.

H-10I, L-33B, 34I

CAMBRIDGE N42°59.66' W73°20.64' NOTAM FILE BTV.

NEW YORK

(L) VOR/DME 115.0 CAM Chan 97 159° 7.5 NM to Bennington State, Vt. 1490/14W.

H-11C, 12I, L-32B, 34I

HIWAS.

DME unusable 050°-130° beyond 20 NM below 9000'.

Figure 356. BUFFALO THREE Departure (BUF).

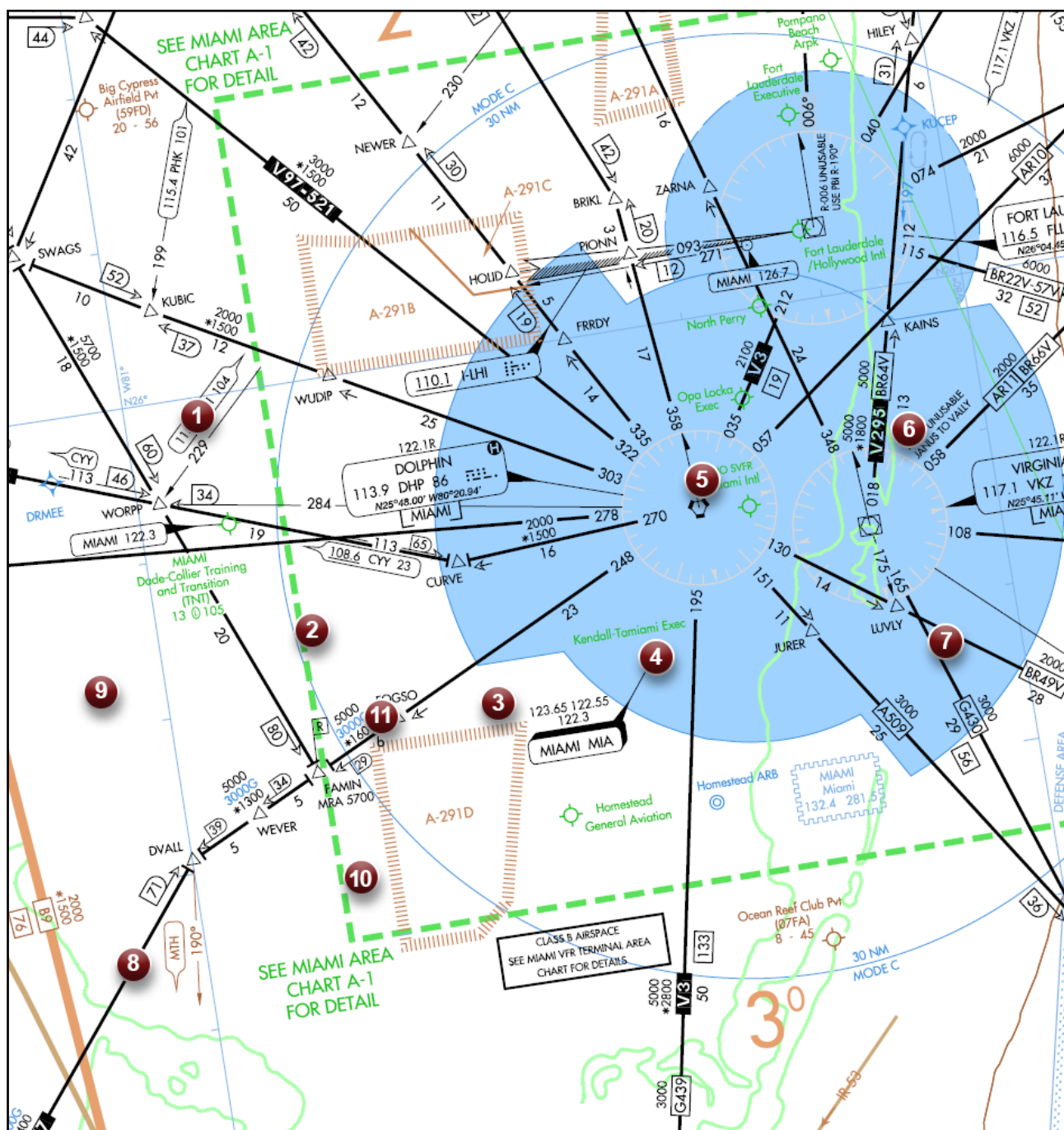
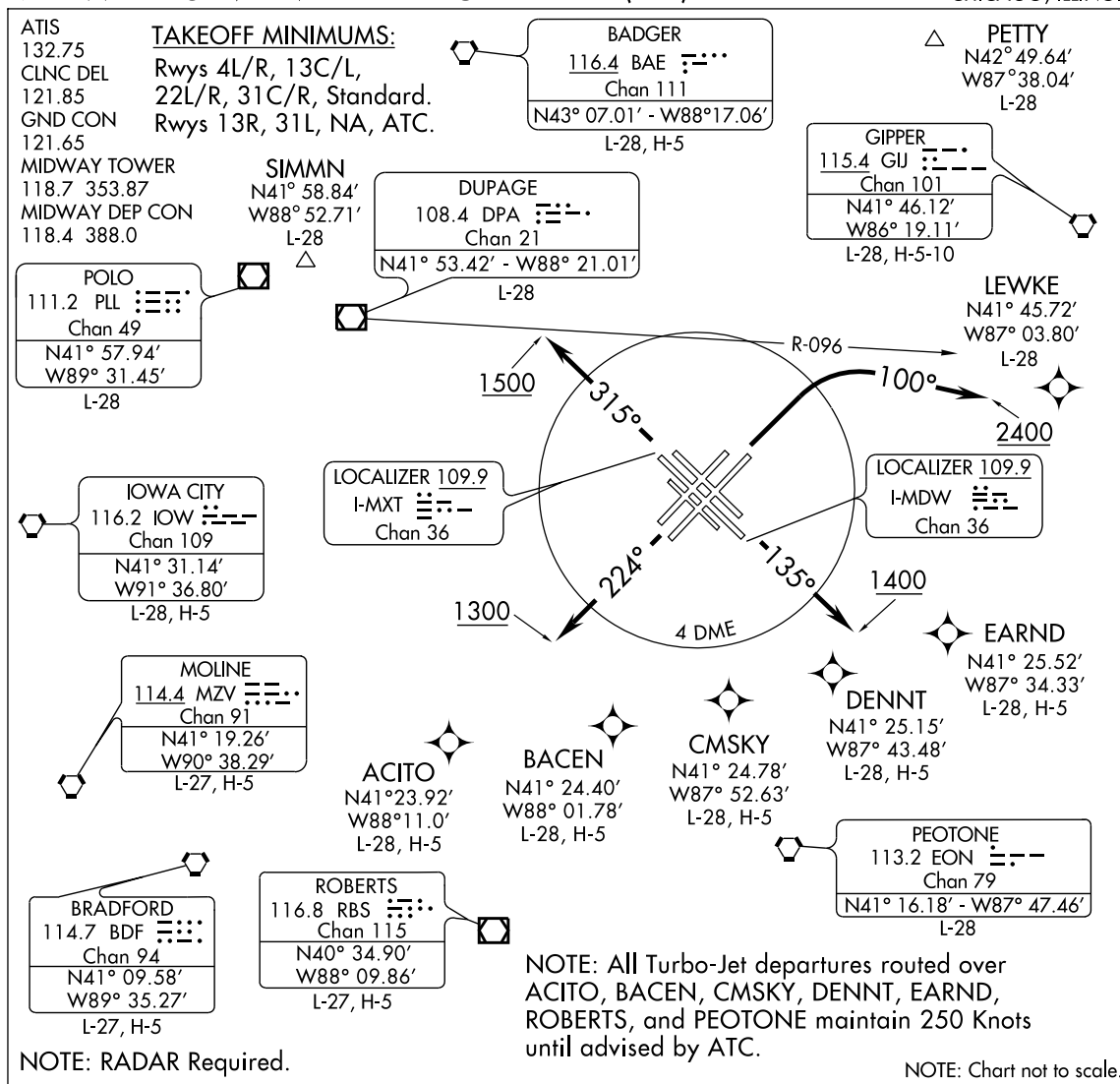


Figure 357. Low Altitude Airways.

(MDWAY7.MDW) 11125

MIDWAY SEVEN DEPARTURE SL-81 (FAA)

CHICAGO MIDWAY INTL (MDW)
CHICAGO, ILLINOIS



DEPARTURE ROUTE DESCRIPTION

ALL AIRCRAFT:

TAKE-OFF RWYS 4L/R: Northbound departures assigned headings 360° (CW) thru 080°, climbing right turn to 2400 heading 100° before proceeding on course, thence. . . .

TAKE-OFF RWY 13C: Climb heading 135° to 1400 before turning, thence. . . .

TAKE-OFF RWY 13L: Climb heading 135° to 1400 before turning, thence. . . .

TAKE-OFF RWY 22L: Climb heading 224° to 1300 before turning, thence. . . .

TAKE-OFF RWY 22R: Climb heading 224° to 1300 before turning, thence. . . .

TAKE-OFF RWY 31C: Climb heading 315° to 1500 before turning, thence. . . .

TAKE-OFF RWY 31R: Climb heading 315° to 1500 before turning, thence. . . .

DME EQUIPPED AIRCRAFT: Complete initially assigned turn within 4 DME of Midway. Maintain 3000 feet or assigned lower altitude, thence. . . .

NON-DME EQUIPPED AIRCRAFT: Complete initially assigned turn south of DPA R-096, maintain 3000 feet or assigned lower altitude, thence. . . .

....expect radar vectors to first enroute fix. Expect clearance to requested altitude/flight level 10 (ten) minutes after departure.

MIDWAY SEVEN DEPARTURE
(MDWAY7.MDW) 11125

CHICAGO, ILLINOIS
CHICAGO MIDWAY INTL (MDW)

Figure 358. MIDWAY SEVEN Departure (MDW).

(MDWAY7.MDW) 08325

MIDWAY SEVEN DEPARTURE SL-81 (FAA)

CHICAGO MIDWAY INTL (MDW)
CHICAGO, ILLINOISTAKEOFF OBSTACLE NOTES:

NOTE: RWY 4L, Fence 18 feet from DER, 257 feet left of centerline, 12 feet AGL/616 feet MSL. Vehicle plus road 143 feet from DER, 163 feet left of centerline, 16 feet AGL/620 feet MSL. Bldg 251 feet from DER, 217 feet left of centerline, 26 feet AGL/630 feet MSL. Sign 1,912 feet from DER, 330 feet left of centerline, 88 feet AGL/692 feet MSL. Multiple Lt poles and trees beginning 375 feet from DER, 98 feet right of centerline, up to 75 feet AGL/679 feet MSL.

NOTE: RWY 4R, LOC 300 feet from DER, on centerline, 10 feet AGL/614 feet MSL. Lt pole and multiple trees beginning 40 feet from DER, 369 feet left of centerline, up to 75 feet AGL/679 feet MSL. Blast fence 277 feet from DER, 45 feet left of centerline, 9 feet AGL/613 feet MSL. Tower 3,983 feet from DER, 1,142 feet left of centerline, 109 feet AGL/708 feet MSL. Multiple Lt poles and trees beginning 96 feet from DER, 21 feet right of centerline, up to 53 feet AGL/657 feet MSL. Train beginning 1,483 feet from DER, 570 feet right of centerline, 48 feet AGL/654 feet MSL.

NOTE: RWY 13C, LOC 248 feet from DER, on centerline, 8 feet AGL/619 feet MSL. Bldg 101 feet from DER, 254 feet left of centerline, 14 feet AGL/625 feet MSL. Trees beginning 288 feet from DER, 459 feet left of centerline, up to 76 feet AGL/680 feet MSL. Trees beginning 109 feet from DER, 402 feet right of centerline, up to 86 feet AGL/700 feet MSL.

NOTE: RWY 13L, Multiple poles and trees beginning 362 feet from DER, 215 feet left of centerline, up to 71 feet AGL/675 feet MSL. Trees beginning 1,136 feet from DER, 54 feet right of centerline, up to 76 feet AGL/680 feet MSL.

NOTE: RWY 22L, Multiple poles and trees beginning 74 feet from DER, 375 feet left of centerline, up to 70 feet AGL/689 feet MSL. Multiple poles and trees beginning 465 feet from DER, 49 feet right of centerline, up to 60 feet AGL/679 feet MSL. Tank 4,100 feet from DER, 161 feet right of centerline, 109 feet AGL/728 feet MSL.

NOTE: RWY 22R, Multiple poles and trees beginning 575 feet from DER, 168 feet left of centerline, up to 58 feet AGL/677 feet MSL. Tank 4,100 feet from DER, 161 feet left of centerline, 109 feet AGL/728 feet MSL. Fence 198 feet from DER, 3 feet right of centerline, 12 feet AGL/630 feet MSL. Trees beginning 183 feet from DER, 65 feet right of centerline, up to 72 feet AGL/686 feet MSL.

NOTE: RWY 31C, LOC 239 feet from DER, on centerline, 10 feet AGL/617 feet MSL. Trees beginning 452 feet from DER, 454 feet left of centerline, up to 63 feet AGL/667 feet MSL. Spire 2,207 feet from DER, 699 feet left of centerline, 78 feet AGL/684 feet MSL. Multiple poles and trees beginning 142 feet from DER, 28 feet right of centerline, up to 73 feet AGL/672 feet MSL. DME 183 feet from DER, 309 feet right of centerline, 17 feet AGL/624 feet MSL. Sign 1,528 feet from DER, 270 feet right of centerline, 52 feet AGL/652 feet MSL. Tank 5,576 feet from DER, 1,430 feet right of centerline, 162 feet AGL/756 feet MSL.

NOTE: RWY 31R, Multiple poles and trees beginning 379 feet from DER, 49 feet left of centerline, up to 65 feet AGL/664 feet MSL. Pole and trees beginning 70 feet from DER, 50 feet right of centerline, up to 68 feet AGL/667 feet MSL.

MIDWAY SEVEN DEPARTURE
(MDWAY7.MDW) 08325CHICAGO, ILLINOIS
CHICAGO MIDWAY INTL(MDW)

Figure 359. MIDWAY SEVEN Departure (MDW).

Appendix 2

ROCHESTER, NEW YORK

AL-351 (FAA)

LOC I-ROC 109.5	APP CRS 278°	Rwy Idg 5801
		TDZE 548
		Apt Elev 559

ILS or LOC RWY 28

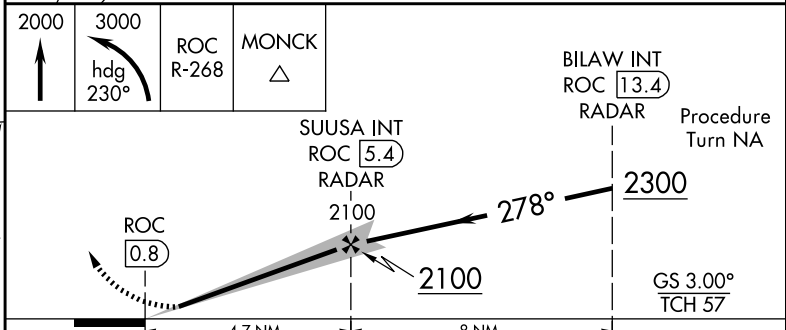
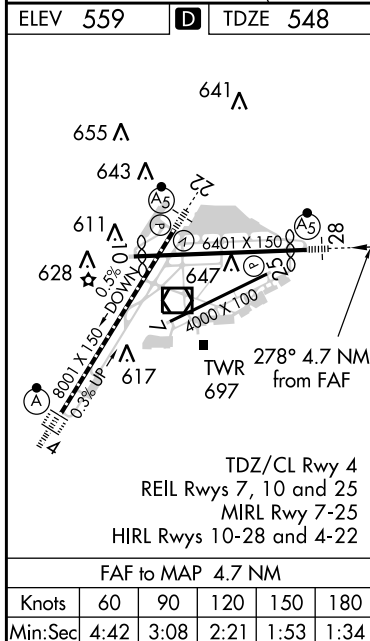
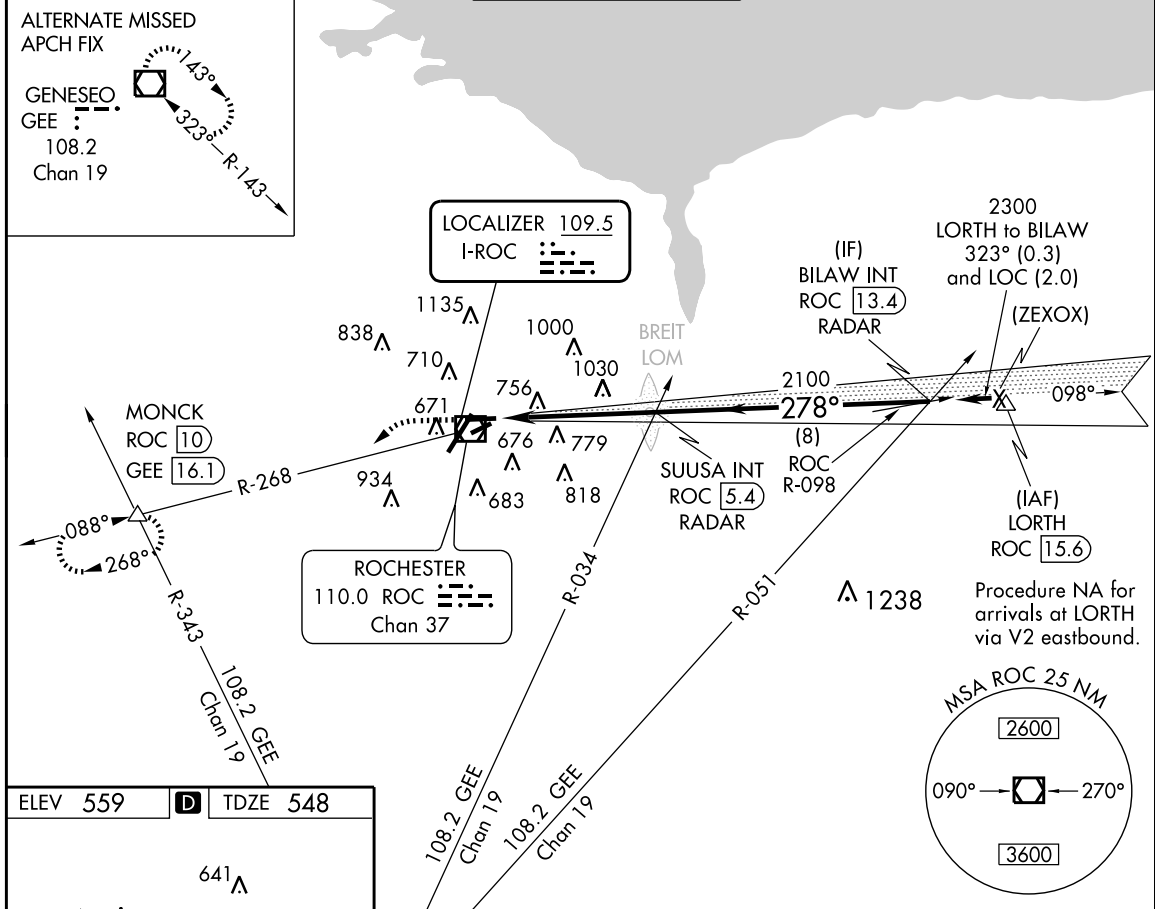
ROCHESTER / GREATER ROCHESTER INTL (ROC)

▼ Inoperative table does not apply to S-ILS 28 all Cats and S-LOC 28 Cats A and B.
▲ Visibility reduction by helicopters NA.
 Multiple unshielded lights in final approach area.

MALSR 

MISSED APPROACH: Climb to 2000 then climbing left turn to 3000 via heading 230° and ROC VOR/DME R-268 to MONCK INT/ROC 10 DME and hold.

ATIS 124.825	ROCHESTER APP CON 119.55 269.6	ROCHESTER TOWER 118.3 254.3	GND CON 121.7	CLNC DEL 118.8 387.0
------------------------	--	---------------------------------------	-------------------------	--------------------------------



CATEGORY	A	B	C	D
S-ILS 28	798/50 250 (300-1)			
S-LOC 28	1280/50	732 (800-1)	1280-1½ 732 (800-1½)	1280-1¾ 732 (800-1¾)
CIRCLING	1280-1	721 (800-1)	1280-2 721 (800-2)	1280-2¼ 721 (800-2¼)

ROCHESTER, NEW YORK
Amdt 30A 12040

ROCHESTER / GREATER ROCHESTER INTL (ROC)
43°07'N-77°40'W
ILS or LOC RWY 28

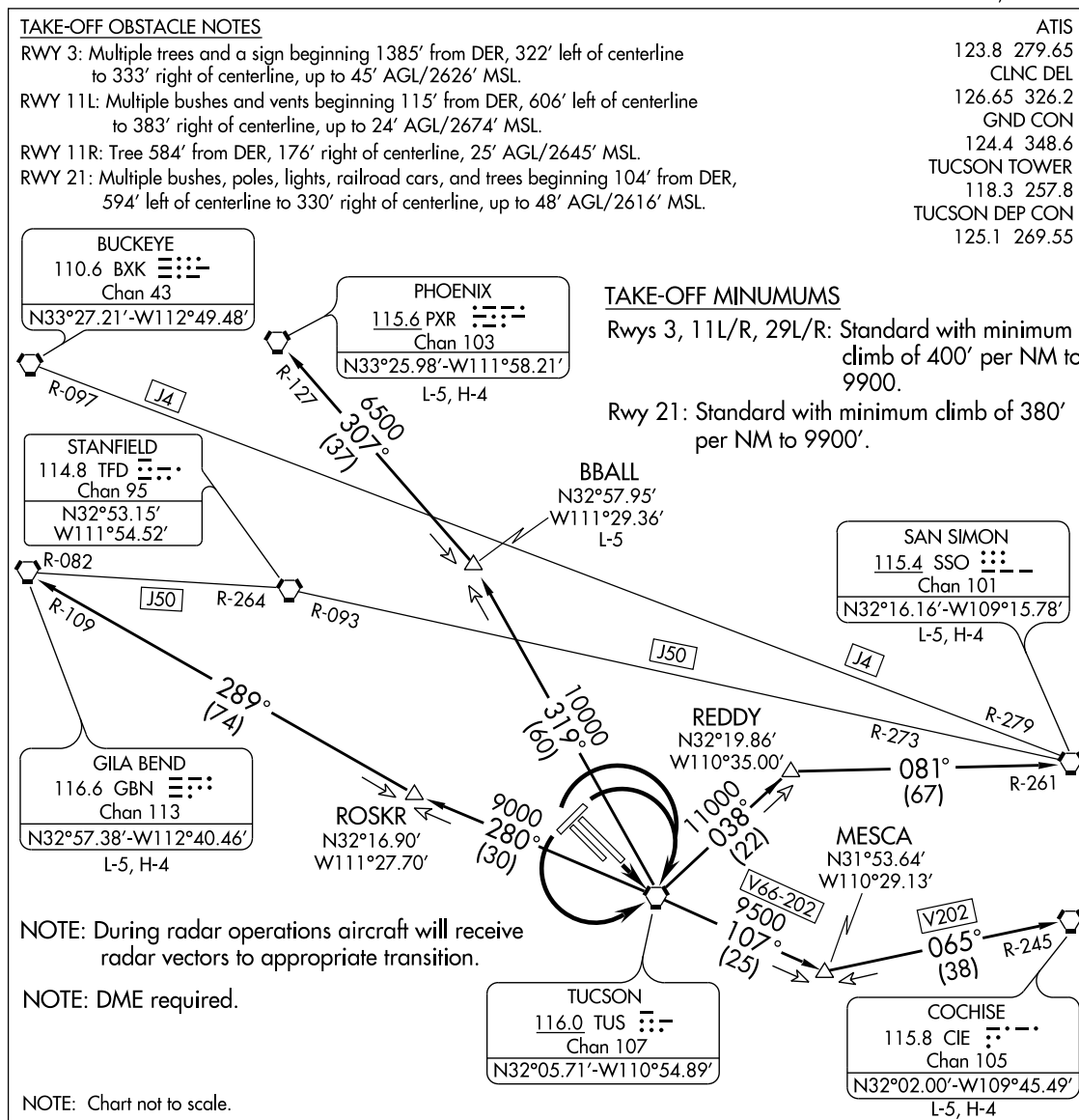
Figure 360. ILS or LOC RWY 28 (ROC).

(TUS7.TUS) 09183

TUCSON SEVEN DEPARTURE

SL-430 (FAA)

TUCSON INTL (TUS)
TUCSON, ARIZONA



DEPARTURE ROUTE DESCRIPTION

TAKE-OFF RUNWAYS 11L/R: Climb direct TUS VORTAC. Thence. . .

TAKE-OFF RUNWAYS 3, 29L/R: Climbing right turn direct TUS VORTAC. Thence. . .

TAKE-OFF RUNWAY 21: Climbing left turn direct TUS VORTAC. Thence. . .

. . . via assigned transition. Maintain 17000, expect clearance to filed altitude 10 minutes after departure.

BBALL TRANSITION (TUS7.BBALL): From over TUS VORTAC via TUS R-319 to BBALL INT.

COCHISE TRANSITION (TUS7.CIE): From over TUS VORTAC via TUS R-107 and CIE R-245 to CIE VORTAC.

GILA BEND TRANSITION (TUS7.GBN): From over TUS VORTAC via TUS R-280 and GBN R-109 to GBN VORTAC.

PHOENIX TRANSITION (TUS7.PXR): From over TUS VORTAC via TUS R-319 and PXR R-127 to PXR VORTAC.

SAN SIMON TRANSITION (TUS7.SSO): From over TUS VORTAC via TUS R-038 and SSO R-261 to SSO VORTAC.

TUCSON SEVEN DEPARTURE
(TUS7.TUS) 09183

TUCSON, ARIZONA
TUCSON INTL (TUS)

Figure 361. TUCSON SEVEN Departure (TUS7.TUS).

**TAKE-OFF MINIMUMS AND (OBSTACLE) DEPARTURE PROCEDURES**

12096

TONOPAH TEST RANGE (KTNX)

TONOPAH, NV. AMDT 1 12096
 DEPARTURE PROCEDURE: **Rwy 14**: 1000-3 with minimum climb of 320 ft/NM to 10,700 or 2700-3 for Climb in Visual Conditions. Climb on a heading between 325° CW to 155° from departure end of runway or Climb in Visual Conditions to cross KZ-KTNX airport at or above 8100 MSL before proceeding on course. **Rwy 32**: 1000-3 with minimum climb of 260 ft/NM to 5900 or 2700-3 for Climb in Visual Conditions. Climb on a heading between 295° CW to 005° from departure end of runway or Climb in Visual Conditions to cross KZ-KTNX airport at or above 8100 MSL before proceeding on course.
 TAKE-OFF OBSTACLES: **Rwy 14**, Terrain, 5582' MSL, 1204' from DER, 823' right of centerline. Terrain, 5565' MSL, 63' from DER, 517' right of centerline. Terrain, 5564' MSL, 46' from DER, 480' right of centerline. Terrain, 5561' MSL, 0' from DER, 353' right of centerline. Terrain, 5558' MSL, 62' from DER, 200' right of centerline. Terrain, 5561' MSL, 14' from DER, 292' right of centerline. Terrain, 5561' MSL, 0' from DER, 287' right of centerline. Terrain, 5559' MSL, 0' from DER, 222' right of centerline. Surveyed terrain, 5560' MSL, 215' from DER, 427' right of centerline. **Rwy 32**, Terrain, 5476' MSL, 0' from DER, 500' left of centerline. Terrain, 5476' MSL, 19' from DER, 465' left of centerline. Terrain, 5476' MSL, 110' from DER, 529' left of centerline.

TOOELE, UT**BOLINDER FIELD-TOOELE VALLEY**

TAKE-OFF MINIMUMS: **Rwy 17**, std. with a min. climb of 490' per NM to 11000. **Rwy 35**, std. with a min. climb of 360' per NM to 9000.
 DEPARTURE PROCEDURE: Use STACO DEPARTURE.
 NOTE: **Rwy 17**, tree 794' from departure end of runway, 277' right of centerline, 35' AGL/4380' MSL. Tree 967' from departure end of runway, 432' right of centerline, 35' AGL/4394' MSL. Tree 1023' from departure end of runway, 313' right of centerline, 35' AGL/4395' MSL.

TUCSON, AZ**MARANA RGNL**

TAKE-OFF MINIMUMS: **Rwys 3, 12**, N/A-Obstacles
 DEPARTURE PROCEDURE: **Rwy 21**, climb to 6500 via heading 360° and TUS R-308 to TOTEC Int/TUS 57 DME, then as filed. **Rwy 30**, climb to 6500 via heading 303° intercept TUS R-308 above 3500, to TOTEC INT/TUS 57 DME, then as filed.
 NOTE: **Rwy 21**, road 192' from departure end of runway, 527' left of centerline 15' AGL/2034' MSL.

RYAN FIELD (RYN)**AMDT 3 10210 (FAA)**

TAKE-OFF MINIMUMS: **Rwys 6L, 15, 24R, 33**, NA, ATC.
 DEPARTURE PROCEDURE: **Rwys 6R, 24L**, use ALMON DEPARTURE.

TUCSON, AZ (CON'T)**TUCSON INTL (TUS)****AMDT 4A 08241 (FAA)**

TAKE-OFF MINIMUMS: **Rwy 3**, 300-1¼ or std. w/ min. climb of 228' per NM to 3000.

DEPARTURE PROCEDURE: **Rwys 3, 29L, 29R**, climbing right turn direct to TUS VORTAC. **Rwys 11L, 11R** climb via runway heading to 4000 then climbing left turn direct TUS VORTAC. **Rwy 21**, climbing left turn direct to TUS VORTAC. **All aircraft** continue climbing in holding pattern (NW, right turns, 128° inbound) to depart TUS VORTAC at or above 9000.

NOTE: **Rwy 3**, tower 9215' from departure end of runway, 1689' left of centerline, 246' AGL/2831' MSL.

VERNAL, UT**VERNAL RGNL**

TAKE-OFF MINIMUMS: **Rwy 16**, 1500-2 or std with a min. climb of 250' per NM to 7000'. **Rwy 25**, 1500-2 or std. with a min. climb of 390' per NM to 7000. **Rwy 34**, 1600-2 pr std. with a min. climb of 330' per NM to 7000'.

DEPARTURE PROCEDURE: **Rwys 7, 34**, turn right. **Rwys 16, 25**, turn left. **All aircraft** climb direct VEL. Aircraft departing V391 S-bound climb on course. All others climb in holding pattern (SE, right turns, 322° inbound). Aircraft SW-bound V208 depart VEL at or above 8400', all others depart VEL at or above 9500'. Continue climb on course to MEA or assigned altitude.

WENDOVER, UT**WENDOVER**

TAKE-OFF MINIMUMS: **Rwy 26**, standard with a min. climb of 300' per NM to 7000. **Rwy 30**, NA.
 DEPARTURE PROCEDURE: **Rwys 8, 12, 26**, climbing left turn direct BVL VORTAC. Aircraft departing BVL VORTAC R-330 CW R-150 climb on course. All others continue climb in BVL VORTAC holding pattern (Hold NE right turns, 247° inbound) to cross at or above 7400, then climb on course.

WILLCOX, AZ**COCHISE COUNTY**

DEPARTURE PROCEDURE: **Rwy 3**, turn right. **Rwy 21**, turn left. **All aircraft** climb direct CIE VORTAC.

WINDOW ROCK, AZ**WINDOW ROCK**

TAKE-OFF MINIMUMS: **Rwy 2**, 700-2 or std. with a min. climb of 500' per NM to 8000. **Rwy 20**, 600-2 or std. with a min. climb of 260' per NM to 8200.

DEPARTURE PROCEDURE: **Rwy 2**, turn right.

Rwy 20, turn left direct to GUP VORTAC before proceeding on course.

NOTE: **Rwy 2**, terrain 3832' from departure end of runway, 1025' right of centerline, 6926' MSL. Poles 5220' from departure end of runway, 245' right of centerline, 180' AGL/6922' MSL. Tower 7067' from departure end of runway, 3072' left of centerline, 71' AGL/7316' MSL. Terrain 7449' from departure end of runway, 1612' left of centerline, 6991' MSL. Terrain 8776' from departure end of runway, 1851' left of centerline, 7109' MSL. Tree 9665' from departure end of runway, 1326' right of centerline, 7340' MSL. Tree 11326' from departure end of runway, 355' left of centerline, 7351' MSL. **Rwy 20**, trees 1018' from departure end of runway, 620' left of centerline, 30' AGL/ 6768' MSL.

12096

**TAKE-OFF MINIMUMS AND (OBSTACLE) DEPARTURE PROCEDURES**

Figure 362. Takeoff Minimums and (Obstacle) Departure Procedures.

HELENA, MONTANA


AL-192 (FAA)

ILS or LOC Y RWY 27

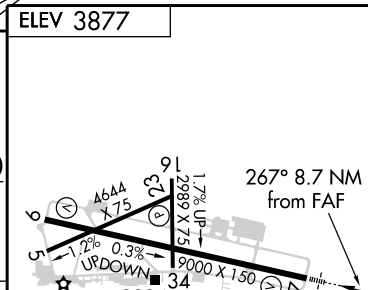
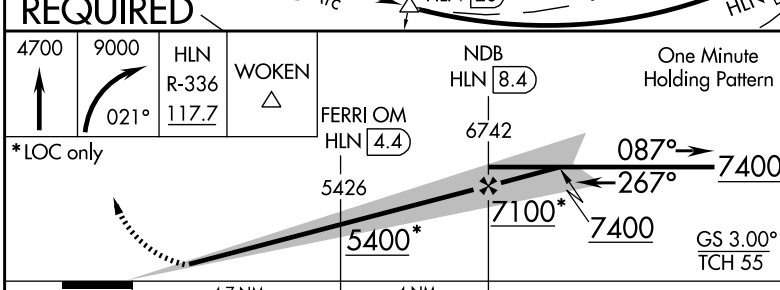
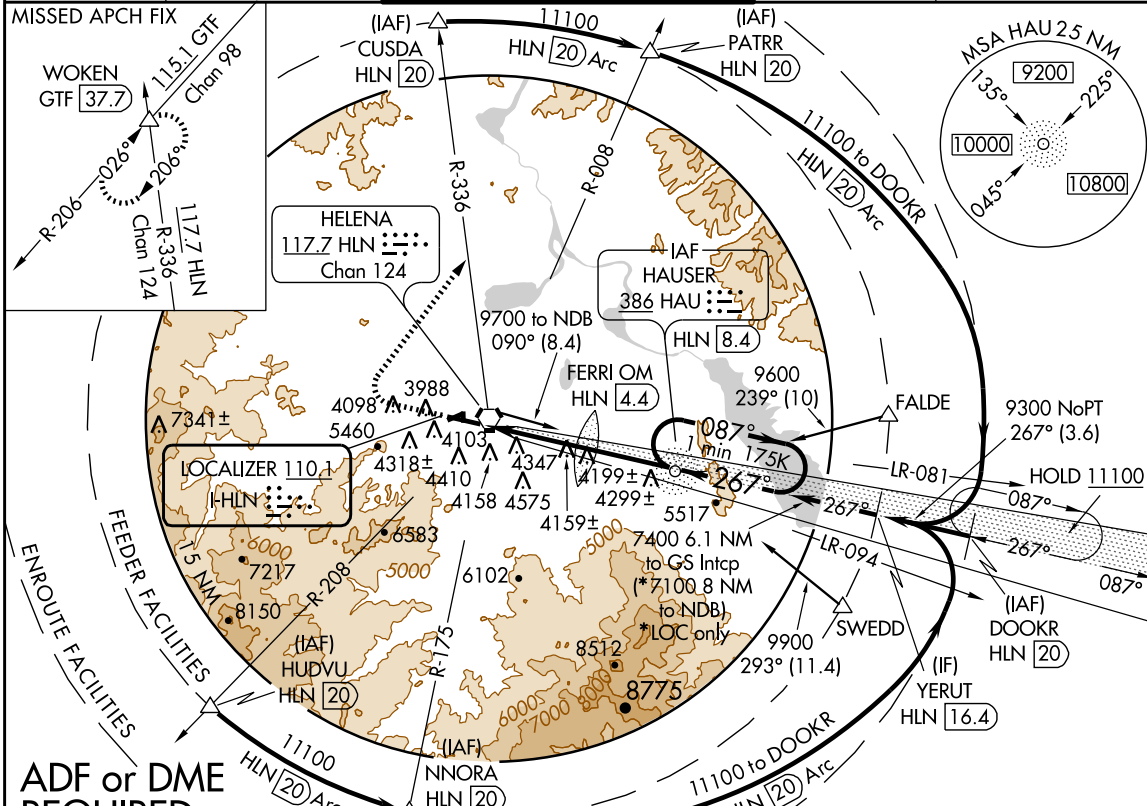
HELENA RGNL (HLN)

LOC I-HLN	APP CRS	Rwy Idg	9000
110.1	267°	TDZE	3852
		Apt Elev	3877

⚠ Circling NA for Cats. D and E south of Rwy 9-27. Inoperative table does not apply to S-LOC 27 Cats. A-B. For inoperative MALSR, increase S-ILS 27 all Cats. visibility to 2 miles, S-LOC 27 Cat. E visibility to 3 miles, FERRI fix minimums: S-LOC 27 Cat E visibility to 2½ miles. DME arc to final approach required for turbojet aircraft. Holding at HAU NDB authorized for Category A and B aircraft only.

MALSR

MISSED APPROACH: Climb to 4700 then climbing right turn to 9000 via heading 021° and HLN VORTAC R-336 to WOKEN INT and hold.

ATIS	HELENA APP CON *	HELENA TOWER *	GND CON	UNICOM
120.4	119.5 229.4	118.3 (CTAF) 257.8	121.9	122.95



CATEGORY	A	B	C	D	E
S-ILS 27	4402-1½ 550 (600-1½)				
S-LOC 27	5400-1¼ 1548 (1600-1¼)	5400-1½ 1548 (1600-1½)	5400-2½ 1548 (1600-2½)		
CIRCLING	5400-1¼ 1523 (1600-1¼)	5400-1½ 1523 (1600-1½)	5400-3 1523 (1600-3)		
FERRI FIX MINIMUMS *					
S-LOC 27	4560-½ 708 (700-½)	4560-1½ 708 (700-1½)	4560-1¾ 708 (700-1¾)	4560-2 708 (700-2)	
CIRCLING	4640-1 763 (800-1)	4740-2½ 863 (900-2½)	4740-2¾ 863 (900-2¾)	4840-3 963 (1000-3)	

ELEV 3877

One Minute Holding Pattern

REIL Rwy 9 **L**
 MRL Rwy 5-23 and 16-34 **L**
 HIRL Rwy 9-27 **L**

FAF to MAP 8.7 NM

Knots	60	90	120	150	180
Min:Sec	8:42	5:48	4:21	3:29	2:54

HELENA, MONTANA
 Amdt 2 10098

46° 36'N - 111° 59'W

ILS or LOC Y RWY 27

Figure 363. ILS or LOC Y RWY 27 (HLN).

HELENA, MONTANA

COPTER VOR 251°

HELENA RGNL (KHLN)

VORTAC HLN 117.7 Chan 124	APCH CRS 251°	Rwy ldg TDZE Arpt Elev N/A N/A 3877
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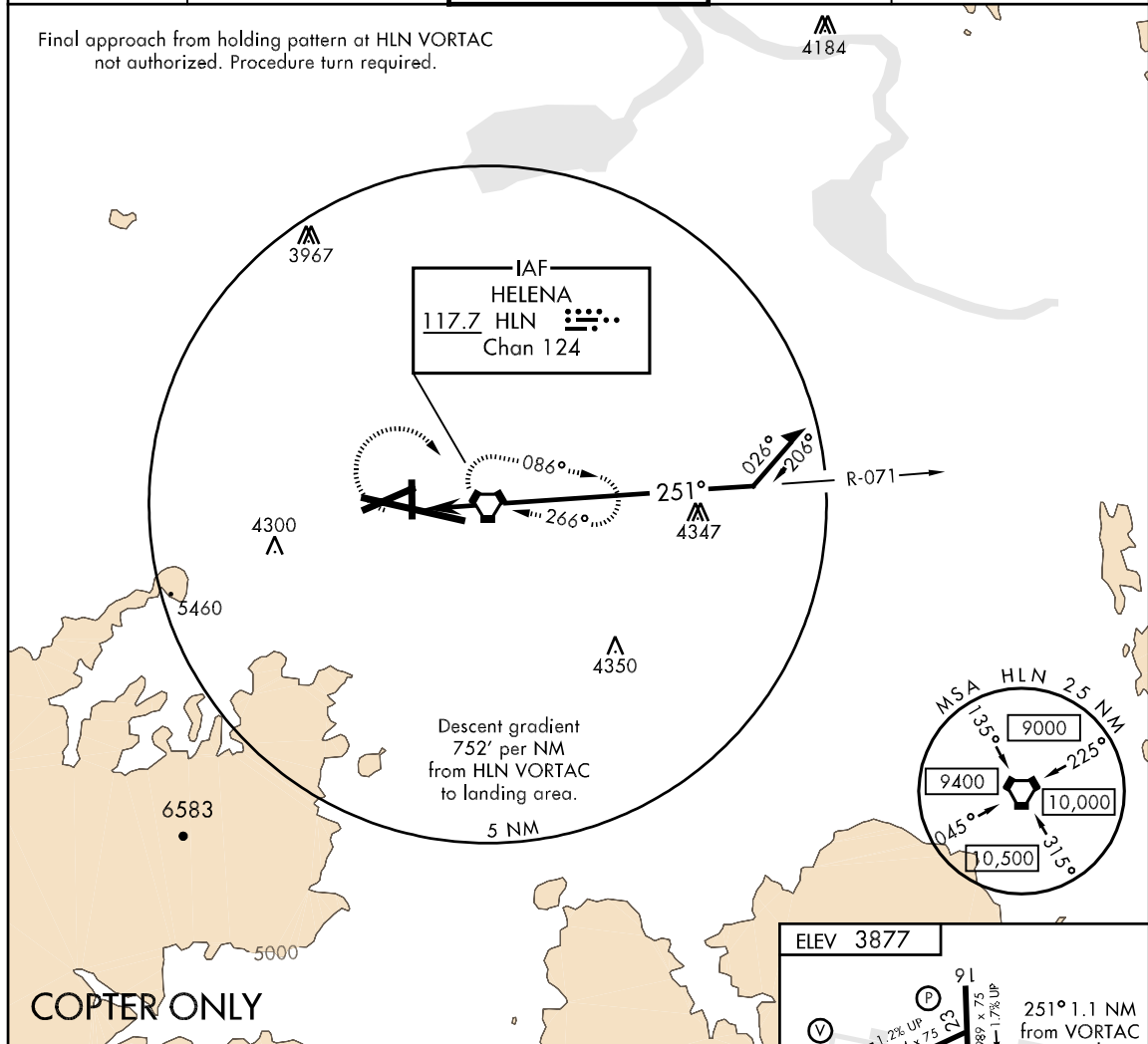
AL-192 [USA]

▼
▲ NA when tower clsd.

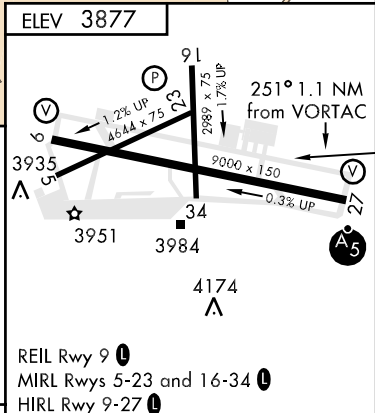
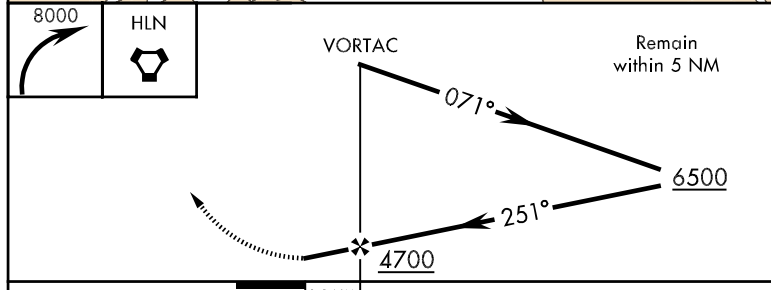
MISSED APPROACH: Climbing right turn to 8000 direct HLN VORTAC and hold.

ATIS 120.4	HELENA APP CON 119.5 229.4	HELENA TOWER ★ 118.3 (CTAF) 0 257.8	GND CON 121.9	UNICOM 122.95
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Final approach from holding pattern at HLN VORTAC not authorized. Procedure turn required.



COPTER ONLY



CATEGORY	COPTER				
H-251°	4260-½	412	(400-½)		
FAF to MAP 1.1 NM					
Knots	45	60	75	90	105
Min:Sec	1:28	1:06	0:53	0:44	0:37

HELENA, MONTANA
Amdt 1 08MAR12

46°36'N-111°59'W

HELENA RGNL (KHLN)

COPTER VOR 251°

Figure 364. COPTER VOR 251° (KHLN).

HELENA, MONTANA

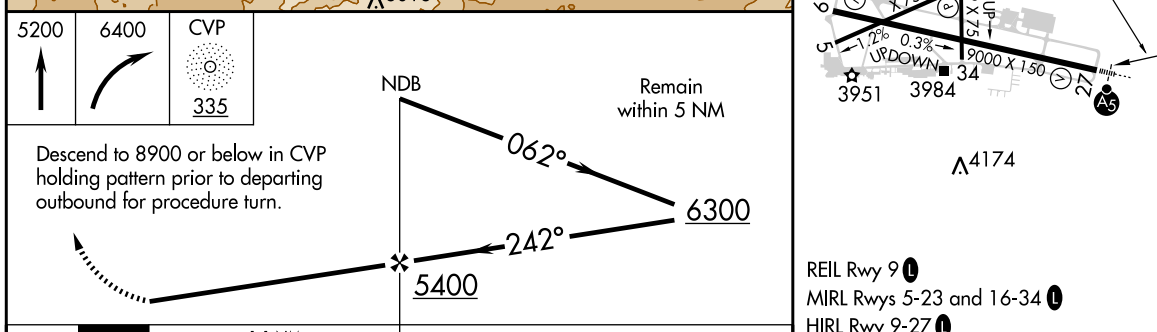
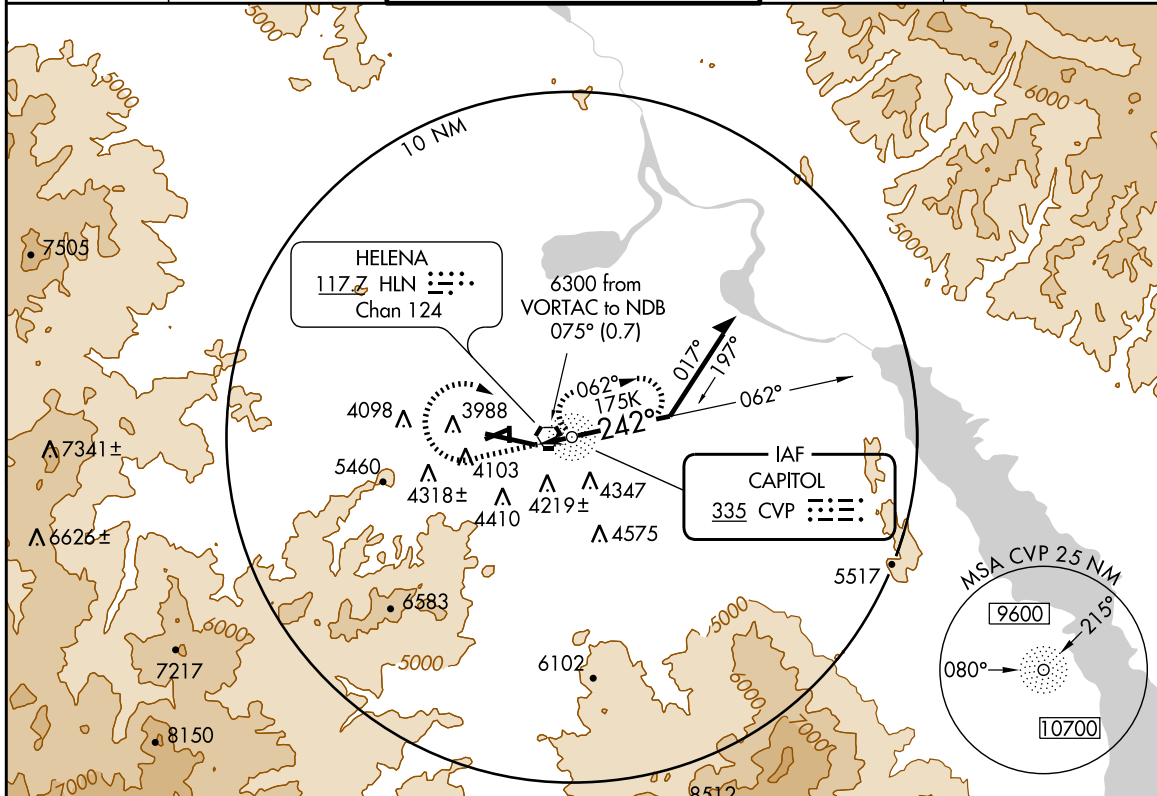
AL-192 (FAA)

NDB-D
HELENA RGNL (HLN)

NDB CVP 335	APP CRS 242°	Rwy Idg TDZE Apt Elev N/A 3877	
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MISSED APPROACH: Climb to 5200, then climbing right turn to 6400 direct CVP NDB and hold.

ATIS 120.4	HELENA APP CON ★ 119.5 229.4	HELENA TOWER ★ 118.3 (CTAF) 257.8	GND CON 121.9	UNICOM 122.95
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CATEGORY	A	B	C	D	FAF to MAP 1.1 NM					
CIRCLING	4980-1¼ 1103 (1200-1¼)		NA		Knots	60	90	120	150	180
					Min:Sec	1:06	0:44	0:33	0:26	0:22

HELENA, MONTANA
Amdt 3 09127

46°36'N - 111°59'W

HELENA RGNL (HLN)
NDB-D

Figure 365. NDB-D (HLN).

LOC I-HLN 110.1	APP CRS 087°	Rwy Idg TDZE Apt Elev N/A N/A 3877
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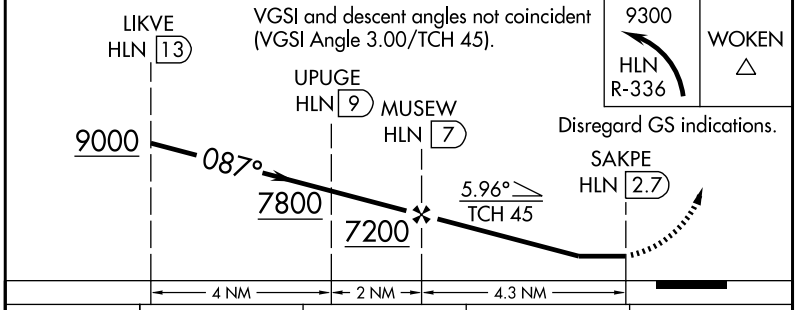
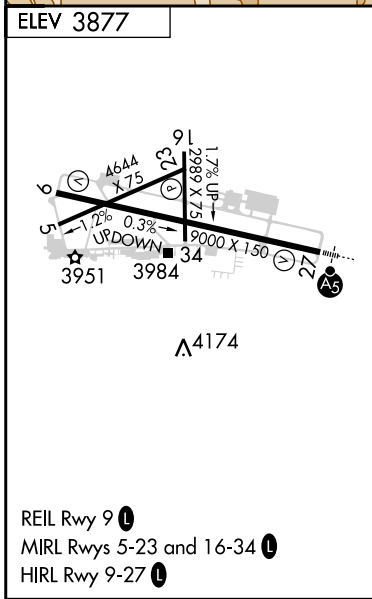
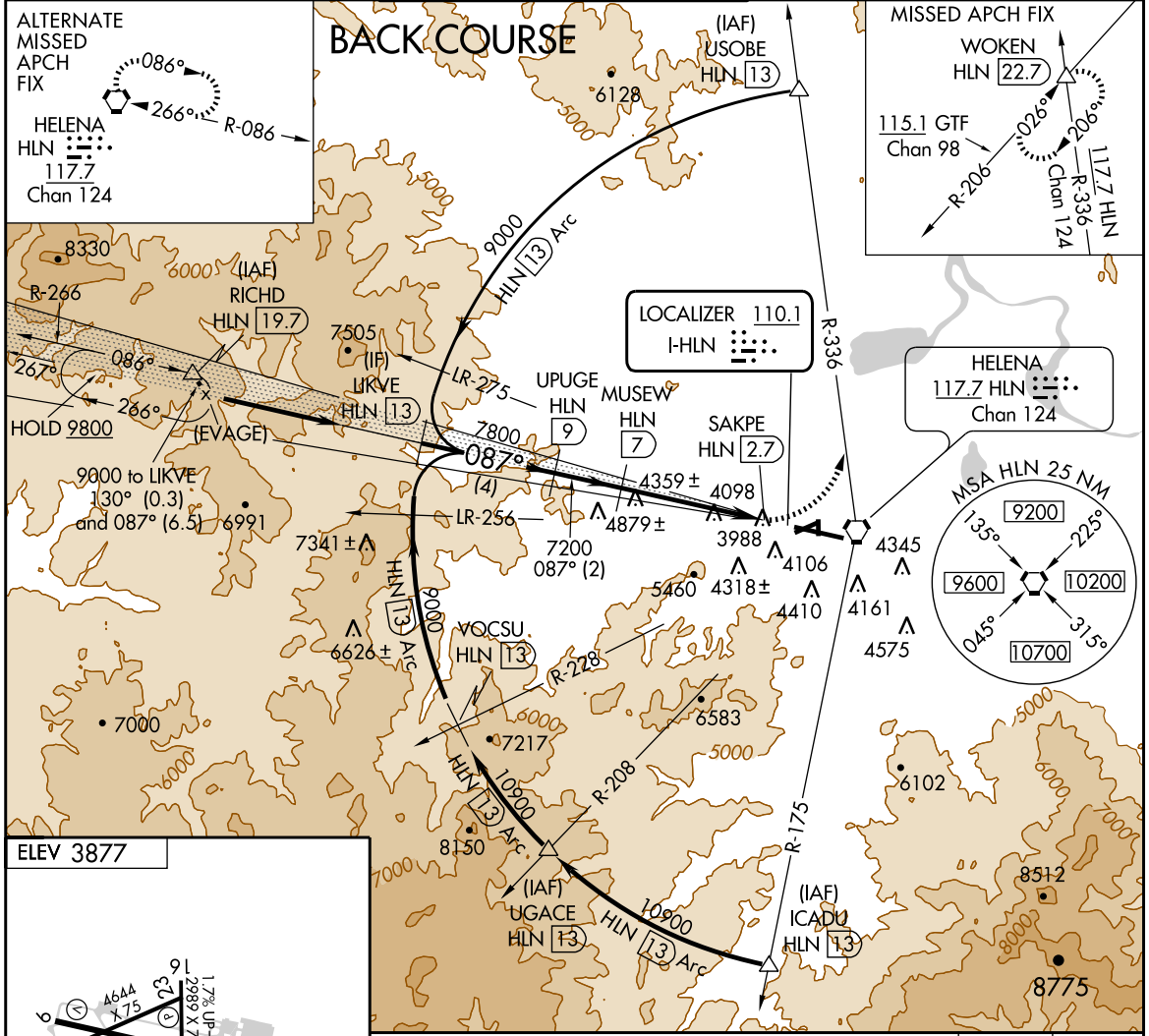
LOC/DME BC-C

HELENA RGNL (HLN)

▼ Circling to Rwy 5, 34 NA at night. When local altimeter setting not received, procedure NA.
▲ Visibility reduction by helicopters NA. DME from HLN VORTAC simultaneous reception of I-HLN and HLN DME required. When VGSI inop, circling to Rwy 9, 23 NA at night.

MISSED APPROACH: Climbing left turn to 9300 on HLN VORTAC R-336 to WOKEN INT and hold.

ATIS 120.4	HELENA APP CON* 119.5 229.4	HELENA TOWER* 118.3 (CTAF) 257.8	GND CON 121.9	UNICOM 122.95
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CATEGORY	A	B	C	D
CIRCLING	5140-1¼ 1263 (1300-1¼)	5140-1½ 1263 (1300-1½)	5140-3 1263 (1300-3)	NA

Figure 366. LOC/DME BC-C (HLN).

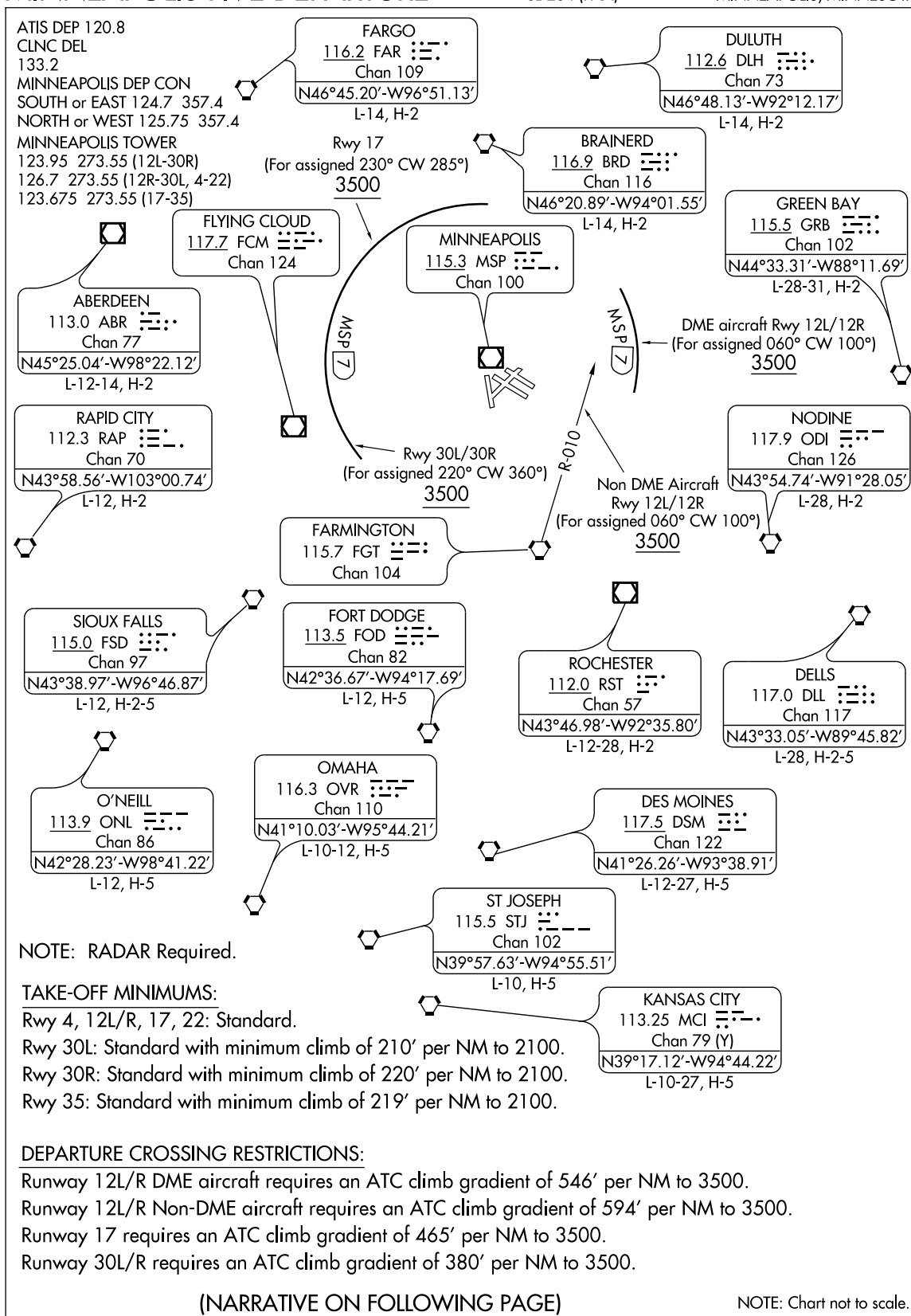
(MSP5.MSP) 12040

MINNEAPOLIS-ST PAUL INTL/WOLD-CHAMBERLAIN (MSP)

MINNEAPOLIS FIVE DEPARTURE

SL-264 (FAA)

MINNEAPOLIS, MINNESOTA



MINNEAPOLIS FIVE DEPARTURE

MINNEAPOLIS, MINNESOTA

(MSP5.MSP) 12040

MINNEAPOLIS-ST PAUL INTL/WOLD-CHAMBERLAIN (MSP)

Figure 367. MINNEAPOLIS FIVE Departure (MSP5.MSP).

(MSP5.MSP) 11349

MINNEAPOLIS-ST PAUL INTL/WOLD-CHAMBERLAIN (MSP)

MINNEAPOLIS FIVE DEPARTURE

SL-264 (FAA)

MINNEAPOLIS, MINNESOTA



DEPARTURE ROUTE DESCRIPTION

ALL RUNWAYS: Fly assigned heading for radar vectors to join filed/assigned route. Turbojet aircraft maintain 7000 or lower assigned altitude, all other aircraft maintain 5000 or lower assigned altitude. Expect clearance to assigned altitude/flight level 10 (ten) minutes after departure.

DME EQUIPPED AIRCRAFT RWY 12L/12R DEPARTURES: For assigned heading from 060° clockwise to 100°, cross MSP 7 DME at or above 3500, maintain assigned altitude. If unable to comply advise ATC as soon as possible prior to departure.

NON-DME EQUIPPED AIRCRAFT RWY 12L/12R DEPARTURES: For assigned headings from 060° clockwise to 100°, cross FGT R-010 at or above 3500, maintain assigned altitude. If unable to comply, advise ATC as soon as possible prior to departure.

TAKE-OFF RWY 17 DEPARTURES: For assigned headings from 230° clockwise to 285° cross MSP 7 DME at or above 3500, maintain assigned altitude. If unable to comply, advise ATC as soon as possible prior to departure.

TAKE-OFF RWYS 30L/30R DEPARTURES: For assigned headings from 220° clockwise to 360° cross MSP 7 DME at or above 3500, maintain assigned altitude. If unable to comply, advise ATC as soon as possible prior to departure.

TAKE-OFF OBSTACLE NOTES:

- RWY 04: Multiple trees beginning 800' from DER, 264' left of centerline, up to 75' AGL/921' MSL.
Rod on building 2528' from DER, 1175' left of centerline, 78' AGL/922' MSL.
Fence 803' from DER, 585' left of centerline, 15' AGL/860' MSL.
Ant on OL building 456' from DER, 319' left of centerline, 13' AGL/850' MSL.
LT poles 1932' from DER, 718' left of centerline, 45' AGL/885' MSL.
Stack 4535' from DER, 481' left of centerline, 139' AGL/949' MSL.
- RWY 12R: Multiple trees beginning 1477' from DER, 407' left of centerline, up to 86' AGL/851' MSL.
Multiple trees beginning 1426' from DER, 124' right of centerline, up to 111' AGL/847' MSL.
LT pole 1408' from DER, 746' right of centerline, 85' AGL/843' MSL.
Radar reflector 983' from DER, 32' left of centerline, 15' AGL/829' MSL.
Pipe on bldg, 826' from DER, 576' left of centerline, 10' AGL/825' MSL.
OL on LOC 766' from DER, on centerline, 7' AGL/821' MSL.
- RWY 17: Antenna 1272' from DER, 562' right of centerline, 57' AGL/891' MSL.
Pole 409' from DER, 530' right of centerline, 29' AGL/866' MSL.
Wind direction indicator on bldg 2619' from DER, 881' left of centerline, 97' AGL/918' MSL.
Bldg 2619' from DER, 859' left of centerline, 84' AGL/905' MSL.
LT 1176' from DER, 291' right of centerline, 11' AGL/875' MSL.
Tree 2619' from DER, on centerline, 79' AGL/900' MSL.
- RWY 22: Tree 2906' from DER, 833' right of centerline, 94' AGL/934' MSL.
Hopper 1717' from DER, 456' left of centerline, 48' AGL/888' MSL.
- RWY 30L: Multiple trees beginning 1113' from DER, 701' left of centerline, up to 80' AGL/919' MSL.
Tree 1230' from DER, 633' right of centerline, 30' AGL/877' MSL.
Ground 28' from DER, 490' right of centerline, 0' AGL/844' MSL.
- RWY 30R: Bldg 1056' from DER, 198' left of centerline, 13' AGL/853' MSL.
Multiple trees beginning 3010' from DER, 334' left of centerline, up to 94' AGL/940' MSL.
LT pole 1849' from DER, 698' right of centerline, 17' AGL/871' MSL.
Fence 1327' from DER, 667' right of centerline, 8' AGL/857' MSL.
Tree 3703' from DER, 350' right of centerline, 67' AGL/914' MSL.
Rod on pole 3143' from DER, 47' right of centerline, 38' AGL/898' MSL.
- RWY 35: Tree 175' from DER, 398' right of centerline, 73' AGL/883' MSL.
Multiple trees beginning 1989' from DER, 351' left of centerline, up to 65' AGL/902' MSL.
Multiple buildings beginning 5.5 NM from DER, 1787' left of centerline, up to 811' AGL/1743' MSL.

MINNEAPOLIS FIVE DEPARTURE

MINNEAPOLIS, MINNESOTA

(MSP5.MSP) 11349

MINNEAPOLIS-ST PAUL INTL/WOLD-CHAMBERLAIN (MSP)

Figure 368. MINNEAPOLIS FIVE Departure (MSP5.MSP).

MINNEAPOLIS, MINNESOTA

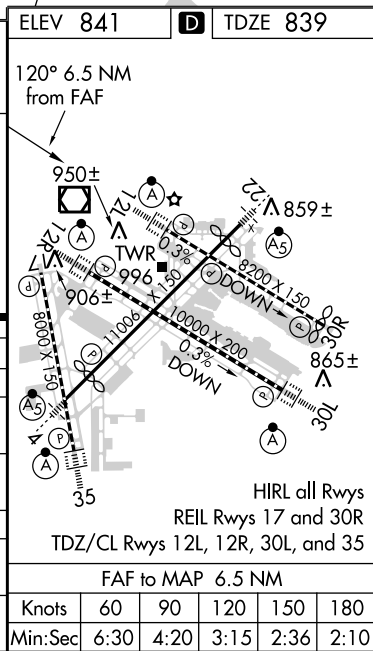
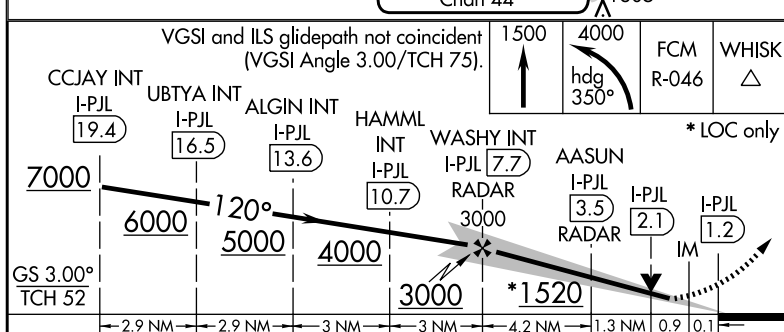
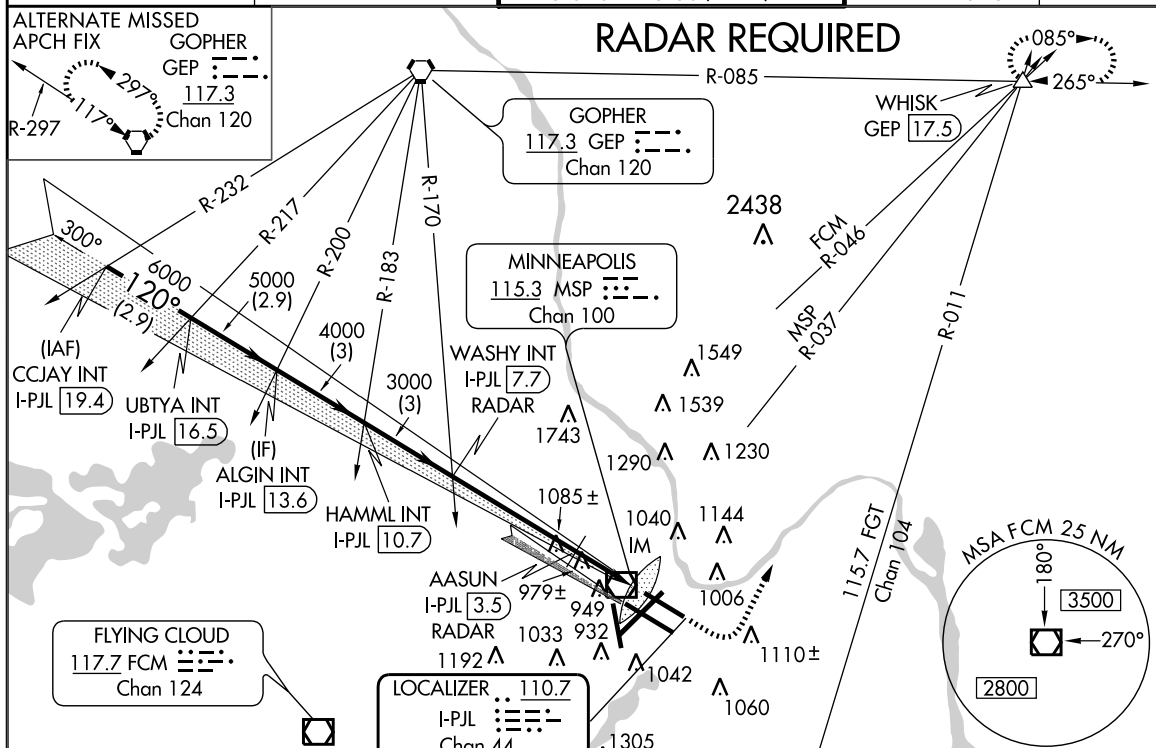
AL-264 (FAA)

12068

LOC/DME I-PJL 110.7 Chan 44	APP CRS 120°	Rwy Idg TDZE Apt Elev	7620 839 841	ILS or LOC RWY 12L MINNEAPOLIS-ST PAUL INTL/WOLD-CHAMBERLAIN (MSP)
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<p>▲ For inop ALSF, increase S-ILS 12L Cat E visibility to RVR 4000 and S-LOC 12L Cat E visibility to 2½ mile. For inop ALSF when using AASUN fix minimums, increase S-LOC Cat E visibility to 1½ mile. Simultaneous approach authorized with Rwy 12R.</p>	<p>ALSF-2 </p>	<p>MISSED APPROACH: Climb to 1500, then climbing left turn to 4000 via heading 350° and FCM VOR/DME R-046 to WHISK INT/ GEP 17.5 DME and hold.</p>
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<p>ATIS ARR 135.35 239.275 DEP 120.8</p>	<p>MINNEAPOLIS APP CON 119.3 335.5</p>	<p>MINNEAPOLIS TOWER 123.95 273.55 (12L-30R) 126.7 273.55 (12R-30L, 4-22) 123.675 273.55 (17-35)</p>	<p>GND CON N 121.8 348.6 S 121.9 348.6 W 127.925</p>	<p>CLNC DEL 133.2</p>
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CATEGORY	A	B	C	D	E
S-ILS 12L	1039/18 200 (200-½)				
S-LOC 12L	1520/24	681 (700-½)	1520-1½ 681 (700-1½)	1520-¾ 681 (700-¾)	1520-2 681 (700-2)
CIRCLING	1520-1	679 (700-1)	1520-2 679 (700-2)	1520-2¼ 679 (700-2¼)	1660-3 819 (900-3)
AASUN FIX MINIMUMS					
S-LOC 12L	1240/24	401 (400-½)	1240/40	401 (400-¾)	1240/50 401 (400-1)
CIRCLING	1360-1	519 (600-1)	1360-1½ 519 (600-1½)	1460-2 619 (700-2)	1660-3 819 (900-3)

MINNEAPOLIS, MINNESOTA
Amdt 8A 08MAR12

MINNEAPOLIS-ST PAUL INTL/WOLD-CHAMBERLAIN (MSP)
44°53'N-93°13'W
ILS or LOC RWY 12L

Figure 369. ILS or LOC RWY 12L (MSP).

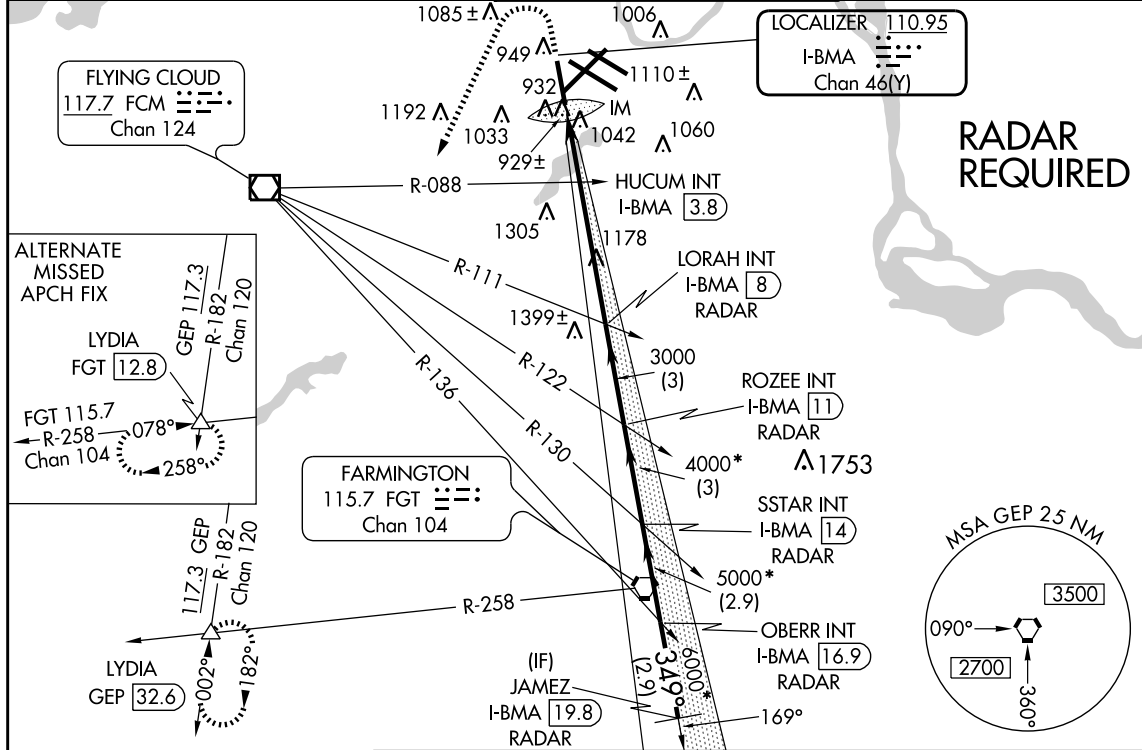
LOC/DME I-BMA 110.95 Chan 46 (Y)	APP CRS 349°	Rwy Idg 8000 TDZE 834 Apt Elev 841
---	------------------------	---

ILS or LOC RWY 35

MINNEAPOLIS-ST PAUL INTL/WOLD-CHAMBERLAIN (MSP)

<p>▼ For inoperative ALSF, increase S-ILS 35 Cat E visibility to RVR 4000, increase all S-LOC 35 Cat E visibilities to ½ mile.</p> <p>▲ ALSF-2</p>	<p>MISSED APPROACH: Climb to 1600 then climbing left turn to 5000 via heading 240° and GEP R-182 to LYDIA INT/ GEP 32.6 DME and hold.</p>
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<p>ATIS ARR 135.35 239.275 DEP 120.8</p>	<p>MINNEAPOLIS APP CON 119.3 335.5</p>	<p>MINNEAPOLIS TOWER 123.95 273.55 (12L-30R) 126.7 273.55 (12R-30L, 4-22) 123.675 273.55 (17-35)</p>	<p>GND CON N 121.8 348.6 S 121.9 348.6 W 127.925</p>	<p>CLNC DEL 133.2</p>
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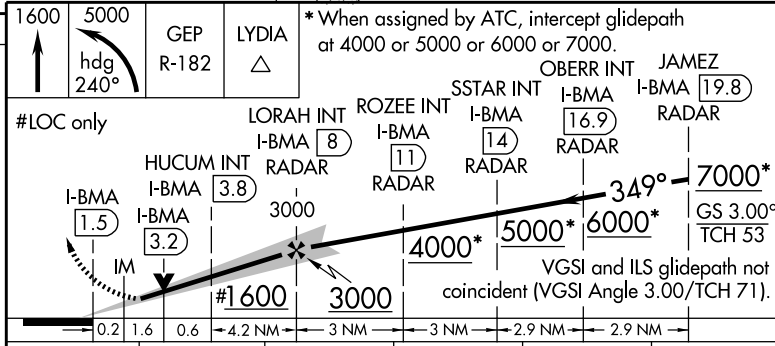


ELEV 841 TDZE 834

HIRL all Rwy's
REIL Rwy's 17 and 30R
TDZ/CL Rwy's 12L, 12R, 30L, and 35

FAF to MAP 6.5 NM

Knots	60	90	120	150	180
Min:Sec	6:30	4:20	3:15	2:36	2:10



CATEGORY	A	B	C	D	E
S-ILS 35	1034/18 200 (200-½)				
S-LOC 35	1600/24 766 (800-½)	1600/40 766 (800-¾)	1600-1¾ 766 (800-1¾)	1600-2 766 (800-2)	1600-2¼ 766 (800-2¼)
CIRCLING	1600-1 759 (800-1)	1600-1¼ 759 (800-¼)	1600-2¼ 759 (800-2¼)	1600-2½ 759 (800-2½)	1660-3 819 (900-3)
HUCUM FIX MINIMUMS					
S-LOC 35	1460/24 626 (700-½)	626 (700-½)	1460/60 626 (700-¼)	1460-1½ 626 (700-½)	1460-1¾ 626 (700-¾)
CIRCLING	1460-1 619 (700-1)	619 (700-1)	1460-1¾ 619 (700-¾)	1460-2 619 (700-2)	1660-3 819 (900-3)

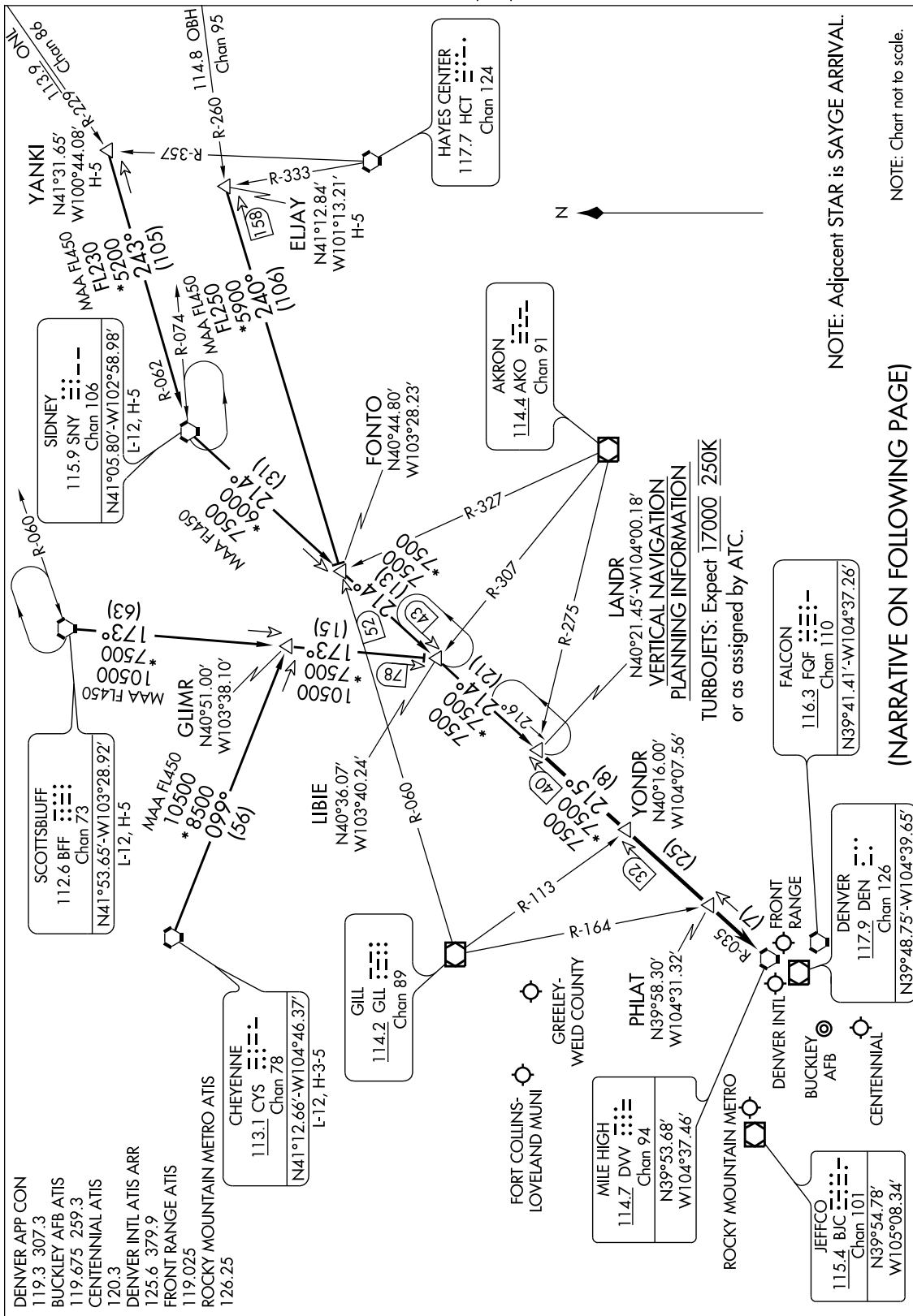
Figure 370. ILS or LOC RWY 35 (MSP).

(LANDR.LANDR6) 12096

LANDR SIX ARRIVAL

ST-9077 (FAA)

DENVER, COLORADO



LANDR SIX ARRIVAL

(LANDR.LANDR6) 12096

DENVER, COLORADO

Figure 371. LANDR SIX Arrival (LANDR.LANDR6).

(LANDR.LANDR6) 12096
LANDR SIX ARRIVAL

ST-9077 (FAA)

DENVER, COLORADO

ARRIVAL ROUTE DESCRIPTION

CHEYENNE TRANSITION (CYS.LANDR6): From over CYS VORTAC via CYS R-099 and BFF R-173 to LIBIE INT; then via SNY R-214 and DVV R-035 to LANDR INT. Thence

ELJAY TRANSITION (ELJAY.LANDR6): From over ELJAY INT via GLL R-060 to FONTO INT, then via SNY R-214 and DVV R-035 to LANDR INT. Thence

SCOTTSBLUFF TRANSITION (BFF.LANDR6): From over BFF VORTAC via BFF R-173 to LIBIE INT; then via SNY R-214 and DVV R-035 to LANDR INT. Thence

SIDNEY TRANSITION (SNY.LANDR6): From over SNY VORTAC via SNY R-214 to FONTO INT, then via SNY R-214 and DVV R-035 to LANDR INT. Thence

YANKI TRANSITION (YANKI.LANDR6): From over YANKI INT via SNY R-062 to SNY VORTAC; then via SNY R-214 and DVV R-035 to LANDR INT. Thence

. . . . From over LANDR INT via DVV R-035 to DVV VORTAC. Expect RADAR vectors to the final approach course at or before DVV VORTAC.

LANDR SIX ARRIVAL
 (LANDR.LANDR6) 12096

DENVER, COLORADO

Figure 372. LANDR SIX Arrival (LANDR.LANDR6).

DENVER, COLORADO


AL-9077 (FAA)

ILS or LOC RWY 25

DENVER INTL (DEN)

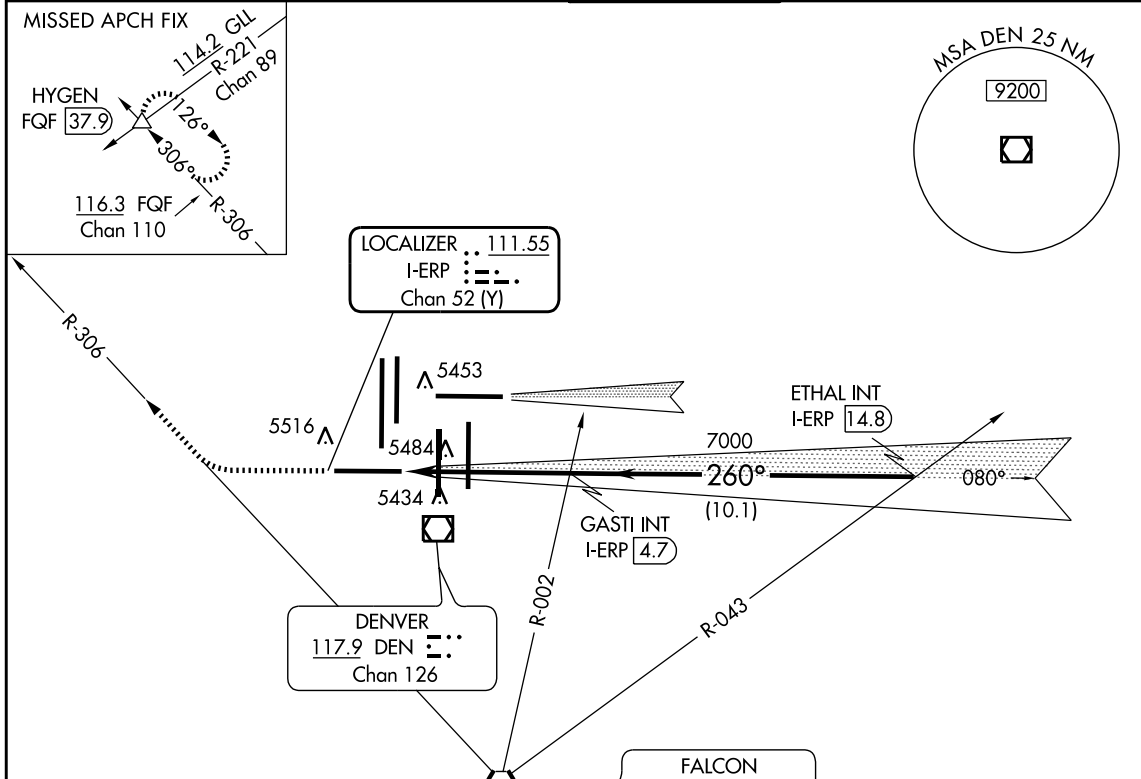
LOC/DME I-ERP 111.55 Chan 52 (Y)	APP CRS 260°	Rwy Idg 12000 TDZE 5352 Apt Elev 5431
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Simultaneous approach authorized with Rwy 26.
S-LOC minimums not authorized during simultaneous operations.
RVR 1800 authorized with the use of FD or AP or HUD to DA.

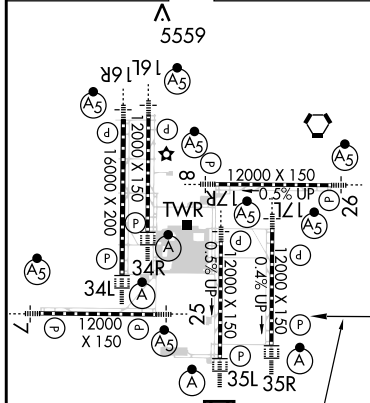
MALSR 

MISSED APPROACH: Climb to 12000 via 260° heading and FQF VORTAC R-306 to HYGEN INT/FQF 37.9 DME and hold.

ATIS ARR 125.6 379.9 DEP 134.025	DENVER APP CON 119.3 307.3 120.35 379.3 (NORTH) (SOUTH)	DENVER TOWER 132.35 273.55	GND CON 127.5 379.175	CLNC DEL 118.75
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ELEV 5431 TDZE 5352



TDZ/CL Rws 7, 16L, 16R, 17R, 26, 34L, 34R, 35L, 35R 260° 4.9 NM from FAF

HIRL all Rws

FAF to MAP 4.9 NM					
Knots	60	90	120	150	180
Min:Sec	4:54	3:16	2:27	1:58	1:38



RADAR REQUIRED

12000	FQF R-306	HYGEN	*or as assigned by ATC	ETHAL INT I-ERP 14.8
260° hdg			†7000 when assigned by ATC	
			GASTI INT I-ERP 4.7	
			7000	
			8000†	
			10000*	
			GS 3.00° TCH 59	
			4.9 NM	10.1 NM

CATEGORY	A	B	C	D
S-ILS 25	# 5552/24 200 (200-½)			
S-LOC 25	5720/24 368 (300-½)		5720/40 368 (300-¾)	
CIRCLING	NA			

DENVER, COLORADO
Amdt 2B 12096

39°52'N-104°40'W

DENVER INTL (DEN)

ILS or LOC RWY 25

Figure 373. ILS or LOC RWY 25 (DEN).

Appendix 2


DENVER, COLORADO

AL-9077 (FAA)

LOC/DME I-FUI 108.9 Chan 26	APP CRS 080°	Rwy Idg 12000 TDZE 5351 Apt Elev 5431
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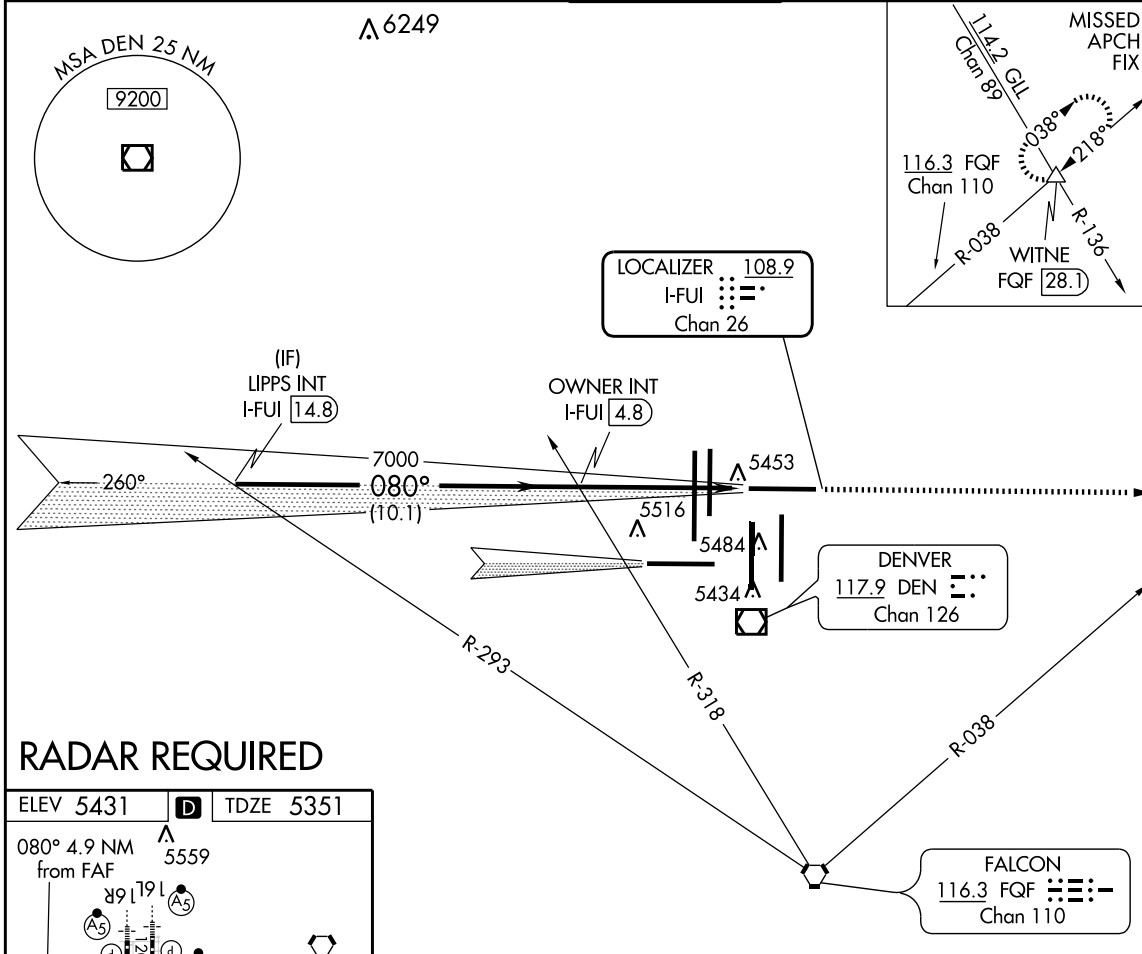
ILS or LOC RWY 8
DENVER INTL (DEN)

Simultaneous approaches authorized with Rwy 7.
S-LOC minima not authorized during simultaneous operations.
** RVR 1800 authorized with the use of FD or AP or HUD to DA.

MALSR 

MISSED APPROACH: Climb to 10000 via 080° heading and FQF VORTAC R-038 to WITNE INT/FQF 28.1 DME and hold.

ATIS ARR 125.6 379.9 DEP 134.025	DENVER APP CON 119.3 307.3 120.35 379.3 (NORTH) (SOUTH)	DENVER TOWER 124.3 239.275	GND CON 121.85 377.1	CLNC DEL 118.75
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RADAR REQUIRED

ELEV 5431 TDZE 5351

080° 4.9 NM from FAF

TDZ/CL Rwy 7, 16L, 16R, 17R, 26, 34L, 34R, 35L, 35R
HIRL all Rwy

FAF to MAP 4.9 NM

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

LIPPS INT I-FUI 14.8	# 7000 when assigned by ATC * or as assigned by ATC.	10000	FQF R-038	WITNE
OWNER INT I-FUI 4.8		080° hdg		
* 10000	080°	7000		
GS 3.00°	# 8000	7000		
TCH 52	10.1 NM	4.9 NM		
CATEGORY	A	B	C	D
S-ILS 8	** 5551/24 200 (200-½)			
S-LOC 8	5700/24 349 (300-½)			5700/40 349 (300-¾)
CIRCLING	NA			

DENVER, COLORADO
Amdt 4A 12096

39°52'N-104°40'W

DENVER INTL (DEN)
ILS or LOC RWY 8

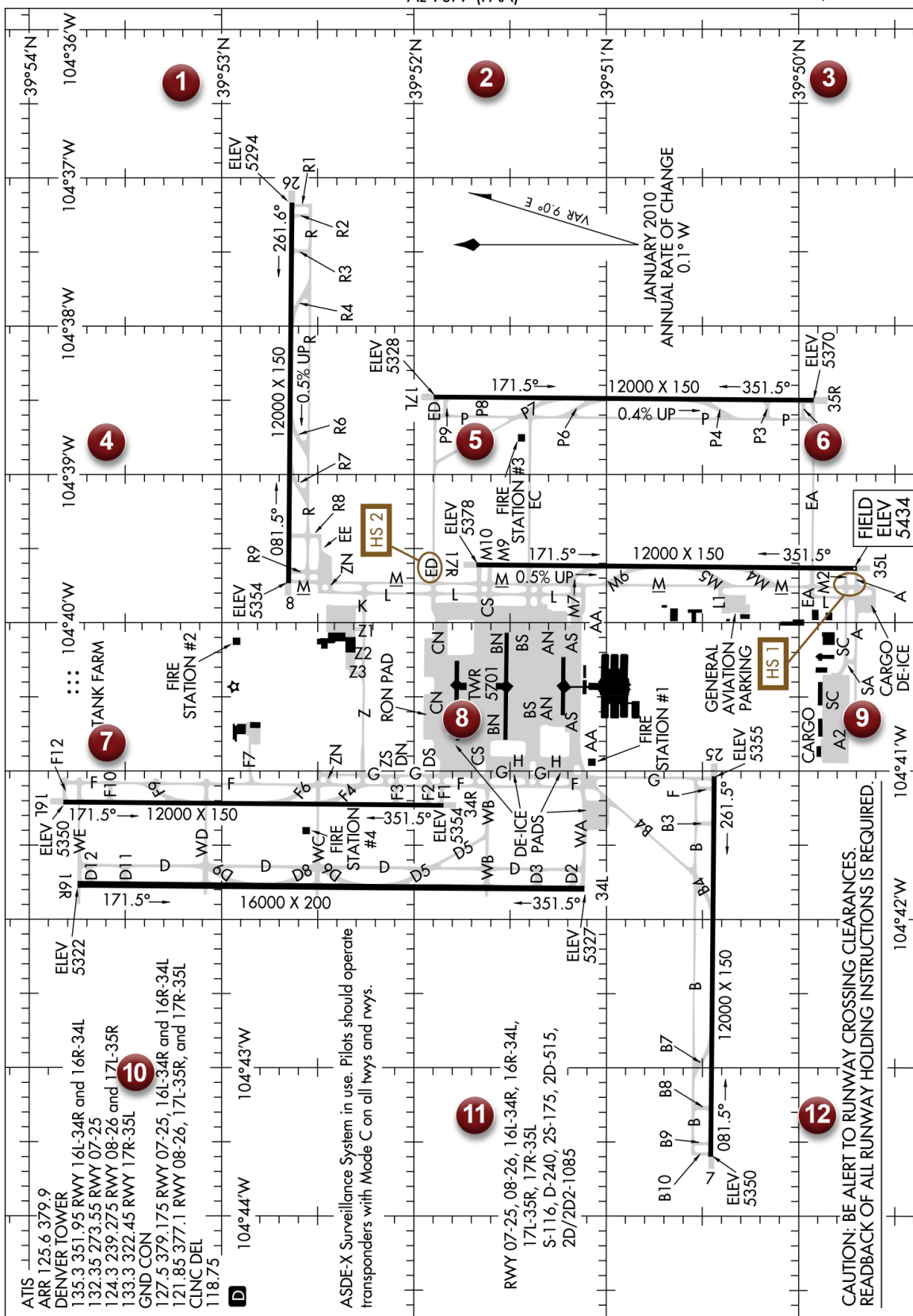
Figure 374. ILS or LOC RWY 8 (DEN).

12096

AIRPORT DIAGRAM

AL-9077 (FAA)

DENVER INTL (DEN)
DENVER, COLORADO



AIRPORT DIAGRAM

DENVER, COLORADO
DENVER INTL (DEN)

12096

Figure 375. Airport Diagram (DEN).

COLORADO

DENVER INTL (DEN) 16 NE UTC-7(-6DT) N39°51.70' W104°40.39'
5434 B S4 FUEL 100, 100LL, JET A, MOGAS OX 1, 3 Class I, ARFF Index E
NOTAM FILE DEN

DENVER
H-3F, 5A, L-10F, A
IAP, AD

RWY 16R-34L: H16000X200 (CONC-GRVD) S-116, D-240, 2S-175,
2D-515, 2D/2D2-1085 PCN 92 R/B/W/T HIRL CL

RWY 16R: MALSR. TDZL. PAPI(P4R)—GA 3.0° TCH 55'.

RWY 34L: ALSF2. TDZL. PAPI(P4L)—GA 3.0° TCH 50'.

RWY 07-25: H12000X150 (CONC-GRVD) S-116, D-240, 2S-175,
2D-515, 2D/2D2-1085 PCN 92 R/B/W/T HIRL CL

RWY 07: MALSR. TDZL. PAPI(P4R)—GA 3.0° TCH 55'.

RWY 25: MALSR. PAPI(P4L)—GA 3.0° TCH 59'.

RWY 08-26: H12000X150 (CONC-GRVD) S-116, D-240, 2S-175,
2D-515, 2D/2D2-1085 PCN 92 R/B/W/T HIRL CL

RWY 08: MALSR. PAPI(P4L)—GA 3.0° TCH 52'.

RWY 26: MALSR. TDZL. PAPI(P4L)—GA 3.0° TCH 55'. 0.5% up.

RWY 16L-34R: H12000X150 (CONC-GRVD) S-116, D-240, 2S-175,
2D-515, 2D/2D2-1085 PCN 92 R/B/W/T HIRL CL

RWY 16L: MALSR. TDZL. PAPI(P4L)—GA 3.0° TCH 60'.

RWY 34R: ALSF2. TDZL. PAPI(P4L)—GA 3.0° TCH 59'.

RWY 17L-35R: H12000X150 (CONC-GRVD) S-116, D-240, 2S-175,
2D-515, 2D/2D2-1085 PCN 92 R/B/W/T HIRL CL

RWY 17L: MALSR. PAPI(P4L)—GA 3.0° TCH 55'. 0.4% up.

RWY 35R: ALSF2. TDZL. PAPI(P4R)—GA 3.0° TCH 59'.

RWY 17R-35L: H12000X150 (CONC-GRVD) S-116, D-240, 2S-175, 2D-515, 2D/2D2-1085 PCN 92 R/B/W/T HIRL CL

RWY 17R: MALSR. TDZL. PAPI(P4L)—GA 3.0° TCH 60'. 0.5% up.

RWY 35L: ALSF2. TDZL. PAPI(P4R)—GA 3.0° TCH 57'.

RUNWAY DECLARED DISTANCE INFORMATION

RWY 07: TORA-12000 TODA-12000 ASDA-12000 LDA-12000

RWY 08: TORA-12000 TODA-13000 ASDA-12000 LDA-12000

RWY 16L: TORA-12000 TODA-12000 ASDA-12000 LDA-12000

RWY 16R: TORA-16000 TODA-16000 ASDA-16000 LDA-16000

RWY 17L: TORA-12000 TODA-12000 ASDA-12000 LDA-12000

RWY 17R: TORA-12000 TODA-12000 ASDA-12000 LDA-12000

RWY 25: TORA-12000 TODA-13000 ASDA-12000 LDA-12000

RWY 26: TORA-12000 TODA-12000 ASDA-12000 LDA-12000

RWY 34L: TORA-16000 TODA-16000 ASDA-16000 LDA-16000

RWY 34R: TORA-12000 TODA-13000 ASDA-12000 LDA-12000

RWY 35L: TORA-12000 TODA-12000 ASDA-12000 LDA-12000

RWY 35R: TORA-12000 TODA-12000 ASDA-12000 LDA-12000

AIRPORT REMARKS: Attended continuously. Waterfowl and migratory bird activity in vol of arpt year round. ASDE-X Surveillance System in use. Pilots should opr transponders with Mode C on all twys and rwys. Arpt maintains clearways (500' X 1000'). 1.25% slope) on departure Rwy 08, Rwy 26, and Rwy 34R. RVR Rwy 07 touchdown, rollout, RVR Rwy 25 touchdown, rollout, RVR Rwy 08 touchdown, rollout, RVR Rwy 26 touchdown, rollout, RVR Rwy 16L touchdown, midfield, rollout, RVR Rwy 34R touchdown, midfield, rollout, RVR Rwy 17L touchdown, midfield, rollout, RVR Rwy 35R touchdown, midfield, rollout, RVR Rwy 17R touchdown, midfield, rollout, RVR Rwy 35L touchdown, midfield, rollout. RVR Rwy 16R touchdown, midfield, rollout, RVR Rwy 34L touchdown, midfield, rollout. Overhead passenger bridge on South side of concourse 'A' provides 42 ft tail and 118 ft wingspan clearance when on twy centerline. Insufficient twy corner fillet pavement in the SE corner of the Twy M/M2 intersection for acft with wingspan over 107 ft. Informal rwy use program is in effect 24 hours a day. For additional noise abatement information contact airport management at 303-342-4200. Customs avbl with prior permission. Ldg fee. Flight Notification Service (ADCUS) avbl. NOTE: See Special Notices—Continuous Power Facilities.

WEATHER DATA SOURCES: ASOS (303) 342-0838 LLWAS-NE. TDWR.

COMMUNICATIONS: D-ATIS ARR 125.6 303-342-0819 D-ATIS DEP 134.025 303-342-0820 UNICOM 122.95

RCO 122.2 122.35 (DENVER RADIO)

RCO 123.65 (DENVER RADIO)

Ⓡ APP CON 119.3 124.95 (North) 120.35 126.55 (South) FINAL CON 120.8

TOWER 132.35 (Rwy 07-25) 135.3 (Rwy 16L-34R, Rwy 16R-34L) 133.3 (Rwy 17R-35L) 124.3 (Rwy 08-26 and 17L-35R)

GND CON 127.5 (Rwy 07-25, Rwy 16L-34R and Rwy 16R-34L) 121.85 (Rwys 08-26, 17L-35R and 17R-35L)

CLNC DEL 118.75

Ⓡ DEP CON 128.25 (East) 127.05 (North) 126.1 (West) 128.45 (South)

AIRSPACE: CLASS B See VFR Terminal Area Chart

RADIO AIDS TO NAVIGATION: NOTAM FILE DEN.

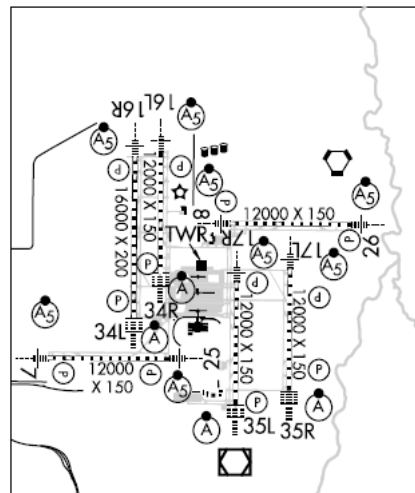


Figure 376. Excerpt from Chart Supplement.

COLORADO

CONTINUED FROM PRECEDING PAGE

(H) VORW/DME 117.9 DEN Chan 126 N39°48.75' W104°39.64' 338° 3.0 NM to fld. 5452/11E.
 ILS/DME 111.55 I-DZG Chan 52(Y) Rwy 07. Class IE.
 ILS/DME 108.9 I-FUI Chan 26 Rwy 08.
 ILS/DME 111.1 I-LTT Chan 48 Rwy 16L. Class IE.
 ILS/DME 111.9 I-DQQ Chan 56 Rwy 16R.
 ILS/DME 110.15 I-BXP Chan 38(Y) Rwy 17L. Class IE.
 ILS/DME 108.5 I-ACX Chan 22 Rwy 17R. Class IE.
 ILS/DME 111.55 I-ERP Chan 52(Y) Rwy 25. Class IE.
 ILS/DME 108.9 I-JOY Chan 26 Rwy 26. Class IE.
 ILS/DME 111.9 I-DXU Chan 56 Rwy 34L. Class IIIE.
 ILS/DME 111.1 I-OUF Chan 48 Rwy 34R. Class IIIE.
 ILS/DME 108.5 I-AQD Chan 22 Rwy 35L.
 ILS/DME 110.15 I-DPP Chan 38(Y) Rwy 35R. Class IIIE.
 COMM/NAV/WEATHER REMARKS: Emerg frequency 121.5 not avbl at twr.

FRONT RANGE (FTG) 19 E UTC-7(-6DT) N39°47.12' W104°32.59'
 5512 B S4 FUEL 100LL, JET A OX 1, 2 TPA-6500(988) NOTAM FILE FTG

DENVER
 H-5A, L-10F, A
 IAP AD

RWY 08-26: H8000X100 (ASPH) S-28, D-40 HIRL
 RWY 08: REIL. PAPI(P2L)—GA 3.0° TCH 50'. Rgt tfc. 0.5% up.

RWY 26: MALSR. PAPI(P2L)—GA 3.0° TCH 50'. 0.4% down.

RWY 17-35: H8000X100 (ASPH) S-34, D-75 MIRL

RWY 17: REIL. PAPI(P4L)—GA 3.0° TCH 50'. 0.5% up.

RWY 35: MALSR. PAPI(P4L)—GA 3.0° TCH 50'. Rgt tfc.

AIRPORT REMARKS: Attended 1400-0400Z†. For svc after hrs call 303-208-8536. 24 hr credit card 100LL self fueling station. Be alert, intensive USAF student training invof Colorado Springs and Pueblo Colorado. Noise sensitive areas SE, S and SW of arpt. Avoid flights blo 1,000 ft over populated areas. Blue and yellow reflectors along Twy A, B, C, E edges. ACTIVATE MIRL Rwy 17-35, HIRL Rwy 08-26, PAPI Rwy 08, Rwy 26, Rwy 17 and Rwy 35 and REIL Rwy 08 and Rwy 17, MALSR Rwy 26 and Rwy 35—CTAF. See Special Notices—USAF 306 FTG Flight Training Areas, Vicinity of Colorado Springs and Pueblo Colorado.

WEATHER DATA SOURCES: AWOS-3 119.025 (303) 261-9104.

COMMUNICATIONS: CTAF 120.2 ATIS 119.025 UNICOM 122.95

DENVER APP/DEP CON 128.2

TOWER 120.2 (1400-0400Z†) GND CON 124.7 CLNC DEL 124.7

DENVER CLNC DEL 121.75 (0400-1400Z†)

AIRSPACE: CLASS D svc 1400-0400Z† other times CLASS G

RADIO AIDS TO NAVIGATION: NOTAM FILE DEN.

DENVER (H) VORW/DME 117.9 DEN Chan 126 N39°48.75' W104°39.64' 096° 5.7 NM to fld. 5452/11E.

SKIPI NDB (LOM) 321 FT N39°47.51' W104°26.05' 255° 5.1 NM to fld. Unmonitored.

ILS/DME 110.9 I-FZR Chan 46 Rwy 17.

ILS/DME 109.3 I-FTG Chan 30 Rwy 26. LOM SKIPI NDB. Unmonitored.

ILS/DME 110.9 I-VWT Chan 46 Rwy 35.

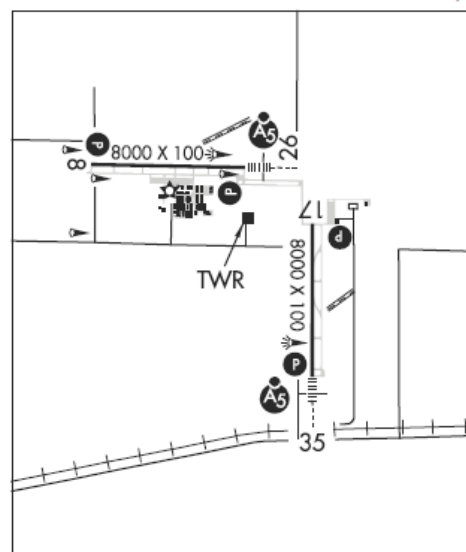


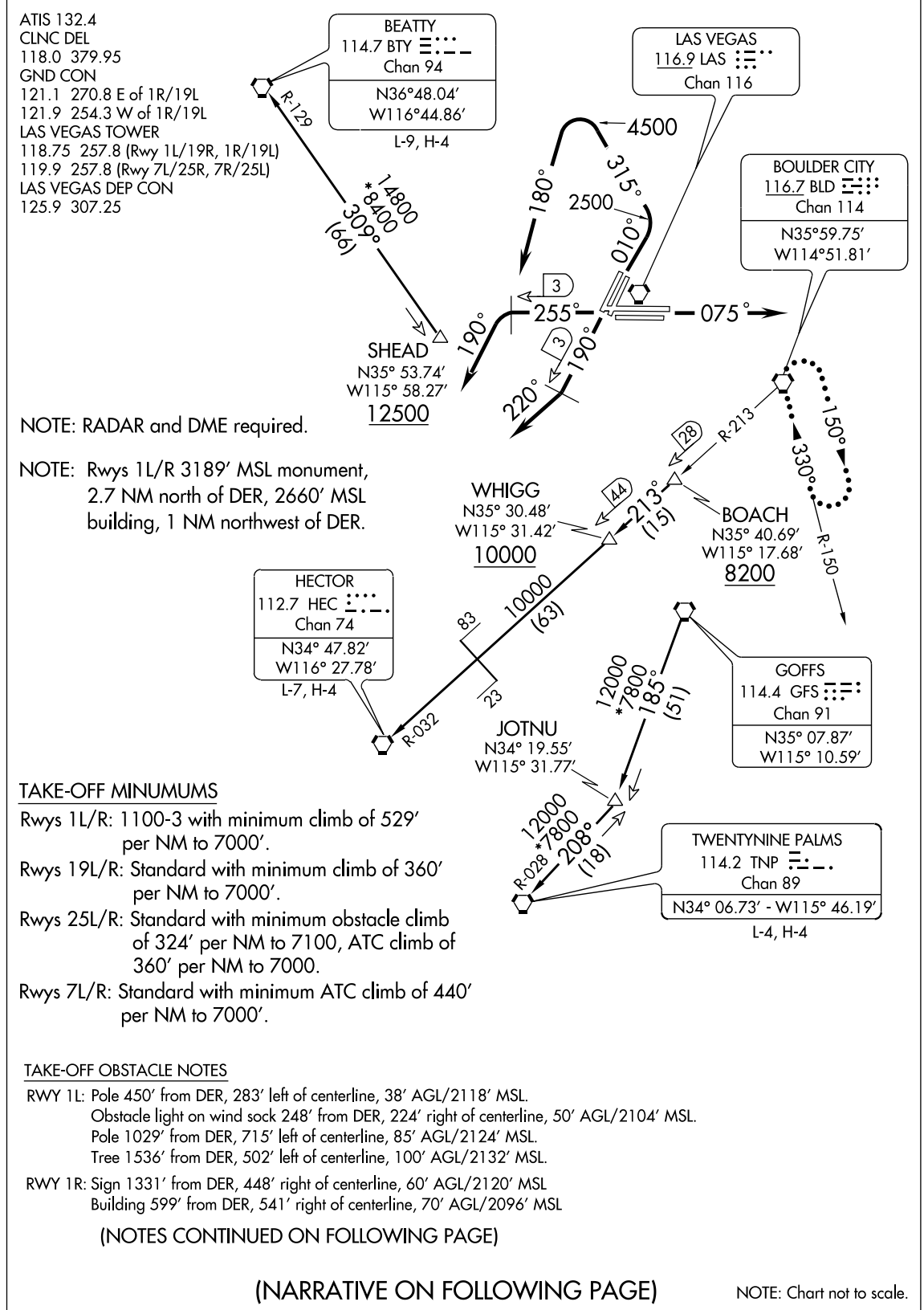
Figure 377. Excerpt from Chart Supplement.

(MCCRN3.LAS) 09351

SL-662 (FAA)

LAS VEGAS/MC CARRAN INTL (LAS)
LAS VEGAS, NEVADA

MCCARRAN THREE DEPARTURE



MCCARRAN THREE DEPARTURE

(MCCRN3.LAS) 09351

LAS VEGAS, NEVADA
LAS VEGAS/MC CARRAN INTL (LAS)

Figure 378. MCCARRAN THREE Departure (MCCRN3.LAS).

(MCCRN3.LAS) 09351

SL-662 (FAA)

LAS VEGAS/MC CARRAN INTL (LAS)
LAS VEGAS, NEVADA**MCCARRAN THREE DEPARTURE****DEPARTURE ROUTE DESCRIPTION**

TAKE-OFF RUNWAYS 1L/R: Climb via heading 010° to 2500', then climbing left turn via heading 315° to 4500', then climbing left turn heading 180°, thence

TAKE-OFF RUNWAYS 7L/R: Climb via heading 075°, thence

TAKE-OFF RUNWAYS 19L/R: Climb via heading 190° until LAS VORTAC 3 DME, then right turn via heading 220°, thence

TAKE-OFF RUNWAYS 25L/R: Climb via heading 255° until LAS VORTAC 3 DME, then left turn via heading 190°, thence

...via radar vectors to transition or assigned route, maintain 7000', expect clearance to filed altitude 2 minutes after departure.

LOST COMMUNICATIONS: If no contact with ATC upon reaching 7000', proceed direct BLD VORTAC, then climb in BLD VORTAC holding pattern to the appropriate MEA for route of flight.

BEATTY TRANSITION (MCCRN3.BTY): From over SHEAD INT via BTY R-129 to BTY VORTAC.

HECTOR TRANSITION (MCCRN3.HEC): From over BOACH INT via BLD R-213 and HEC R-032 to HEC VORTAC.

TWENTY NINE PALMS TRANSITION (MCCRN3.TNP): From over GFS VORTAC via GFS R-185 to JOTNU INT, then via TNP R-028 to TNP VORTAC.

TAKE-OFF OBSTACLE NOTES (CONTINUED)

RWY 25R: Light pole 3115' from DER, 1033' right of centerline, 109' AGL/2301' MSL.

Light on pole 1.5 NM from DER, 2836' left of centerline, 124' AGL/2457' MSL.

Light pole 1.7 NM from DER, 2965' left of centerline, 139' AGL/2469' MSL.

Light on pole 1100' from DER, 508' left of centerline, 47' AGL/2226' MSL.

Building 1822' from DER, 652' left of centerline, 46' AGL/2238' MSL.

Building 2202' from DER, 596' left of centerline, 44' AGL/2246' MSL.

Rod on building 534' from DER, 369' left of centerline, 33' AGL/2202' MSL.

Road 678' from DER, 16' right of centerline, 35' AGL/2201' MSL.

Light on localizer antenna 533' from DER, 32' AGL/2195' MSL.

RWY 25L: Pole 2860' from DER, 813' left of centerline, 57' AGL/2236' MSL.

Sign 3672' from DER, 1302' left of centerline, 57' AGL/2256' MSL.

Antenna on building 1002' from DER, 251' left of centerline, 34' AGL/2183' MSL.

Pole 3677' from DER, 145' left of centerline, 67' AGL/2249' MSL.

RWY 7L: Tree 1257' from DER, 789' left of centerline, 85' AGL/2077' MSL.

Light pole 747' from DER, 441' right of centerline, 62' AGL/2057' MSL.

Tree 1007' from DER, 557' right of centerline, 70' AGL/2062' MSL.

RWY 7R: Light on wind sock 102' from DER, 300' right of centerline, 30' AGL/2051' MSL.

RWY 19L: Pole 1394' from DER, 533' right of centerline, 36' AGL/2236' MSL.

Sign 2181' from DER, 1062' right of centerline, 50' AGL/2256' MSL.

Rod on building 2921' from DER, 581' right of centerline, 50' AGL/2262' MSL.

Pole 2633' from DER, 319' right of centerline, 40' AGL/2246' MSL.

RWY 19R: Pole 1135' from DER, 619' right of centerline, 65' AGL/2249' MSL.

Pole 756' from DER, 618' right of centerline, 50' AGL/2231' MSL.

Sign 2182' from DER, 125' right of centerline, 50' AGL/2256' MSL.

Pole 1396' from DER, 403' left of centerline, 55' AGL/2236' MSL.

Rod on building 197' from DER, 441' right of centerline, 30' AGL/2202' MSL.

Rod on building 2922' from DER, 356' left of centerline, 50' AGL/2262' MSL.

MCCARRAN THREE DEPARTURE
(MCCRN3.LAS) 09351LAS VEGAS, NEVADA
LAS VEGAS/MC CARRAN INTL (LAS)**Figure 379.** MCCARRAN THREE Departure (MCCRN3.LAS).

CALIFORNIA

SAN FRANCISCO INTL (SFO) 8 SE UTC-8(-7DT) N37°37.14' W122°22.49'
13 B S4 FUEL 100, 100LL, JET A OX 1, 2, 3, 4 LRA Class I, ARFF Index E
NOTAM FILE SFO

SAN FRANCISCO
H-3B, L-2F, 3B, A
IAP, AD

RWY 10L-28R: H11870X200 (ASPH-GRVD) PCN 80 F/B/X/T HIRL CL

RWY 10L: REIL. PAPI(P4L)—GA 3.0° TCH 80'. Tower.

RWY 28R: ALSF2. TDZL. PAPI(P4L)—GA 3.0° TCH 70'. Rgt tfc.

RWY 10R-28L: H10602X200 (ASPH-GRVD) PCN 80 F/B/X/T HIRL CL

RWY 10R: PAPI(P4L)—GA 3.0° TCH 75'. Tower. Rgt tfc.

RWY 28L: SSALR. PAPI(P4L)—GA 3.0° TCH 75'.

RWY 01R-19L: H8648X200 (ASPH-GRVD) PCN 100F/B/X/T HIRL CL

RWY 01R: REIL. Thld dsplcd 238'. Tree.

RWY 19L: MALSF. TDZL. PAPI(P4L)—GA 3.0° TCH 75'.

RWY 01L-19R: H7500X200 (ASPH-CONC-GRVD) PCN 90 F/B/X/T HIRL CL

RWY 01L: REIL. Thld dsplcd 491'.

RWY 19R: PAPI(P4L)—GA 3.0° TCH 73'.

AIRPORT REMARKS: Attended continuously. PAEW AER 28L, Rwy 28R and

Rwy 19L indef. Flocks of birds feeding along shoreline adjacent to arpt,

on occasions fly across various parts of arpt. Due to obstructed vision,

SFO twr is able to provide only limited arpt tfc control svc on Twy A

between gates 88 and 89. Twr personnel are unable to determine whether this area is clear of traffic or obstructions. Rwy

10 preferred rwy between 0900-1400Z† weather and flight conditions permitting. Simultaneous ops in effect all rwys.

Helicopter ldg area marked on Twy (C) west of Twy (R) opr for civil and military use. Noise sensitive arpt. For noise

abatement procedures ctc arpt noise office Monday-Friday 1600-0100Z† by calling 650-821-5100. Airline pilots shall

strictly follow the painted nose gear lines and no oversteering adjustment is permitted. No grooving exists at arpt rwy

intersections. Rwy 01L-19R, 01R-19L, Rwy 10R-28L, Rwy 10L-28R grooved full length except at rwy intersections.

B747, B777, A330, A340 or larger acft are restricted from using Twy A1 when B747-400, A340-600 or larger acft are

holding short of Rwy 01R on Twy A. 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. All outbound Twy Y heavy aircraft with a wingspan of 171' or

greater under power prohibited from entering westbound Twy Z. Ramp clsd to acft with wingspan over 117' at Terminal

1, gate C41 indef. 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. Rwy 19L MALSF has a NSTD length of 1115' with 3 sequenced flashers. Ldg

fee. Flight Notification Service (ADCUS) available. NOTE: See Special Notices—Intersection Departures During Period of

Darkness, Expanded Charted Visual Flight Procedures. Continuous Power Facilities, Special Noise Abatement Procedures,

Special Noise Abatement Procedures—Preferential Runways.

WEATHER DATA SOURCES: ASOS (650) 872-0246 LLWAS.

COMMUNICATIONS: D-ATIS 135.45 118.85 115.8 113.7 650-877-3585/8422 UNICOM 122.95

Ⓡ NORCAL APP CON 135.65 (S) 133.95

TOWER 120.5 GND CON 121.8 CLNC DEL 118.2 PRE TAXI CLNC 118.2

Ⓡ NORCAL DEP CON 135.1 (SE-W) 120.9 (NW-E)

AIRSPACE: CLASS B See VFR Terminal Area Chart

RADIO AIDS TO NAVIGATION: NOTAM FILE SFO.

(L) VOR/DME 115.8 SFO Chan 105 N37°37.17' W122°22.43' at fld. 13/17E.

VOR DME unusable:

025°-065° byd 30 NM blo 18,000'

035°-055° byd 12 NM blo 6,500'

150°-190° byd 25 NM blo 4,500'

190°-260° byd 10 NM blo 4,500'

260°-295° byd 35 NM blo 3,000'

295°-330° byd 20 NM blo 8,000'

BRIJJ NDB (LOM) 379 GW N37°34.33' W122°15.59' 282° 6.2 NM to fld. LOM unusable 160°-195° byd 6 NM.

ILS/DME 108.9 I-SIA Chan 26 Rwy 19L. Class IE. Ry 19L glideslope deviations are possible when critical areas

are not required to be protected. Acft operating invof glideslope transmitter. Pilots should be alert for momentary

localizer course excursions due to large aircraft operating in vicinity of localizer antenna.

ILS/DME 109.55 I-SFO Chan 32(Y) Rwy 28L. Class IE.

ILS/DME 111.7 I-GWQ Chan 54 Rwy 28R. Class IIIIE. LOM BRIJJ NDB. LOM unusable 160°-195° byd 6 NM.

LDA/DME 110.75 I-FNP Chan 44(Y) Rwy 28R.

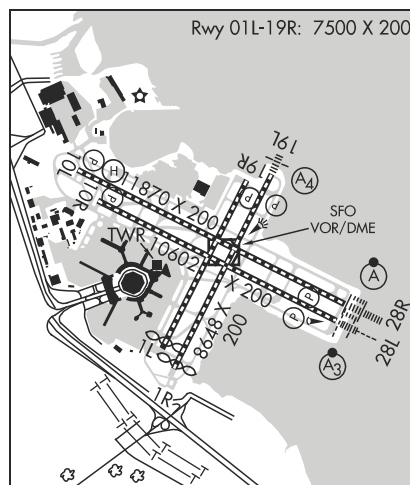


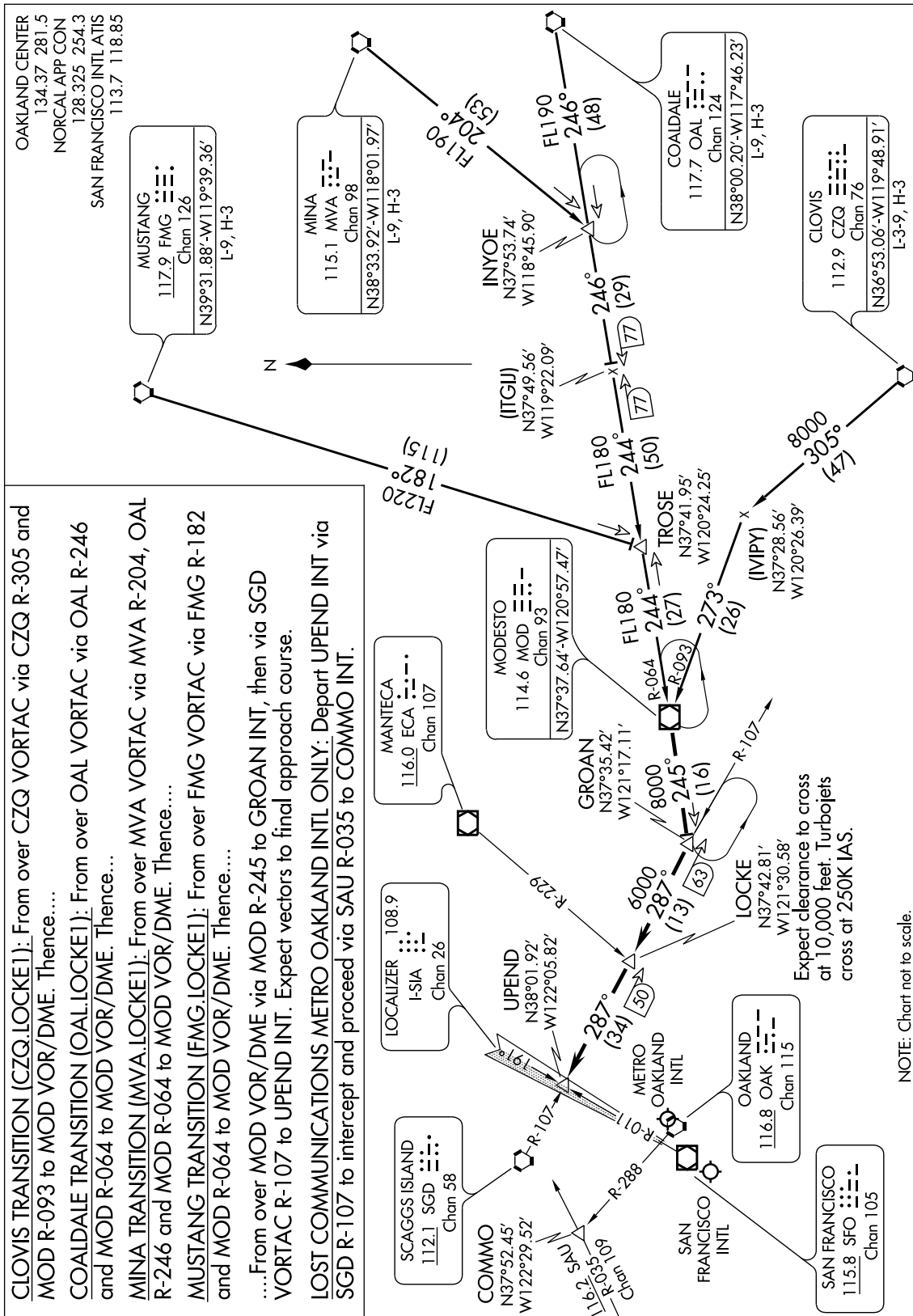
Figure 380. Excerpt from Chart Supplement.

(MOD.LOCKE1) 11125

LOCKE ONE ARRIVAL

ST-375 (FAA)

SAN FRANCISCO, CALIFORNIA



LOCKE ONE ARRIVAL

(MOD.LOCKE1) 11125

SAN FRANCISCO, CALIFORNIA

Figure 381. LOCKE ONE Arrival (MOD.LOCKE1).

CALIFORNIA

OAKLAND

METROPOLITAN OAKLAND INTL (OAK) 4 S UTC-8(-7DT) N37°43.28' W122°13.24'

SAN FRANCISCO

9 B S4 FUEL 100LL, JET A OX 1, 2, 3, 4 TPA—See Remarks LRA Class I, ARFF Index D

H-3B, L-2F, 3B, A

NOTAM FILE OAK

IAP, AD

RWY 11-29: H1000X150 (ASPH-GRVD) PCN 71 F/A/W/T HIRL CL

RWY 11: MALS. PAPI(P4L)—GA 2.75° TCH 65'. Rgt tfc.

RWY 29: ALSF2. TDZL. PAPI(P4L)—GA 3.0° TCH 71'.

RWY 09R-27L: H6213X150 (ASPH-GRVD) PCN 97 F/B/W/T HIRL

RWY 09R: REIL. PAPI(P4R)—GA 2.9° TCH 50'.

RWY 27L: PAPI(P4L)—GA 3.0° TCH 71'.

RWY 09L-27R: H5454X150 (ASPH-GRVD) PCN 69 F/C/W/T HIRL

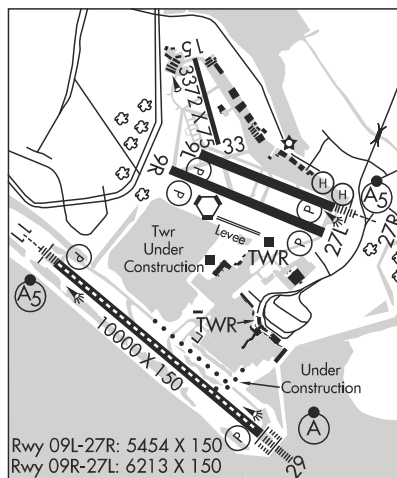
RWY 09L: PAPI(P4R)—GA 3.0° TCH 49'.

RWY 27R: MALS. PAPI(P4L)—GA 2.9° TCH 57'. Bldg. Rgt tfc.

RWY 15-33: H3372X75 (ASPH) S-12.5 MIRL

RWY 33: Rgt tfc.

AIRPORT REMARKS: Attended continuously. Rwy 15-33 CLOSED to air carrier acft. Birds on and invof arpt. Acft with experimental or limited certification having over 1,000 horsepower or 4,000 pounds are restricted to Rwy 11-29. 24 hr Noise abatement procedure—turbojet and turbofan powered acft, turborops over 17,000 lbs, four engine reciprocating powered acft, and surplus Military acft over 12,500 lbs should not depart Rwy 27L and Rwy 27R or land on Rwy 09L and Rwy 09R. For noise abatement information ctc noise abatement office at 510-563-6463. Intersection of Twy B, Twy W and Twy V not visible from twr. Twy K between Rwy 33 and Twy D and portions of Twy D not visible from twr. Twy A, Twy E, Twy G, Twy H between Rwy 27R and Twy C max acft weight 150,000 lbs. Twy G and Twy H between Rwy 27L and Rwy 27R, max acft weight 12,500 lbs. Twy P max acft weight 24,000 lbs single, 40,000 lbs dual. Twy C between Rwy 27R and Twy G and Twy B, Twy J, and Twy D max acft weight 9,000,000 lbs. Twy C between Twy G and Twy J max acft weight 25,000 lbs single, 175,000 lbs dual, 4,000,000 lbs tandem. Twy C between Twy J and Twy F max acft weight 25,000 lbs single, 150,000 lbs dual. 155,000 lbs tandem (dual tandem not authorized). Twy K between Twy D and intersection Twy F, Twy L, Twy K max acft weight 25,000 lbs single, 115,000 lbs dual, 140,000 lbs tandem. Twy K between Rwy 9R and intersection Twy F, Twy L, Twy K max acft weight 25,000 lbs single, 115,000 lbs dual, 140,000 lbs tandem. Twy K between Rwy 9R and intersection Twy F, Twy L, Twy K max acft weight 25,000 lbs single, 45,000 lbs dual, tandem not authorized. Preferential rwy use program in effect 0600-1400Z±. North fld preferred arrival Rwy 27L, north fld preferred departure Rwy 09R or 27R. If these Rwy unacceptable for safety or twr instruction then Rwy 11-29 must be used. Noise prohibitions not applicable in emerg or whenever Rwy 11-29 is closed due to maintenance, safety, winds or weather. 400' blast pad Rwy 29 and 500' blast pad Rwy 11. Rwy 29, 27R and 27L distance remaining signs left side. TPA—Rwy 27L 606(597), TPA—Rwy 27R 1006(997). Ldg fee may apply for Rwy 11-29, rwy commercial ops and tiedown, ctc afld ops 510-563-3361. Flight Notification Service (ADCUS) avbl.



WEATHER DATA SOURCES: ASOS (510) 383-9514 HIWAS 116.8 OAK.

COMMUNICATIONS: D-ATIS 133.775 (510) 635-5850 (N and S Complex) UNICOM 122.95

OAKLAND RCO 122.2 122.5 (OAKLAND RADIO)

Ⓡ NORCAL APP CON 125.35 (East) 135.65 (South) 135.1 (West) 134.5 120.9

Ⓡ NORCAL DEP CON 135.1 (West) 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°43.56' W122°13.42' at fld. 10/17E. HIWAS.

DME unusable:
335°-065° byd 30 NM blo 8,000'

ILS 111.9 I-AAZ Rwy 11. Class IE. Glideslope deviations are possible when critical areas are not required to be protected. Acft operating invof glideslope transmitter.

ILS 109.9 I-OAK Rwy 27R. Class IE.

ILS 108.7 I-INB Rwy 29. Class III.

COMM/NAV/WEATHER REMARKS: Emerg frequency 121.5 not avbl at twr.

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-3A, L-2F, 3B, A

DME unusable:

335°-065° byd 30 NM blo 8,000'

RCO 122.2 122.5 (OAKLAND RADIO)

ASOS OAK N37°43.28' W122°13.24' (510) 383-9514.

Figure 382. Excerpt from Chart Supplement.

FLORIDA

KEY WEST INTL (EYW) 2 E UTC - 5 (- 4DT) N24°33.37' W81°45.57'

MIAMI

3 B S4 FUEL 100, JET A AOE Class I, ARFF Index IB NOTAM FILE EYW

L-21D, 23C

RWY 09-27: H4801X100 (ASPH-GRVD) S-75, D-125, 2D-195 MIRL

IAP, AD

RWY 09: REIL. VASI(V4L)—GA 3.0° TCH 34'. Rgt tfc.

RWY 27: REIL. VASI(V4L)—GA 3.0° TCH 34'.

ARRESTING GEAR/SYSTEM

RWY 09: EMAS

AIRPORT REMARKS: Attended 1200-0400Z†. Parachute Jumping.

Numerous flocks of birds on and in the vicinity of airport.

Departing VFR acft requested to maintain rwy heading until reaching fld boundary, then execute turns for N or S dep.

Restricted area R-2916 located 14 NM NE of arpt has strobe-lgtd and marked balloon and cable to 14,000 ft. Extremely noise sensitive area. Urge no ops 0400-1200Z†. Use NBAA close in noise abatement procedures other times. Local ordinance rqr engine runups in designated area on N side commercial ramp from 0400-1200Z† and fines. PPR for unscheduled air carrier operations with more than 30 passenger seats 0430-1045Z†; Call arpt manager 305-809-5200. PPR for acft exceeding rwy weight bearing capacity; call arpt manager 305-809-5200.

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. Twy A5 and Twy A6 not visible from twr. ACTIVATE MIRL Rwy 09-27, VASI/REIL Rwys 09-27—CTAF. Flight Notification Service (ADCUS) available. NOTE: See Special Notices—U.S. Special Customs Requirement.

WEATHER DATA SOURCES: ASOS 119.65 (305) 292-4046. HIWAS 113.5 EYW.

COMMUNICATIONS: CTAF 118.2 ATIS 119.675 UNICOM 122.95

RCO 122.1R 113.5T (MIAMI RADIO)

RCO 123.65 122.2 (MIAMI RADIO)

Ⓡ NAVY KEY WEST APP/DEP CON 124.025 126.575 (1200-0300Z†)

Ⓡ MIAMI CENTER APP/DEP CON 133.5

(0300-1200Z†)

TOWER 118.2 (1200-0200Z†) GND CON 121.9 CLNC DEL 121.9

AIRSPACE: CLASS D svc 1200-0200Z† other times CLASS G.

RADIO AIDS TO NAVIGATION: NOTAM FILE EYW.

(H) VORTAC 113.5 EYW Chan 82 N24°35.15' W81°48.03' 127° 2.9 NM to fld. 10/01E.

HIWAS. VOR unusable 040°-050°, 210°-240°.

FISH HOOK NDB (HW) 332 FIS N24°32.90' W81°47.18' 076° 1.5 NM to fld.

ASR (1100-0300Z†)

COMM/NAV/WEATHER REMARKS: FSS freqs 123.65 and 122.2 unusable 330°-015° beyond 20 NM below 1500'. VORTAC unusable 121°-139°. Acft overflying SIMPL, ACRUZ, CANOA, and MAXIM shall ctc Miami Center 10 minutes prior to crossing the Miami flight information region 132.2.

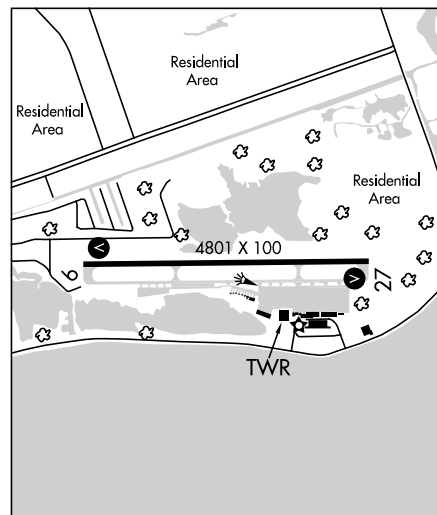


Figure 383. Excerpt from Chart Supplement.

Appendix 2

VERO BEACH, FLORIDA

AL-437 (FAA)

RNAV (GPS) RWY 4

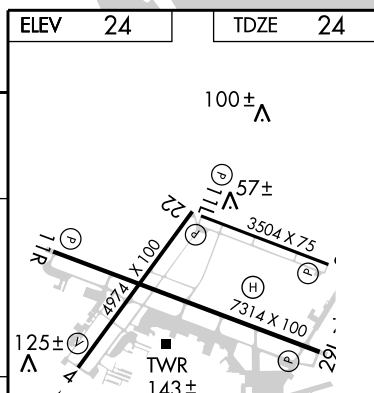
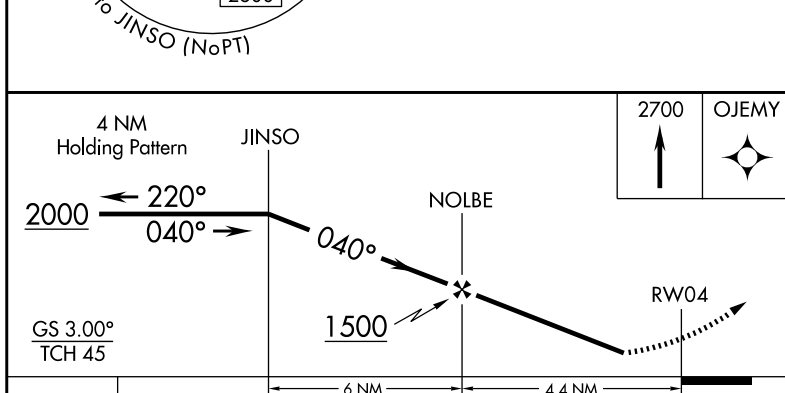
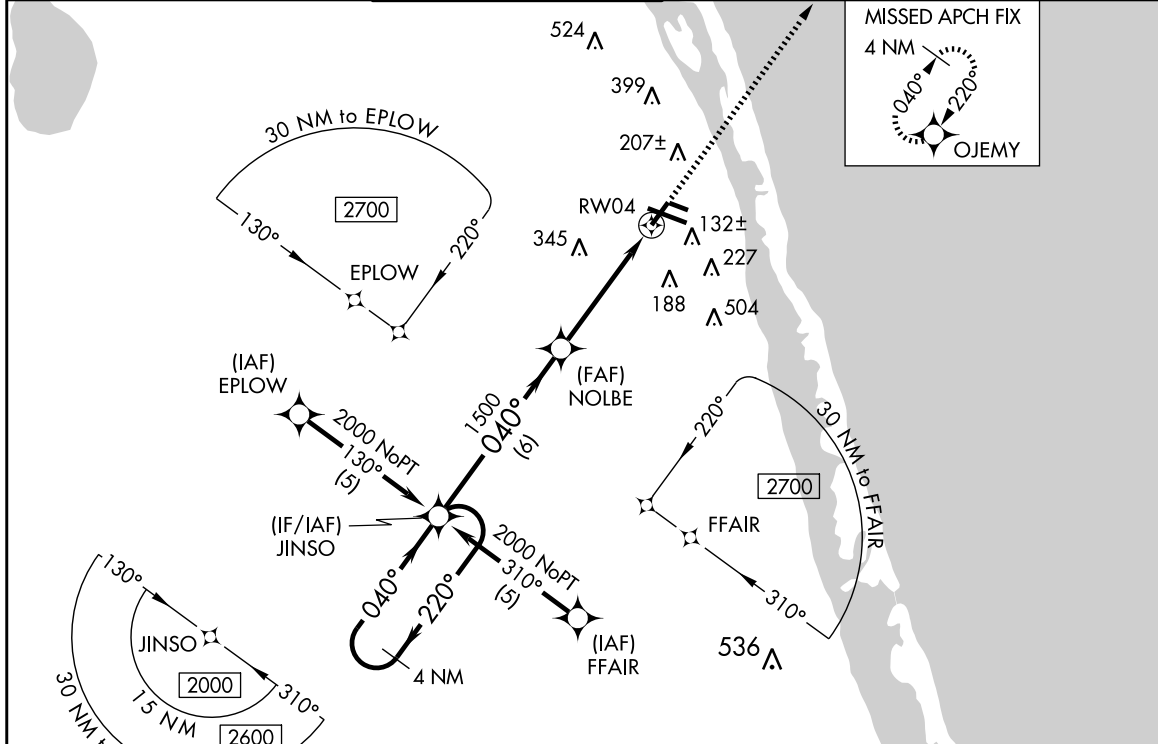
VERO BEACH MUNI (VRB)

WAAS CH 61311 W04A	APP CRS 040°	Rwy ldg TDZE 24 Apt Elev 24	4974
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Baro-VNAV NA when using Fort Pierce altimeter setting. For uncompensated Baro-VNAV systems, LNAV/VNAV NA below -15° C (5° F) or above 48° C (118° F). DME/DME RNP-0.3 NA. Procedure NA at night. Visibility reduction by helicopters NA. When local altimeter setting not received, use Fort Pierce altimeter setting and increase all DA 23 feet and all MDA 40 feet, increase LPV and LNAV/VNAV all Cats and Circling Cat D visibilities ¼ mile.

MISSED APPROACH:
Climb to 2700 direct OJEMY and hold.

ATIS 132.5	MIAMI CENTER 132.25 370.9	VERO BEACH TOWER ★ 126.3 (CTAF) 0	GND CON 127.45	CLNC DEL 134.975	UNICOM 122.95
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CATEGORY	A	B	C	D
LPV DA	323-1		299 (300-1)	
LNAV/VNAV DA	395-1¼		371 (400-1¼)	
LNAV MDA	460-1	436 (500-1)	460-1¼ 436 (500-1¼)	460-1½ 436 (500-1½)
CIRCLING	560-1	536 (600-1)	560-1½ 536 (600-1½)	660-2 636 (700-2)

MIRL Rwy 4-22 and 11L-29R
 REIL Rwy 11R and 29L
 MIRL Rwy 11R-29L
 REIL Rwy 4 and 22

VERO BEACH, FLORIDA
 Orig 11349

27°39'N-80°25'W

VERO BEACH MUNI (VRB) RNAV (GPS) RWY 4

Figure 384. RNAV (GPS) RWY 4 (VRB).

FLORIDA

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VERO BEACH MUNI (VRB) 1 NW UTC - 5(- 4DT) N27°39.33' W80°25.08'

MIAMI

24 B S4 FUEL 100, JET A OX 1, 2 TPA—See Remarks Class IV, ARFF Index A

H-8I, L-24F

NOTAM FILE VRB

IAP, AD

RWY 11R-29L: H7314X100 (ASPH-GRVD)

S-85, D-115, 2S-146, 2D-220 MIRL

RWY 11R: REIL. PAPI (P4L)—GA 3.0° TCH 41'. Trees.

RWY 29L: REIL. PAPI(P4L) TCH 58'.

RWY 04-22: H4974X100 (ASPH-GRVD) S-30, D-115, 2S-146, 2D-220 MIRL

RWY 04: REIL. VASI(V4L)—GA 3.0° TCH 45'. Trees.

RWY 22: REIL. PAPI(P4L)—GA 3.0° TCH 42'. Trees.

RWY 11L-29R: H3504X75 (ASPH) S-12.5 MIRL

RWY 11L: PAPI(P2L)—GA 3.0° TCH 37'. Tree.

RWY 29R: PAPI(P2L)—GA 3.5° TCH 35'. Poles.

LAND AND HOLD SHORT OPERATIONS

LANDING	HOLD SHORT POINT	DIST AVBL
RWY 29L	04/22	4700

AIRPORT REMARKS: Attended 1200-0200Z†. Rwy 04-22 CLOSED when twr clsd. TPA 1024(1000) large acft 1524(1500). Rwy 11L-29R CLOSED when twr clsd. CLOSED to air carrier ops with more than 30 passenger seats except 24 hrs PPR, call arprt manager 772-978-4930. No intersection departures except by ATC req.

Noise sensitive arprt. Jet acft use NBAA noise abatement procedures. Voluntary local noise abatement procedures in effect call 772-978-4930. No touch and go ops 0300-1200Z† except PPR. Extensive flight training. ACTIVATE MIRL Rwy 11R-29L and REIL Rwy 11R and Rwy 29L—CTAF.

WEATHER DATA SOURCES: ASOS (772) 978-9535. HIWAS 117.3 VRB.

COMMUNICATIONS: CTAF 126.3 ATIS 132.5 UNICOM 122.95

RCO 122.1R 117.3T (ST PETERSBURG RADIO)

RCO 122.5 122.2 (ST PETERSBURG RADIO)

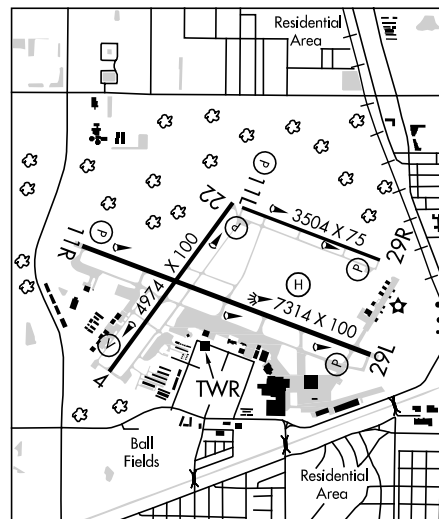
Ⓜ MIAMI CENTER APP/DEP CON 132.25

TOWER 126.3 133.15 (1200-0200Z†) GND CON 127.45 CLNC DEL 134.975

AIRSPACE: CLASS D svc 1200-0200Z† other times CLASS E.

RADIO AIDS TO NAVIGATION: NOTAM FILE VRB.

(H) VORTAC 117.3 VRB Chan 120 N27°40.71' W80°29.38' 114° 4.1 NM to fld. 11/04W. HIWAS.



VIRGINIA KEY N25°45.11' W80°09.27' NOTAM FILE MIA.

MIAMI

(H) VOR/DME 117.1 VKZ Chan 118 293° 7.8 NM to Miami Intl. 12/04W.

H-8I, L-23C, A

VOR portion unusable 020°-064° byd 20 NM blo 4500', 091°-104° byd 30 NM blo 3000', 279°-284° byd 25 NM blo 7500', 285°-319° byd 15 NM blo 7500', 320°-335° byd 25 NM blo 3000'.

RCO 122.1R 117.1T (MIAMI RADIO)

WAKUL N30°19.57' W84°21.50' NOTAM FILE TLH.

JACKSONVILLE

NDB (HW/LOM) 379 TL 007° 4.2 NM to Tallahassee Rgnl.

H-8G, L-21D, 22I

WAKULLA CO (See PANACEA)

WARRINGTON N30°28.69' W86°31.25' NOTAM FILE CEW.

NEW ORLEANS

(T) TACAN Chan 2 DWG (134.5) at Eglin AFB 118/00°E.

L-21C, 22H

Figure 385. Excerpt from Chart Supplement.

WINDSOR LOCKS

BRADLEY INTL (BDL) 3 W UTC-5(-4DT) N41°56.35' W72°41.00'
 173 B S4 FUEL 100LL, JET A OX 1, 2, 3, 4 TPA—See Remarks
 LRA Class I, ARFF Index D NOTAM FILE BDL

NEW YORK
 H-10I, 11D, 12K, L-33C, 34I
 IAP, AD

RWY 06-24: H9510X200 (ASPH-GRVD) S-200, D-200, 2S-175, 2D-350, 2D/2D2-710 HIRL CL
RWY 06: ALSF2. TDZL. PAPI(P4L)—GA 3.0° TCH 71'. Trees.
RWY 24: MALSR. TDZL. PAPI(P4L)—GA 3.0° TCH 71'. Trees.
RWY 15-33: H6847X150 (ASPH-GRVD) S-200, D-200, 2S-175, 2D-350 HIRL
RWY 15: REIL. PAPI(P4L)—GA 3.5°TCH 61'. Trees.
RWY 33: MALSF. PAPI(P4R)—GA 3.0°TCH 72'. Trees.
RWY 01-19: H4268X100 (ASPH) S-60, D-190, 2S-175, 2D-328 MIRL
RWY 01: Thld dspcd 475'. Acft. **RWY 19:** Trees.

LAND AND HOLD SHORT OPERATIONS

LANDING	HOLD SHORT POINT	DIST AVBL
RWY 06	01-19	6000
RWY 24	15-33	5850
RWY 33	06-24	4550

RUNWAY DECLARED DISTANCE INFORMATION

RWY 01: TORA-4268	TODA-4268	ASDA-4268	
RWY 06: TORA-9509	TODA-9509	ASDA-9509	LDA-9509
RWY 15: TORA-6847	TODA-6847	ASDA-6847	LDA-6847
RWY 19:			LDA-4268
RWY 24: TORA-9509	TODA-9509	ASDA-9509	LDA-9509
RWY 33: TORA-6847	TODA-6847	ASDA-6847	LDA-6847

AIRPORT REMARKS: Attended continuously. Numerous birds frequently on or in/ovf arpt. No training flights; no practice apchs; no touch and go lds between: Mon-Sat 0400-1200Z† and Sun 0400-1700Z†. Rwy 01-19 open for acft with wingspan less than 79'. Rwy 01 CLOSED for arrivals to all fixed wing acft. Rwy 19 CLOSED for departures to all fixed wing acft. Twy J clsd between S and R to acft with wing spans in excess of 171 ft. Air National Guard ramp PAEW barricaded adjacent northeast side. ASDE-X Surveillance System in Use. Pilots should operate transponders with Mode C on all twys and rwys. Rwy 33 touchdown RVR avbl. TPA-1873(1700) heavy acft. Rwy 06 visual glideslope indicator and glidepath not coincident. Rwy 24 visual glideslope indicator and glidepath not coincident. Rwy 33 visual glideslope indicator and glidepath not coincident. Ldg fee for business, corporate and revenue producing acft. Flight Notification Service (ADCUS) available. NOTE: See Special Notices-Land and Hold Short Lights.

WEATHER DATA SOURCES: ASOS (860) 627-9732. WSP.

COMMUNICATIONS: D-ATIS 118.15 (860-386-3570) **UNICOM** 122.95

WINDSOR LOCKS RCO 122.3 (BRIDGEPORT RADIO)

Ⓡ **BRADLEY APP CON** 123.95 (176°-240°) 125.35 (241°-060°) 127.8 (061°-175° and HFD area)

Ⓡ **BRADLEY DEP CON** 123.95 (176°-240°) 125.35 (241°-060°) 127.8 (061°-175° and HFD area)

TOWER 120.3 **GND CON** 121.9 **CLNC DEL** 121.75

AIRSPACE: CLASS C svc continuous ctc **APP CON**

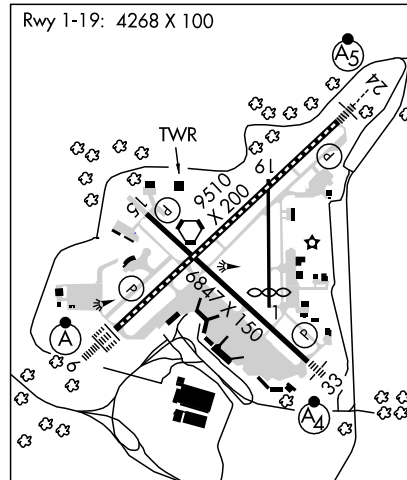
RADIO AIDS TO NAVIGATION: NOTAM FILE BDL.

(T) **VORTACW** 109.0 BDL Chan 27 N41°56.46' W72°41.32' at fld. 160/14W.

ILS/DME 111.1 I-BDL Chan 48 Rwy 06. Class IIIE.

ILS/DME 108.55 I-IXX Chan 22(Y) Rwy 33. Class IE.

ILS/DME 111.1 I-MYQ Chan 48 Rwy 24. Class IT. DME unusable from .4 NM inbound to Rwy 24.



YALESVILLE HELIPORT (4C3) 2 N UTC-5(-4DT) N41°29.51' W72°48.67'

65 B FUEL 100LL, JET A NOTAM FILE BDR

HELIPAD H1: H65X65 (CONC)

HELIPORT REMARKS: Attended 1400-2300Z†. Pilots unfamiliar with heliport ctc 203-294-8800 prior to arrival for a briefing on current procedures. ACTIVATE rotating bcn-123.5

COMMUNICATIONS: CTAF/UNICOM 123.05

Figure 386. Excerpt from Chart Supplement.



 12096	ALTERNATE MINS	M4	
<p>NAME ALTERNATE MINIMUMS ROCHESTER, NY GREATER ROCHESTER INTL (ROC) ILS or LOC Rwy 4¹ ILS or LOC Rwy 22¹ ILS or LOC Rwy 28² RNAV (GPS) Rwy 4³ RNAV (GPS) Rwy 22³ RNAV (GPS) Rwy 25³ RNAV (GPS) Rwy 28⁴ VOR Rwy 4³ VOR/DME Rwy 4³</p> <p>¹ILS, Category D, 700-2¼. LOC, Category D, 800-2¼. ²ILS, Categories A,B,C, 800-2; Category D, 800-2¼. LOC, Category D, 800-2¼. ³Category D, 800-2¼. ⁴Category C, 800-2¼; Category D, 800-2½.</p> <p>ROME, NY GRIFFISS INTL (RME) ILS or LOC Rwy 33¹² RNAV (GPS) Rwy 15³ RNAV (GPS) Rwy 33³</p> <p>NA when local weather not available. ¹NA when control tower closed. ²ILS, Categories A, B, 700-2; Category C, 800-2; Category D, 800-2½. LOC, Category D, 800-2½. ³Category D, 800-2½.</p> <p>SARANAC LAKE, NY ADIRONDACK RGNL (SLK) VOR/DME Rwy 5¹ VOR or GPS Rwy 9²</p> <p>¹Category A, 1100-2; Category B, 1200-2; Categories C,D, 1200-3. ²Categories A,B, 1400-2; Categories C,D, 1400-3.</p> <p>SHIRLEY, NY BROOKHAVEN (HWV) RNAV (GPS) Rwy 6 RNAV (GPS) Rwy 15 RNAV (GPS) Y Rwy 24 RNAV (GPS) Z Rwy 24 RNAV (GPS) Rwy 33 VOR Rwy 6</p> <p>NA when local weather not available.</p> <p>SUSSEX, NJ SUSSEX (FWN) RNAV (GPS) Rwy 3¹ VOR-A²</p> <p>NA when local weather not available. ¹Categories A, B, 900-2; Category C, 900-2½. ²Categories A, B, 1400-2; Category C, 1400-3.</p>	<p>NAME ALTERNATE MINIMUMS TETERBORO, NJ TETERBORO (TEB) ILS or LOC Rwy 6¹ ILS Rwy 19¹ RNAV (GPS) Y Rwy 6³ RNAV (RNP) Z Rwy 6, 800-2¼ VOR/DME-A² VOR/DME-B² VOR/DME Rwy 6³ VOR Rwy 24⁴</p> <p>¹ILS, Categories A,B, 800-2; Category C, 800-2¼; Category D, 900-2¾. LOC, Category C, 800-2¼; Category D, 900-2¾. ²Categories A,B, 1000-2; Categories C,D, 1000-3. ³Category C, 800-2¼; Category D, 900-2¾. ⁴Categories B,C,D, 1000-3.</p> <p>TRENTON, NJ TRENTON MERCER (TTN) ILS Rwy 6 NDB or GPS Rwy 6 VOR or GPS-A VOR or GPS Rwy 24</p> <p>NA when control tower closed.</p> <p>WATERTOWN, NY WATERTOWN INTL (ART) ILS or LOC Rwy 7¹ RNAV (GPS) Rwy 7² RNAV (GPS) Rwy 10³ RNAV (GPS) Rwy 28³ VOR Rwy 7²</p> <p>¹ILS, Categories A, B, C, 700-2; Category D 700-2¼. LOC, Category D, 800-2¼. ²Category D, 800-2¼. ³NA when local weather not available.</p> <p>WELLSVILLE, NY WELLSVILLE MUNI ARPT, TARANTINE FIELD (ELZ) RNAV (GPS) Rwy 10 RNAV (GPS) Rwy 28 VOR-A¹</p> <p>NA when local weather not available. ¹Categories A,B, 1100-2; Categories C,D, 1100-3.</p> <p>WESTHAMPTON BEACH, NY FRANCIS S. GABRESKI (FOK) ILS or LOC Rwy 24¹ RNAV (GPS) Rwy 24</p> <p>NA when local weather not available. ¹NA when control tower closed. ²NA when control tower closed. ³Category D, 800-2¼.</p>		

Figure 388. IFR Alternate Minimums.

Airspeed limitations and their operational significance are shown in Airspeed Limitations Chart.

	SPEED	KCAS	KIAS	REMARKS
V_{MO}	Maximum Operating Speed	175	175	Do not exceed this speed in any operation.
V_A	Maneuvering Speed: 8750 Pounds 7500 Pounds 6250 Pounds 5000 Pounds	148 137 125 112	148 137 125 112	Do not make full or abrupt control movements above this speed.
V_{FE}	Maximum Flap Extended Speed: UP – 10° Flaps 10° – 20° Flaps 20° – Full	175 150 125	175 150 125	Do not exceed these speeds with the given flap settings.
	Maximum Open Window Speed	175	175	Do not exceed this speed with window open.

Figure 389. CE-208—Airspeed Limitations.

Illustrations and materials were used with permission from Cessna Aircraft Company.

CONDITIONS:
 8,750 Pounds
 Power Lever **IDLE**
 FUEL CONDITION Lever **HIGH IDLE**

MOST REARWARD CENTER OF GRAVITY

Flap Setting	Angle of Bank							
	0°		30°		45°		60°	
	KIAS	KCAS	KIAS	KCAS	KIAS	KCAS	KIAS	KCAS
UP	63	78	68	84	75	93	89	110
10°	58	69	62	74	69	82	82	98
20°	53	63	57	68	63	75	75	89
FULL	48	60	52	64	57	71	68	85

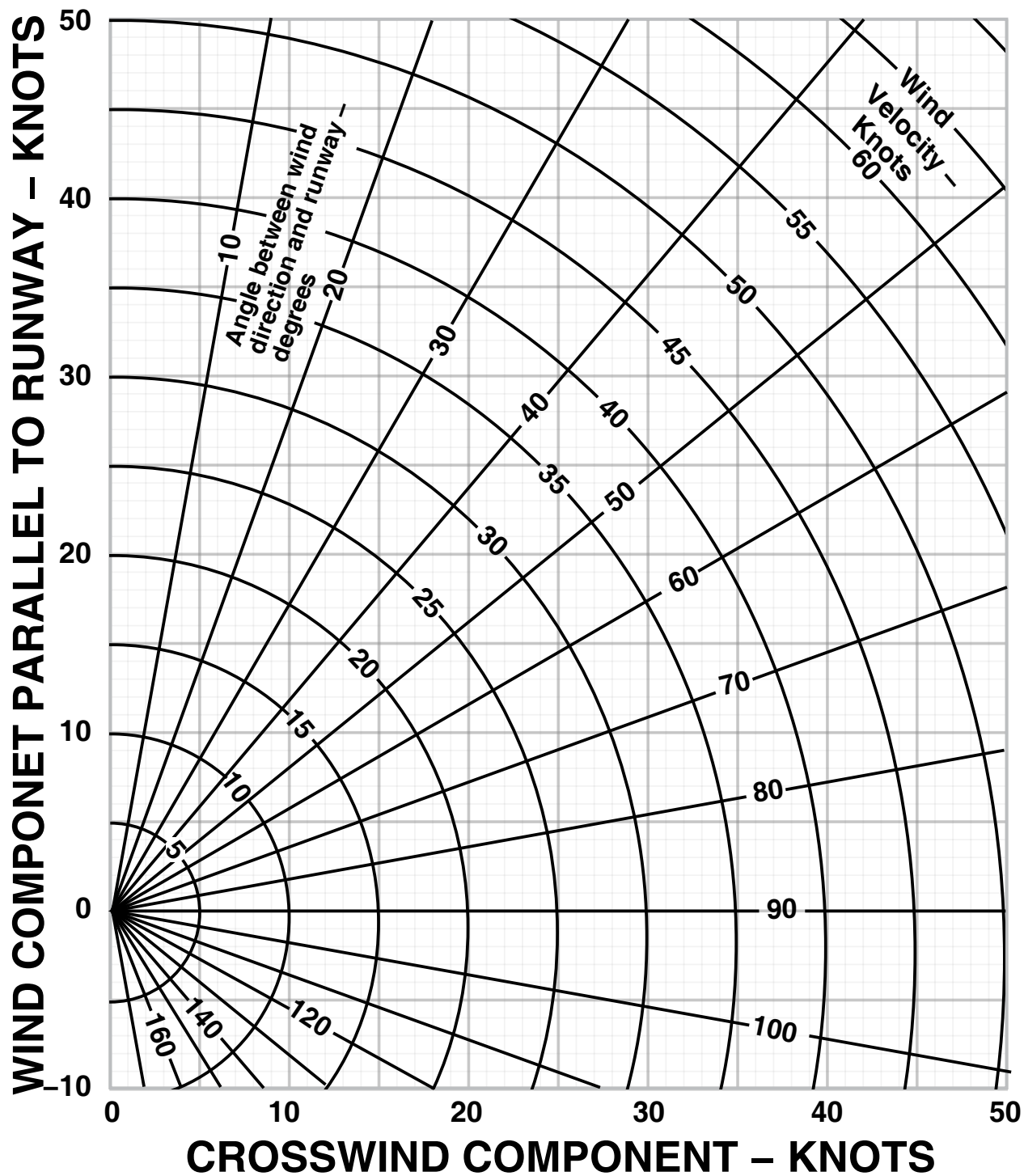
MOST FORWARD CENTER OF GRAVITY

Flap Setting	Angle of Bank							
	0°		30°		45°		60°	
	KIAS	KCAS	KIAS	KCAS	KIAS	KCAS	KIAS	KCAS
UP	63	78	68	84	75	93	89	110
10°	60	70	64	75	71	83	85	99
20°	54	64	58	69	64	76	76	91
FULL	50	61	54	66	59	73	71	86

NOTE

1. Altitude loss during a stall recovery may be as much as 300 feet from a wings-level stall, and even greater from a turning stall.
2. KIAS values are approximate.

Figure 390. CE-208—Stall Speeds.



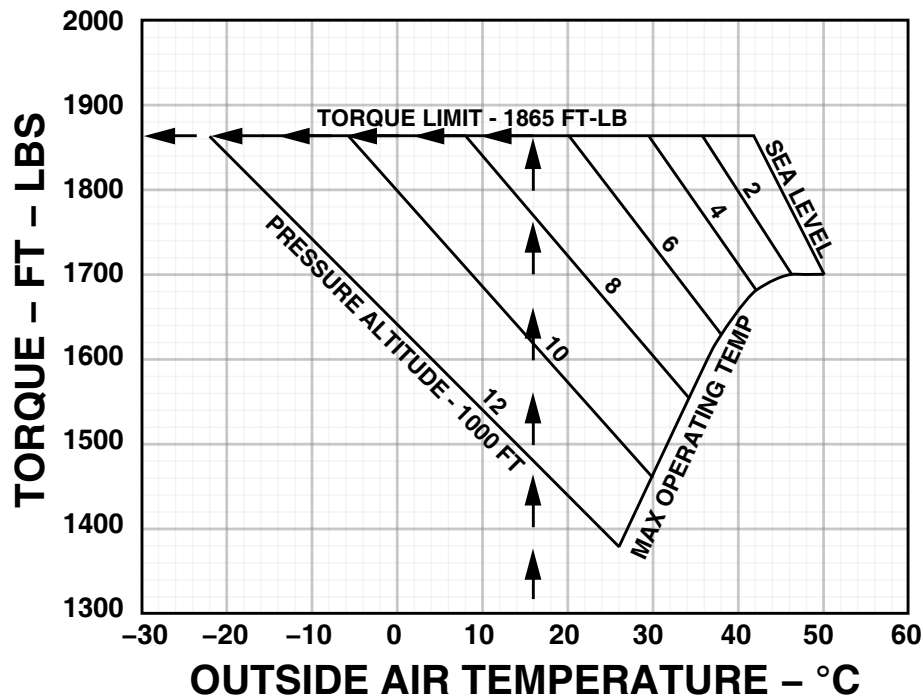
NOTE

Maximum demonstrated crosswind velocity is 20 knots (not a limitation).

Figure 391. CE-208—Wind Components.

Illustrations and materials were used with permission from Cessna Aircraft Company.

CONDITIONS:
 1900 RPM
 60 KIAS
 INERTIAL SEPARATOR **NORMAL**



NOTE

1. Torque increases approximately 10 Ft-Lbs from 0 to 60 KIAS.
2. Torque on this chart shall be achieved without exceeding 805 °C ITT or 101.6 N_g. When the ITT exceeds 765 °C, this power setting is time limited to 5 minutes.
3. With the inertial separator in BYPASS, where altitude and temperature do not permit 1865 Ft-Lbs for takeoff, decrease torque setting by 15 Ft-Lbs.
4. With the cabin heater ON, where altitude and temperature do not permit 1865 Ft-Lbs for takeoff, decrease torque setting by 65 Ft-Lbs.

Figure 392. CE-208—Maximum Engine Torque for Takeoff.

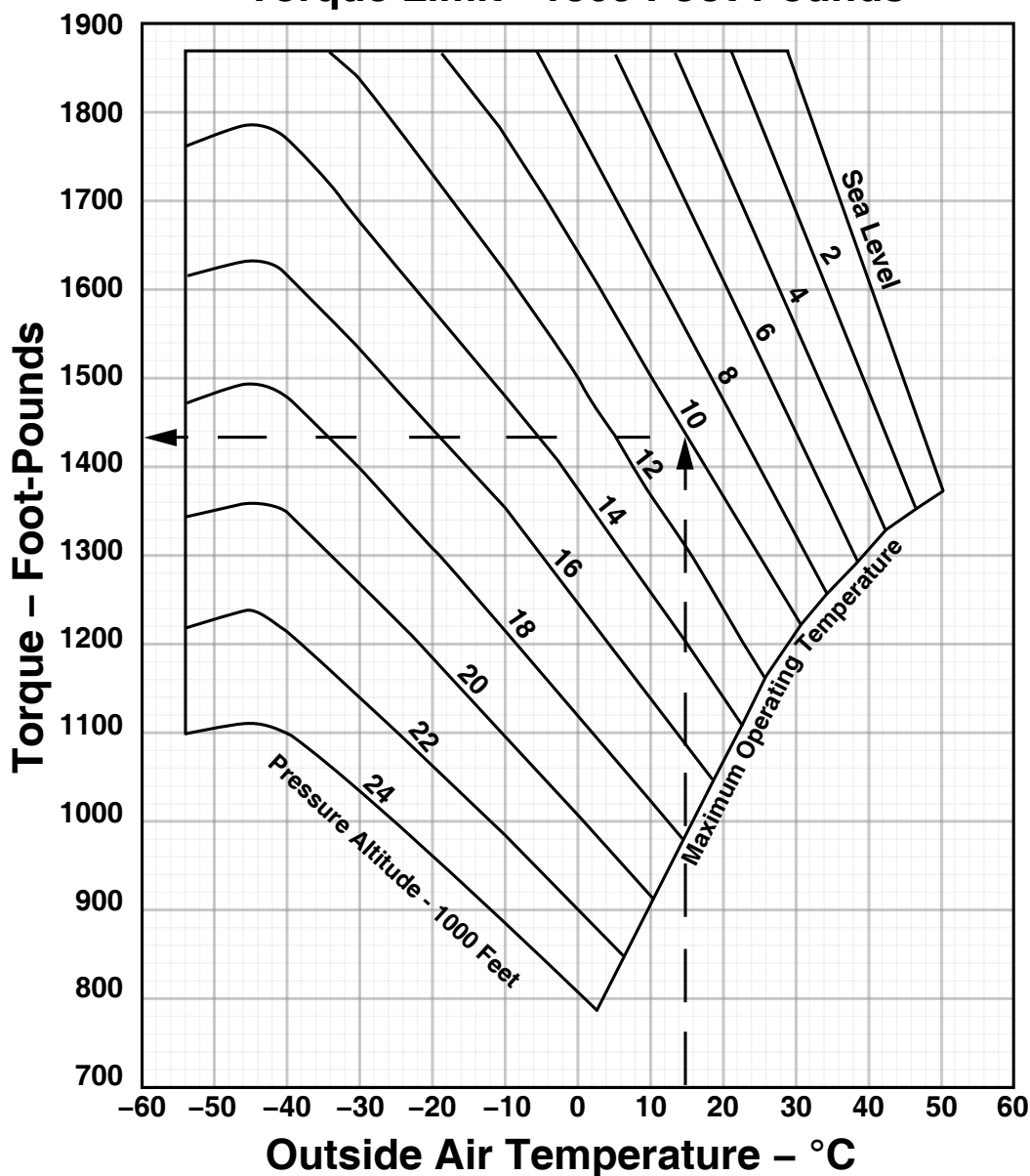
CONDITIONS:

1900 RPM

V_y KIAS

INERTIAL SEPARATOR NORMAL

Torque Limit - 1865 Foot-Pounds



NOTE

1. Torque on this chart shall be achieved without exceeding 765 °C ITT or 101.6 N_g.
2. With the inertial separator in BYPASS, decrease torque setting by 100 Foot-Pounds.
3. With the cabin heater ON, decrease torque setting by 80 Foot-Pounds.

Figure 393. CE-208—Maximum Engine Torque for Climb.

Illustrations and materials were used with permission from Cessna Aircraft Company.

CARGO POD INSTALLED SHORT FIELD TAKEOFF DISTANCE

NOTE

The following general information is applicable to all SHORT FIELD TAKEOFF DISTANCE Charts.

1. Use short field takeoff technique as specified in Section 4.
2. Decrease distance by 10% for 11 knots of headwind. For operation with a tailwind of up to 10 knots, increase distance by 10% for each 2 knots.
3. For operation on a dry, grass runway, increase distance by 15% of the “Ground Roll” figure.
4. With takeoff power set below the torque limit (1865 foot-pounds), increase distances (both ground roll and total distance) by 3% for INERTIAL SEPARATOR in BYPASS and increase ground roll by 5% and total distance by 10% for CABIN HEAT ON.
5. Where distance values have been replaced by dashes, operating temperature limits of the airplane would be greatly exceeded. The distance values that are provided, where the operation slightly exceeds the temperature limits, are provided for interpolation purposes only.
6. For operation above 40 °C and below the operating temperature limits, increase distance at 40 °C by 20%.

Figure 394. CE-208—Cargo Pod Installed—Short Field Takeoff Distance.

Illustrations and materials were used with permission from Cessna Aircraft Company.

CARGO POD INSTALLED SHORT FIELD TAKEOFF DISTANCE

CONDITIONS:

Flaps **20°**

1900 RPM

CABIN HEAT **OFF**INERTIAL SEPARATOR **NORMAL**

Paved, Level, Dry Runway

Zero Wind

Lift Off: 70 KIAS

Speed at 50 Feet: 83 KIAS

8750 Pounds

Pressure Altitude (Feet)	-10 °C		0 °C		10 °C	
	Grnd Roll (Feet)	Total Dist To Clear 50 Foot Obst	Grnd Roll (Feet)	Total Dist To Clear 50 Foot Obst	Grnd Roll (Feet)	Total Dist To Clear 50 Foot Obst
Sea Level	1205	2160	1280	2295	1365	2430
2000	1360	2430	1455	2580	1545	2740
4000	1550	2745	1655	2920	1760	3105
6000	1765	3115	1890	3325	2015	3540
8000	2025	3560	2165	3805	2345	4125
10000	2335	4090	2585	4580	2930	5325
12000	2875	5155	3270	6030	3745	7175

Pressure Altitude (Feet)	20 °C		30 °C		40 °C	
	Grnd Roll (Feet)	Total Dist To Clear 50 Foot Obst	Grnd Roll (Feet)	Total Dist To Clear 50 Foot Obst	Grnd Roll (Feet)	Total Dist To Clear 50 Foot Obst
Sea Level	1445	2570	1535	2720	1625	2870
2000	1645	2905	1745	3075	1910	3400
4000	1875	3295	1995	3510	2290	4135
6000	2145	3765	2435	4370	2805	5195
8000	2670	4815	3065	5715	3565	7005
10000	3370	6350	3915	7790	---	---
12000	4350	8865	5130	11755	---	---

Figure 395. CE-208—Cargo Pod Installed—Short Field Takeoff Distance.

Illustrations and materials were used with permission from Cessna Aircraft Company.

CARGO POD INSTALLED FLAPS UP TAKEOFF DISTANCE

NOTE

The following general information is applicable to all FLAPS UP TAKEOFF DISTANCE Charts.

1. Use Type II, Type III, or Type IV anti-ice fluid takeoff technique as specified in Section 4.
2. Decrease distance by 10% for each 11 knots of headwind. For operation with a tailwind of up to 10 knots, increase distance by 10% for each 2 knots.
3. For operation on a dry, grass runway, increase distance by 15% of the “Ground Roll” figure.
4. With takeoff power set below the torque limit (1865 foot-pounds), increase distances (both ground roll and total distance) by 3% for INERTIAL SEPARATOR in BYPASS and increase ground roll by 5% and total distance by 10% for CABIN HEAT ON.

Figure 396. CE-208—Cargo Pod Installed—Flaps Up Takeoff Distance.

Illustrations and materials were used with permission from Cessna Aircraft Company.

CARGO POD INSTALLED
RATE OF CLIMB - TAKEOFF FLAP SETTING
FLAPS 20°

CONDITIONS:

Takeoff Power

1900 RPM

INERTIAL SEPARATOR **NORMAL**

Weight (Pounds)	Pressure Altitude (Feet)	Climb Speed (KIAS)	Rate of Climb - Feet Per Minute (FPM)				
			-40 °C	-20 °C	0 °C	20 °C	40 °C
8750	Sea Level	92	875	855	835	815	795
	2000	90	860	835	815	795	730
	4000	89	835	815	790	765	645
	6000	88	815	790	765	740	555
	8000	87	785	760	735	620	435
	10000	85	760	730	665	500	---
8300	Sea Level	91	955	940	920	900	880
	2000	89	940	920	895	875	810
	4000	88	915	895	870	850	725
	6000	86	895	870	845	820	630
	8000	85	865	840	815	700	505
	10000	84	835	810	745	575	---
7800	Sea Level	89	1055	1035	1020	1000	980
	2000	87	1035	1015	995	975	910
	4000	86	1015	995	970	950	820
	6000	85	990	965	945	920	720
	8000	83	965	940	915	795	595
	10000	82	935	905	840	665	---
7300	Sea Level	88	1160	1145	1130	1110	1090
	2000	86	1145	1125	1105	1085	1020
	4000	85	1125	1105	1080	1060	925
	6000	84	1100	1075	1055	1030	825
	8000	82	1075	1050	1025	900	690
	10000	81	1045	1015	950	765	---
	12000	79	1015	965	810	635	---

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NOTE

1. Do not exceed torque limit for takeoff per **MAXIMUM ENGINE TORQUE FOR TAKEOFF** chart. When ITT exceeds 765 °C, this power setting is time limited to 5 minutes.
2. With climb power set below the torque limit, decrease rate of climb by 20 FPM for INERTIAL SEPARATOR set in BYPASS and 45 FPM for CABIN HEAT ON.
3. Where rate of climb values have been replaced by dashes, operating temperature limits of the airplane would be greatly exceeded. The rates of climb that are provided included, where the operation slightly exceeds the temperature limit, are provided for interpolation purposes only.

Figure 397. CE-208—Cargo Pod Installed—Rate of Climb—Takeoff Flap Setting.

Illustrations and materials were used with permission from Cessna Aircraft Company.

CARGO POD INSTALLED CLIMB GRADIENT - TAKEOFF FLAPS UP

CONDITIONS:
Takeoff Power
1900 RPM

Zero Wind
INERTIAL SEPARATOR **NORMAL**

Weight (Pounds)	Pressure Altitude (Feet)	Climb Speed (KIAS)	Climb Gradient - Feet/Nautical Mile (FT/NM)				
			-40 °C	-20 °C	0 °C	20 °C	40 °C
8750	Sea Level	68	735	695	655	620	475
	2000	69	695	655	615	580	390
	4000	69	660	615	580	500	305
	6000	70	620	580	545	410	230
	8000	70	580	540	475	330	165
	10000	71	545	505	390	250	---
	12000	72	505	420	305	180	---
8300	Sea Level	66	810	770	725	690	535
	2000	66	770	730	685	650	445
	4000	67	730	690	650	565	360
	6000	68	690	645	610	470	280
	8000	68	650	605	540	380	210
	10000	69	610	570	445	300	---
	12000	69	570	475	355	225	---
7800	Sea Level	61	910	860	815	775	615
	2000	62	865	820	775	735	515
	4000	62	820	775	730	640	425
	6000	62	780	730	690	540	340
	8000	63	735	690	615	445	265
	10000	63	690	645	515	360	---
	12000	63	645	550	420	280	---
7300	Sea Level	59	1020	970	920	875	700
	2000	59	975	920	875	830	595
	4000	59	925	875	830	730	500
	6000	59	880	830	780	620	405
	8000	59	830	780	700	520	330
	10000	59	785	735	595	430	---
	12000	59	735	630	490	340	---

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NOTE

1. Do not exceed torque limit for takeoff per **MAXIMUM ENGINE TORQUE FOR TAKEOFF** chart. When ITT exceeds 765 °C, this power setting is time limited to 5 minutes.
2. With climb power set below the torque limit, decrease climb by 10 FT/NM for INERTIAL SEPARATOR set in BYPASS and 40 FT/NM for CABIN HEAT ON.
3. Where climb gradient values have been replaced by dashes, operating temperature limits of the airplane would be greatly exceeded. The climb gradients that are included, where the operation slightly exceeds the temperature limit, are provided for interpolation purposes only.

Figure 398. CE-208—Cargo Pod Installed—Climb Gradient—Takeoff.

**CARGO POD INSTALLED
TIME, FUEL, AND DISTANCE TO CLIMB
MAXIMUM RATE OF CLIMB**

CONDITIONS:

FLAPS UP

1900 RPM

Zero Wind

INERTIAL SEPARATOR **NORMAL**

Weight (Pounds)	Pressure Altitude (Feet)	Climb Speed (KIAS)	Climb From Sea Level								
			20 °C Below Standard			Standard Temperature			20 °C Above Standard		
			Time (min)	Fuel (lbs)	Dist (NM)	Time (min)	Fuel (lbs)	Dist (NM)	Time (min)	Fuel (lbs)	Dist (NM)
8750	Sea Level	104	0	0	0	0	0	0	0	0	0
	4,000	104	4	32	8	5	33	8	6	38	10
	8,000	104	9	64	16	9	66	17	12	80	24
	12,000	102	14	98	25	15	105	29	22	132	43
	16,000	96	20	136	37	23	152	45	35	202	71
	20,000	88	28	186	54	36	219	72	69	349	142
	24,000	79	49	278	93	75	388	152	---	---	---
8300	Sea Level	103	0	0	0	0	0	0	0	0	0
	4,000	103	4	29	7	4	30	7	5	34	9
	8,000	103	8	58	14	8	60	15	11	72	21
	12,000	101	13	89	23	14	95	26	19	116	37
	16,000	95	18	123	33	21	135	40	30	172	60
	20,000	87	25	165	47	31	189	61	51	265	104
	24,000	77	40	233	76	54	287	106	---	---	---
7800	Sea Level	101	0	0	0	0	0	0	0	0	0
	4,000	101	4	26	6	4	27	6	4	30	8
	8,000	101	7	52	13	8	54	14	10	63	18
	12,000	99	11	80	20	12	84	22	16	100	31
	16,000	92	16	110	29	18	119	34	25	145	49
	20,000	84	22	146	41	27	163	51	40	210	79
	24,000	74	33	198	62	42	229	81	88	395	178
7300	Sea Level	99	0	0	0	0	0	0	0	0	0
	4,000	99	3	24	5	3	24	6	4	27	7
	8,000	99	7	47	11	7	49	12	9	55	16
	12,000	97	10	72	18	11	75	20	14	87	27
	16,000	89	14	99	25	16	105	30	21	124	41
	20,000	80	20	129	35	23	141	43	32	173	63
	24,000	70	29	171	52	34	191	65	55	260	108

NOTE:

1. Torque set at 1865 foot-pounds or lesser value must not exceed maximum climb ITT of 765 °C or Ng of 101.6%.
2. Add 35 pounds of fuel for engine start, taxi, and takeoff allowances.
3. With INERTIAL SEPARATOR set in BYPASS, increase time, fuel, and distance numbers by 1% for every 2000 feet of climb and for CABIN HEAT ON, increase time, fuel, and distance numbers by 1% for every 1000 feet of climb.
4. Where time, fuel, and distance values have been replaced by dashes, an appreciable rate of climb for the weight shown cannot be expected.

Figure 399. CE-208—Cargo Pod Installed—Time, Fuel and Distance To Climb.

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CARGO POD INSTALLED FUEL AND TIME REQUIRED

MAXIMUM CRUISE POWER (40-200 Nautical Miles)

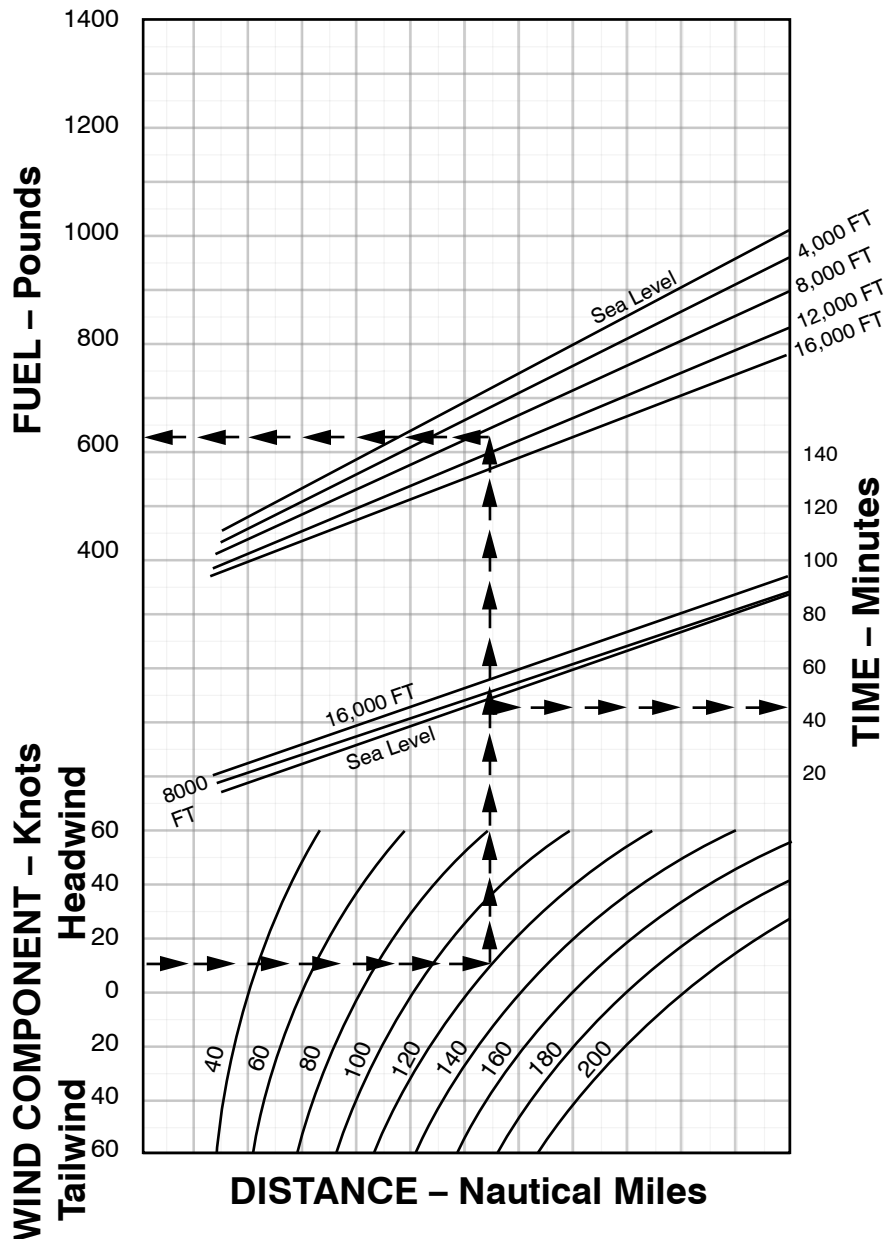
CONDITIONS:

8750 Pounds

Standard Temperature

1900 RPM

INERTIAL SEPARATOR **NORMAL**



NOTE

1. Fuel required includes the fuel used for engine start, taxi, takeoff, maximum climb from sea level, descent to sea level and 45 minutes reserve. Time required includes the time during a maximum climb and descent.
2. With INERTIAL SEPARATOR in BYPAS, increase time by 4% and fuel by 2% or CABIN HEAT ON, increase time by 3% and fuel by 2%.

Figure 400. CE-208—Cargo Pod Installed—Fuel and Time Required.

Illustrations and materials were used with permission from Cessna Aircraft Company.

CARGO POD INSTALLED SHORT FIELD LANDING DISTANCE

NOTE

The following general information is applicable to all SHORT FIELD LANDING DISTANCE Charts.

1. Use short field landing technique as specified in Section 4.
2. Decrease distance by 10% for every 11 knots of headwind. For operation with a tailwind of up to 10 knots, increase distance by 10% for every 2 knots.
3. For operation on a dry, grass runway, increase distance by 40% of the “Ground Roll” figure.
4. If a landing with flaps UP is necessary, increase the approach speed by 15 KIAS and allow for 40% longer distances.
5. Use of maximum reverse thrust after touchdown reduces ground roll distance by approximately 10%.
6. Where distance values have been replaced by dashes, operating temperature limits of the airplane would be greatly exceeded. The distance values that are included, where the operation slightly exceeds the temperature limit, are provided for interpolation purposes only.

CARGO POD INSTALLED SHORT FIELD LANDING DISTANCE

CONDITIONS:

Flaps **FULL**

Zero Wind

Maximum Braking

PROP RPM Lever **MAX**

Paved, Level, Dry Runway

POWER Lever **IDLE** after clearing obstacles. **BETA** range (lever against spring) after touchdown.

8500 Pounds

Speed at 50 Feet: 78 KIAS

Pressure Altitude (Feet)	-10 °C		0 °C		10 °C	
	Grnd Roll (Feet)	Total Dist To Clear 50 Foot Obst	Grnd Roll (Feet)	Total Dist To Clear 50 Foot Obst	Grnd Roll (Feet)	Total Dist To Clear 50 Foot Obst
Sea Level	835	1625	865	1670	900	1715
2000	900	1715	935	1765	965	1815
4000	965	1815	1005	1865	1040	1920
6000	1040	1920	1080	1975	1120	2030
8000	1125	2035	1165	2095	1210	2155
10000	1215	2160	1260	2220	1305	2285
12000	1310	2295	1360	2360	1410	2430

Pressure Altitude (Feet)	20 °C		30 °C		40 °C	
	Grnd Roll (Feet)	Total Dist To Clear 50 Foot Obst	Grnd Roll (Feet)	Total Dist To Clear 50 Foot Obst	Grnd Roll (Feet)	Total Dist To Clear 50 Foot Obst
Sea Level	930	1765	965	1810	995	1855
2000	1000	1860	1035	1910	1070	1960
4000	1075	1970	1115	2020	1150	2070
6000	1160	2085	1200	2140	1240	2195
8000	1250	2210	1295	2270	1340	2330
10000	1350	2345	1400	2410	---	---
12000	1460	2495	1510	2560	---	---

Figure 402. CE-208—Cargo Pod Installed—Short Field Landing Distance.

**WITHOUT CARGO POD
ENDURANCE PROFILE
45 MINUTES RESERVE
2224 POUNDS USABLE FUEL**

CONDITIONS:

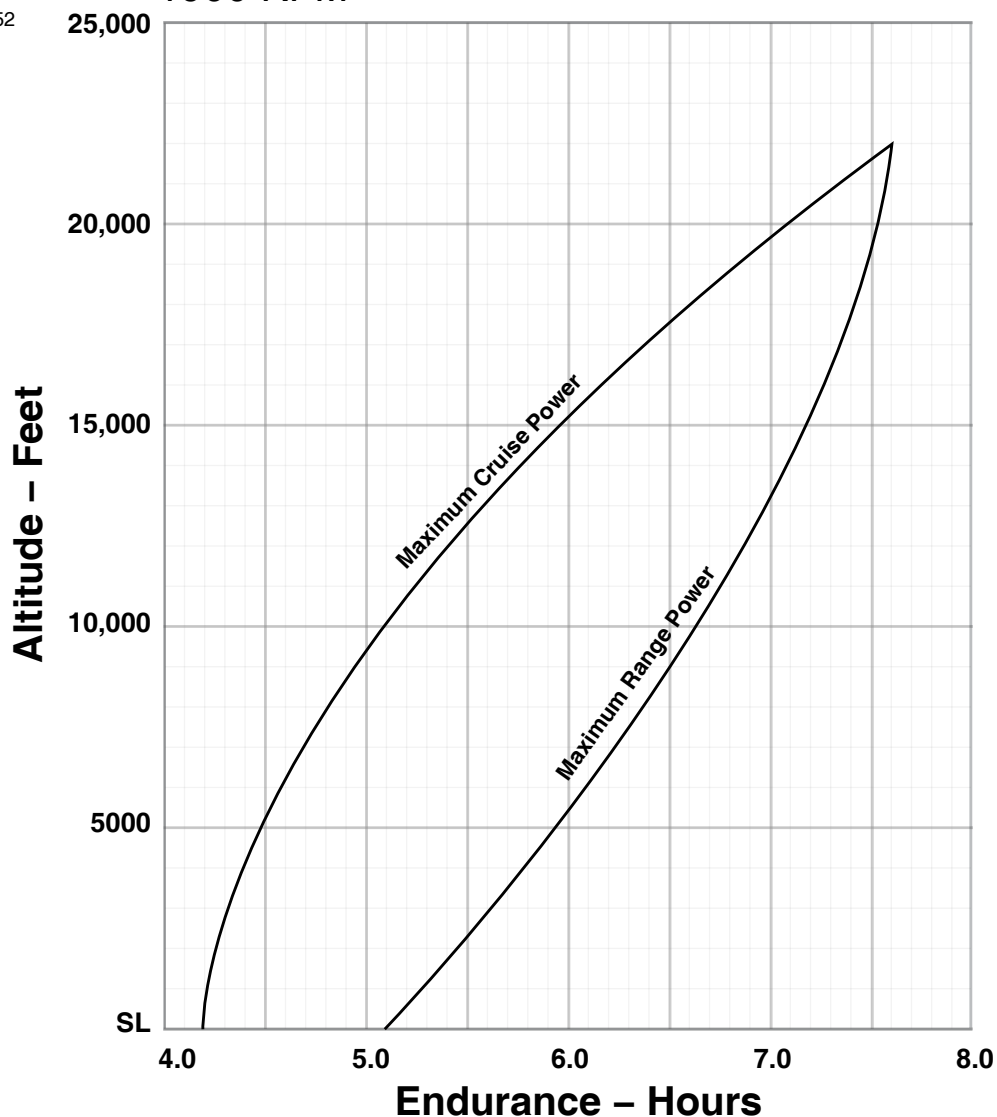
8750 Pounds

Standard Temperature

1900 RPM

INERTIAL SEPARATOR NORMAL

A39952



NOTE

1. This chart allows for the fuel used for engine start, taxi, takeoff, climb and descent. The time during a maximum climb and the time during descent are included.
2. With INERTIAL SEPARATOR in BYPASS, decrease endurance by 2%, or CABIN HEAT ON, decrease endurance by 3%.

Figure 403. CE-208—Without Cargo Pod—Endurance Profile—45 Minutes Reserve—2224 Pounds Useable Fuel.

WEIGHT AND BALANCE RECORD (LOAD MANIFEST)

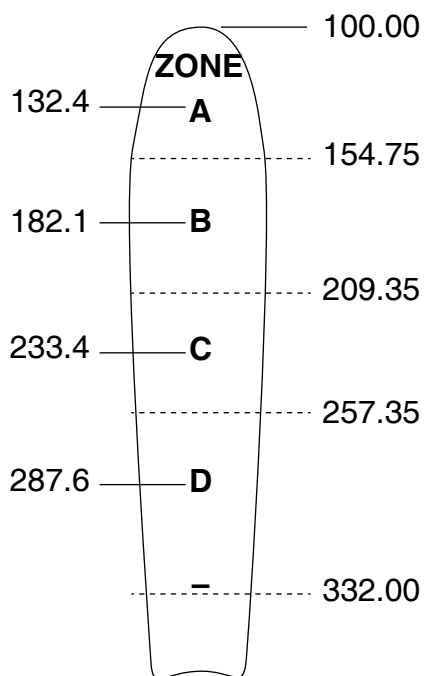
MAXIMUM STRUCTURAL WEIGHTS

MAX RAMP	8785 LBS
MAX TAKEOFF	8750 LBS
MAX LANDING	8500 LBS

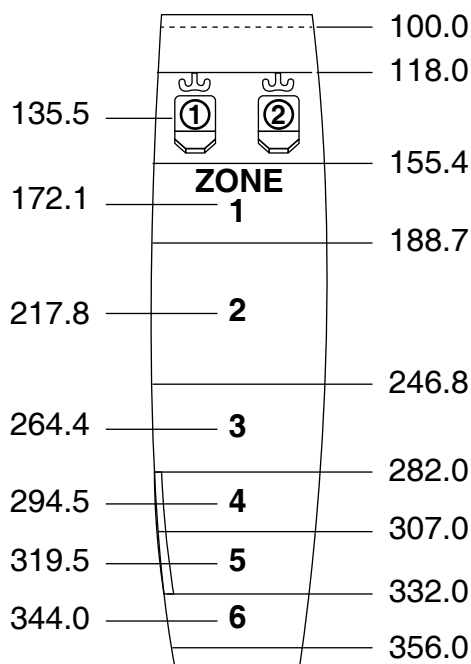
INDEX FORMULA

$\text{BASIC AIRPLANE INDEX} = \frac{\text{WT (ARM} - 192)}{500} + 500$
$\text{LOAD ITEM INDEX} = \frac{\text{WT (ARM} - 192)}{500} = (\text{IF NEG. SUBTRACT FROM 1,000})$

CENTROID (C.G. ARM)	POD STATION ARM	CENTROID C.G. ARM	CABIN STATION ARM
------------------------	--------------------	----------------------	----------------------



CARGO POD



CABIN CARGO

Figure 405. CE-208—Weight and Balance Record (Load Manifest).
Illustrations and materials were used with permission from Cessna Aircraft Company.

CARGO POD

The airplane may be equipped with a 111.5 cubic foot capacity cargo pod attached to the bottom of the fuselage. The pod is divided into four compartments (identified as Zones A, B, C, and D) by bulkheads and has a maximum floor loading of 30 pounds per square foot and maximum load weight limit of 1090 pounds. Each compartment has a loading door located on the left side of the pod. The doors are hinged at the bottom, and each has two latches. When the latch handles are rotated to the horizontal position with the doors closed, the doors are secured. Refer to the Pod Internal Dimension and Load Markings and Cargo Pod Loading Arrangements figures for additional details.

MAXIMUM ZONE/COMPARTMENT LOADINGS

Maximum zone loadings are as follows:

Weight Limits (Pounds)					
	Zone/ Compartment	Volume (Cubic Feet)	*Secured by Tie-downs	**Unsecured Using Partitions or in Cargo Pod	C.G. (Station Location)
FUSELAGE	1	52.9	1780	415	172.1
	2	109.0	3100	860	217.8
	3	63.0	1900	495	264.4
	4	43.5	1380	340	294.5
	5	40.1	1270	315	319.5
	6	31.5	320	245	344.0
CARGO POD	A	23.4	---	230	132.4
	B	31.5	---	310	182.1
	C	27.8	---	270	233.4
	D	28.8	---	280	287.6

* THIS IS THE MAXIMUM CARGO ALLOWED IN THE BAY INDICATED.

**DENSITY MUST BE 7.9 LBS/FT³ OR LESS AND BAY 75% OR MORE FULL.

Figure 406. CE-208—Cargo Pod and Maximum Zone/Compartment Loadings.

CABIN INTERNAL LOAD MARKINGS (CARGO VERSION)

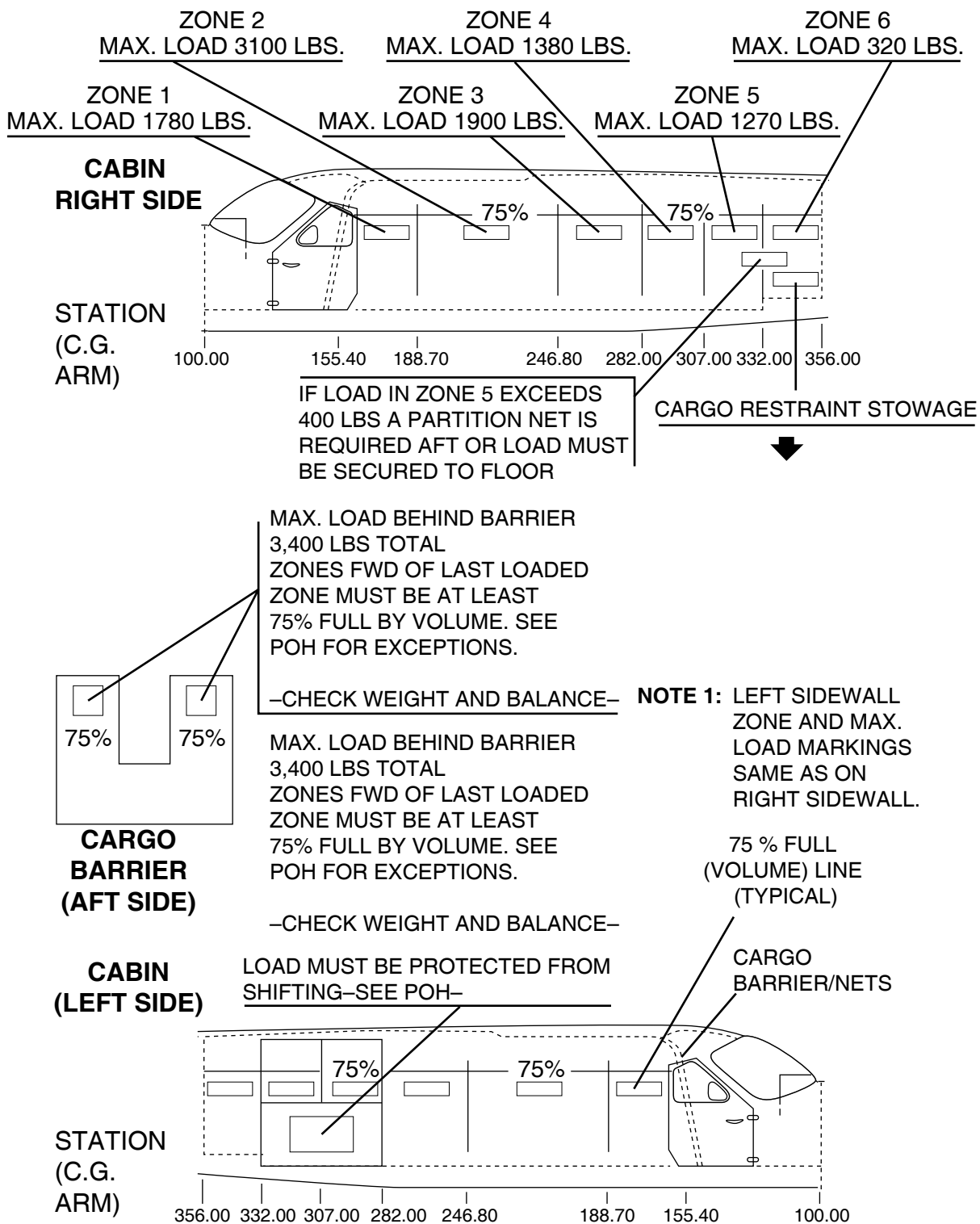
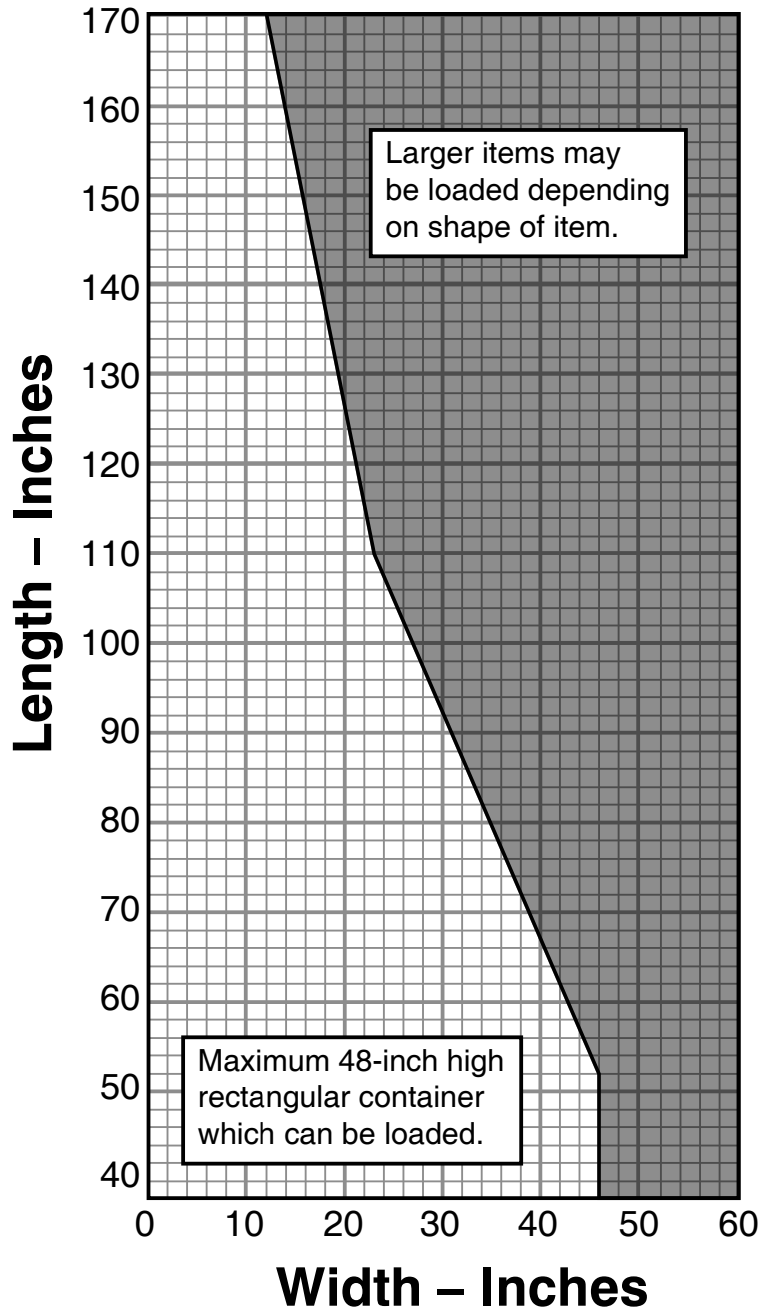


Figure 407. CE-208—Cabin Internal Load Markings (Cargo Version).

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MAXIMUM CARGO SIZES



NOTE

1. Approximately one inch clearance allowed from sidewall and ceiling.
2. Subtract roller height and pallet thickness, if applicable.

Figure 408. CE-208—Maximum Cargo Sizes.

CARGO POD INSTALLED SHORT FIELD LANDING DISTANCE

CONDITIONS:

Flaps **FULL**

Zero Wind

Maximum Braking

PROP RPM Lever **MAX**

Paved, Level, Dry Runway

POWER Lever **IDLE** after clearing obstacles. **BETA** range (lever against spring) after touchdown.

8500 Pounds

Speed at 50 Feet: 78 KIAS

Pressure Altitude (Feet)	-10 °C		0 °C		10 °C	
	Grnd Roll (Feet)	Total Dist To Clear 50 Foot Obst	Grnd Roll (Feet)	Total Dist To Clear 50 Foot Obst	Grnd Roll (Feet)	Total Dist To Clear 50 Foot Obst
Sea Level	835	1625	865	1670	900	1715
2000	900	1715	935	1765	965	1815
4000	965	1815	1005	1865	1040	1920
6000	1040	1920	1080	1975	1120	2030
8000	1125	2035	1165	2095	1210	2155
10000	1215	2160	1260	2220	1305	2285
12000	1310	2295	1360	2360	1410	2430

Pressure Altitude (Feet)	20 °C		30 °C		40 °C	
	Grnd Roll (Feet)	Total Dist To Clear 50 Foot Obst	Grnd Roll (Feet)	Total Dist To Clear 50 Foot Obst	Grnd Roll (Feet)	Total Dist To Clear 50 Foot Obst
Sea Level	930	1765	965	1810	995	1855
2000	1000	1860	1035	1910	1070	1960
4000	1075	1970	1115	2020	1150	2070
6000	1160	2085	1200	2140	1240	2195
8000	1250	2210	1295	2270	1340	2330
10000	1350	2345	1400	2410	---	---
12000	1460	2495	1510	2560	---	---

Figure 409. CE-208—Weight and Moment Tables—Pilot and Front Passenger.

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WEIGHT AND MOMENT TABLES
10 PLACE COMMUTER
Crew and Passengers (Single Commuter Seating)

Weight (Pounds)	Aft Passengers Seats				
	Pilot/Front Passenger Seats 1 and 2 (Arm = 135.5 Inch)	3 and 4 (Arm = 173.9 Inch)	5 and 6 (Arm = 209.9 Inch)	7 and 8 (Arm = 245.9 Inch)	9 and 10 (Arm = 281.9 Inch)
		Moment (Inch-Pound/1000)			
1	0.1	0.2	0.2	0.2	0.3
2	0.3	0.3	0.4	0.5	0.6
3	0.4	0.5	0.6	0.7	0.8
4	0.5	0.7	0.8	1.0	1.1
5	0.7	0.9	1.0	1.2	1.4
6	0.8	1.0	1.3	1.5	1.7
7	0.9	1.2	1.5	1.7	2.0
8	1.1	1.4	1.7	2.0	2.3
9	1.2	1.6	1.9	2.2	2.5
10	1.4	1.7	2.1	2.5	2.8
20	2.7	3.5	4.2	4.9	5.6
30	4.1	5.2	6.3	7.4	8.5
40	5.4	7.0	8.4	9.8	11.3
50	6.8	8.7	10.5	12.3	14.1
60	8.1	10.4	12.6	14.8	16.9
70	9.5	12.2	14.7	17.2	19.7
80	10.8	13.9	16.8	19.7	22.6
90	12.2	15.7	18.9	22.1	25.4
100	13.6	17.4	21.0	24.6	28.2
200	27.1	34.8	42.0	49.2	56.4
300	40.7	52.2	63.0	73.8	84.6

EXAMPLE:

To obtain moments for a 185 pound passenger in seat 5, add moments shown for 100 pounds (21.0), 80 pounds (16.8), and 5 pounds (1.0) for a total moment of 38.8 inch-pound/1000.

NOTE:

The airplane may be configured with left single commuter seats installed on the right side, and right single commuter seats installed on the left side. Actual seat location should be noted when computing airplane weight and balance.

Figure 410. CE-208—Weight and Moment Tables—10 Place Commuters.

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WEIGHT AND MOMENT TABLES

FUEL (JET FUEL WITH DENSITY OF 6.7 POUNDS/GALLON AT 60 °F)

Gallons	Weight Pounds	Moment Inch-Pound/1000 (Arm Varies)	Gallons	Weight Pounds	Moment Inch-Pound/1000 (Arm Varies)
5	34	6.8	175	1173	238.4
10	67	13.6	180	1206	245.2
15	101	20.4	185	1240	252.0
20	134	27.2	190	1273	258.8
25	168	34.0	195	1307	265.7
30	201	40.8	200	1340	272.5
35	235	47.6	205	1374	279.3
40	268	54.4	210	1407	286.1
45	302	61.2	215	1441	292.9
50	335	68.0	220	1474	299.7
55	369	74.8	225	1508	306.5
60	402	81.6	230	1541	313.3
65	436	88.4	235	1575	320.1
70	469	95.2	240	1608	326.9
75	503	102.0	245	1642	333.7
80	536	108.8	250	1675	340.5
85	570	115.7	255	1709	347.3
90	603	122.5	260	1742	354.1
95	637	129.3	265	1776	360.9
100	670	136.1	270	1809	367.7
105	704	142.9	275	1843	374.5
110	737	149.7	280	1876	381.2
115	771	156.6	285	1910	388.0
120	804	163.4	290	1943	394.8
125	838	170.2	295	1977	401.6
130	871	177.0	300	2010	408.4
135	905	183.8	305	2044	415.2
140	938	190.6	310	2077	422.0
145	972	197.5	315	2111	428.8
150	1005	204.3	320	2144	435.6
155	1039	211.1	325	2178	442.4
160	1072	217.9	327	2189	444.7
165	1106	224.7	330	2211	449.1
170	1139	231.5	332	2224	451.7

Figure 411. CE-208—Weight and Moment Tables—Fuel.

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WEIGHT AND MOMENT TABLES CARGO (CABIN LOCATIONS)

Weight (Pounds)	Zone 1 (Arm = 172.1 Inch)	Zone 2 (Arm = 217.8 Inch)	Zone 3 (Arm = 264.4 Inch)	Zone 4 (Arm = 294.5 Inch)	Zone 5 (Arm = 319.5 Inch)	Zone 6 (Arm = 344.0 Inch)
	Moment (Inch-Pound/1000)					
1	0.2	0.2	0.3	0.3	0.3	0.3
2	0.3	0.4	0.5	0.6	0.6	0.7
3	0.5	0.7	0.8	0.9	1.0	1.0
4	0.7	0.9	1.1	1.2	1.3	1.4
5	0.9	1.1	1.3	1.5	1.6	1.7
6	1.0	1.3	1.6	1.8	1.9	2.1
7	1.2	1.5	1.9	2.1	2.2	2.4
8	1.4	1.7	2.1	2.4	2.6	2.8
9	1.5	2.0	2.4	2.7	2.9	3.1
10	1.7	2.2	2.6	2.9	3.2	3.4
20	3.4	4.4	5.3	5.9	6.4	6.9
30	5.2	6.5	7.9	8.8	9.6	10.3
40	6.9	8.7	10.6	11.8	12.8	13.8
50	8.6	10.9	13.2	14.7	16.0	17.2
60	10.3	13.1	15.9	17.7	19.2	20.6
70	12.0	15.2	18.5	20.6	22.4	24.1
80	13.8	17.4	21.2	23.6	25.6	27.5
90	15.5	19.6	23.8	26.5	28.8	31.0
100	17.2	21.8	26.4	29.5	32.0	34.4
200	34.4	43.6	52.9	58.9	63.9	68.8
300	51.6	65.3	79.3	88.4	95.9	103.2
400	68.8	87.1	105.8	117.8	127.8	
500	86.1	108.9	132.2	147.3	159.8	
600	103.3	130.7	158.6	176.7	191.7	
700	120.5	152.5	185.1	206.2	223.7	
800	137.7	174.2	211.5	235.6	255.6	
900	154.9	196.0	238.0	265.1	287.6	
1000	172.1	217.8	264.4	294.5	319.5	
2000		435.6				
3000		653.4				

EXAMPLE:

To obtain moments for 350 pounds of cargo in Zone 1, add moments shown in Zone 1 for 300 pounds (51.6) and 50 pounds (8.6) for a total moment of 60.2 inch-pound/1000.

Figure 412. CE-208—Weight and Moment Tables—Cargo (Cabin Locations).

WEIGHT AND MOMENT TABLES
CARGO (CARGO POD LOCATIONS)

Weight Pounds	Zone A (Arm = 132.4 Inch)	Zone B (Arm = 182.1 Inch)	Zone C (Arm = 233.4 Inch)	Zone D (Arm = 287.6 Inch)
	Moment (Inch-Pound/1000)			
1	0.1	0.2	0.2	0.3
2	0.3	0.4	0.5	0.6
3	0.4	0.5	0.7	0.9
4	0.5	0.7	0.9	1.2
5	0.7	0.9	1.2	1.4
6	0.8	1.1	1.4	1.7
7	0.9	1.3	1.6	2.0
8	1.1	1.5	1.9	2.3
9	1.2	1.6	2.1	2.6
10	1.3	1.8	2.3	2.9
20	2.6	3.6	4.7	5.8
30	4.0	5.5	7.0	8.6
40	5.3	7.3	9.3	11.5
50	6.6	9.1	11.7	14.4
60	7.9	10.9	14.0	17.3
70	9.3	12.7	16.3	20.1
80	10.6	14.6	18.7	23.0
90	11.9	16.4	21.0	25.9
100	13.2	18.2	23.3	28.8
200	26.5	36.4	46.7	57.5
300		54.6		

EXAMPLE:
To obtain moments for 48 pounds of cargo in Zone A, add moments shown in Zone A for 40 pounds (5.3) and 8 pounds (1.1) for a total moment of 6.4 inch-pound/1000.

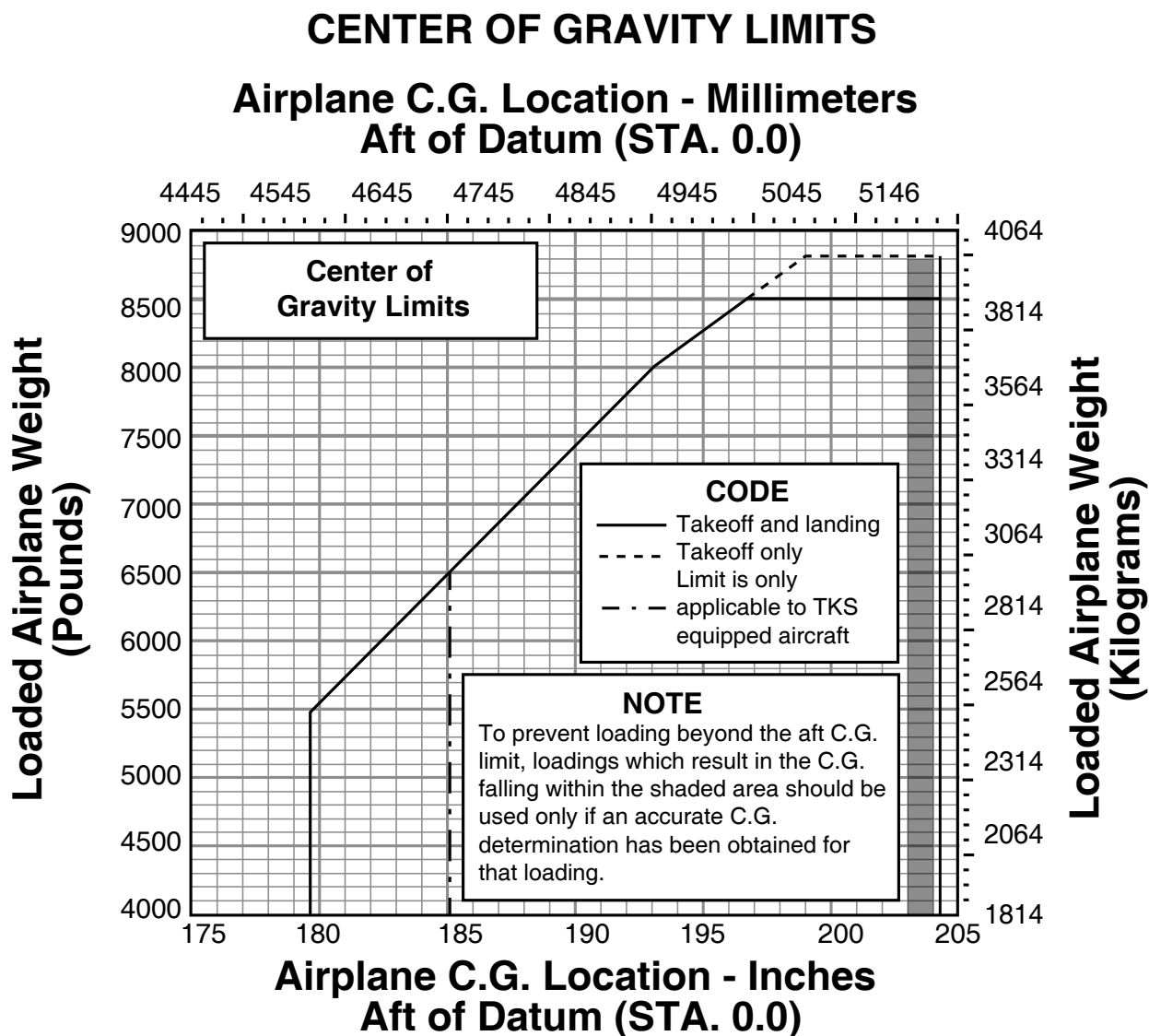
Figure 413. CE-208—Weight and Moment Tables—Cargo (Cargo POD Locations).

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SAMPLE LOADING PROBLEM

(CARGO LOADING SHOWN)	SAMPLE AIRPLANE		YOUR AIRPLANE	
	Weight Pounds	Moment Inch-Pound/1000	Weight Pounds	Moment Inch-Pound/1000
1. Basic Empty Weight (Use the data pertaining to your airplane as it is presently equipped (includes unusable fuel and full oil).	5005	929.4	5005	929.4
2. Usable Fuel (332 Gallons Max)	2224	451.7		
3. Pilot (Seat 1) (STA. 133.5 to 146.5)	170	23.1	200	
4. Front Passenger (Seat 2) (STA 133.5 to 146.5)				
5. Aft Passengers (Commuter Seating):				
STA. 173.9				
STA. 209.9				
STA. 245.9				
STA. 281.9				
6. Baggage/Cargo (Cabin Locations):				
Zone 1 (STA. 155.40 to 188.70)	120	20.6		
Zone 2 (STA. 188.70 to 246.80)	416	90.6		
Zone 3 (STA. 246.80 to 282.00)	200	52.9		
Zone 4 (STA. 282.00 to 307.00)	200	58.9		
Zone 5 (STA. 307.00 to 332.00)	200	63.9		
Zone 6 (STA. 332.00 to 356.00)	50	17.2		
7. Baggage/Cargo (Cargo Pod Locations):				
Zone A (STA. 100.00 to 154.75)	50	6.6		
Zone B (STA. 154.75 to 209.35)	50	9.1		
Zone C (STA. 209.35 to 257.35)	50	11.7		
Zone D (STA. 257.35 to 332.00)	50	14.4		
8. RAMP WEIGHT AND MOMENT	8785	1750.1		
9. Fuel Allowance (for engine start, taxi, and runup)	-35	-7.0		
10. TO WEIGHT AND MOMENT (Subtract Step 9 from Step 8)	8750	1743.1		
11. Locate this point (8750 at 1743.1) on the Center of Gravity Moment Envelope, and since this point falls within the envelope, the loading is acceptable.				
NOTE:				
Refer to the Weight and Moment Tables for weight and moment of crew, passengers, usable fuel, and cargo being carried. Refer to Cabin Internal Loading Arrangements for aft passengers seating arrangements.				

Figure 414. CE-208—Sample Loading Problem.



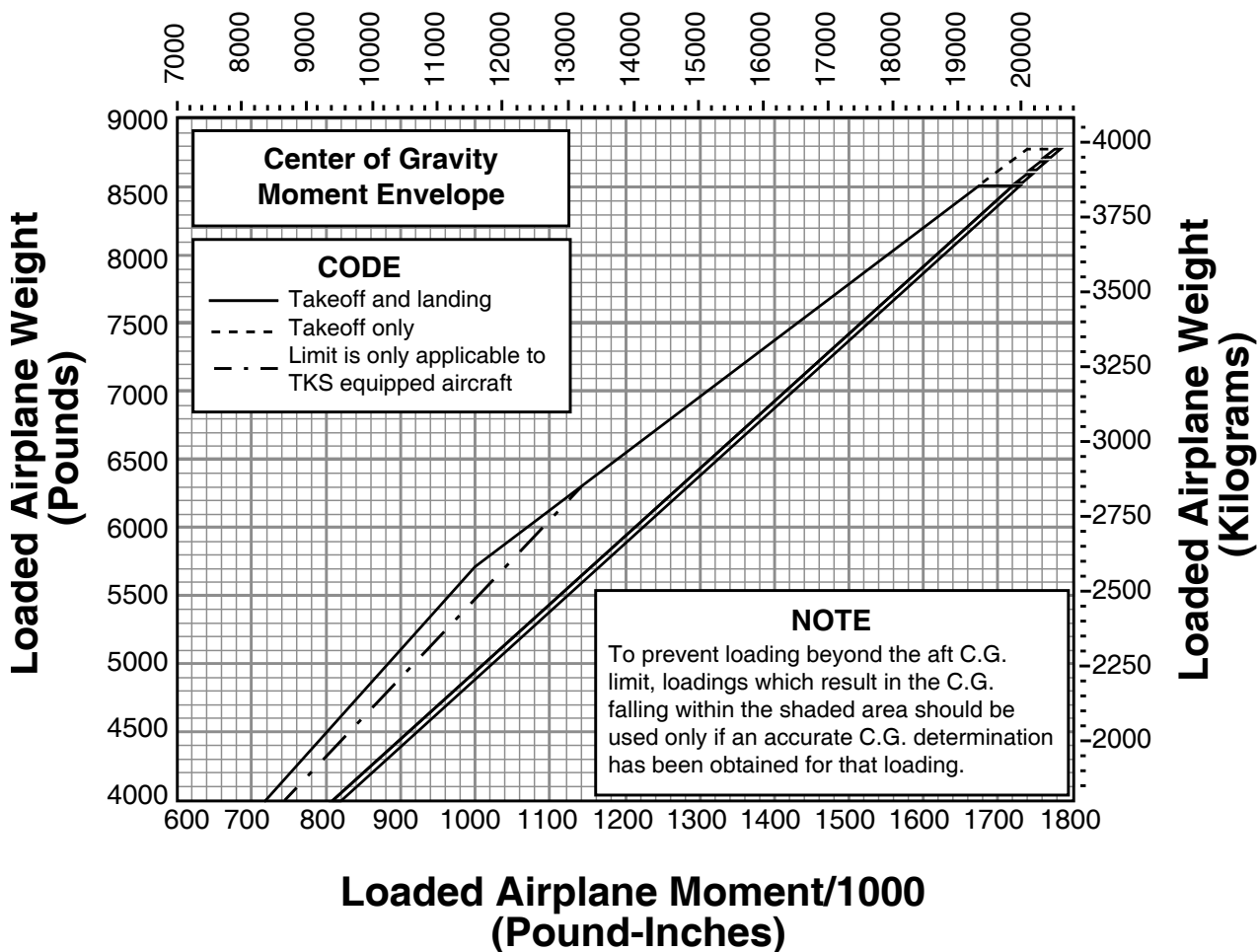
WARNING

It is the responsibility of the pilot to make sure that the airplane is loaded correctly. Operation outside of prescribed weight and balance limitations could result in an accident and serious or fatal injury.

Figure 415. CE-208—Center of Gravity Limits.

CENTER OF GRAVITY MOMENT ENVELOPE

**Loaded Airplane Moment/1000
(Kilogram-Millimeters)**



WARNING

Because loading personnel may not always be able to achieve an ideal loading, a means of protecting the C.G envelope is provided by supplying an aft C.G. location warning (shaded area) between 38.33% MAC and the maximum aft C.G. of 40.33% MAC on the center of gravity moment envelope. Points falling within this shaded area should be used only if accurate C.G. determination for cargo loadings can be obtained.

It is the responsibility of the pilot to make sure that the airplane is loaded correctly. Operation outside of prescribed weight and balance limitations could result in an accident and serious or fatal injury.

Figure 416. CE-208—Center of Gravity Moment Envelope.

1. INTRODUCTION

Observance of the limitations included in this chapter is mandatory.

2. KINDS OF AIRPLANE OPERATION

The airplane is certified in the transport category for day and night operations, in the following conditions when the equipment and instruments required by the airworthiness and operating regulations are approved, installed, and in an operable condition:

- VFR and IFR
- Flight in icing conditions

The airplane is certified for ditching when the safety equipment specified by the applicable regulations is installed.

The airplane is certified capable of RVSM operations in accordance with the FAA “Interim guidance material on the approval of operations/aircraft for RVSM operations,” 91-RVSM, dated June 30, 1999 and with the JAA Temporary Guidance Leaflet, TGL No. 6, Revision 1, RVSM. <1030>

NOTE

Compliance with these FAA and JAA standards does not constitute an operational approval. <1030>

RVSM operations must not be commenced or continued unless all of the required equipment specified in the RVSM Required Equipment List table is operational. <1030>

RVSM Required Equipment List <1030>	
Equipment	Requirements for RVSM
Autopilot	Must be operational.
Altitude Alerting System	Must be operational.
Altitude Reporting Transponder (2)	One (1) must be operational.
Air Data Computers (2)	Two (2) must be operational.

Effectivity:

- On airplanes registered in the Republic of Argentina:
 - The Necessary equipment for the different kinds of operations must comply with the applicable Argentinean regulation. <DNA>

Figure 417. CRJ 900—Limitations.

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1. STRUCTURAL WEIGHT LIMITATION

Weight	kg	lb	Airplane Option Code
Medium Ramp Weight (MRW)	36628	80750	
	36 613	80719	<2217>
	37108	81810	<2002>
	37535	82750	<2004>
	38222	84265	<2006>
	38555	85000	<2005>
Medium Takeoff Weight (MTOW)	36514	80500	
	36500	80469	<2217>
	36995	81560	<2002>
	37421	82500	<2004>
	37995	83765	<2006>
	38329	84500	<2005>
Maximum Landing Weight (MLW)	33339	73500	
	34065	75100	<2005> or <2006>
Maximum Zero Fuel Weight (MZFW)	31751	70000	
	32092	70750	<2005> or <2006>
Minimum Flight Weight	20412	45000	

NOTE

The Maximum Take-off Weight (MTOW) and/or Maximum Landing Weight (MLW) may be further limited due to performance considerations.

Figure 418. CRJ 900—Limitations—Structural Weight.

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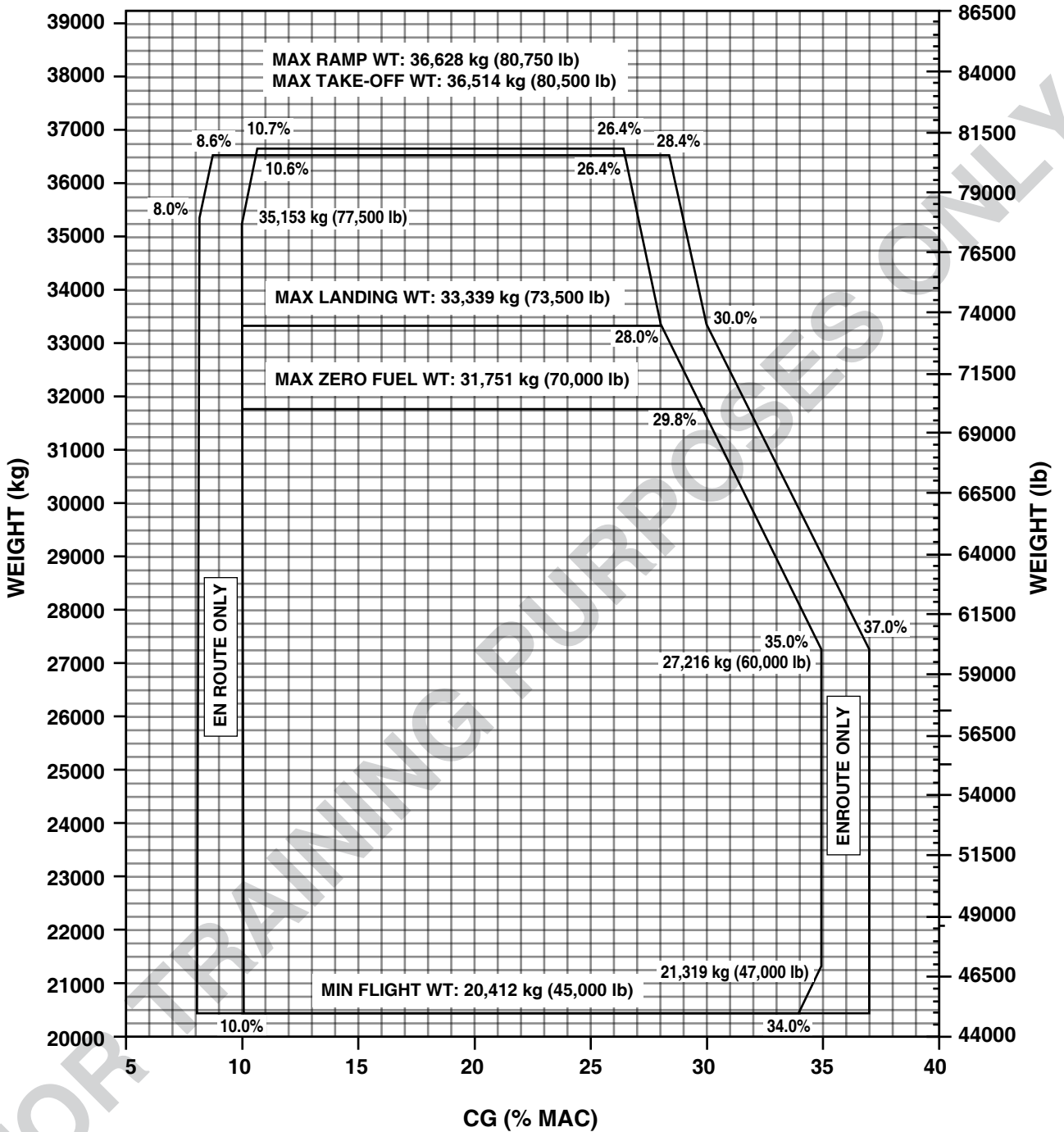


Figure 419. CRJ 900—Center of Gravity Limits.

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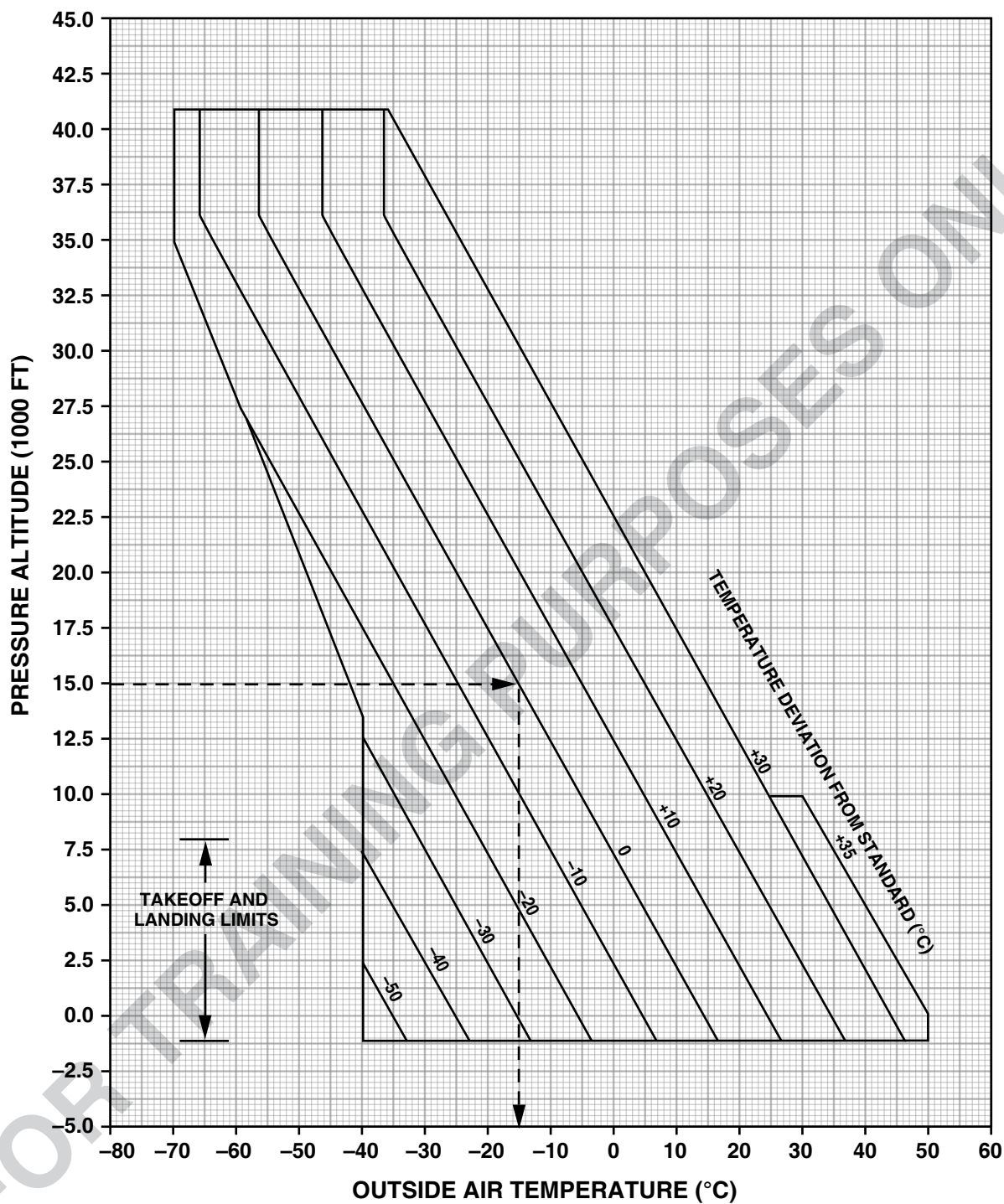


Figure 420. CRJ 900—Altitude and Temperature Operating Limits.
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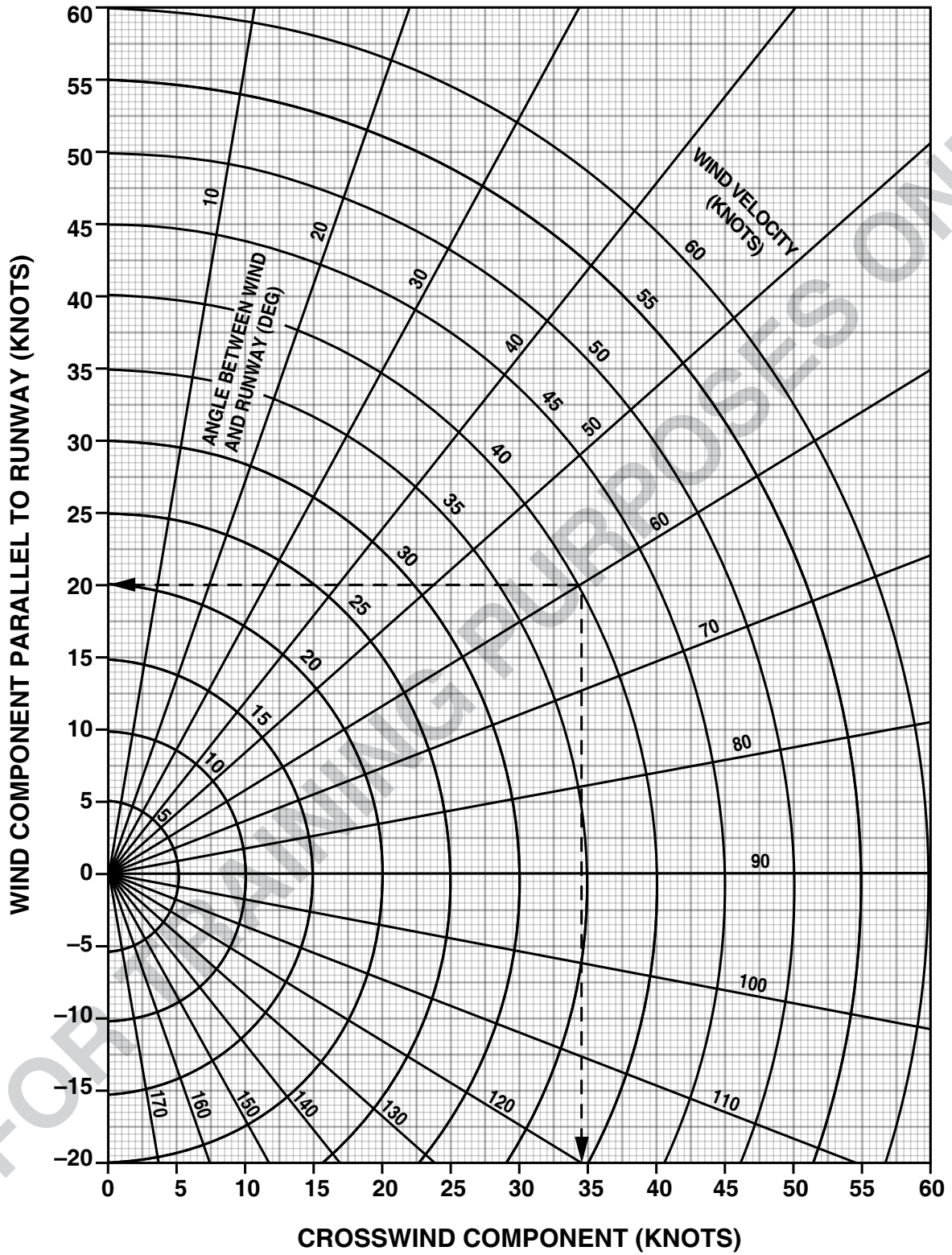


Figure 421. CRJ 900—Performance—Wind Component.
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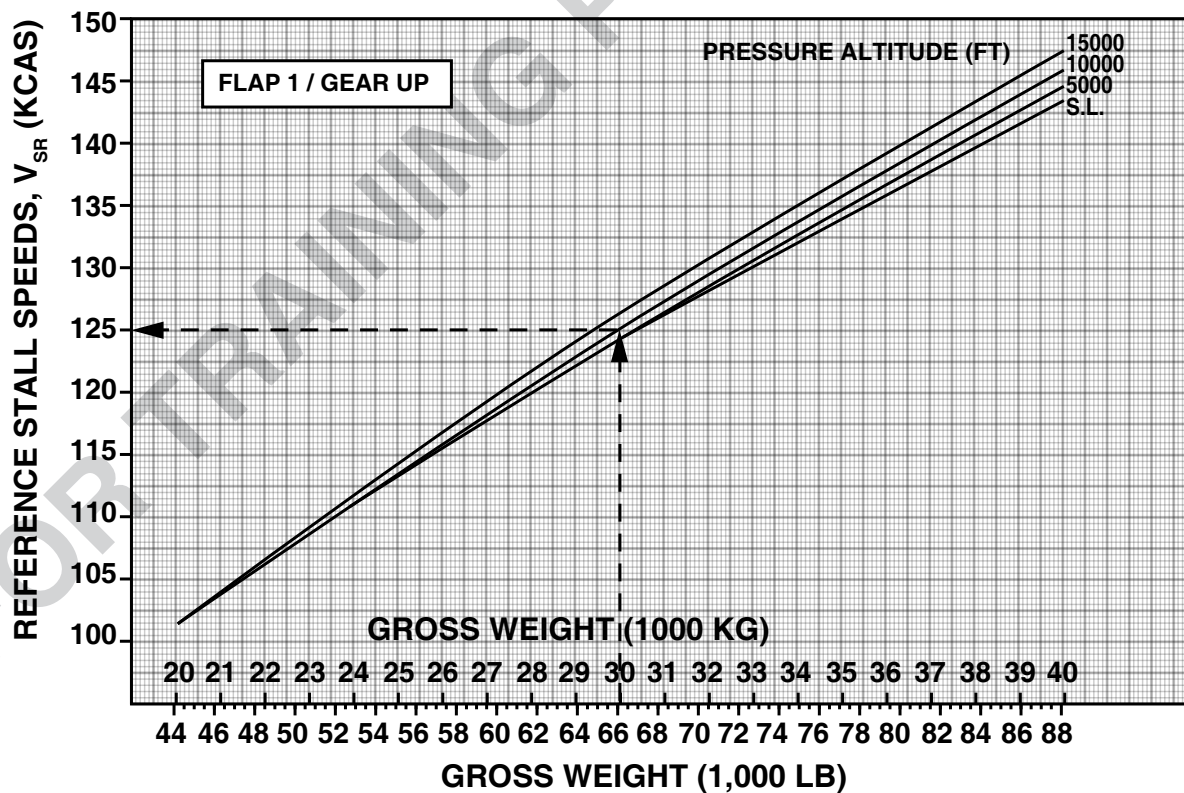
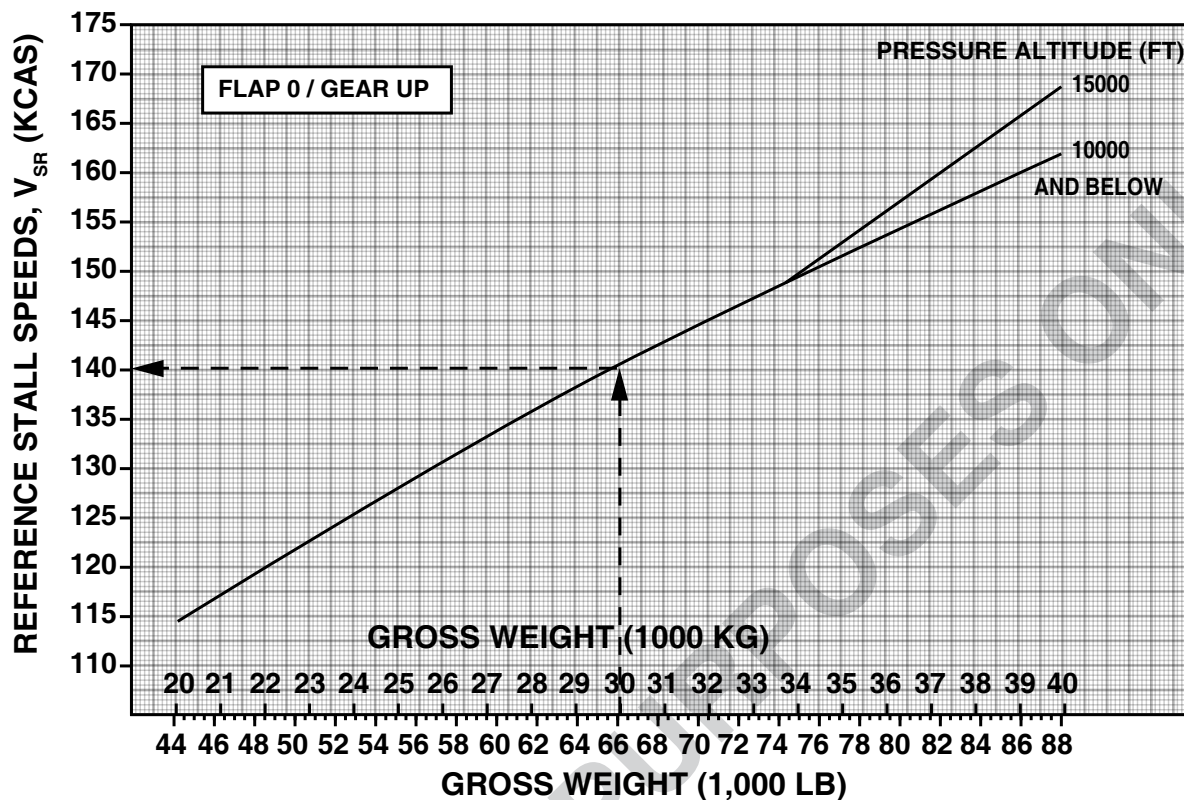


Figure 422. CRJ 900—Performance—Stall Speeds, V_{SR} .
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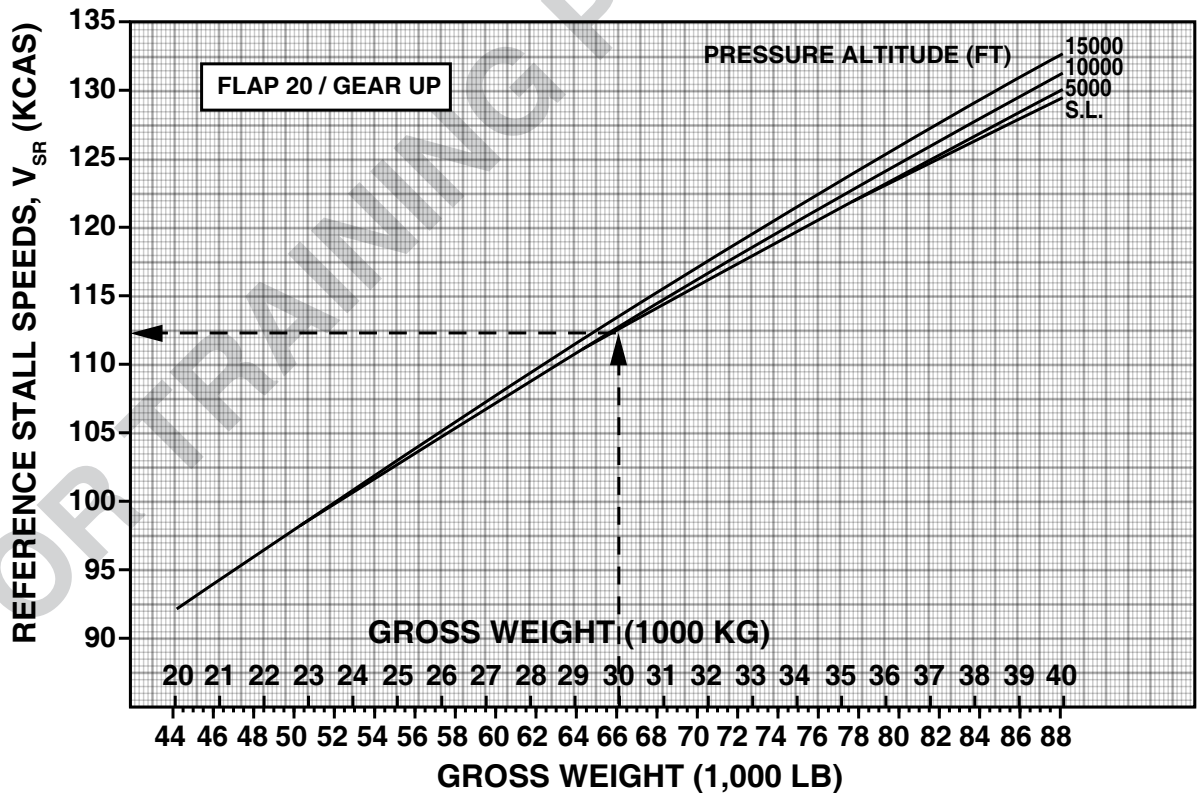
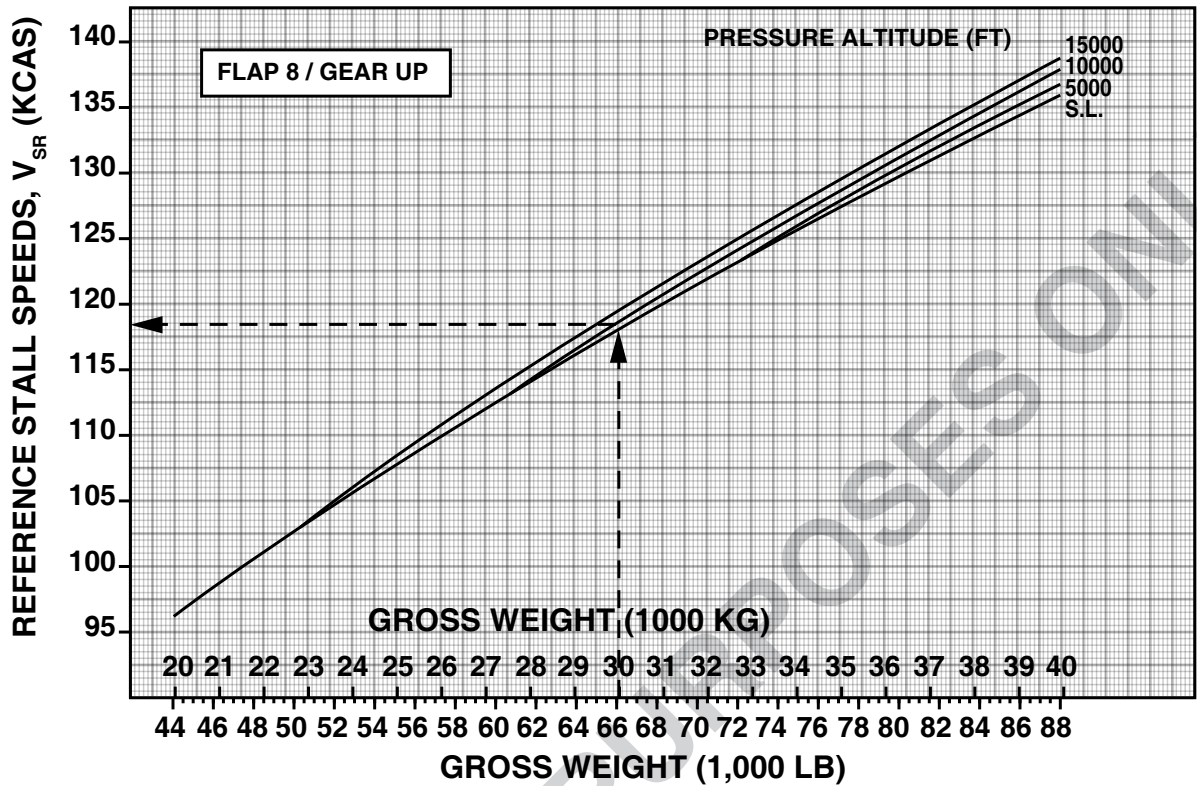


Figure 423. CRJ 900—Performance—Stall Speeds, V_{SR} .
Illustrations and materials were used with permission from Bombardier.

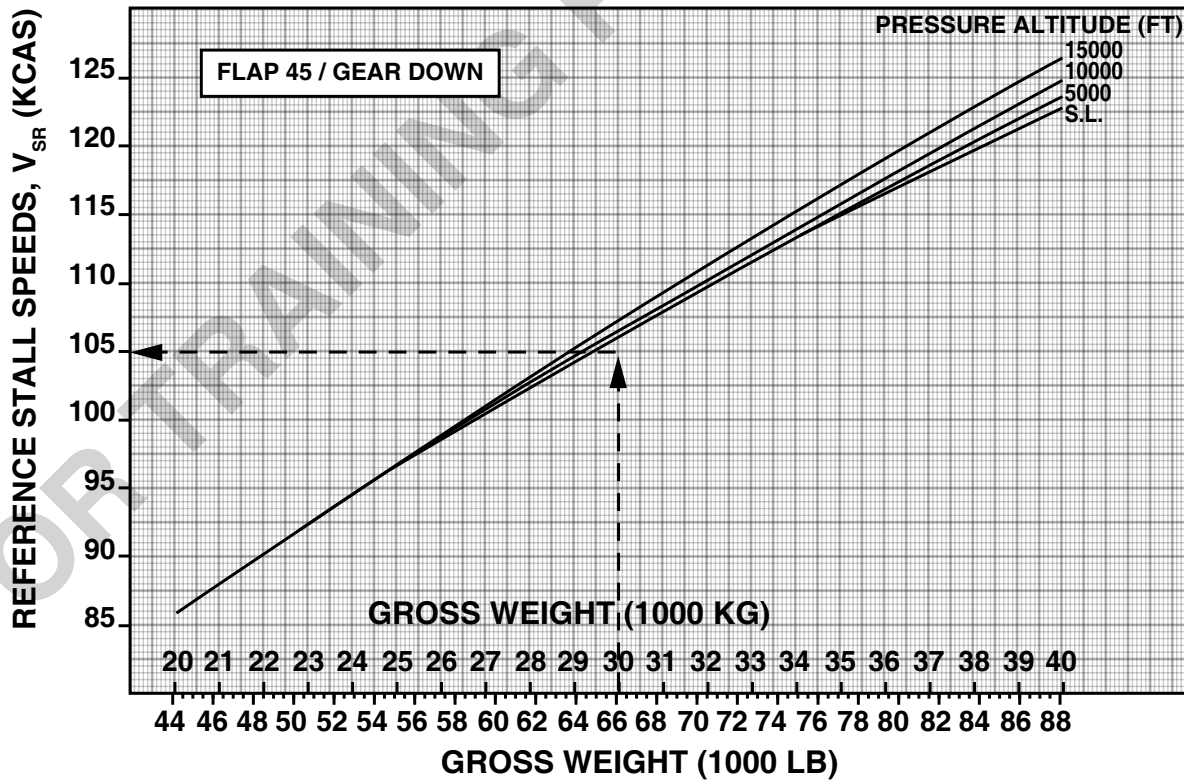
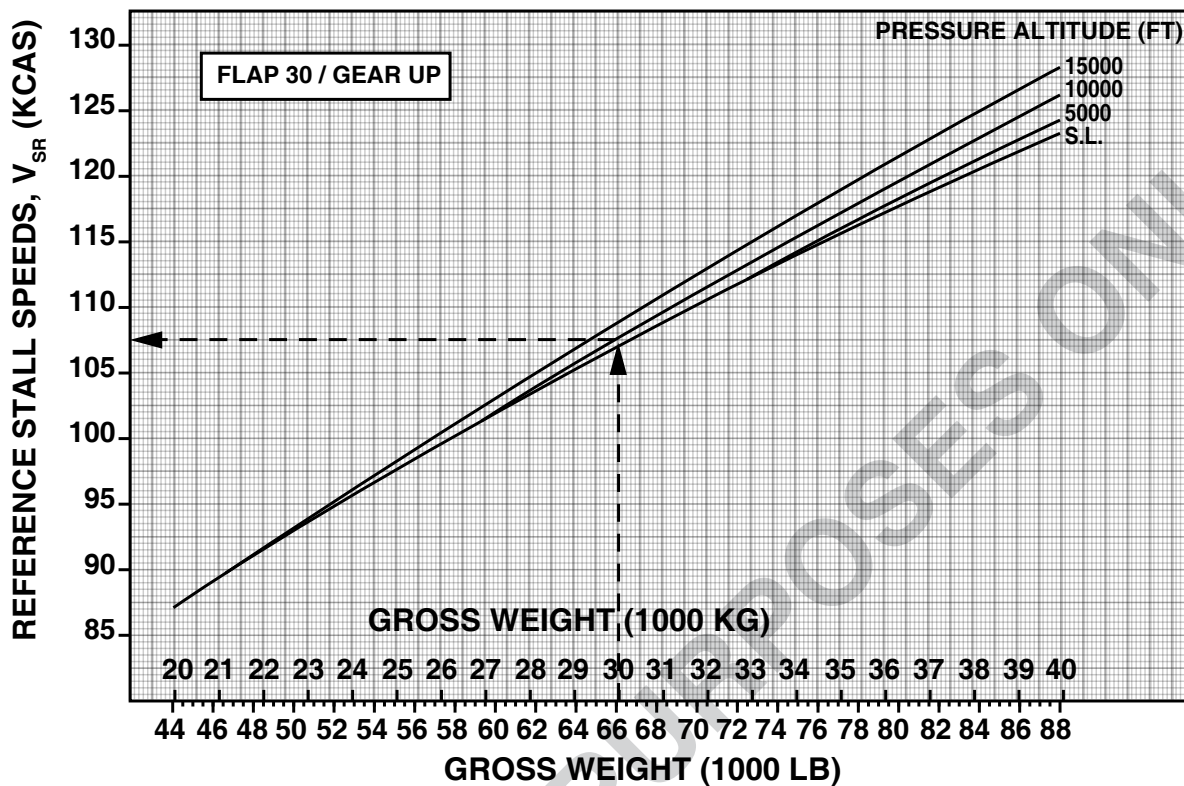


Figure 424. CRJ 900—Performance—Stall Speeds, V_{SR} .
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B. Maneuvering Capabilities

The maneuvering capabilities are shown in Figure 426. Figure 426 shows the maneuver margin (bank angle and/or g-load factor) for a given weight, CG, altitude and speed combination. Alternatively, for a given load factor, Figure 426 shows the altitude and speed margins for a given weight, CG and speed combination.

Maneuvering capability is defined relative to buffet onset or stick shaker activation, whichever occurs first.

Example A:

Associated conditions:

- Airplane gross weight = 33000 kg (72,750 lb)
- Center of Gravity (CG) = 20% MAC
- Indicated Mach No. = 0.770
- Pressure altitude = 35000 feet

Example A in Figure 426, for the given associated conditions (enter Figure 426 from the indicated Mach number scale), shows that the maneuvering capability is equal to 1.70 g or a bank angle of 54 degrees.

Example B:

Associated conditions:

- Airplane gross weight = 33000 kg (72,750 lb)
- Centre of Gravity (CG) = 20% MAC
- Pressure altitude = 37000 feet
- Required maneuvering capability = 1.30 g (or approximately 40-degree bank)

Example B in Figure 426, for the given associated conditions (enter Figure 426 from the load factor [or bank angle] scale towards the gross weight scale), shows the following speed margins:

- Low speed = 0.680 M
- High speed = 0.845 M

Operating at a speed greater than 0.680 M and lower than 0.845 M at 37000 feet will ensure that a minimum maneuvering capability of 1.30 g before stick shaker activation or buffet onset, will be maintained for the conditions in Example B.

Following the same example, the maximum altitude at a speed of 0.77 M, before stick shaker activation or buffet onset for the required maneuvering capability of 1.30 g is 40,600 feet, as marked by an X in Figure 426.

Figure 425. CRJ 900—Performance—Maneuvering Capabilities.

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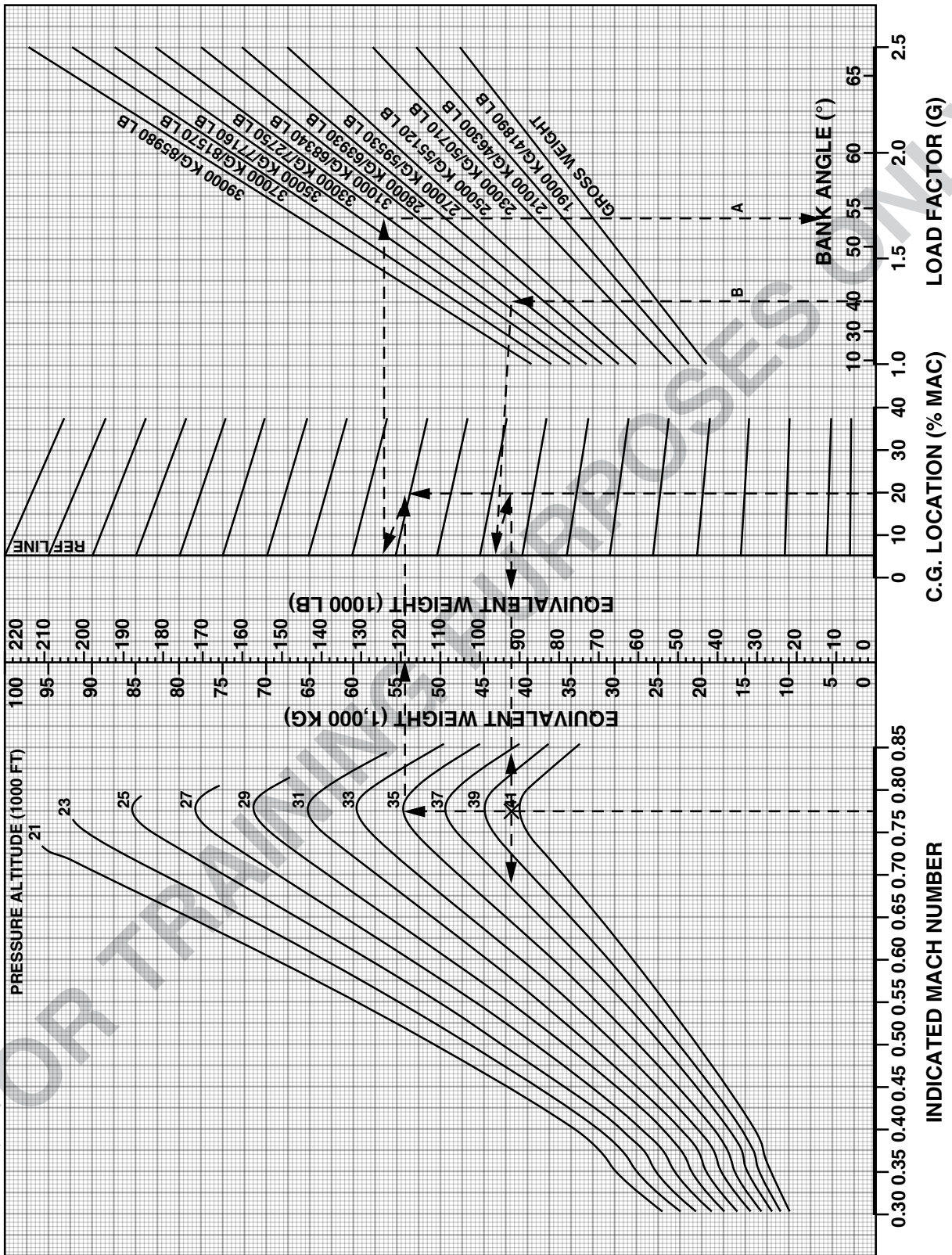


Figure 426. CRJ 900—Performance—Maneuvering Capabilities.

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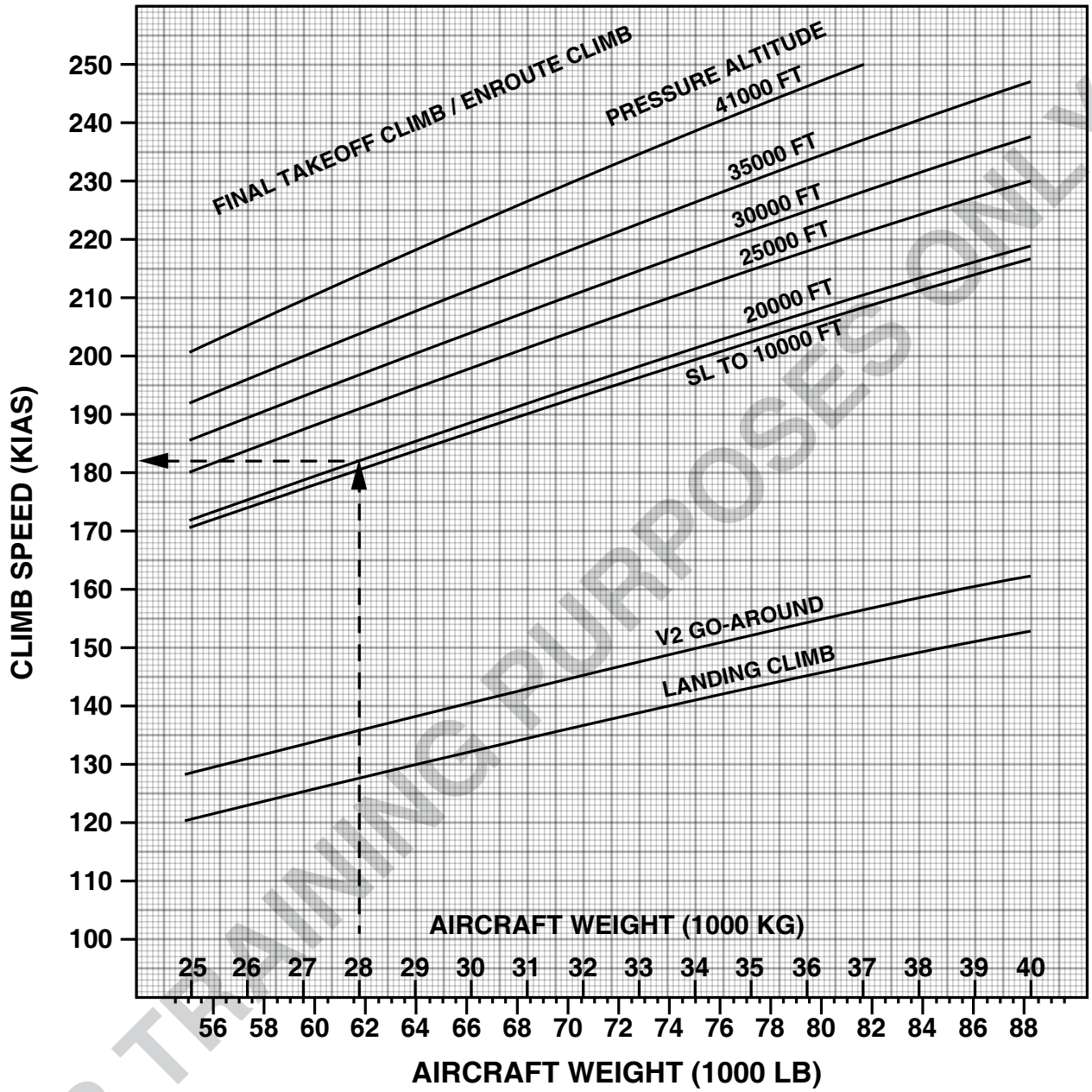


Figure 427. CRJ 900—Performance—Climb Speeds.
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OAT		PRESSURE ALTITUDE (Feet)									
(°C)	(°F)	-1,000	0	2000	4000	6000	8000	10000	12000	14000	16000
-45	-49								85.1	86.0	85.8
-40	-40	80.0	81.1	81.8	82.8	83.6	84.3	85.2	86.0	86.8	86.6
-35	-31	80.8	81.9	82.7	83.6	84.5	85.2	86.0	86.8	87.7	87.4
-30	-22	81.6	82.7	83.5	84.4	85.3	86.0	86.8	87.6	88.5	88.3
-25	-13	82.4	83.5	84.3	85.2	86.1	86.8	87.6	88.4	89.3	89.1
-20	-4	83.2	84.3	85.1	86.0	86.9	87.6	88.4	89.2	90.1	89.9
-15	5	84.0	85.1	85.9	86.8	87.7	88.4	89.2	90.0	90.9	90.7
-10	14	84.7	85.9	86.7	87.6	88.5	89.2	90.0	90.8	91.7	91.5
-5	23	85.5	86.7	87.5	88.4	89.3	90.0	90.8	91.6	92.4	92.0
0	32	86.3	87.4	88.2	89.2	90.1	90.8	91.6	92.4	93.2	92.1
5	41	87.0	88.2	89.0	90.0	90.8	91.6	92.4	93.2	93.6	91.8
10	50	87.8	88.9	89.8	90.7	91.6	92.3	93.1	93.3	93.2	91.2
15	59	88.5	89.7	90.5	91.5	92.4	92.9	93.0	92.9	92.7	90.6
20	68	89.2	90.4	91.3	92.2	92.7	92.6	92.4	92.4	92.3	90.2
25	77	90.0	91.2	92.0	92.3	92.2	92.1	92.0	91.9	91.7	90.1
30	86	90.7	91.9	91.8	91.7	91.6	91.5	91.4	91.3	91.2	
35	95	90.4	90.9	90.9	91.0	90.9	90.8	90.7	90.6		
40	104	89.3	89.8	89.9	89.9	89.9	90.1				
45	113	88.1	88.6	88.6	88.7	88.9					
50	122	86.8	87.3	87.3	87.4						

Figure 428. CRJ 900—Thrust Settings—Normal Takeoff Thrust Setting (All Engines Operating), %N₁ Engine Bleeds Closed—Static to 65 KIAS.

OAT		PRESSURE ALTITUDE (Feet)									
(°C)	(°F)	-1000	0	2000	4000	6000	8000	10000	12000	14000	16000
-45	-49								84.2	85.0	84.9
-40	-40	79.4	80.5	81.2	82.1	82.9	83.6	84.3	85.1	85.8	85.7
-35	-31	80.2	81.3	82.1	83.0	83.7	84.4	85.1	85.9	86.6	86.5
-30	-22	81.0	82.1	82.9	83.8	84.6	85.2	86.0	86.7	87.4	87.3
-25	-13	81.8	82.9	83.7	84.6	85.4	86.0	86.8	87.5	88.2	88.1
-20	-4	82.6	83.7	84.5	85.4	86.2	86.8	87.6	88.3	89.0	88.9
-15	5	83.4	84.5	85.3	86.2	87.0	87.6	88.3	89.1	89.8	89.7
-10	14	84.1	85.3	86.0	87.0	87.7	88.4	89.1	89.8	90.6	90.5
-5	23	84.9	86.0	86.8	87.7	88.5	89.1	89.9	90.6	91.3	91.1
0	32	85.6	86.8	87.6	88.5	89.3	89.9	90.6	91.3	92.0	90.9
5	41	86.4	87.5	88.3	89.2	90.0	90.7	91.4	91.9	92.0	90.3
10	50	87.1	88.3	89.1	90.0	90.8	91.4	91.8	91.8	91.4	89.7

Figure 429. CRJ 900—Thrust Settings—Normal Takeoff Thrust Setting (All Engines Operating), %N₁ Cowl Anti-ice On, PACK On—Static to 65 KIAS.

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OAT		PRESSURE ALTITUDE (Feet)									
(°C)	(°F)	-1000	0	2000	4000	6000	8000	10000	12000	14000	16000
-45	-49								86.4	86.5	87.4
-40	-40	82.3	83.4	84.1	84.9	85.8	86.6	87.2	87.2	87.3	88.2
-35	-31	83.1	84.3	84.9	85.7	86.6	87.4	88.0	88.0	88.2	89.1
-30	-22	83.9	85.1	85.8	86.6	87.4	88.2	88.8	88.8	89.0	89.9
-25	-13	84.7	85.9	86.6	87.4	88.2	89.0	89.6	89.6	89.8	90.7
-20	-4	85.5	86.7	87.4	88.2	89.0	89.8	90.4	90.4	90.6	91.3
-15	5	86.3	87.5	88.2	88.9	89.8	90.6	91.1	90.9	91.0	90.1
-10	14	87.1	88.3	89.0	89.7	90.6	91.4	91.2	91.3	91.3	89.5
-5	23	87.9	89.0	89.7	90.5	91.4	91.5	91.4	91.4	91.4	88.6
0	32	88.6	89.8	90.5	91.3	91.7	91.6	91.5	91.5	91.5	87.4
5	41	89.4	90.6	91.3	91.9	91.8	91.4	91.4	91.2	91.2	86.8
10	50	90.1	91.3	92.0	92.0	91.5	91.1	91.0	90.9	89.9	86.4

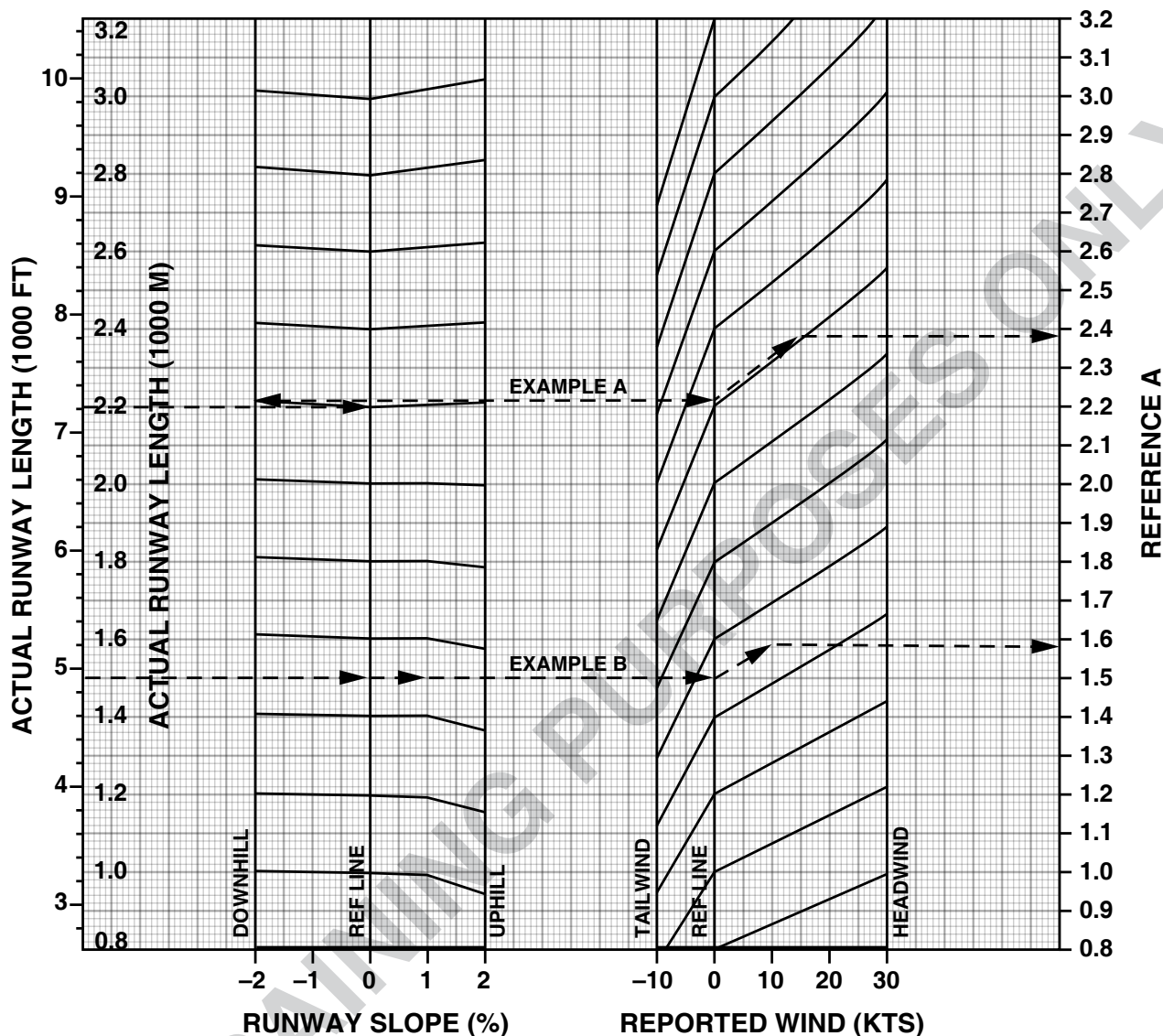
Figure 430. CRJ 900—Thrust Settings—Go Around or APR Thrust Setting (One Engine Inoperative), %N₁ Wing and Cowl Anti-ice On, PACK On—140 KIAS.

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SAT		PRESSURE ALTITUDE (Feet)							
(°C)	(°F)	0	5000	10000	15000	20000	25000	30000	35000
-70	-94							87.8	89.0
-65	-85						87.0	88.6	89.9
-60	-76					86.6	87.9	89.5	90.8
-55	-67					87.4	88.8	90.4	91.7
-50	-58				86.4	88.3	89.6	91.2	92.5
-45	-49			85.0	87.2	89.2	90.5	92.1	93.3
-40	-40	81.4	83.7	85.8	88.1	90.0	91.3	92.9	93.1
-35	-31	82.3	84.6	86.7	88.9	90.8	92.2	93.6	92.4
-30	-22	83.1	85.4	87.5	89.7	91.6	93.0	92.8	91.5
-25	-13	83.9	86.2	88.3	90.6	92.5	93.7	92.2	89.9
-20	-4	84.7	87.1	89.2	91.4	93.3	93.4	91.4	89.0
-15	5	85.5	87.9	90.0	92.2	93.8	92.6	90.7	88.8
-10	14	86.3	88.7	90.8	93.0	93.6	91.8	89.9	88.5
-5	23	87.1	89.5	91.5	93.5	92.8	91.1	89.7	
0	32	87.8	90.2	92.3	93.2	92.0	90.3	89.6	
5	41	88.6	91.0	92.7	92.4	91.3	90.0		
10	50	89.4	91.8	92.4	91.7	90.7	89.9		

Figure 431. CRJ 900—Thrust Settings—Maximum Continuous Thrust Setting (One Engine Inoperative), %N₁ Cowl Anti-ice On, PACK On—170 KIAS.

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FLAPS 8

Figure 432. CRJ 900—Takeoff Performance—Takeoff Weight Limited by Field Length Requirements, Dry Runway— V_{MC} Limited, FLAPS 8

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D. Takeoff Weight Limited by Field Length Requirements, Dry Runway - One Engine Inoperative, FLAPS 8

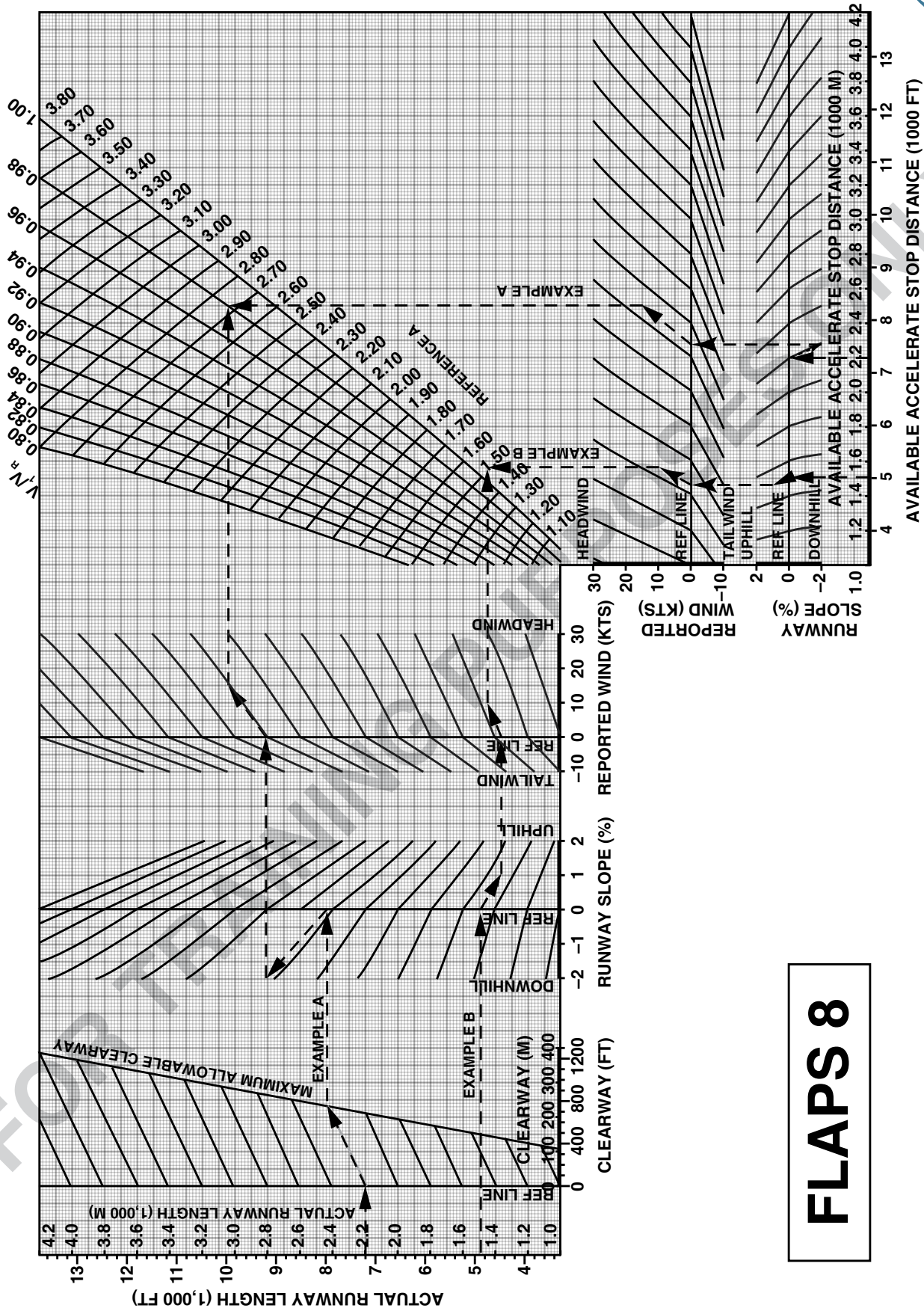
The maximum takeoff weight limited by field length requirements on a dry runway, with one engine inoperative for a FLAPS 8 takeoff, is given by Figure 435, Figure 436, or Figure 437. The following charts take into account the accelerate-stop distance available, the actual length of the runway and the clearway, the airport pressure altitude, and the effects of runway slope, prevailing wind conditions and temperature for varying bleed configurations.

NOTE

1. If a rolling takeoff procedure will be performed, subtract 60 meters (200 feet) from the actual runway length and the available accelerate-stop distance, prior to determining the takeoff weight.
2. If the intersection of the actual runway length and available accelerate-stop distance falls to the right of the curve for a V_1/V_R of 1, project horizontally to the left from this intersection until the 1.0 V_1/V_R curve is reached. Use a V_1/V_R of 1.0 and the corresponding Reference A value at this point.

Figure 434. CRJ 900—Takeoff Performance—Takeoff Weight Limited by Field Length Requirements, Dry Runway—One Engine Inoperative, FLAPS 8

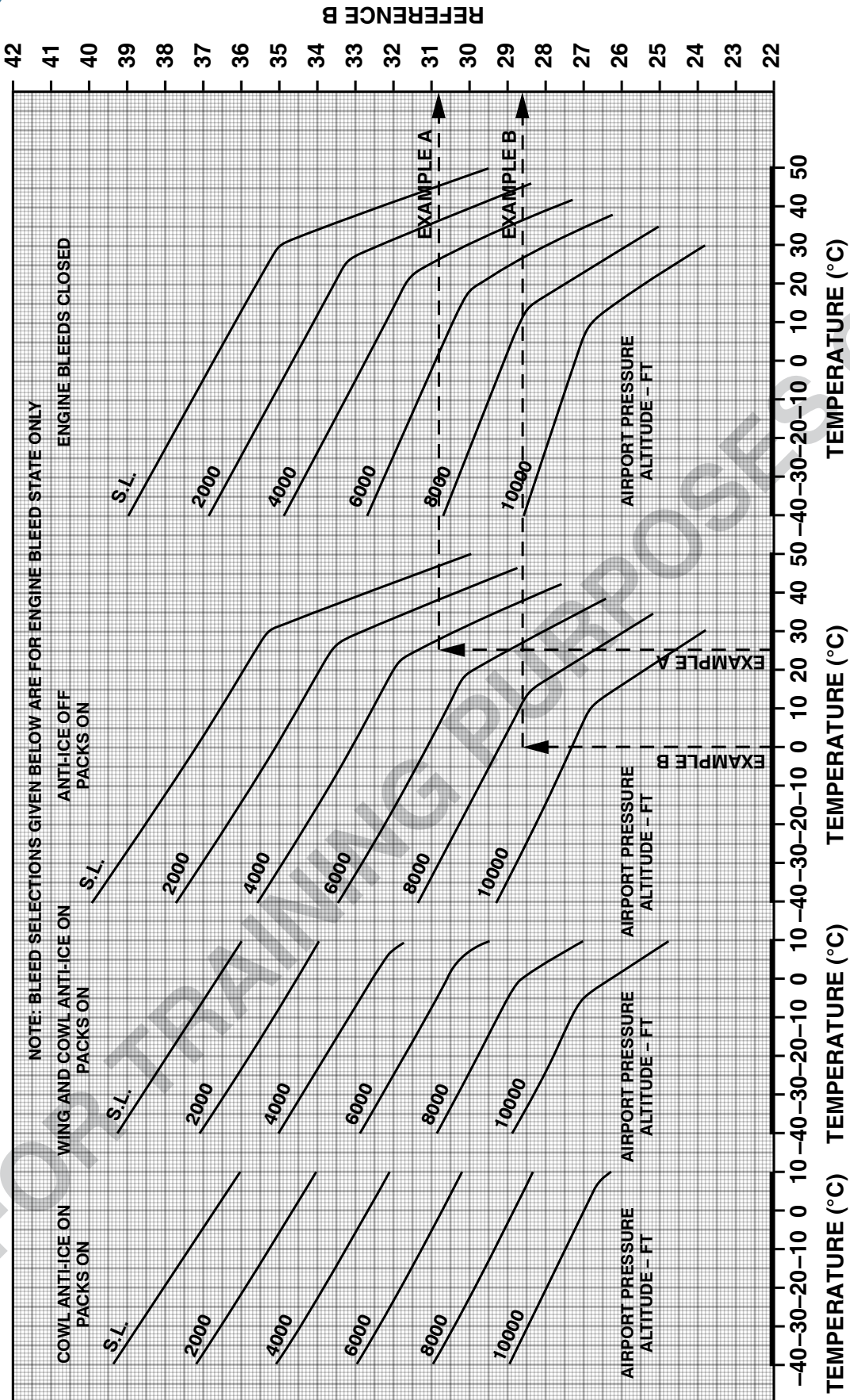
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FLAPS 8

Figure 435. CRJ 900—Takeoff Performance—Takeoff Weight Limited by Field Length Requirements, Dry Runway—One Engine Inoperative, FLAPS 8

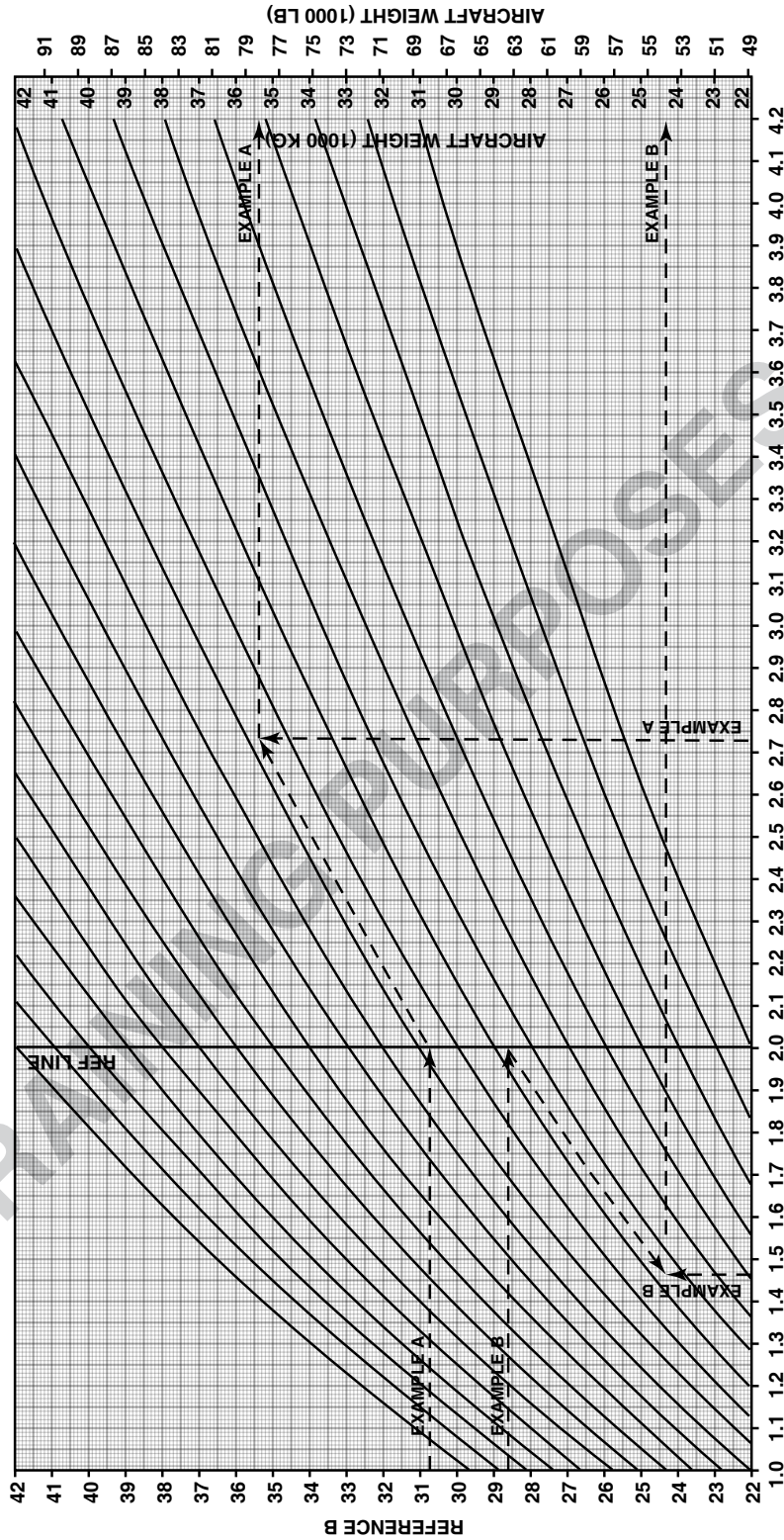
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FLAPS 8

Figure 436. CRJ 900—Takeoff Performance—Takeoff Weight Limited by Field Length Requirements, Dry Runway—One Engine Inoperative, FLAPS 8

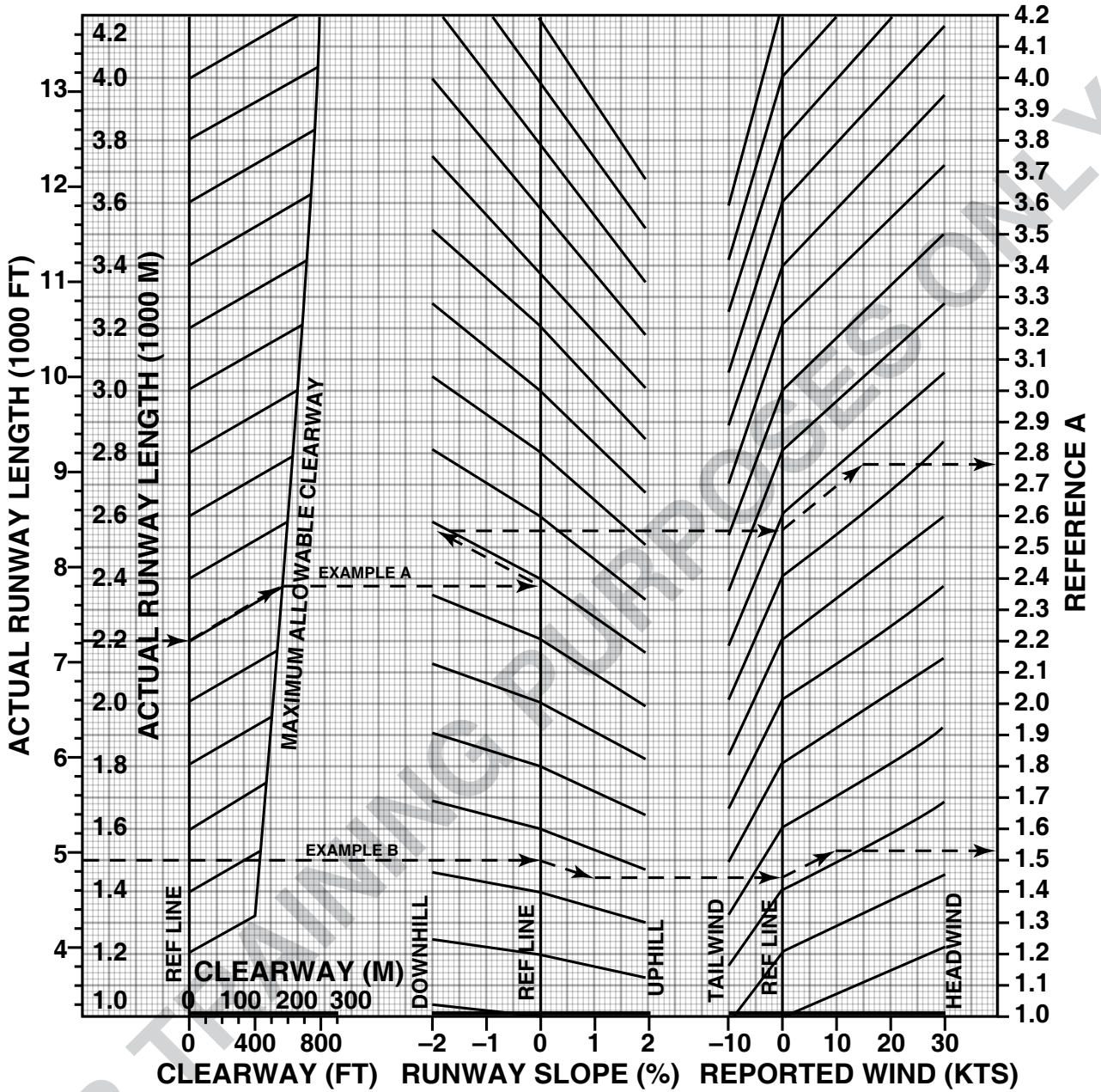
Illustrations and materials were used with permission from Bombardier.



FLAPS 8

Figure 437. CRJ 900—Takeoff Performance—Takeoff Weight Limited by Field Length Requirements, Dry Runway—One Engine Inoperative, FLAPS 8

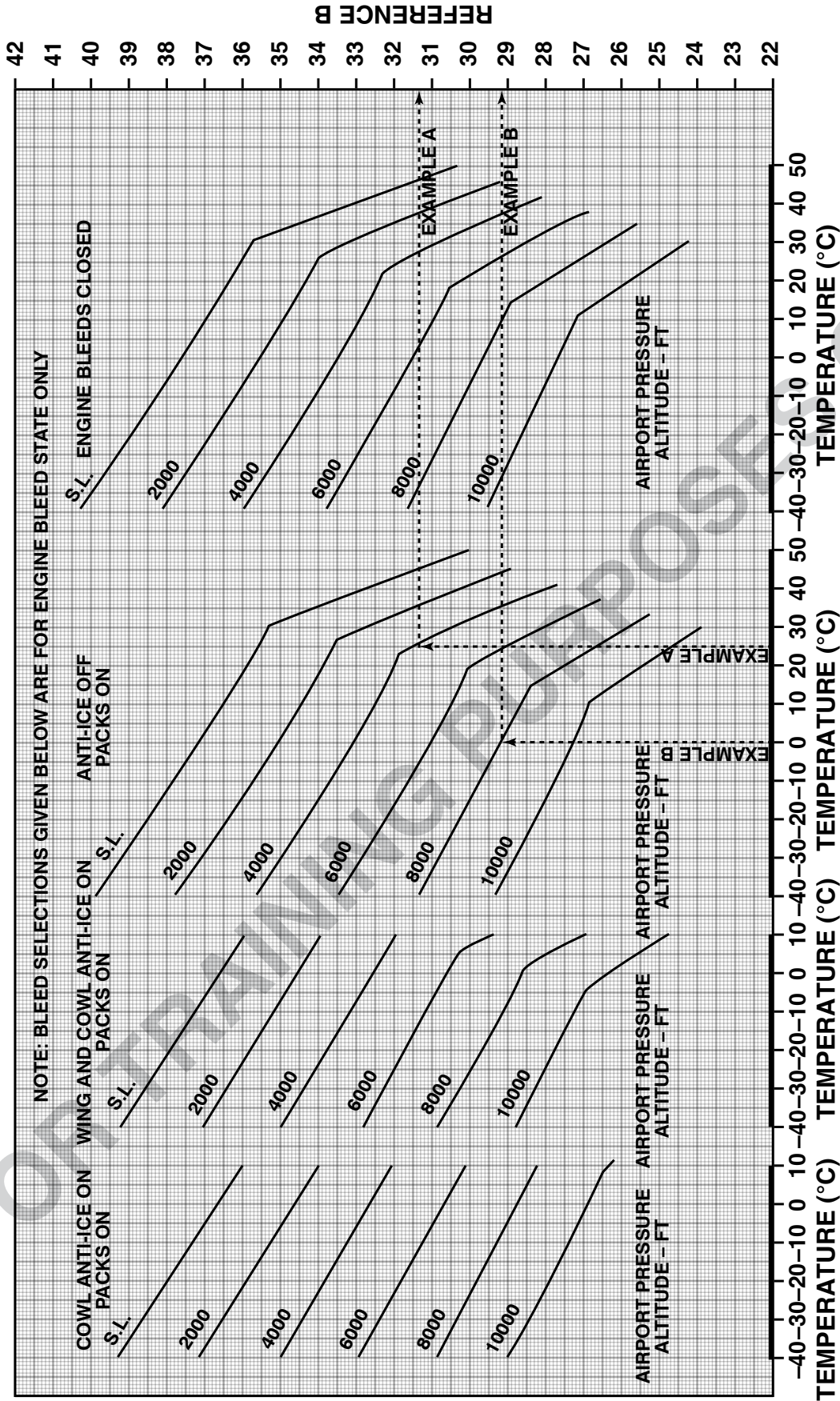
Illustrations and materials were used with permission from Bombardier.



FLAPS 8

Figure 438. CRJ 900—Takeoff Performance—Takeoff Weight Limited by Field Length Requirements—All Engines Operating, FLAPS 8

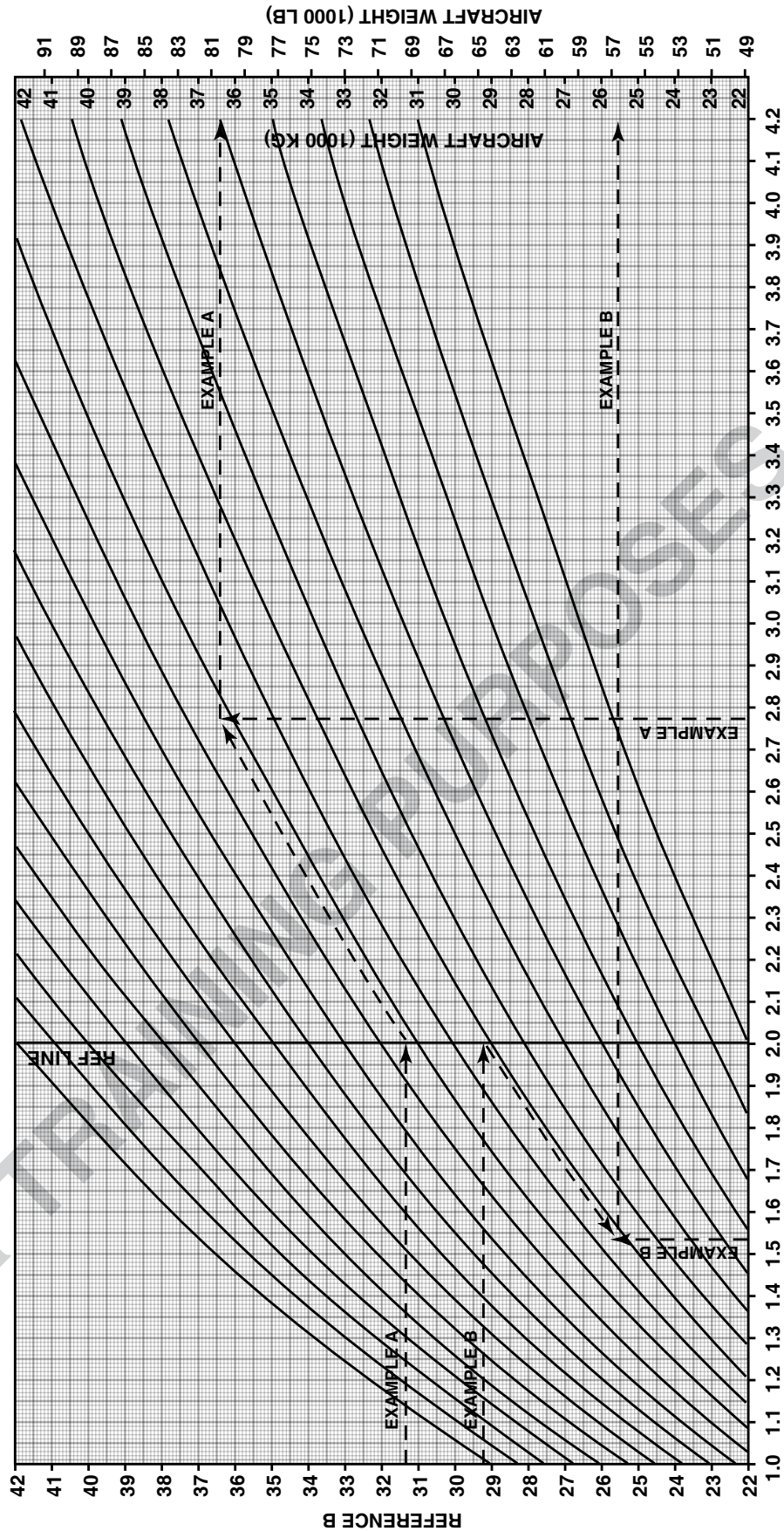
Illustrations and materials were used with permission from Bombardier.



FLAPS 8

Figure 439. CRJ 900—Takeoff Performance—Takeoff Weight Limited by Field Length Requirements—All Engines Operating, FLAPS 8

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FLAPS 8

Figure 440. CRJ 900—Takeoff Performance—Takeoff Weight Limited by Field Length Requirements—All Engines Operating, FLAPS 8
Illustrations and materials were used with permission from Bombardier.

J. Takeoff Weight Limited by Field Length Requirements, Dry Runway — Minimum Control Speed (V_{MC}) Limited, FLAPS 20

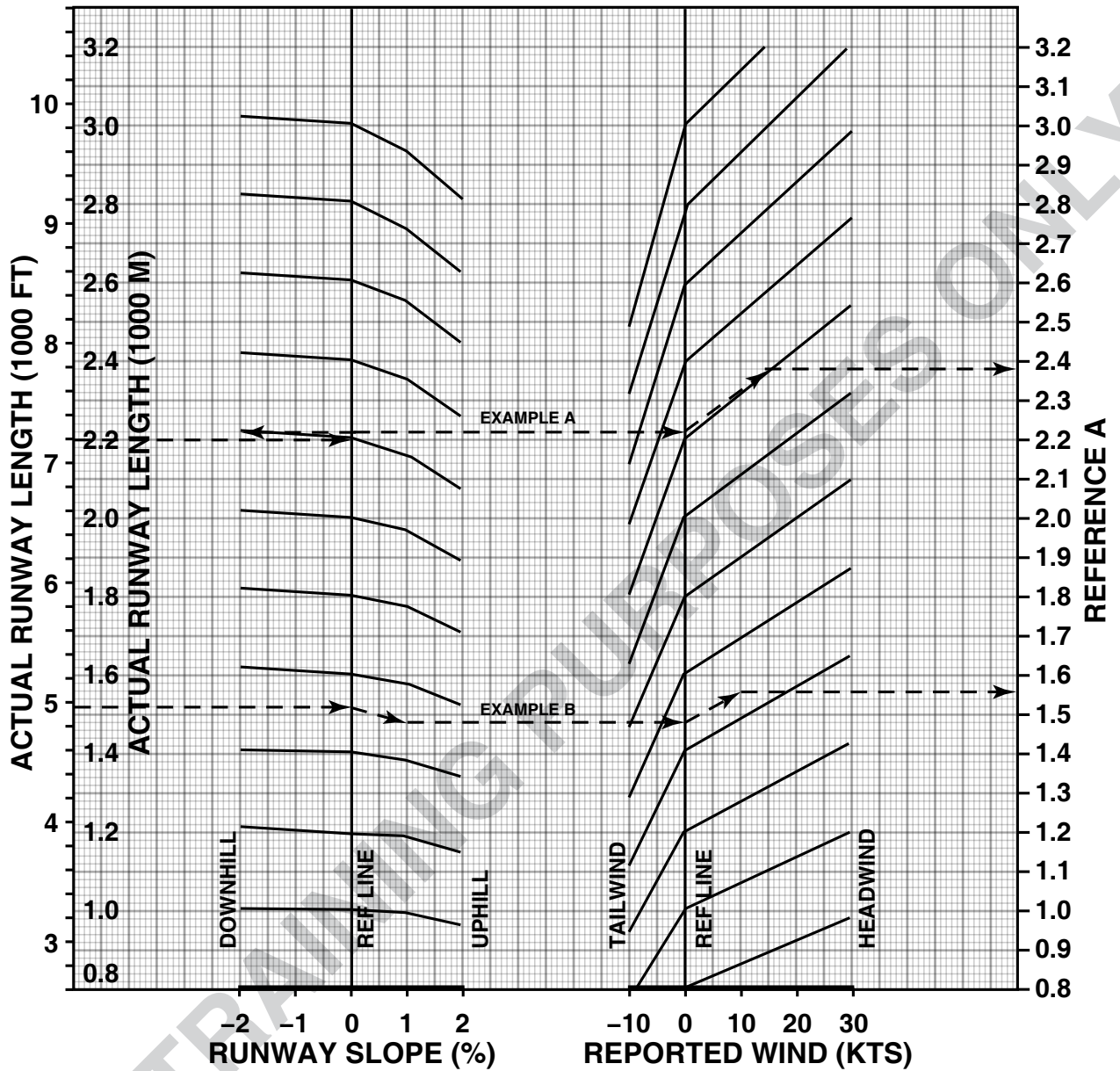
The maximum takeoff weight limited by field length requirements on a dry runway for a FLAPS 20 takeoff, limited by V_{MC} is given by Figure 442, or Figure 443. The following charts are applicable to both the all engines operating and one engine inoperative cases. The first chart takes into account the actual length of the runway and the effects of runway slope and prevailing wind conditions. The subsequent charts cater to the effects of airport pressure altitude and temperature for varying bleed configurations to determine the takeoff weight.

NOTE

If a rolling takeoff procedure will be performed, subtract 60 meters (200 feet) from the actual runway length, prior to determining the takeoff weight.

Figure 441. CRJ 900—Takeoff Performance—Takeoff Weight Limited by Field Length Requirements, Dry Runway—Minimum Control Speed (V_{MC}) Limited, FLAPS 20.

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FLAPS 20

Figure 442. CRJ 900—Takeoff Performance—Takeoff Weight Limited by Field Length Requirements, Dry Runway— V_{MC} Limited, FLAPS 20.

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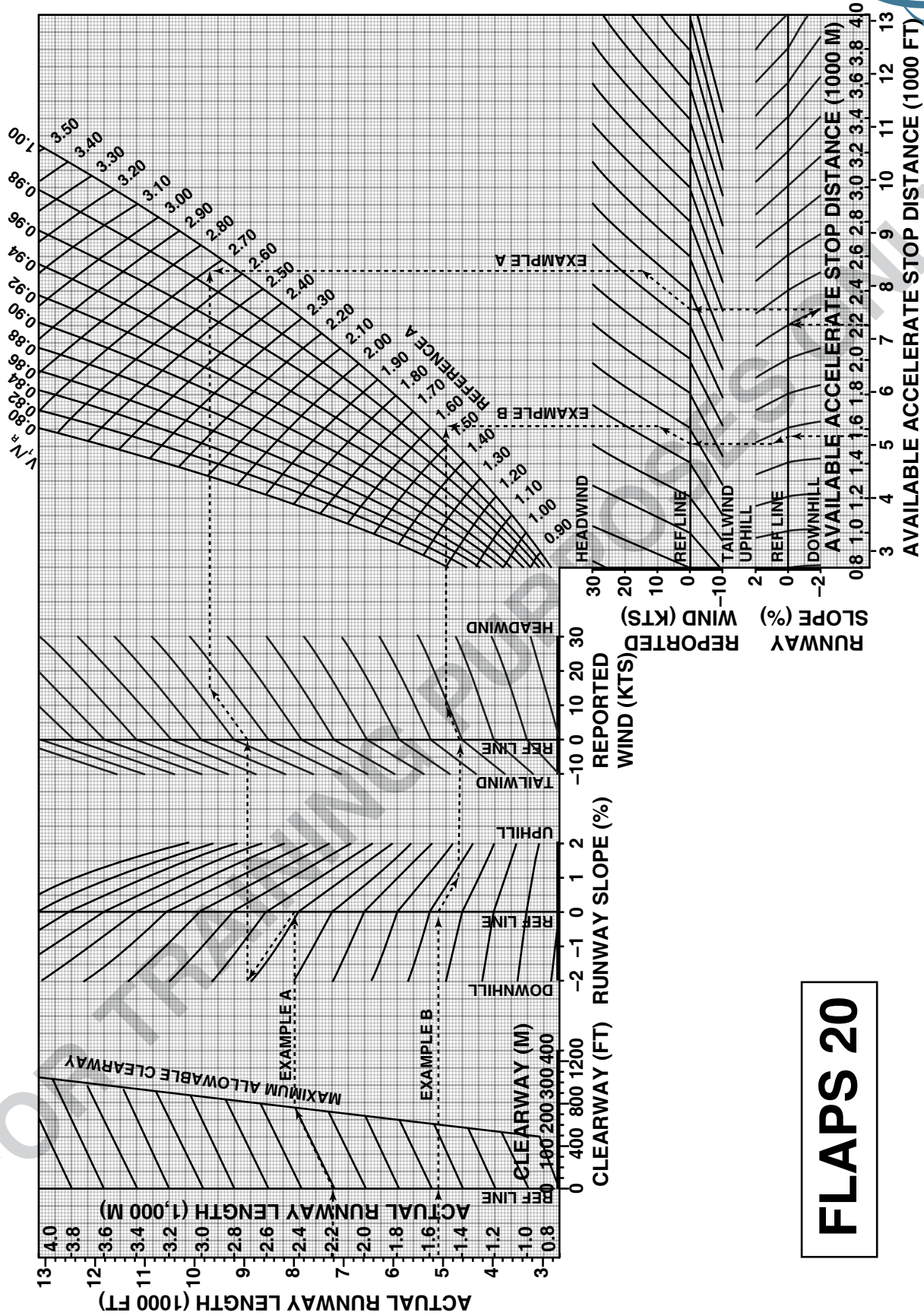
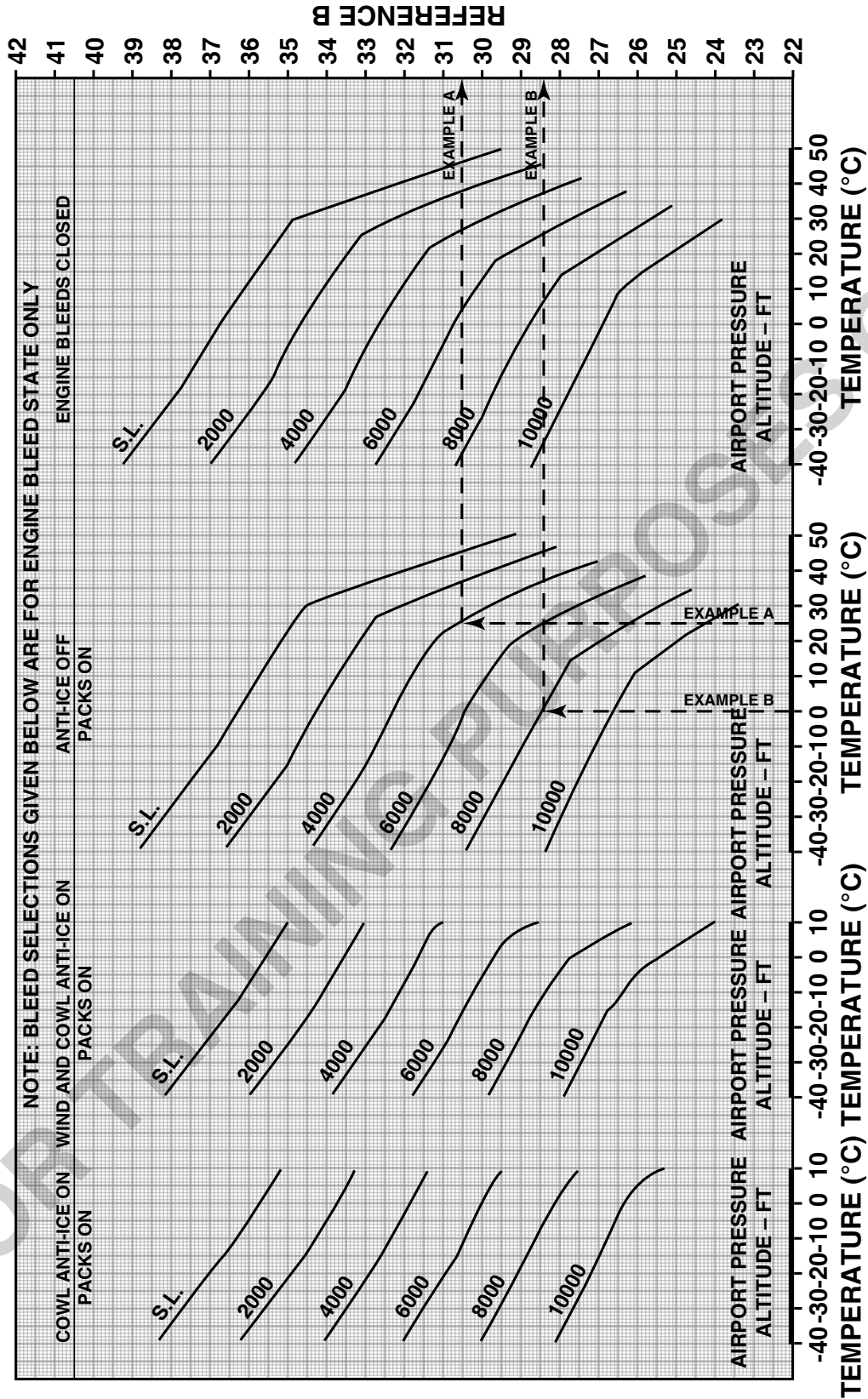


Figure 444. CRJ 900—Takeoff Performance—Takeoff Weight Limited by Field Length Requirements, Dry Runway—One Engine Inoperative, FLAPS 20.

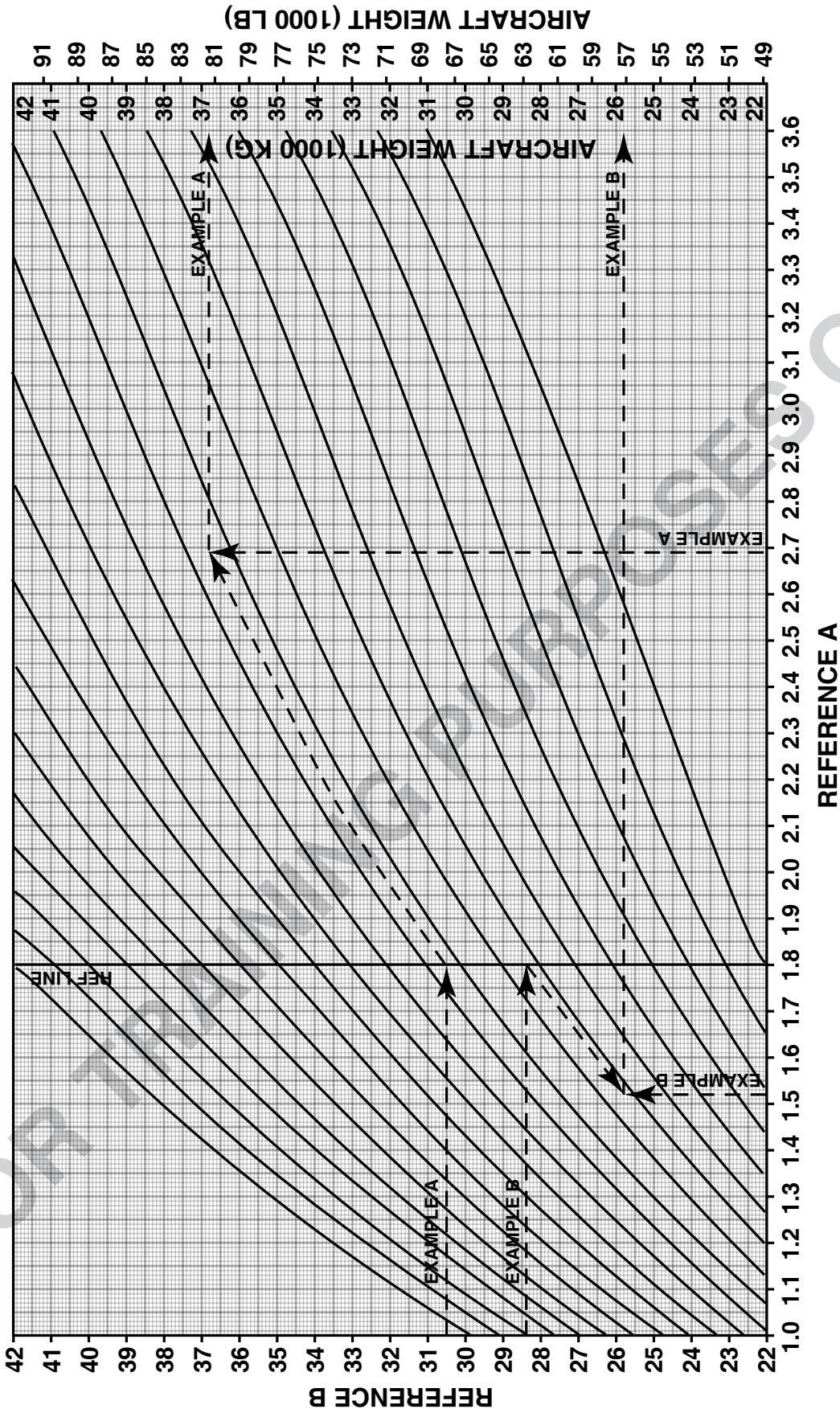
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FLAPS 20

Figure 445. CRJ 900—Takeoff Performance—Takeoff Weight Limited by Field Length Requirements, Dry Runway—One Engine Inoperative, FLAPS 20.

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FLAPS 20

Figure 446. CRJ 900—Takeoff Performance—Takeoff Weight Limited by Field Length Requirements, Dry Runway—One Engine Inoperative, FLAPS 20.

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S. Takeoff Weight Limited by Climb Requirements – FLAPS 8

The maximum takeoff weight limited by climb requirements for a FLAPS 8 takeoff is determined from Figure 448 for varying conditions of temperature and airport pressure altitude, taking into account the effects of different anti-icing and engine bleed configurations.

NOTE:

With the APU on, subtract 350 kg (772 lb) from the weight derived from Figure 448.

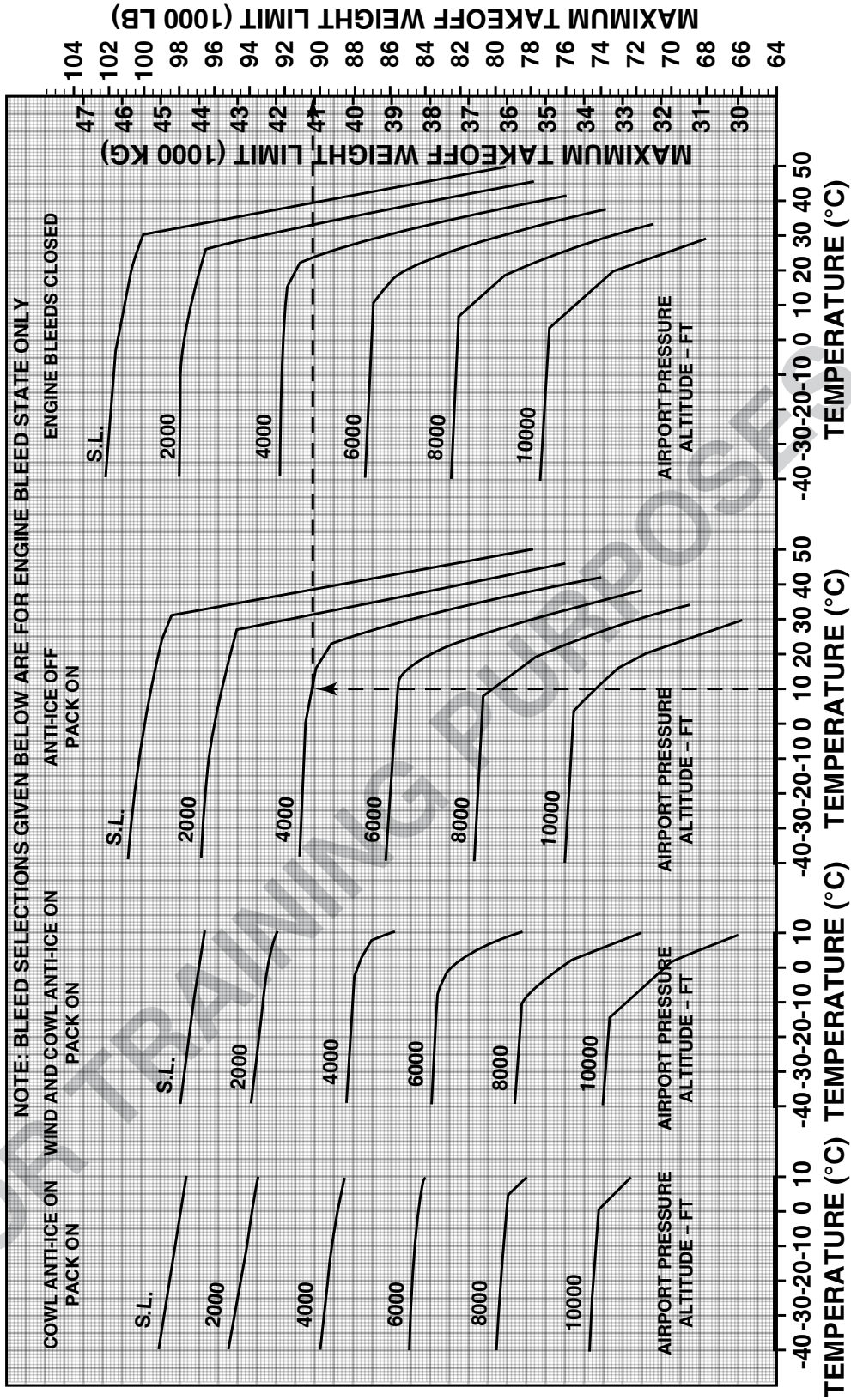
Example:

Associated conditions:

Temperature	= 10 °C
Airport pressure altitude	= 4,000 feet
Wing and cowl anti-ice	= Off
PACK	= On
APU	= Off

Enter Figure 448 from the temperature scale under the appropriate configuration of anti-ice and engine bleeds. As shown in the example, the maximum takeoff weight limited by climb requirements is found to be 41,050 kg (90,490 lb).

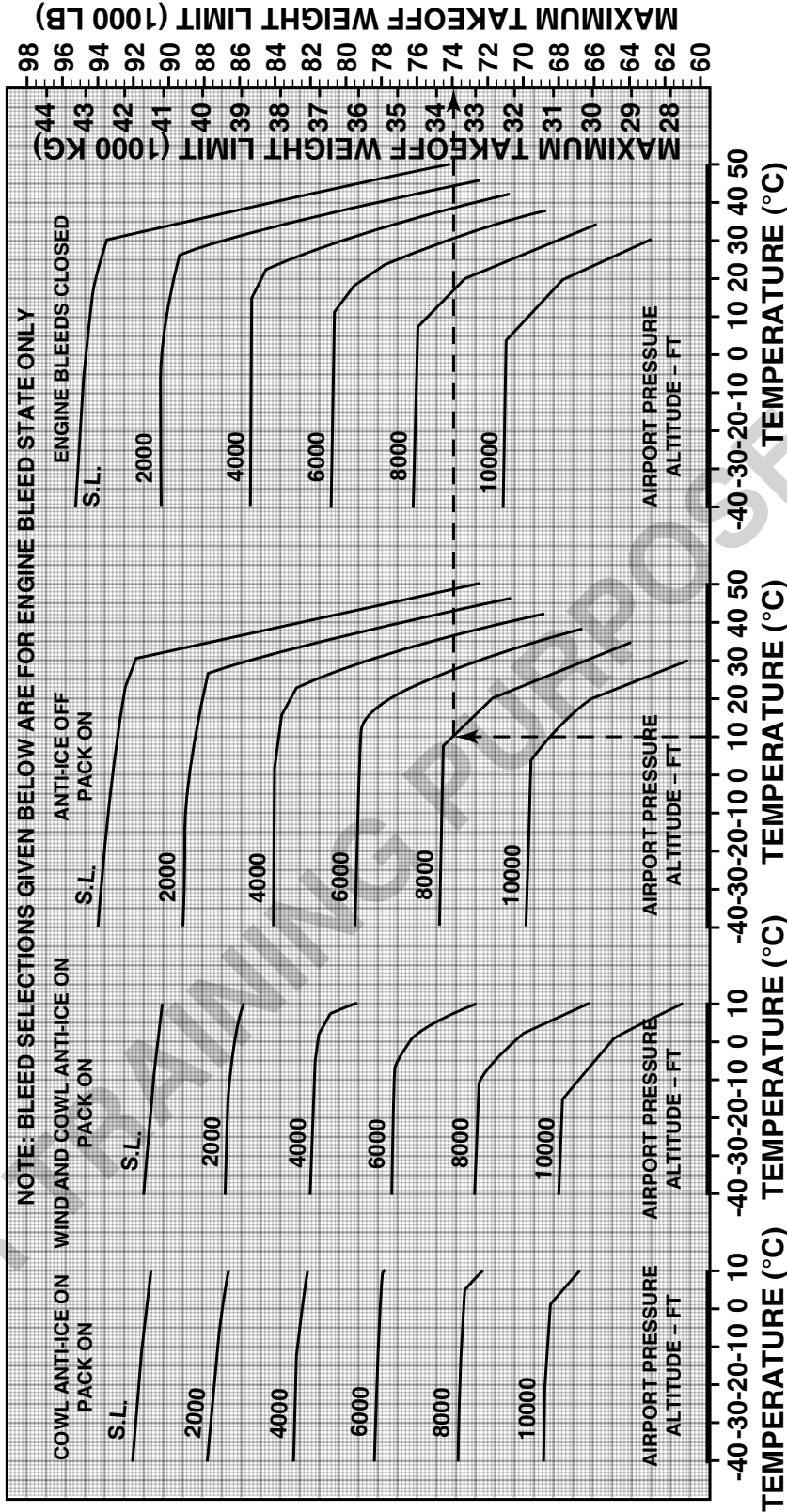
Figure 447. CRJ 900—Takeoff Performance—Takeoff Weight Limited by Climb Requirements—FLAPS 8.



FLAPS 8

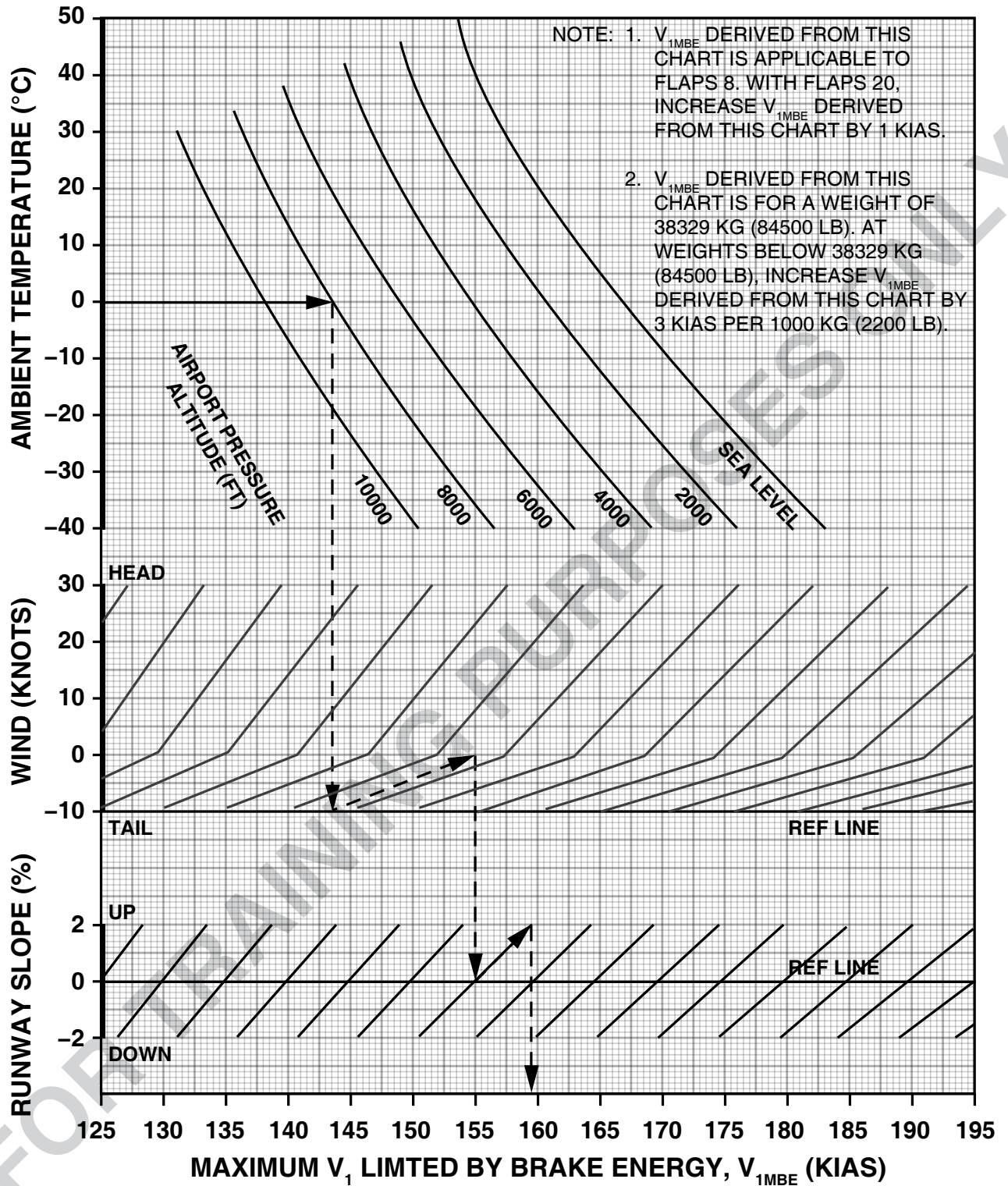
Figure 448. CRJ 900—Takeoff Performance—Takeoff Weight Limited by Climb Requirements—FLAPS 8.

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FLAPS 20

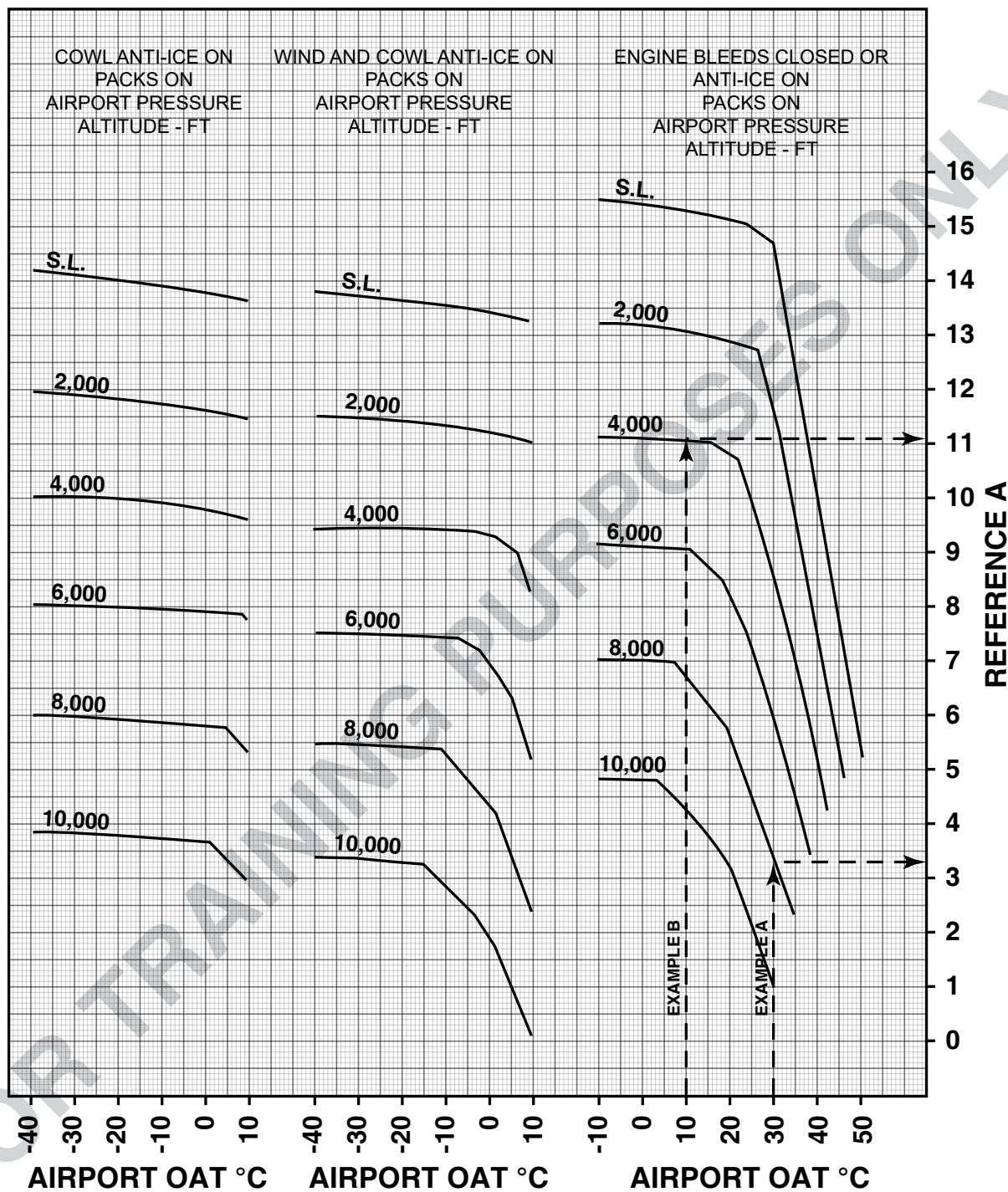
Figure 449. CRJ 900—Takeoff Performance—Takeoff Weight Limited by Climb Requirements—**FLAPS 20.**



FLAPS 8

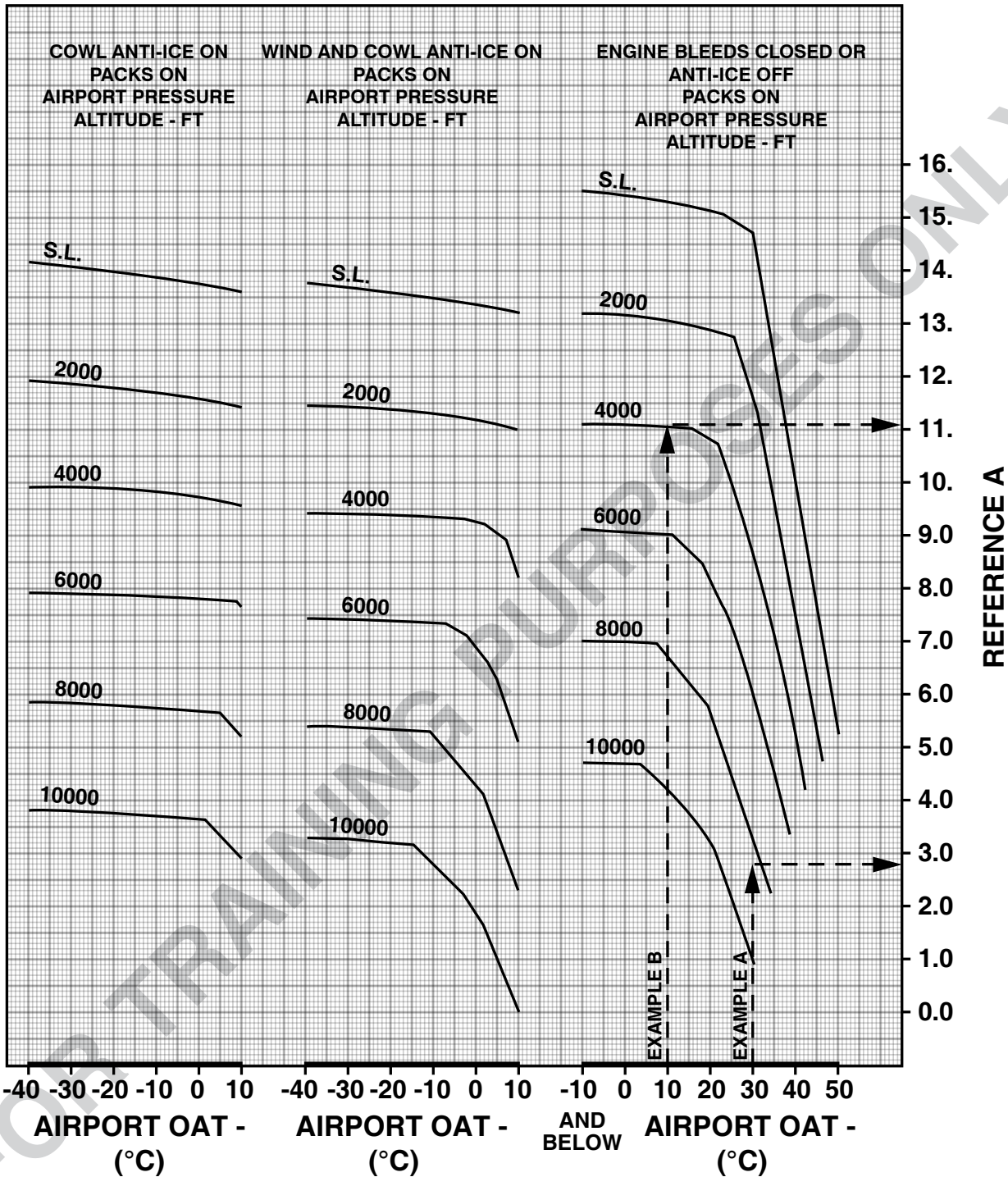
Figure 450. CRJ 900—Takeoff Performance—Maximum V_1 Limited by Brake Energy (V_{1MBE})—FLAPS 8.

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FLAPS 8

Figure 451. CRJ 900—Takeoff Performance—Takeoff Speeds—FLAPS 8.
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FLAPS 20

Figure 453. CRJ 900—Takeoff Performance—Takeoff Speeds—FLAPS 20.
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FLAPS 20

NOTES:

1. IF V_R IS EQUAL TO V_{1MCG} DO NOT APPLY A RUNWAY SLOPE CORRECTION TO V_R
2. IF V_R IS EQUAL TO V_{1MCG} OBTAIN V_2 FROM CHART A.
3. IF V_R IS GREATER THAN V_{1MCG} OBTAIN V_2 FROM CHART B.

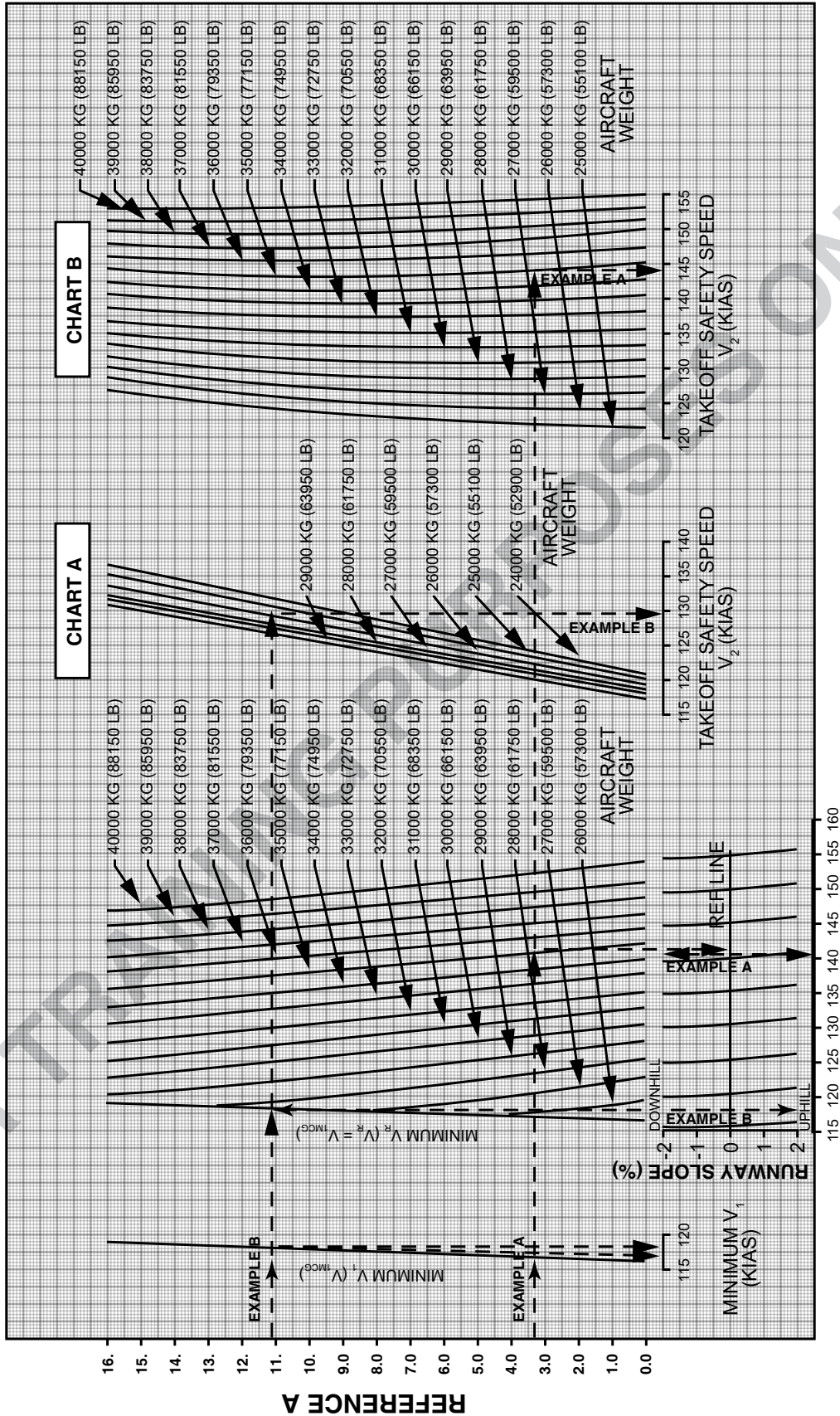
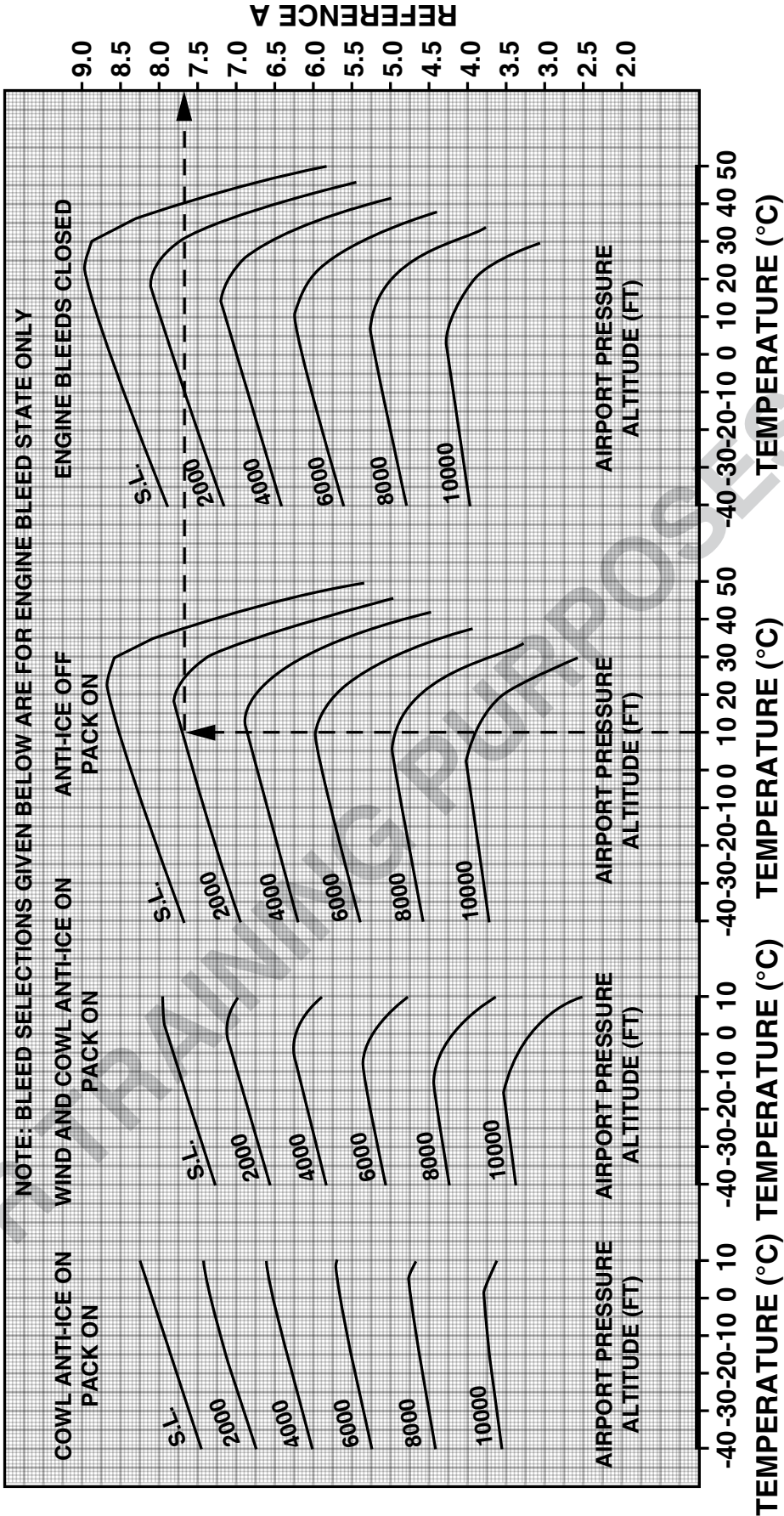
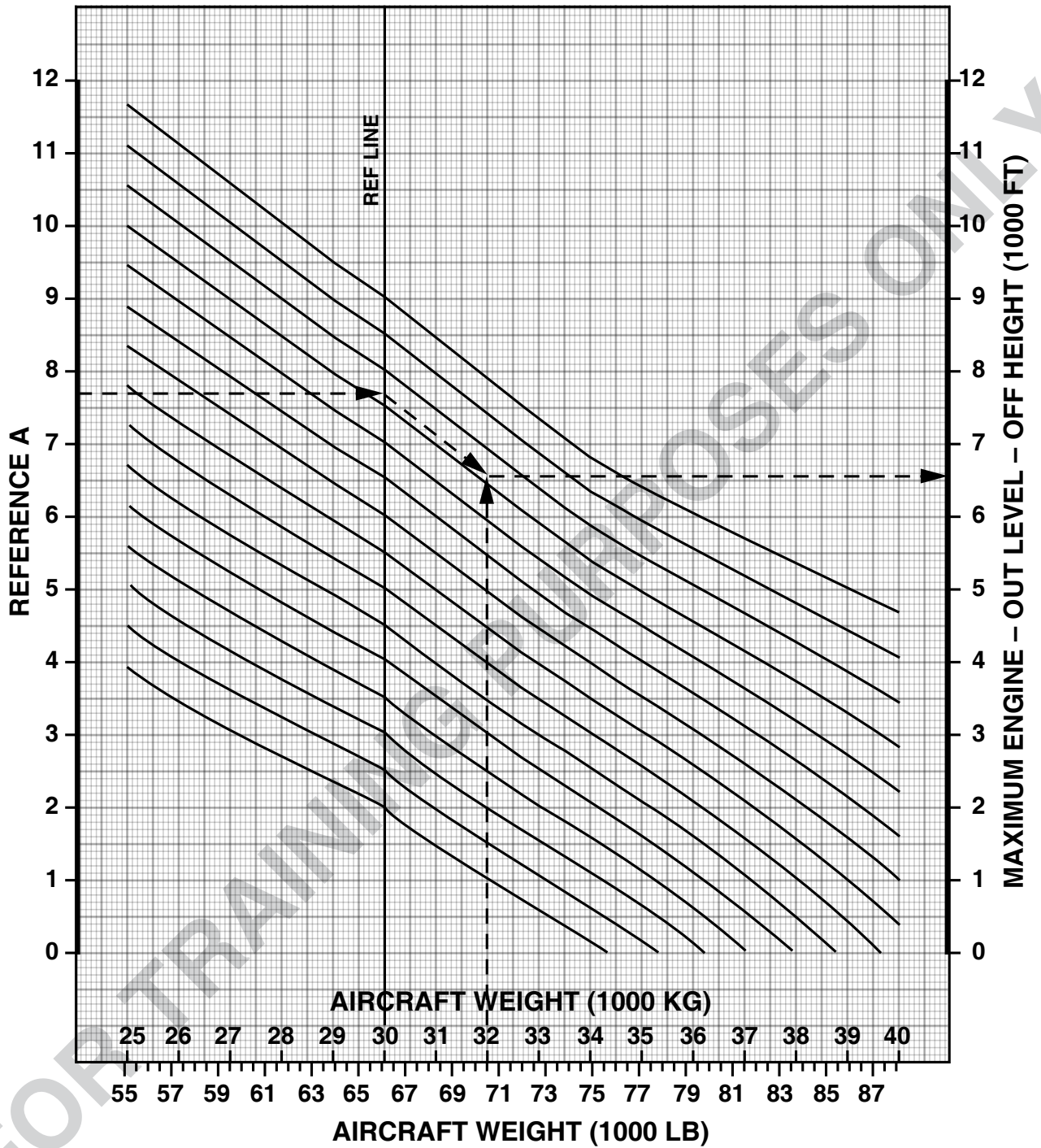


Figure 454. CRJ 900—Takeoff Performance—Takeoff Speeds—FLAPS 20.
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FLAPS 8

Figure 455. CRJ 900—Obstacle Clearance—Maximum Engine-out Level-off Height—FLAPS 8.



FLAPS 8

Figure 456. CRJ 900—Obstacle Clearance—Maximum Engine-out Level-off Height—FLAPS 8.

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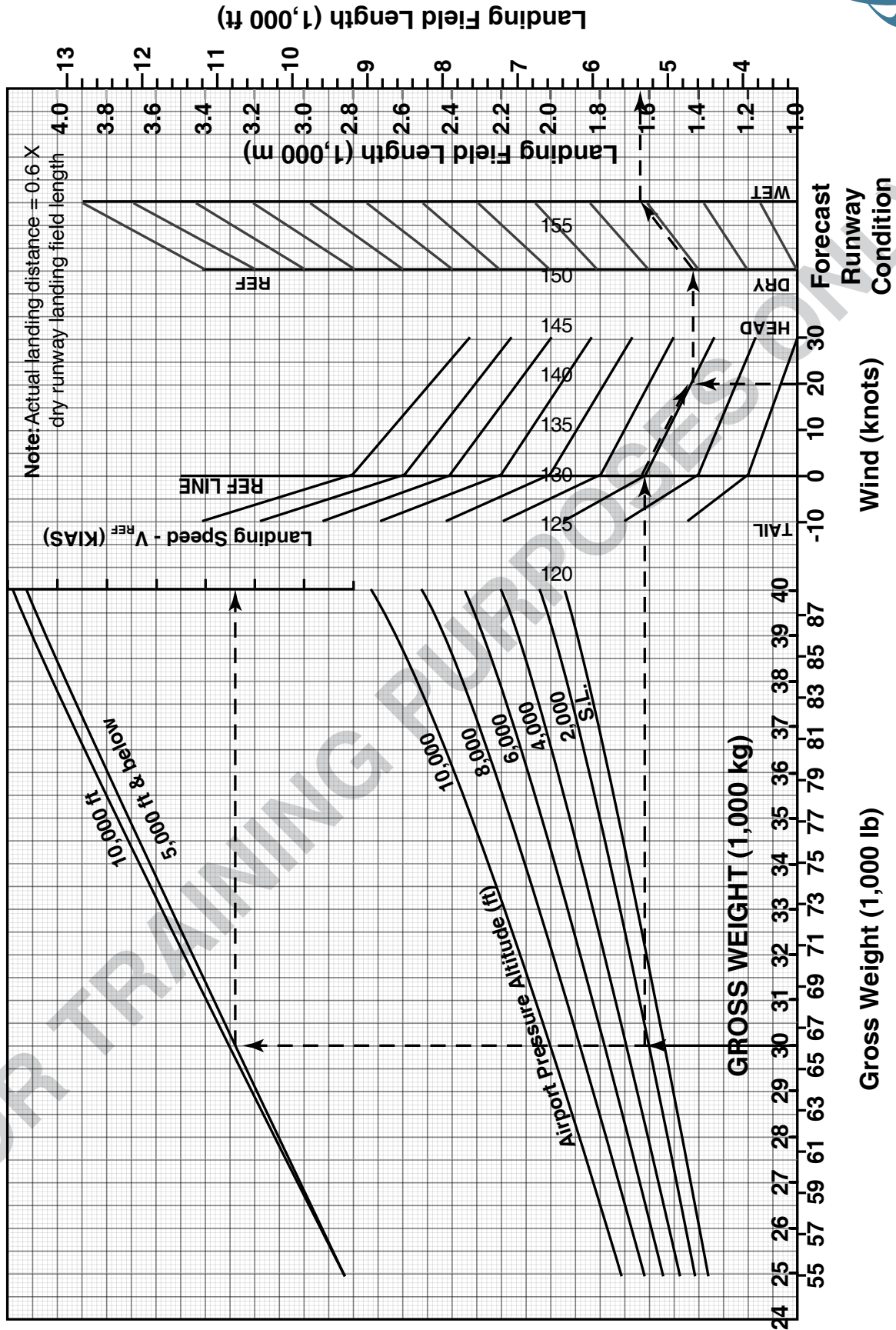


Figure 457. CRJ 900—Landing Performance—Landing Field and Landing Speed—FLAPS 45.

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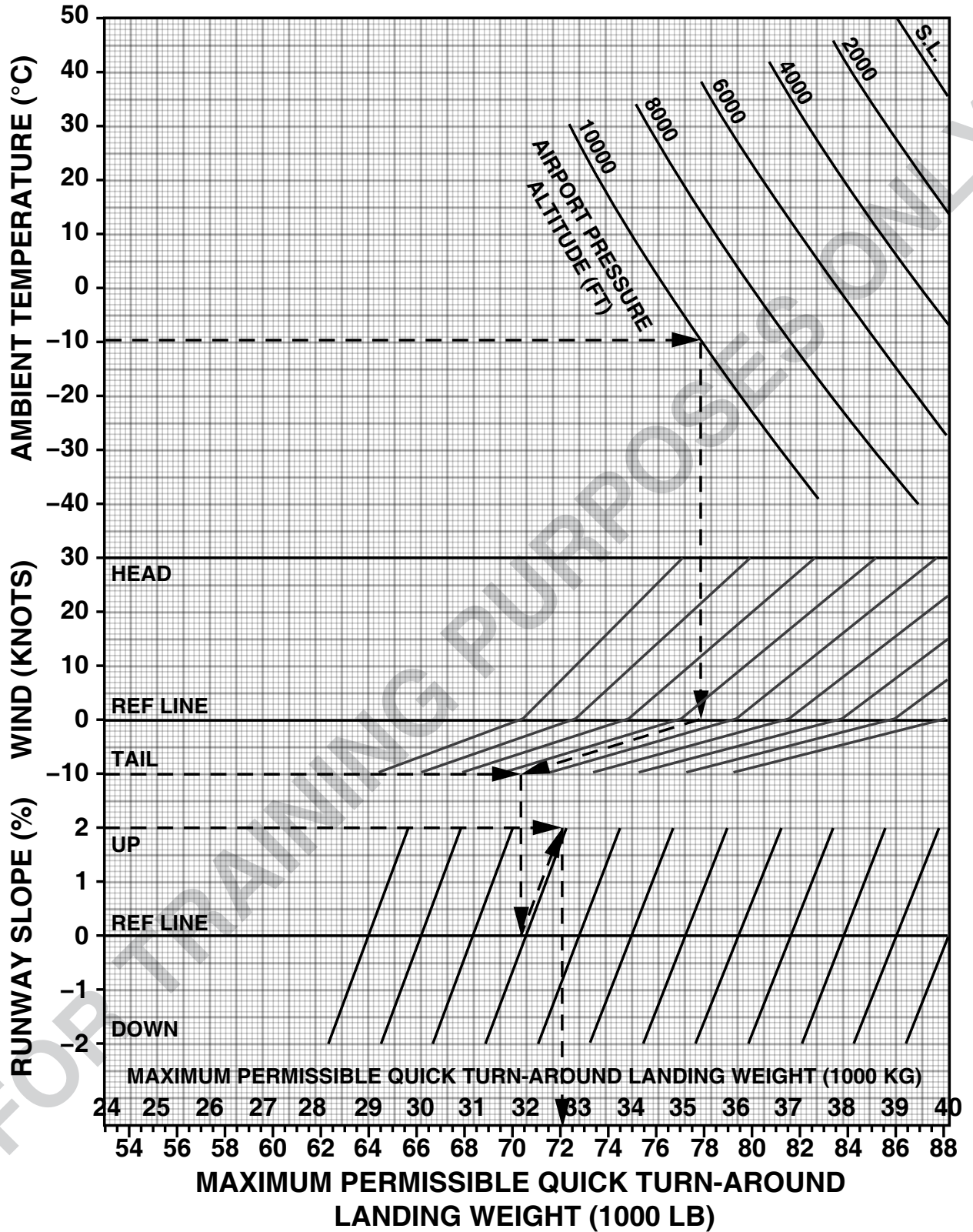


Figure 458. CRJ 900—Landing Performance—Maximum Permissible Quick Turn-around Landing Weight.

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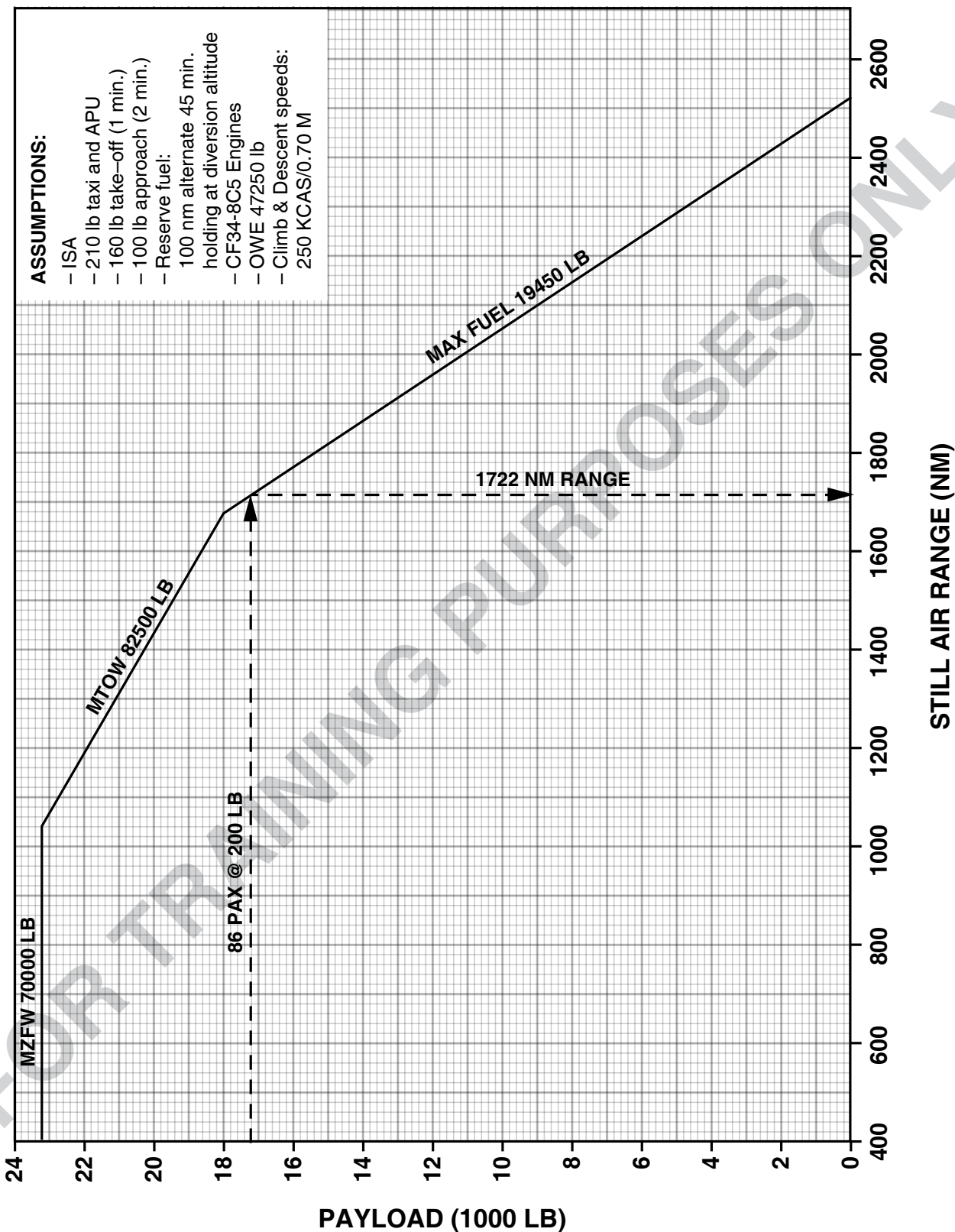


Figure 459. CRJ 900—Airport Planning Manual—Payload/Range.

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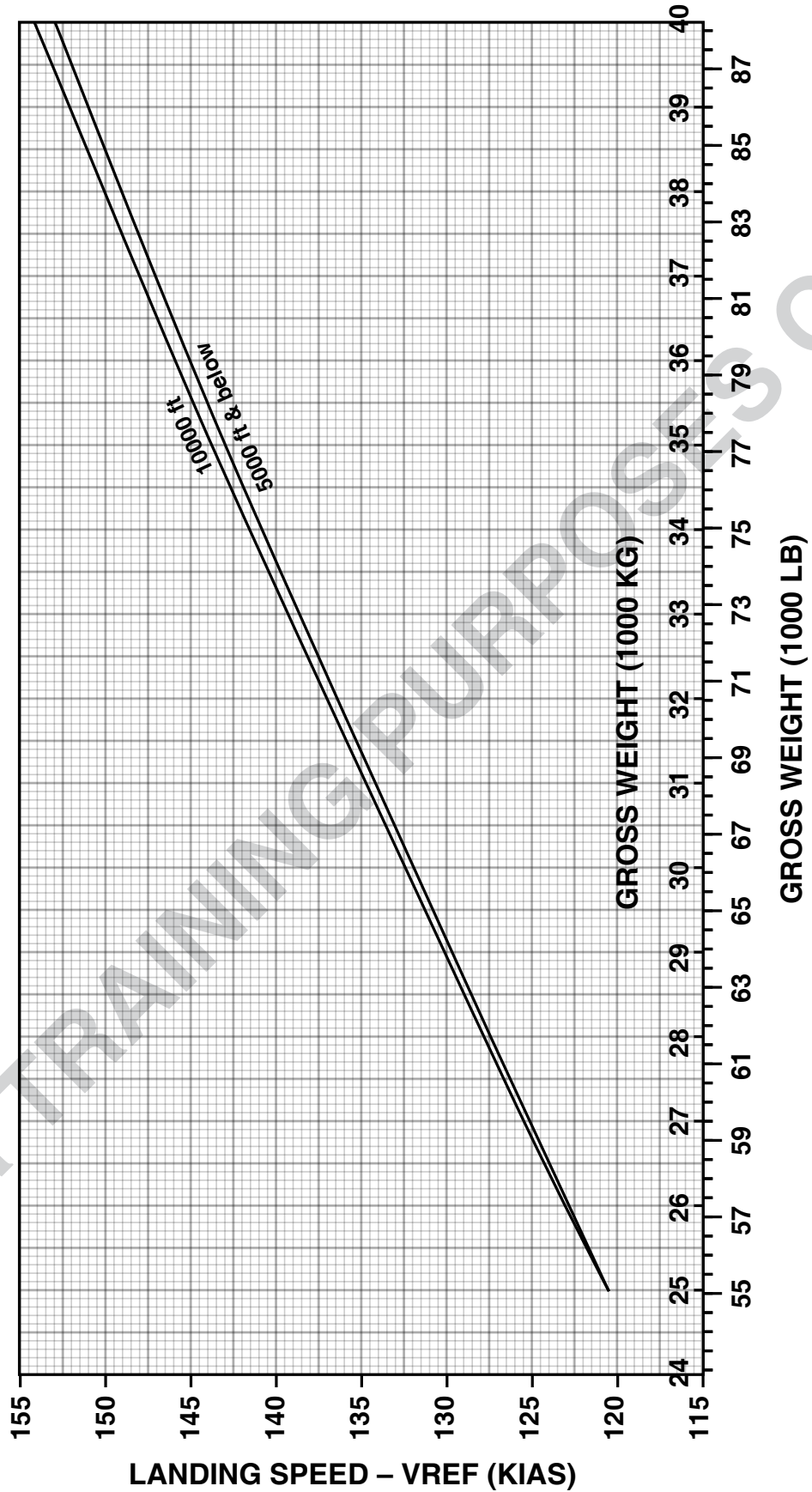


Figure 460. CRJ 900—Airport Planning Manual—Flaps at 45 Degrees/Slats Extended.
Illustrations and materials were used with permission from Bombardier.

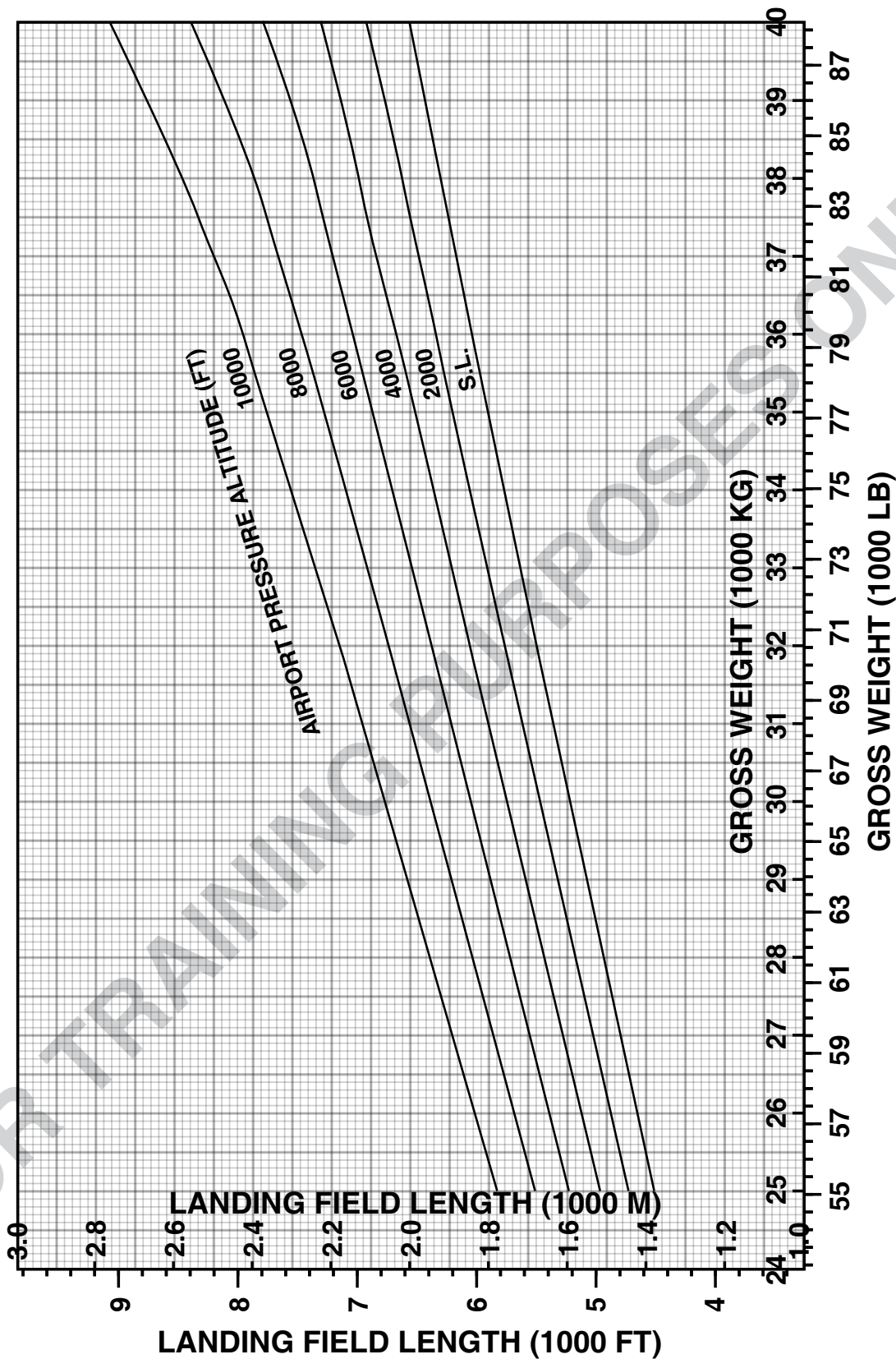


Figure 461. CRJ 900—Airport Planning Manual—Landing Field Length—Flaps at 45 Degrees/Slats Extended.

2.2 WEIGHT AND LOADING

2.2.1 MAXIMUM STRUCTURAL WEIGHT LIMITS

	Basic Gross Weight MS 4-201539	Intermediate Gross Weight MS 4-208807	High Gross Weight MS 4-308907	Enhanced High Gross Weight MS 4-309238
Ramp Weight	28,077 kg (61,900 lb)	29,089 kg (64,130 lb)	29,347 kg (64,700 lb)	29,665 kg (65,400 lb)
Maximum Takeoff Weight	27,987 kg (61,700 lb)	28,998 kg (63,930 lb)	29,257 kg (64,500 lb)	29,574 kg (65,200 lb)
Maximum Landing Weight	27,442 kg (60,500 lb)	28,009 kg (61,750 lb)	28,009 kg (61,750 lb)	28,123 kg (62,000 lb)
Maximum Zero Fuel Weight	25,174 kg (55,500 lb)	25,855 kg (57,000 lb)	25,855 kg (57,000 lb)	26,308 kg (58,000 lb)
Minimum Structural Design Weight	14,403 kg (31,753 lb)	14,403 kg (31,753 lb)	14,403 kg (31,753 lb)	14,403 kg (31,753 lb)

NOTE:

Maximum takeoff weight and maximum landing weight may be reduced by performance requirements of Section 5.

2.2.2 CENTER OF GRAVITY LIMITS (LANDING GEAR DOWN)

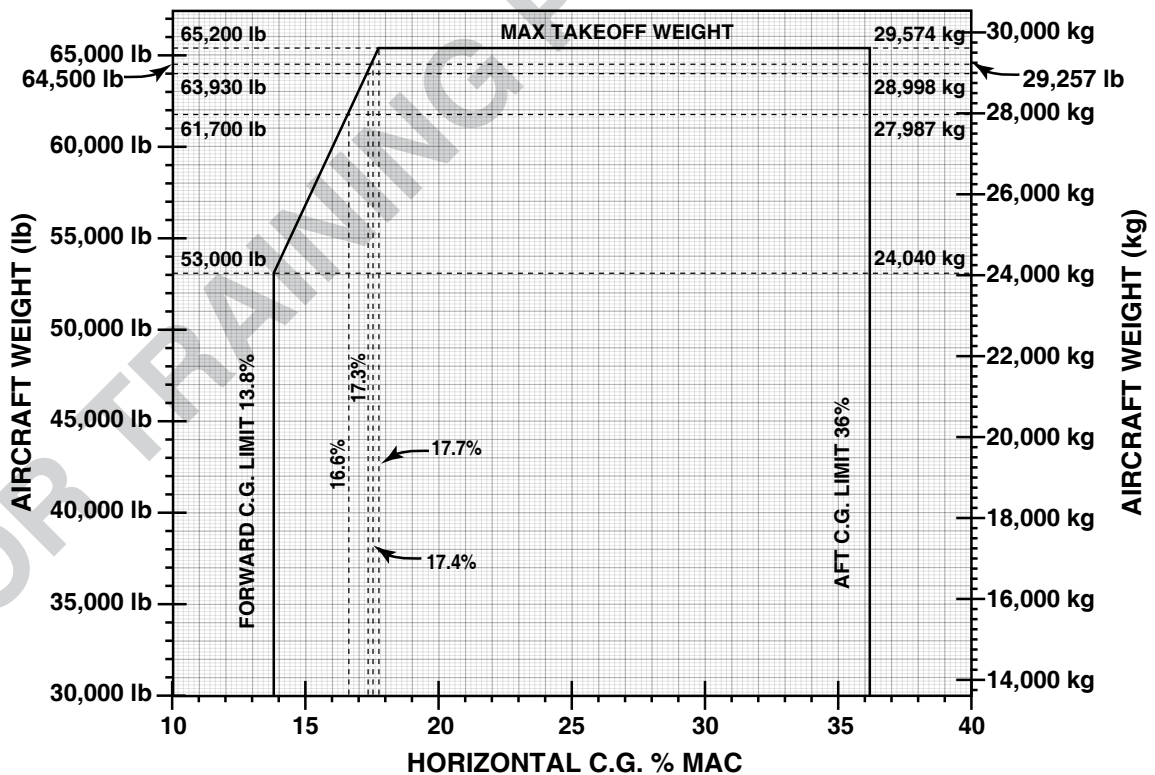


Figure 462. Q400—Weight and Loading—Maximum Structural Weight Limits.

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The Center of Gravity (C.G.) limits at all weights with landing gear extended are as follows:

1. Forward limit:

387.16 inches aft of the reference datum (13.8% M.A.C.) for all weights up to 24,040 kg (53,000 lb).

Slopes from 387.16 inches aft of the reference datum (13.8% M.A.C.) at 24,040 kg (53,000 lb) to 390.84 inches (17.7% M.A.C.) at 29,574 kg (65,200 lb).

2. Aft limit:

408.14 inches aft of the reference datum (36.0% M.A.C.) at all weights.

If these C.G. limits are met with the airplane landing gear extended, safe limits in flight are automatically achieved (see Figure 2-2-1, CG Limits).

2.2.3 LOADING INSTRUCTIONS

The airplane must always be loaded (i.e. crew, passengers, fuel, freight and baggage) to remain within the weight and centre of gravity limits in paragraphs 2.2.1 and 2.2.2.

Procedures for calculating weight and centre of gravity of a loaded airplane are contained in the Weight and Balance Manual (PSM 1-84-8 or 1-84-8M).

2.2.4 LOADING LIMITS

For baggage compartment loading limits for the various configurations, refer to the Cargo Loading Manual (PSM 1-84-8A).

2.2.5 MANEUVERING LIMIT LOAD FACTORS

The following maneuvering limit load factors limit the permissible angle of bank in turns and limit the severity of pull-up and push-over maneuvers.

Flap retracted	+2.5 g
	-1.0 g
Flap extended	+2.0 g
	0.0 g

2.2.6 MAXIMUM LATERAL ASYMMETRY

Maximum fuel imbalance between contents of main fuel tanks is 272 kg (600 lb).

Figure 463. Q400—Weight and Loading—Center of Gravity Limits (Landing Gear Down).

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- d. The maximum permissible take-off and landing weights may be further limited by available runway lengths (sub-sections 5.5 and 5.11), obstacle clearance (sub-section 5.6) and brake energy (sub-section 5.12).
- e. The maximum permissible take-off and landing weight is not limited by maximum tire speed at weight-altitude-temperatures, wind speeds and runway gradients shown on the performance charts included in this section.

5.1.5 MINIMUM CONTROL SPEEDS

The minimum control speeds, air, are as follows:

V_{MCA}	(Flap 15°)	91 kt CAS
	(Flap 10°)	95 kt CAS
	(Flap 5°)	98 kt CAS
	(Flap 0°)	113 kt CAS

V_{MCL}	(Flap 35°)	92 kt CAS
	(Flap 15°)	96 kt CAS
	(Flap 10°)	99 kt CAS
	(Flap 5°)	100 kt CAS

The minimum control speeds, ground, are as follows:

V_{MCG}	(Flap 15°)	89 kt CAS
	(Flap 10°)	89 kt CAS
	(Flap 5°)	89 kt CAS

5.1.6 USE OF PERFORMANCE DATA AND CHARTS

- a. Altitudes: All altitudes are pressure altitudes.
- b. Outside Air Temperature (OAT) is the ambient air temperature. In flight, cockpit indicated Static Air Temperature (SAT) is equal to OAT. At rest, on the ground, the indicated SAT may be higher than the OAT.
- c. Performance data given at a weight of 18,000 kg (39,680 lb) must be used for weights below 18,000 kg (39,680 lb).
- d. Performance data shown at ISA -20 °C must be used for temperatures below ISA -20 °C.
- e. Performance data shown for 20 kt headwind must be used for headwinds greater than 20 kt.
- f. Performance data shown for altitudes at sea level must be used for altitudes below sea level.

Figure 464. Q400—Weight and Loading—Minimum Control Speeds.

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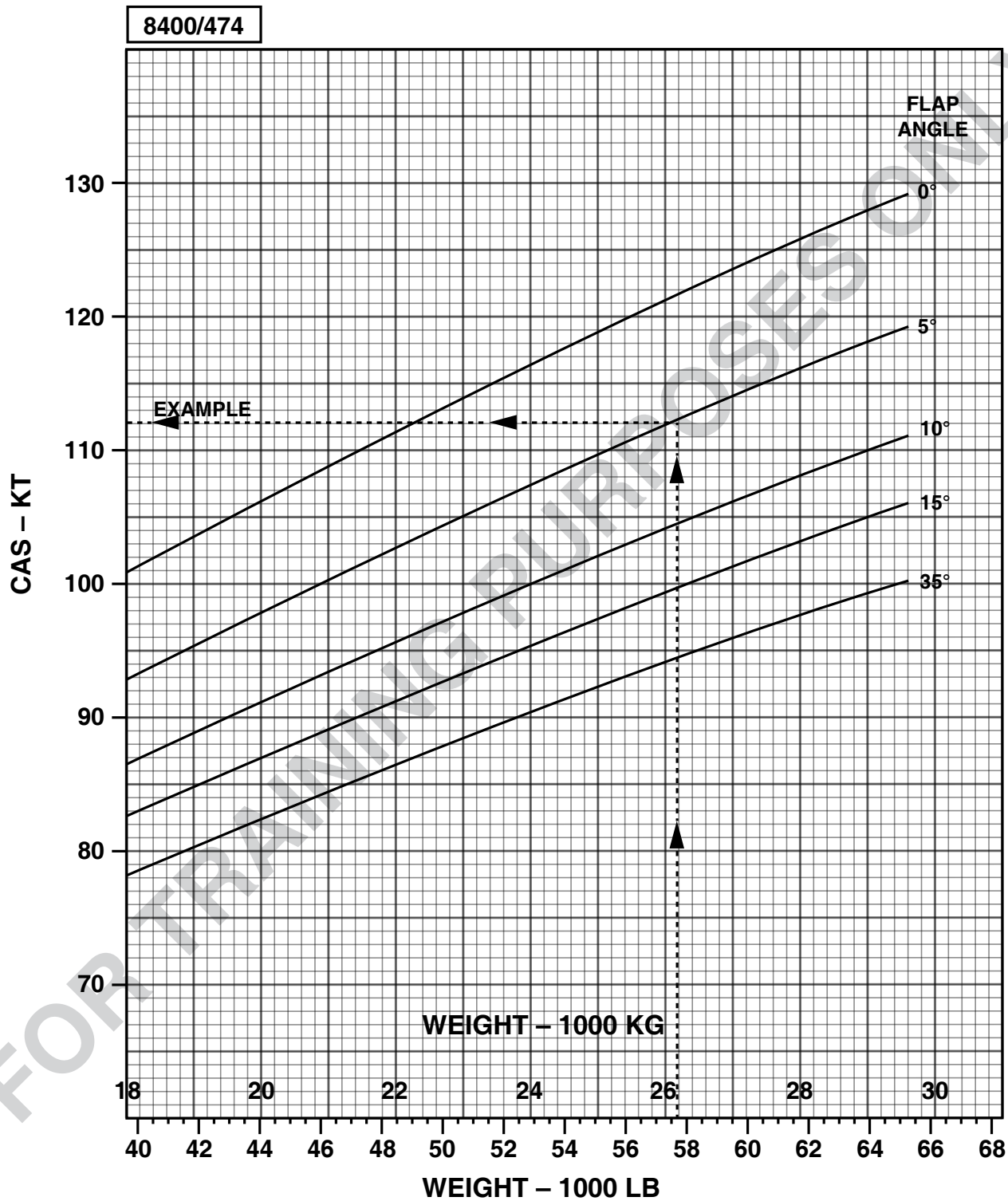


Figure 465. Q400—Weight and Loading—Reference Stall Speeds (V_{SR}).

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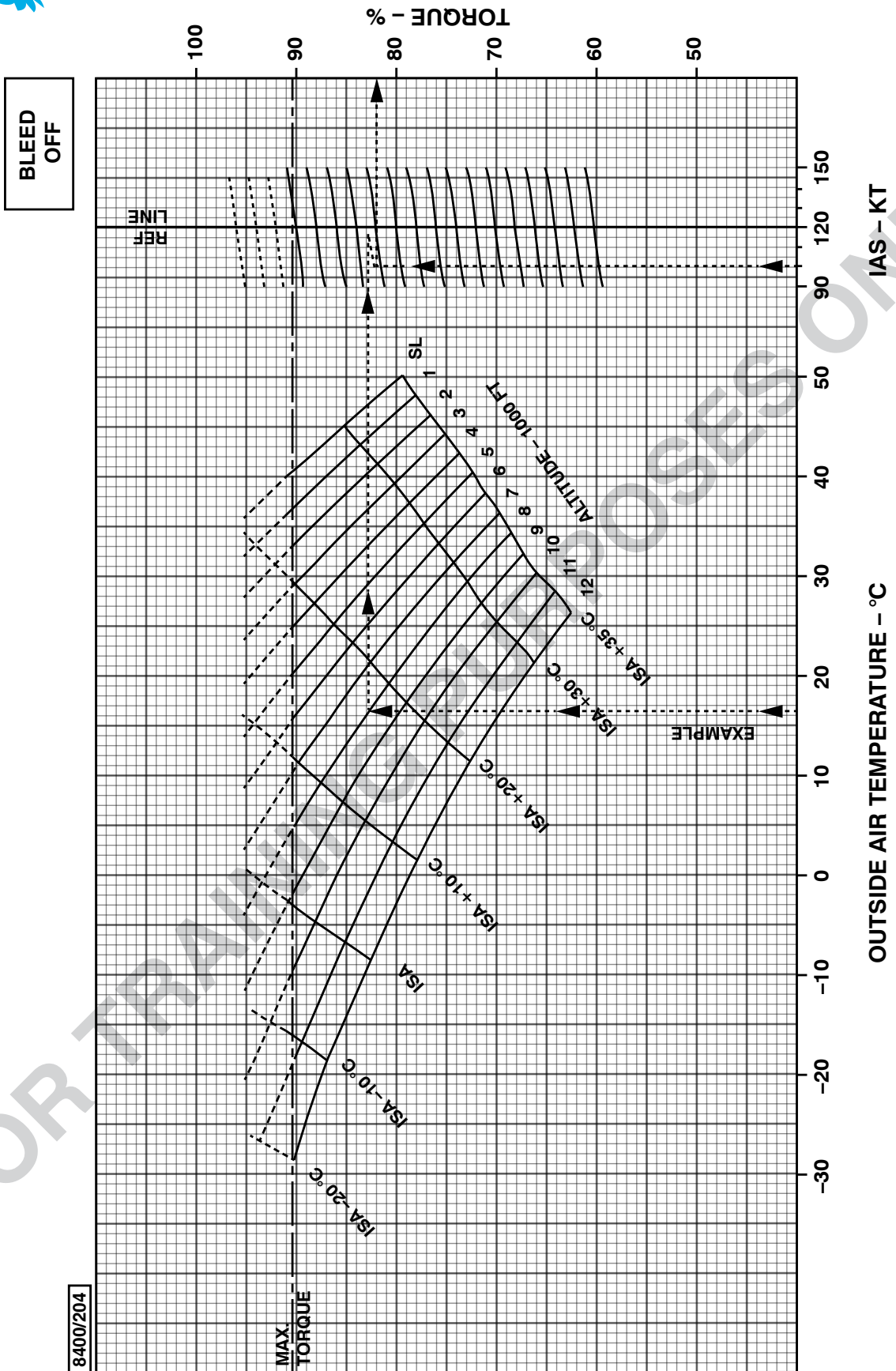


Figure 468. Q400—Normal Takeoff Power Torque Setting (In-Flight) Propeller RPM-1020 Deicing Systems ON or OFF.

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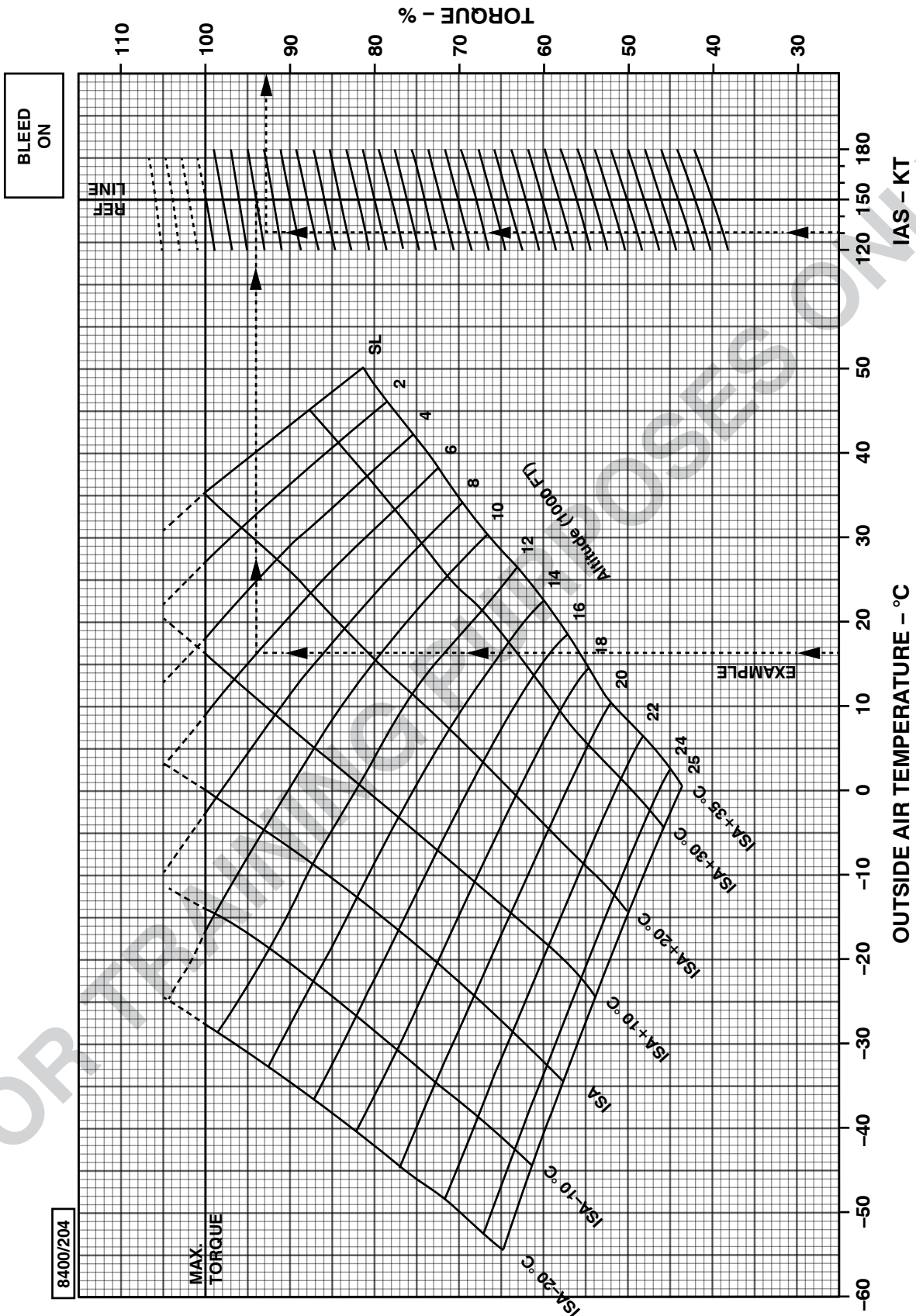


Figure 469. Q400—Maximum Continuous Power Torque Setting (In-Flight) Propeller RPM-1020 Deicing Systems ON or OFF.

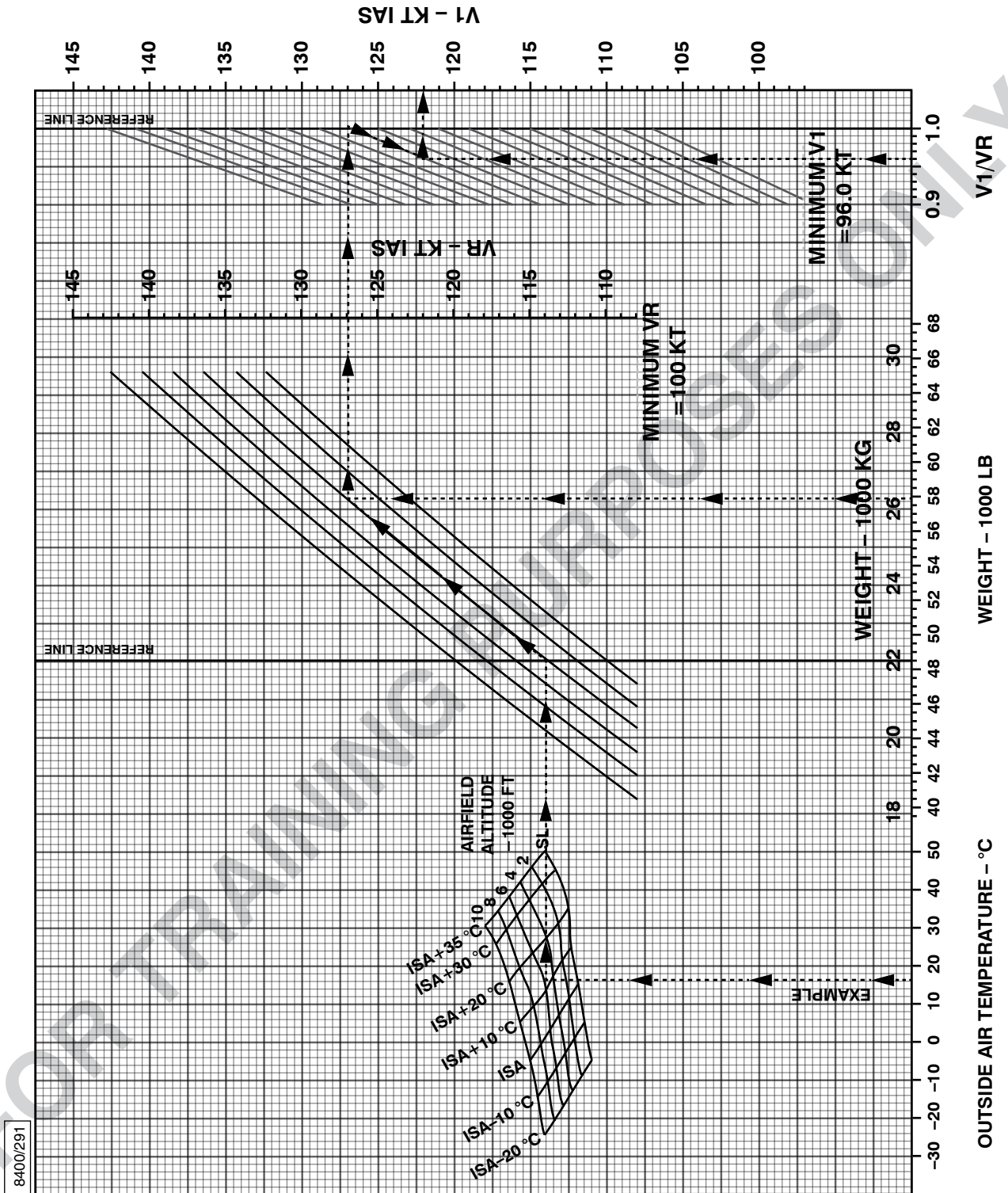


Figure 470. Q400—Rotation Speed V_R and Conversion of V_R and V_1/V_R Ratio to V_1 —Flap 15°. Illustrations and materials were used with permission from Bombardier.

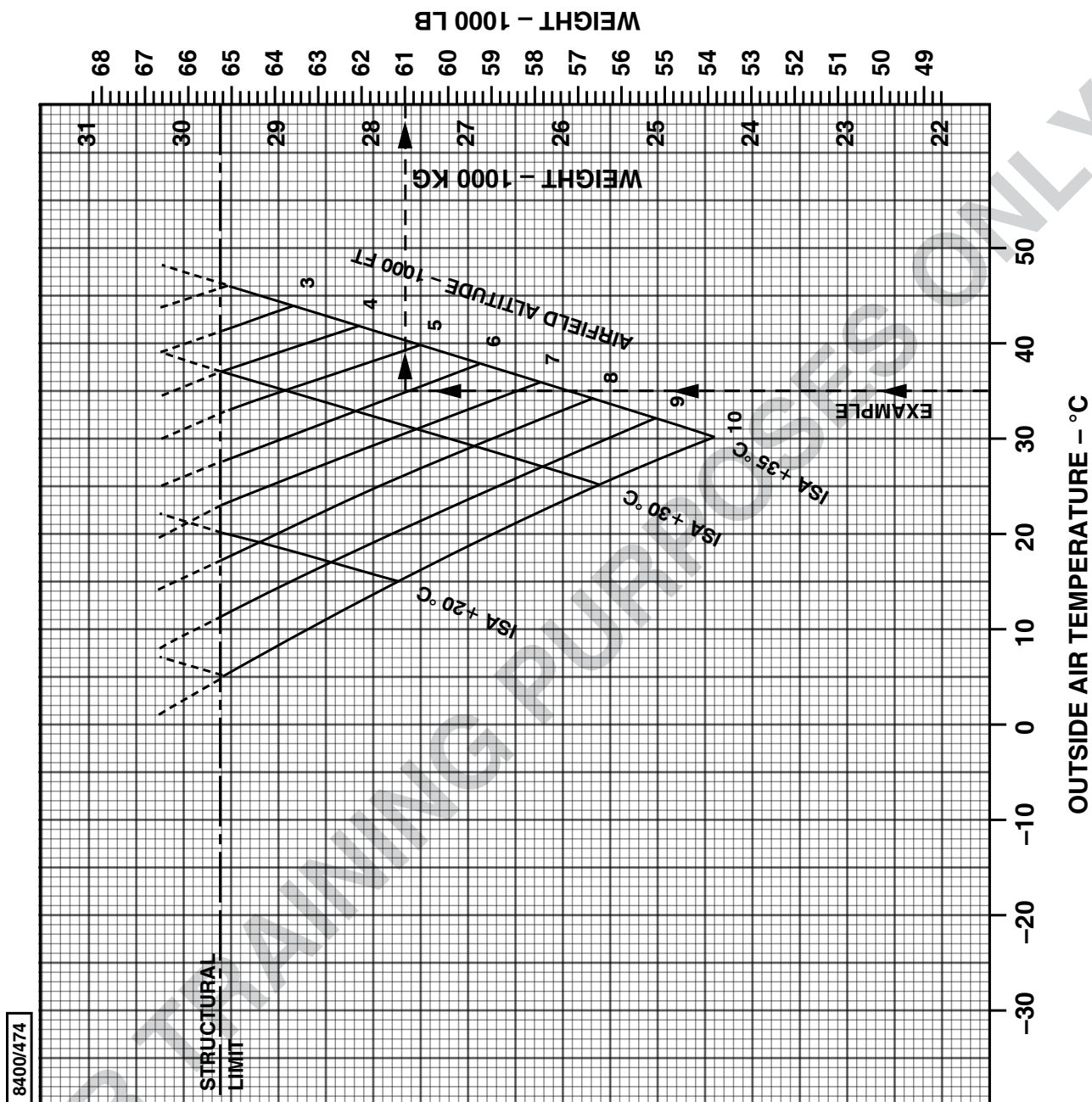
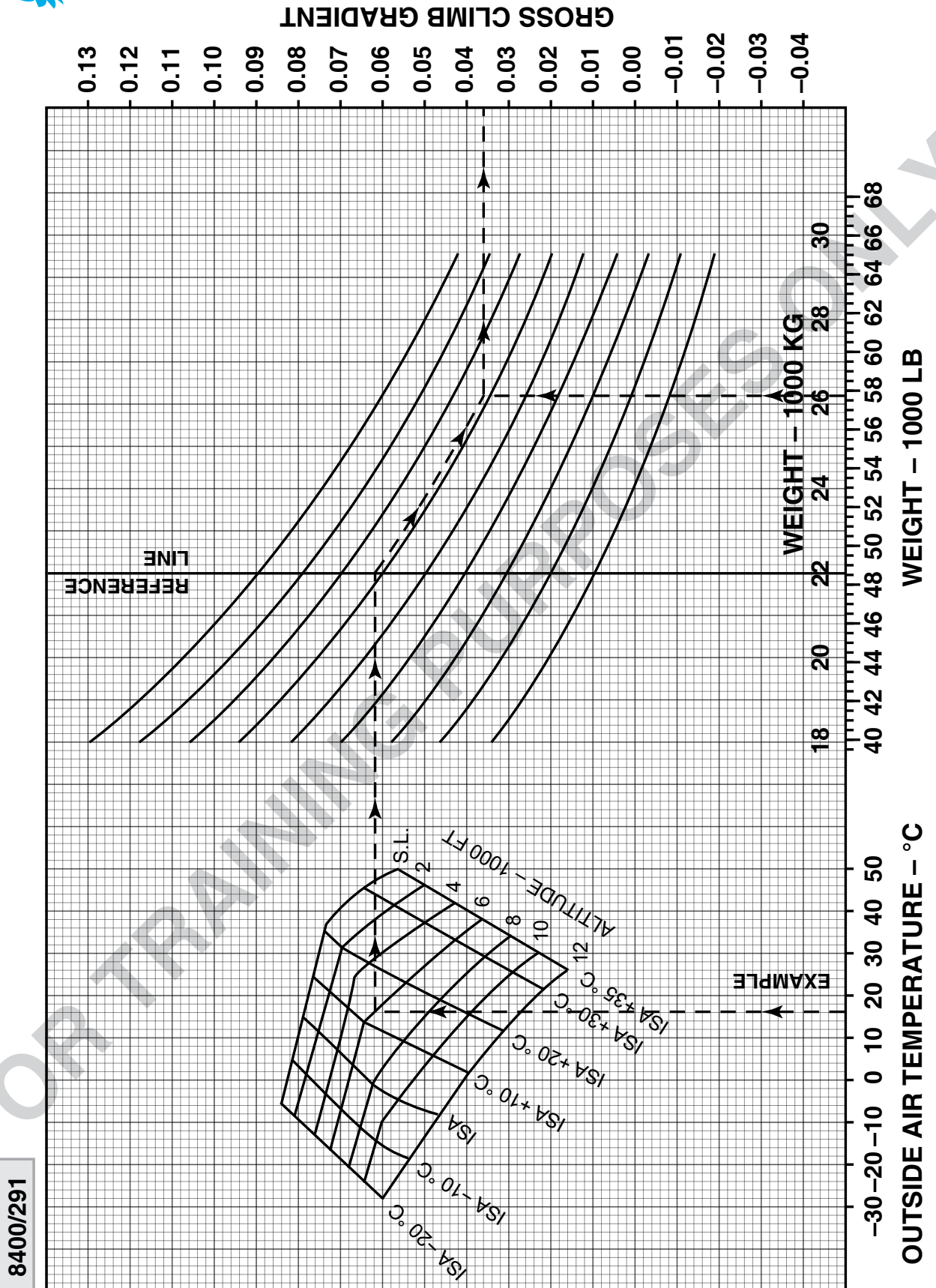


Figure 473. Q400—Maximum Permissible Takeoff Weight (WAT Limit)—Takeoff Flap 5°.

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8400/291

Figure 474. Q400—First Segment Takeoff Gross Climb Gradient
One Engine Inoperative—Flap 5°.

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8400/291

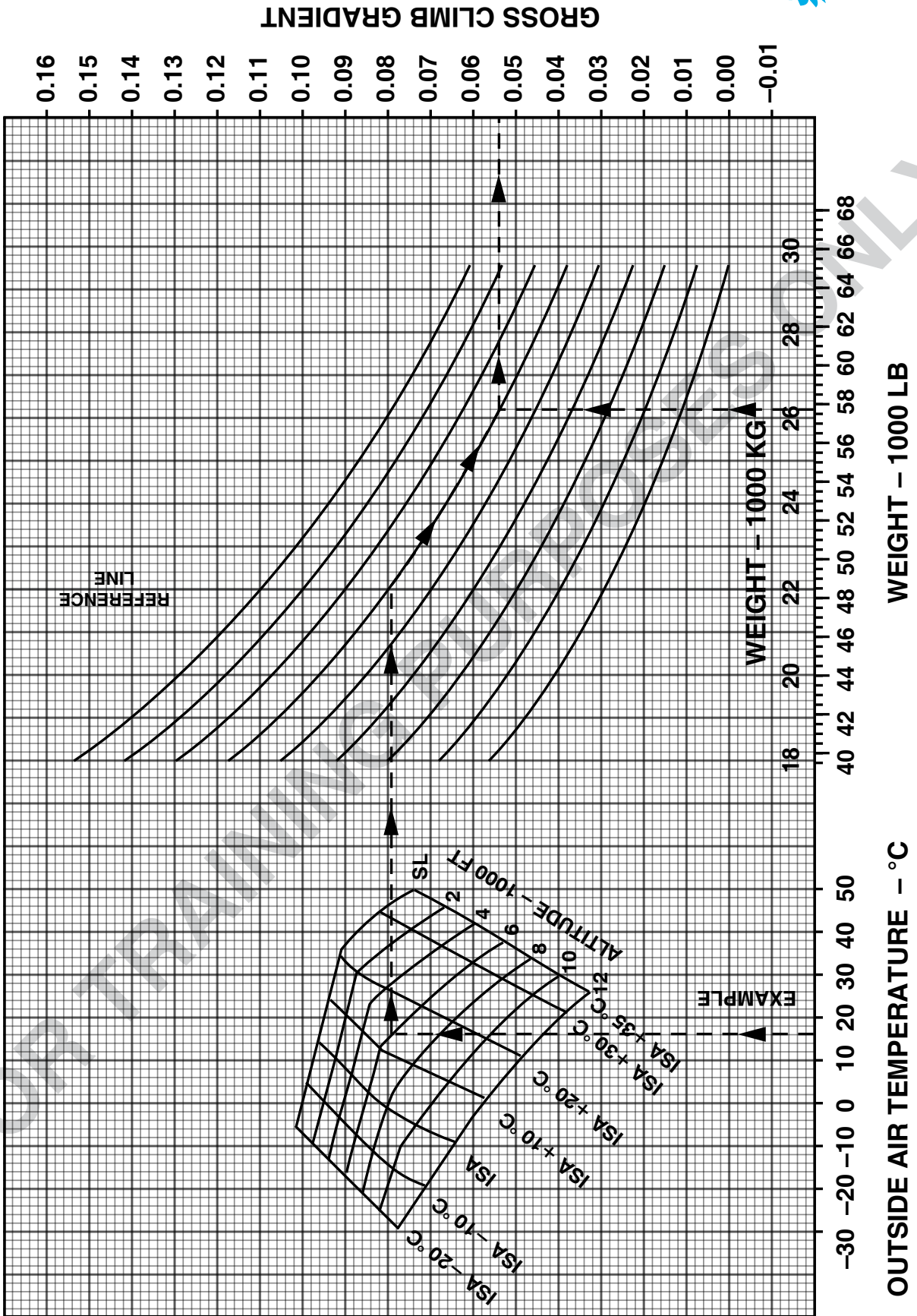


Figure 475. Q400—Second Segment Takeoff Gross Climb Gradient
One Engine Inoperative—Flap 5°.

Illustrations and materials were used with permission from Bombardier.

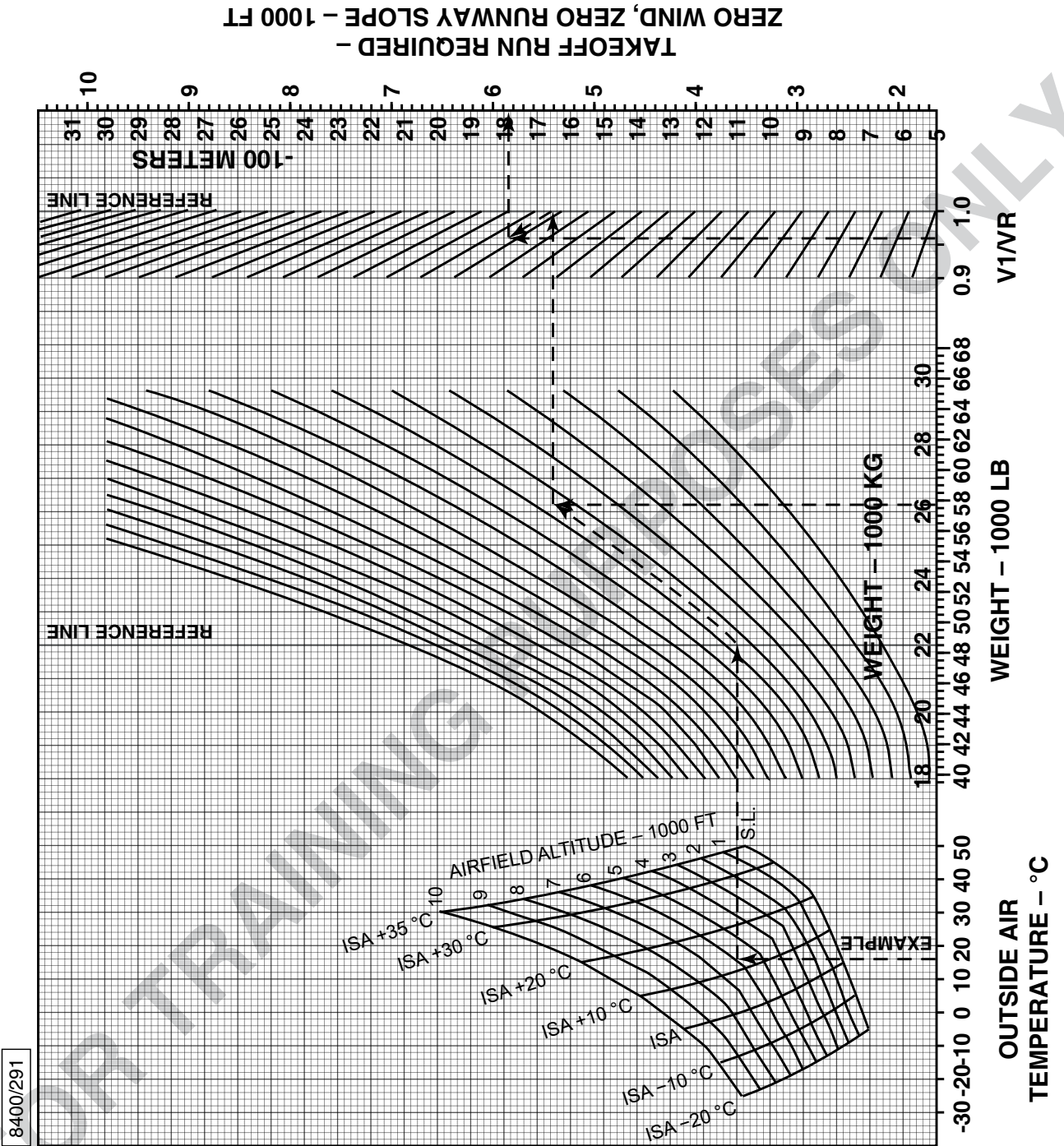


Figure 476. Q400—Takeoff Distance Required—Zero Wind, Zero Runway Slope—Flap 10°.

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8400/047

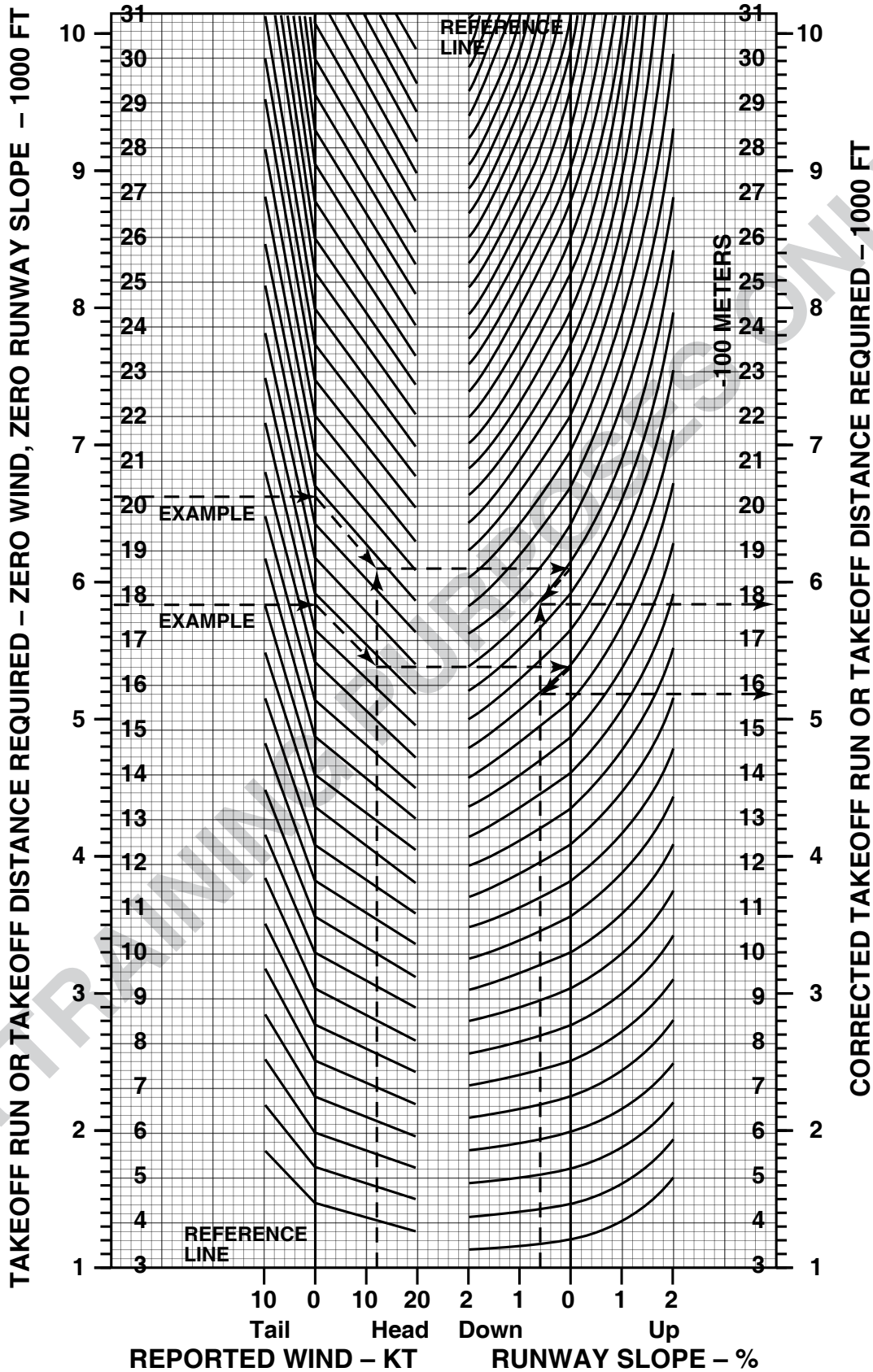


Figure 477. Q400—Takeoff Run and Takeoff Distance Required
Wind and Runway Slope Correction—Flap 5°.

Illustrations and materials were used with permission from Bombardier.

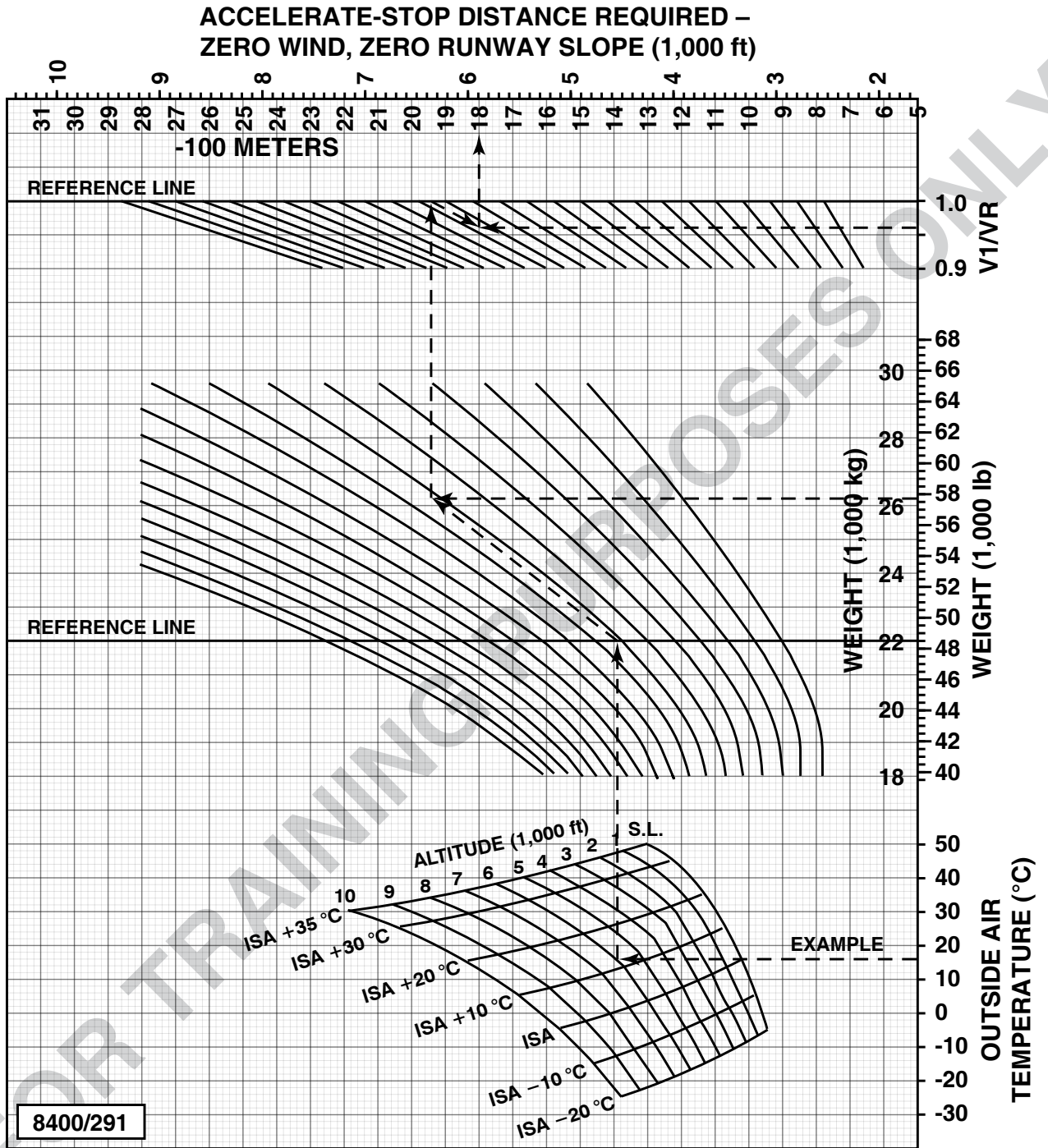


Figure 478. Q400—Accelerate—Stop Distance Required—Zero Wind, Zero Runway Slope Flap 5°.

Illustrations and materials were used with permission from Bombardier.

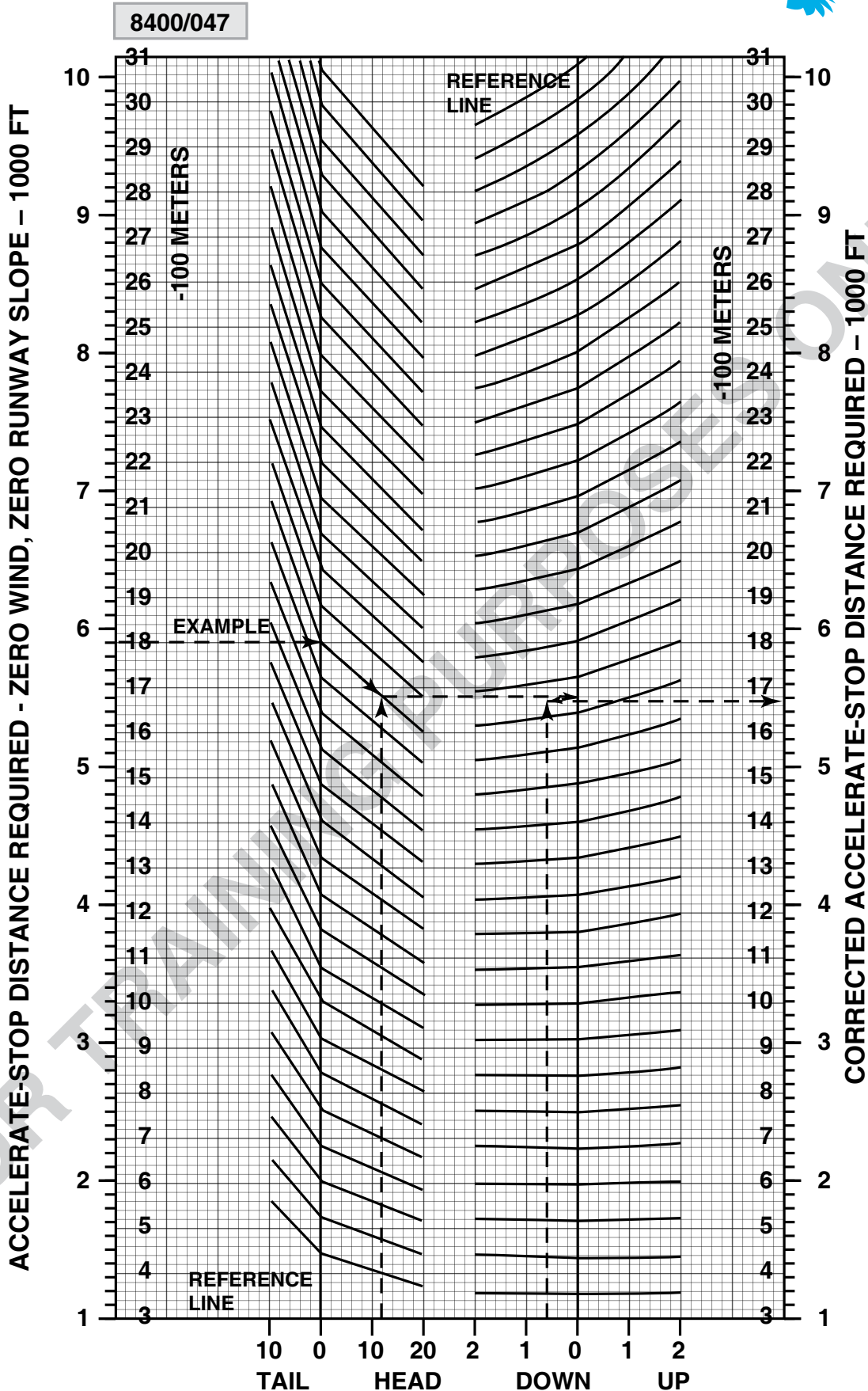


Figure 479. Q400—Accelerate-Stop Distance Required Wind and Runway Slope Correction—Flap 5°.

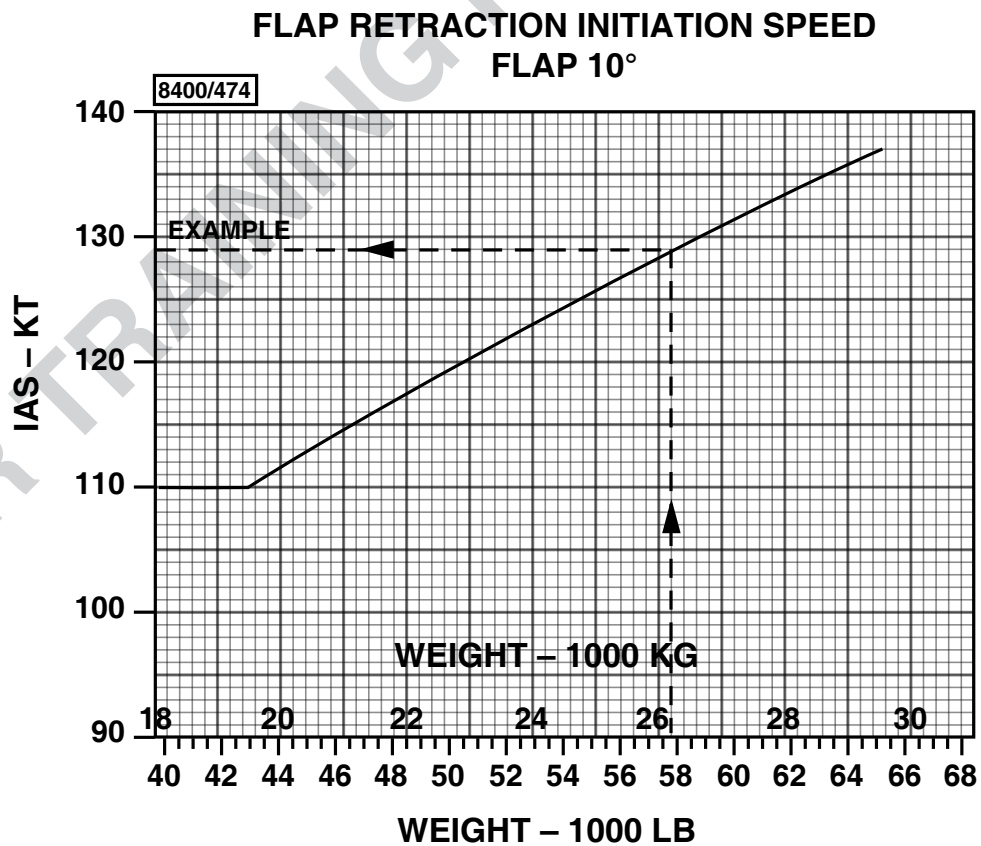
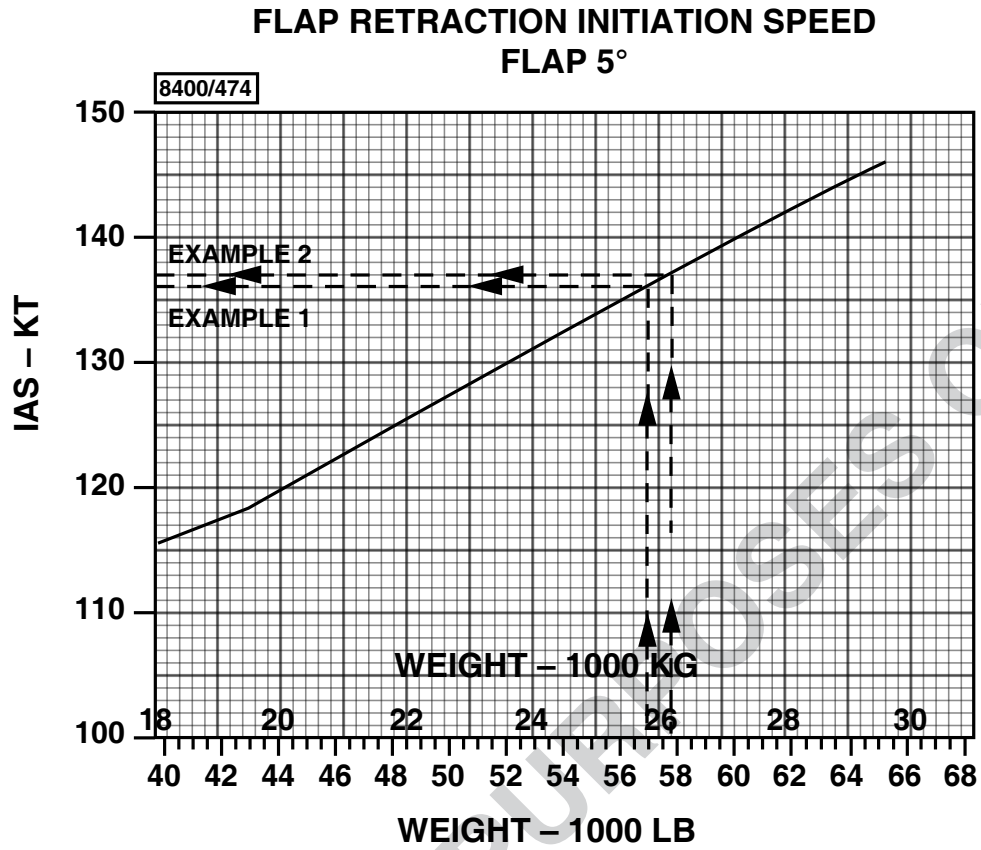


Figure 480. Q400—Flap Retraction Initiation Speed—Flap 5° and Flap 10°. Illustrations and materials were used with permission from Bombardier.

8400/263

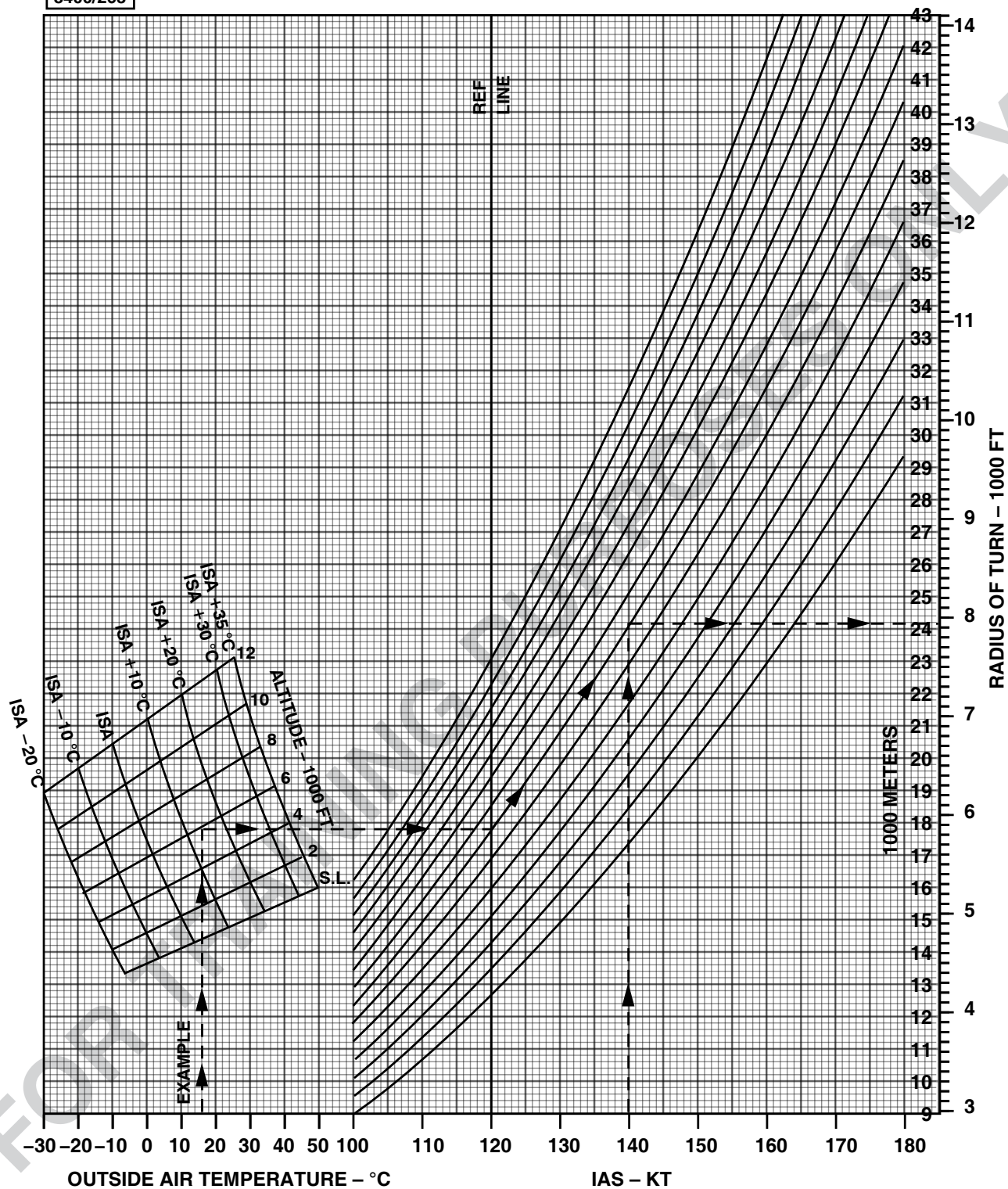


Figure 481. Q400—Net Takeoff Flight Path—Radius of Steady 15° Banked Turn.

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8400/291A

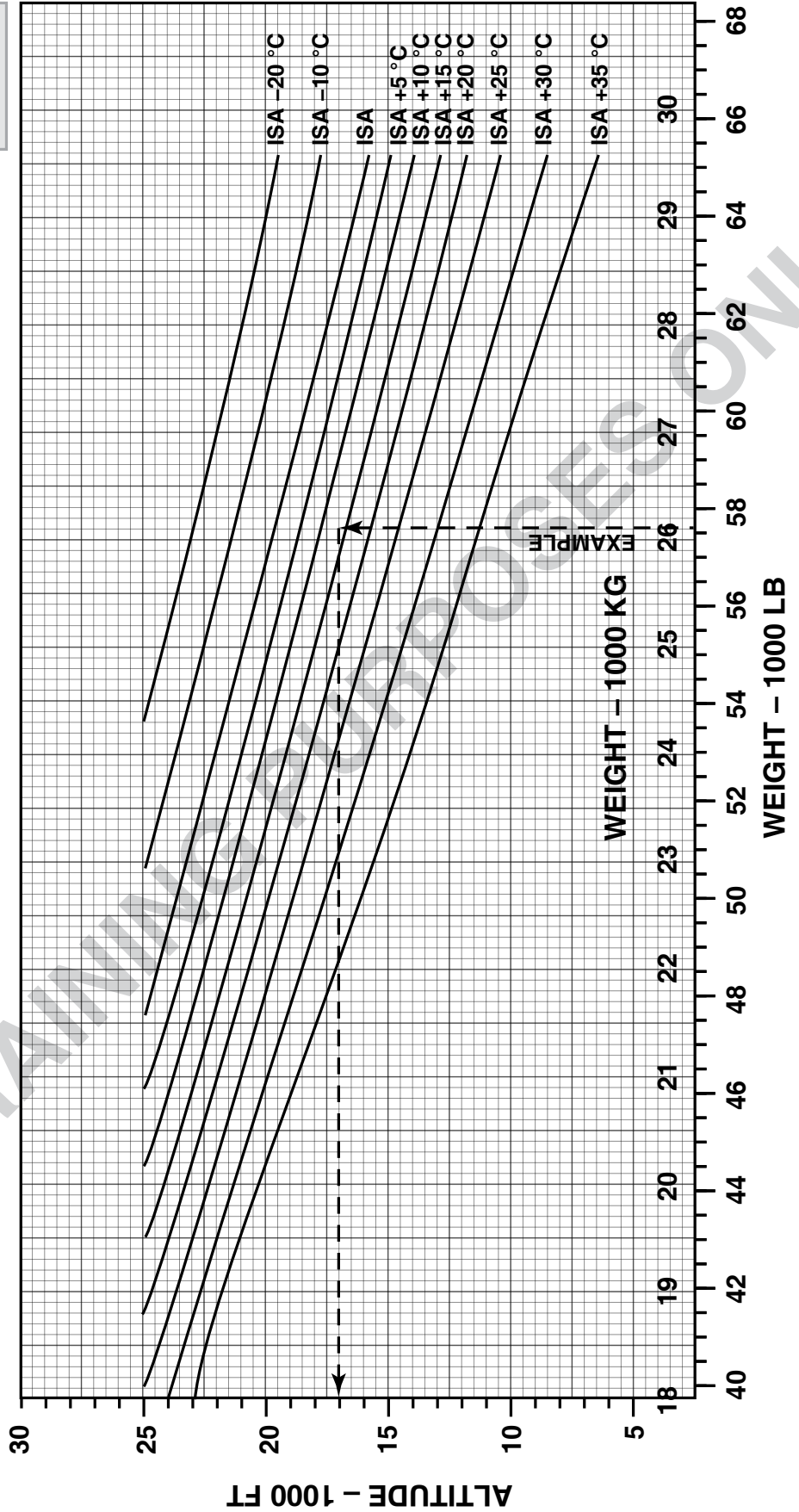


Figure 482. Q400—Enroute Climb Ceiling—One Engine Inoperative (Based on Zero Net Climb Gradient).

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Landing Speeds

Approach and Go-Around Speed
Flap 5°

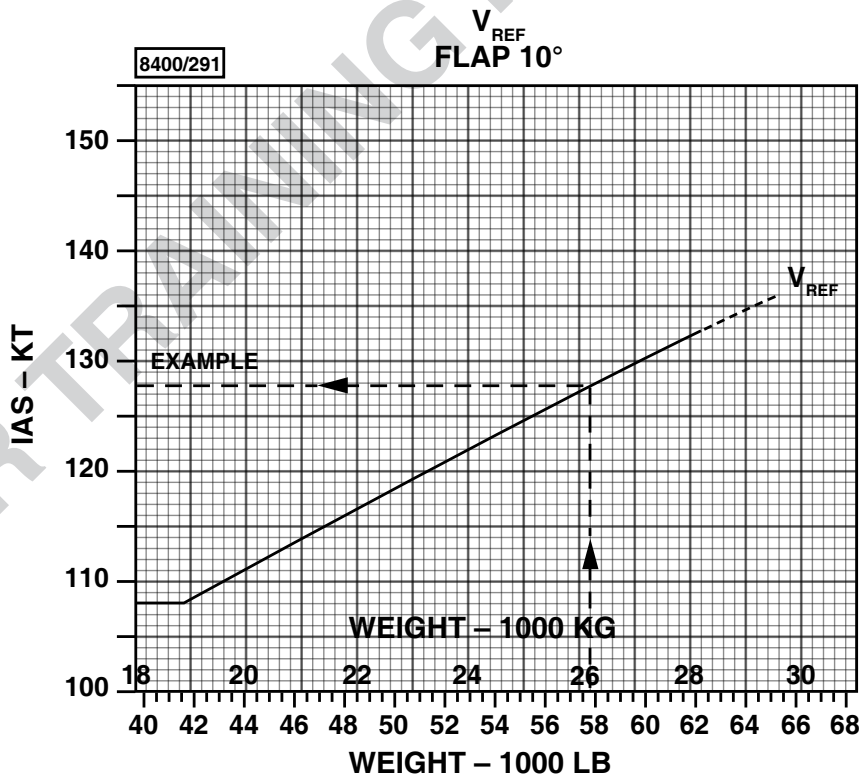
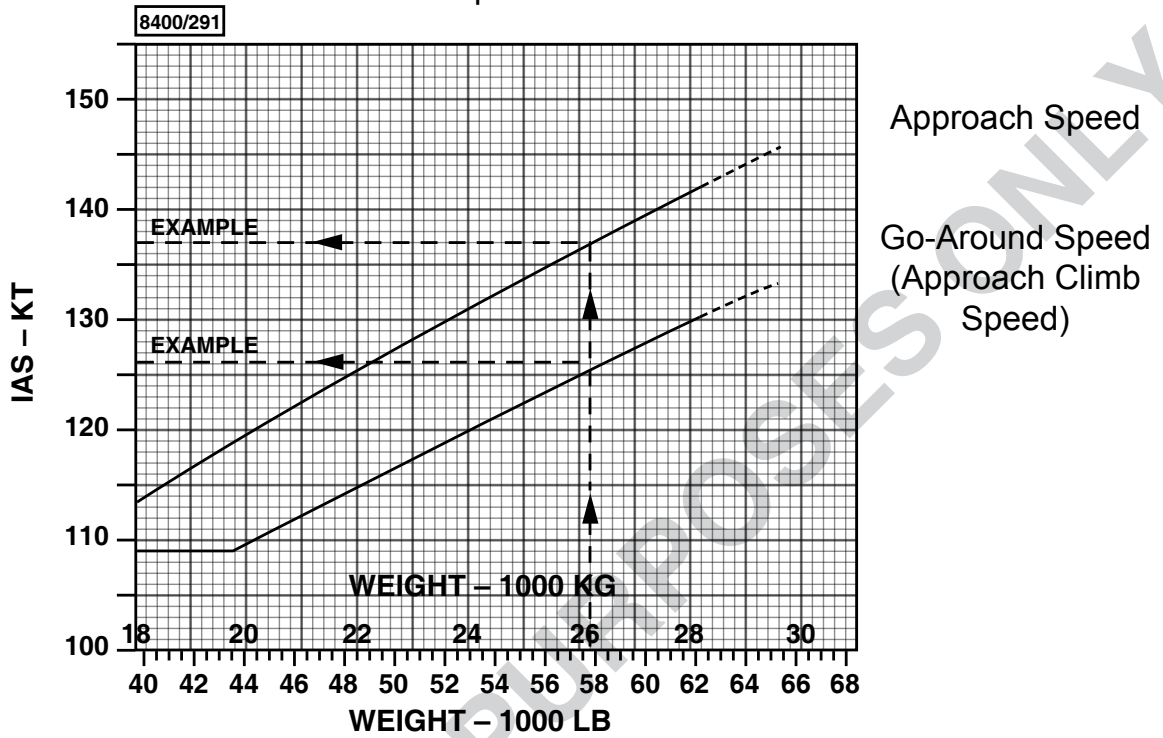


Figure 483. Q400—Approach, Go-Around, and V_{REF} Speeds.
Illustrations and materials were used with permission from Bombardier.

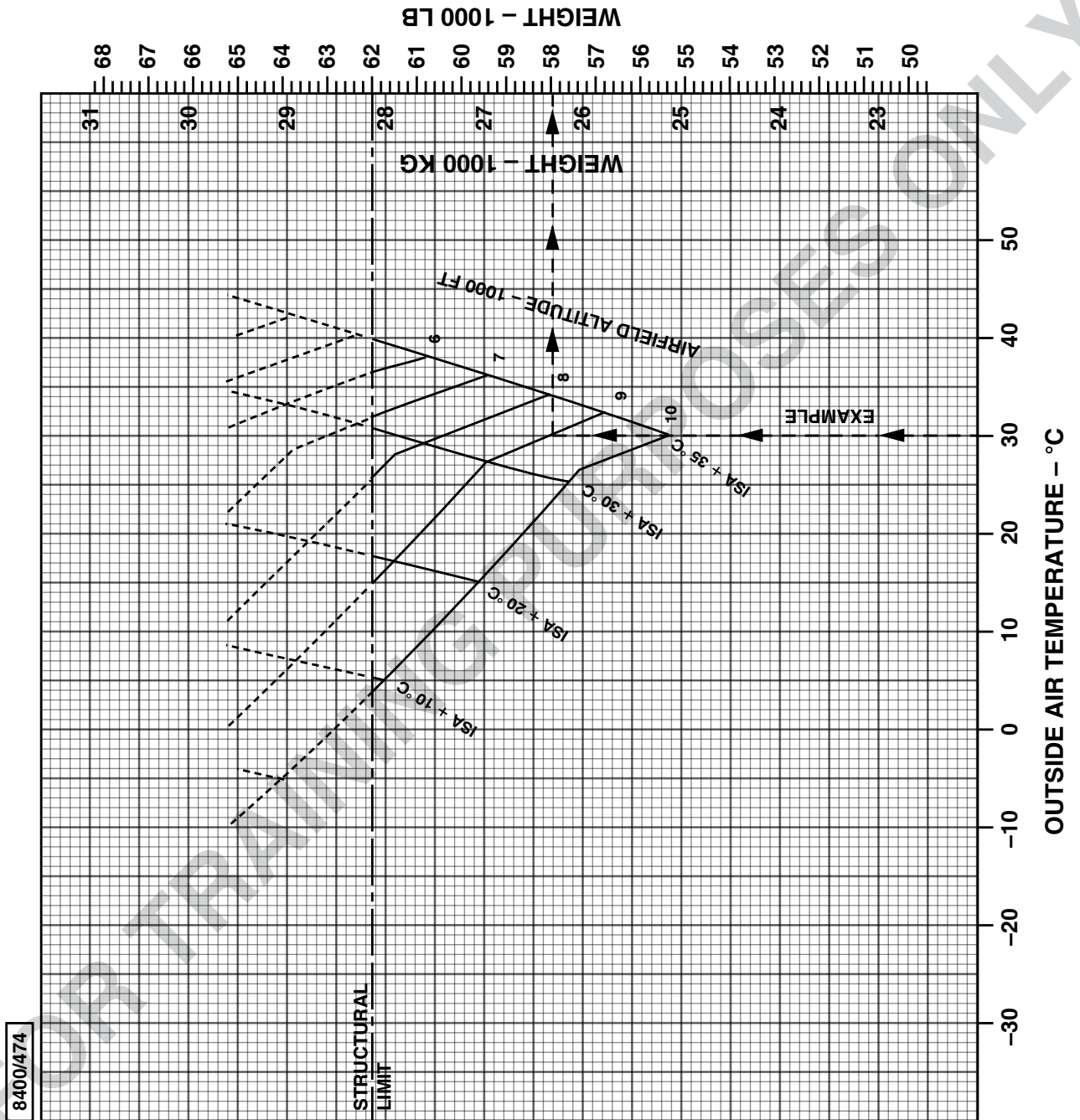
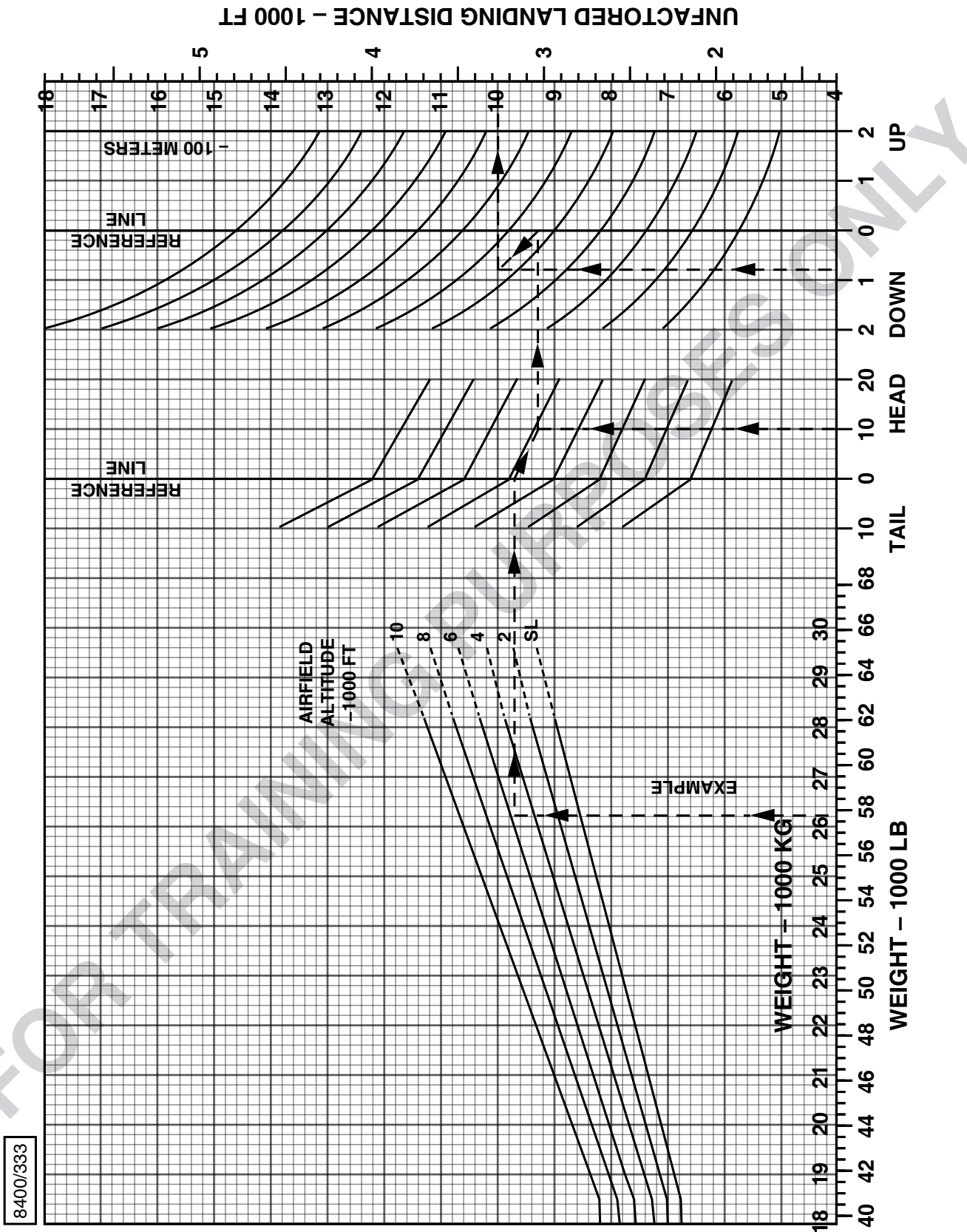


Figure 484. Q400—Maximum Permissible Landing Weight (WAT Limit)
Landing Flap 10°, Approach Flap 5°.

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8400/333

Figure 485. Q400—Unfactored Landing Distance—Flap 10°. Illustrations and materials were used with permission from Bombardier.

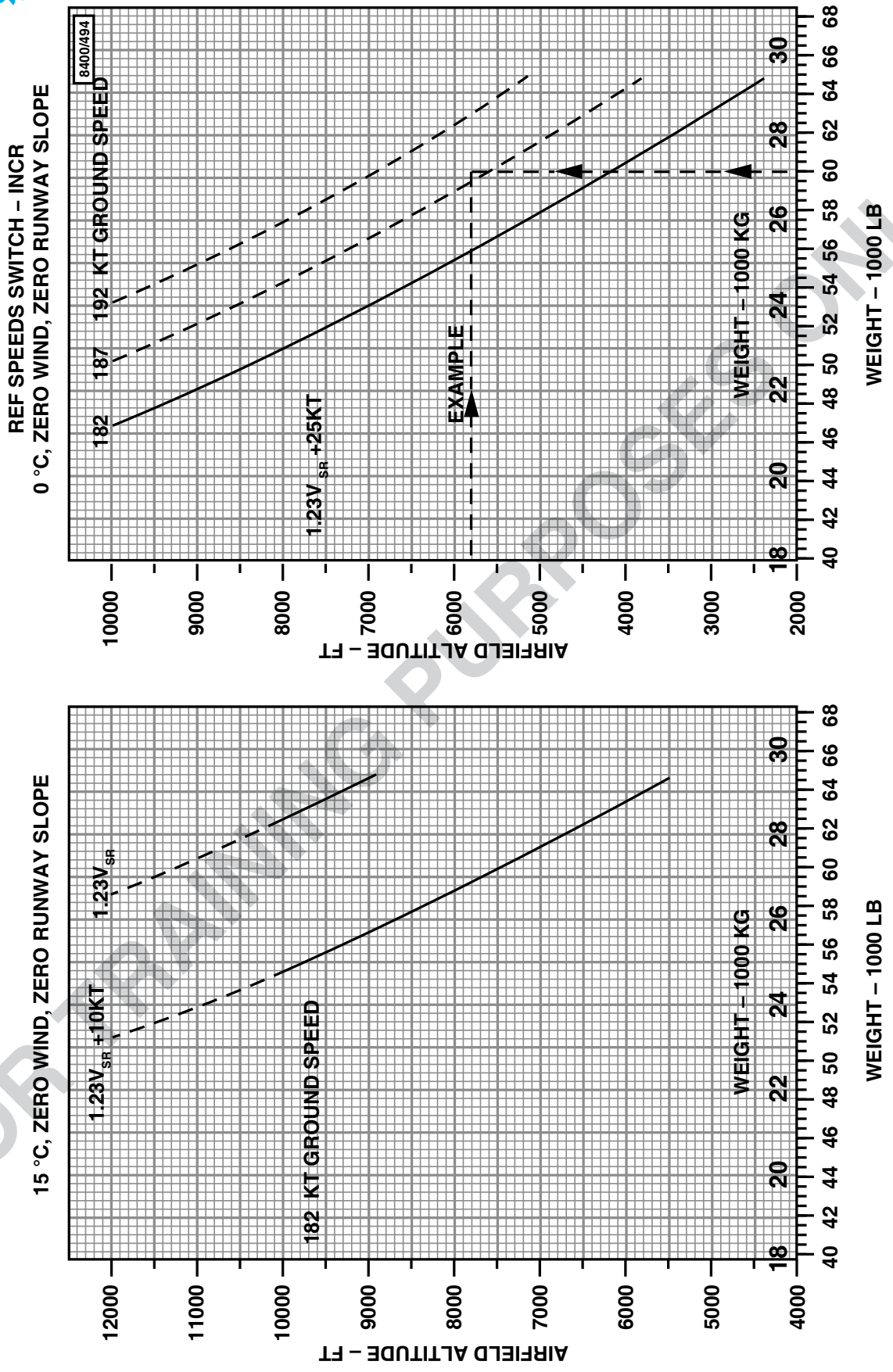


Figure 486. Q400—Expected Touch Down Speeds—Abnormal Flap Landing (Flap 0°).

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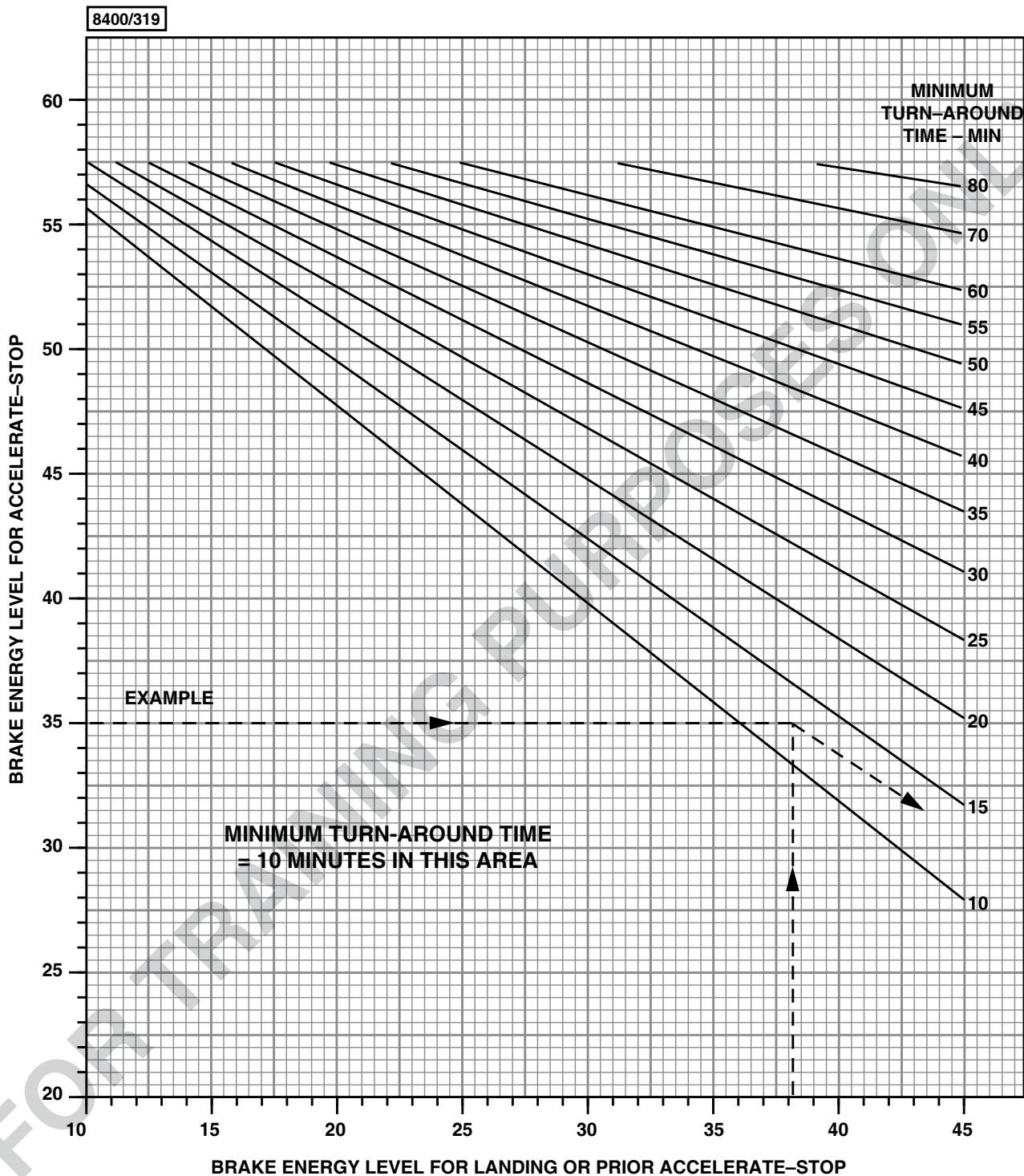


Figure 487. Q400—Minimum Turn-Around Time

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Table A to Part 117—Maximum Flight Time Limits for Unaugmented Operations Table

Time of report (acclimated)	Maximum flight time (hours)
0000–0459	8
0500–1959	9
2000–2359	8

Table B to Part 117—Flight Duty Period: Unaugmented Operations

Scheduled time of start (acclimated time)	Maximum flight duty period (hours) for lineholders based on number of flight segments.						
	1	2	3	4	5	6	7+
0000–0359	9	9	9	9	9	9	9
0400–0459	10	10	10	10	9	9	9
0500–0559	12	12	12	12	11.5	11	10.5
0600–0659	13	13	12	12	11.5	11	10.5
0700–1159	14	14	13	13	12.5	12	11.5
1200–1259	13	13	13	13	12.5	12	11.5
1300–1659	12	12	12	12	11.5	11	10.5
1700–2159	12	12	11	11	10	9	9
2200–2259	11	11	10	10	9	9	9
2300–2359	10	10	10	9	9	9	9

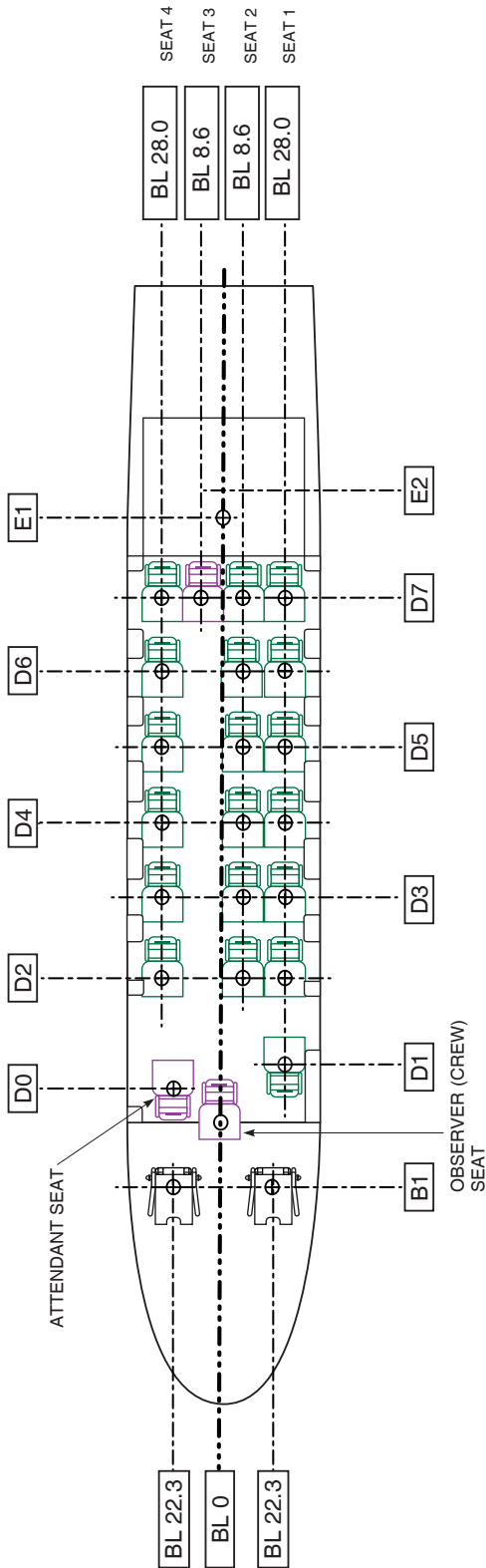
Table C to Part 117—Flight Duty Period: Augmented Operations

Scheduled time of start (acclimated time)	Maximum flight duty period (hours) for lineholders based on number of pilots.					
	Class 1 rest facility		Class 2 rest facility		Class 3 rest facility	
	3 pilots	4 pilots	3 pilots	4 pilots	3 pilots	4 pilots
0000–0559	15	17	14	15.5	13	13.5
0600–0659	16	18.5	15	16.5	14	14.5
0700–1259	17	19	16.5	18	15	15.5
1300–1659	16	18.5	15	16.5	14	14.5
1700–2359	15	17	14	15.5	13	13.5

Figure 488. 14 CFR part 117 Tables A, B, and C.



CREW, PASSENGER, AND BAGGAGE CENTROIDS



NOTE:
 A MAXIMUM OF 19 PASSENGER SEATS IS ALLOWED. SEATS MUST BE INSTALLED ONLY IN SPECIFIED LOCATIONS AS SHOWN IN THIS FIGURE. THE SEAT IN ROW D7, SHOWN IN PINK, IS AN ALTERNATE LOCATION FOR THE AFT-FACING SEAT IN ROW D1. REMOVE ANY ONE STANDARD SEAT WHEN THE OPTIONAL ATTENDANT SEAT IS INSTALLED. THE ATTENDANT SEAT MAY NOT BE OCCUPIED WHEN THE OPTIONAL OBSERVER (CREW) SEAT IS INSTALLED. THE ATTENDANT SEAT AND / OR OBSERVER (CREW) SEAT MAY NOT BE INSTALLED WHEN THE LOWER SAR DOOR IS INSTALLED. THE WEIGHT OF EACH EMPTY PASSENGER SEAT IS 24 POUNDS. THE EMPTY OBSERVER AND ATTENDANT SEATS WEIGH 32 POUNDS EACH.

- * SEE COCKPIT AND CABIN WEIGHT AND MOMENT TABLE FOR SEAT LOADING INFORMATION
- ** MAXIMUM ALLOWABLE LOADING FOR BAGGAGE COMPARTMENT SHELF IS 300 POUNDS.
- *** MAXIMUM ALLOWABLE LOADING FOR CARGO RAMP IS 1000 POUNDS. THE COMBINED RAMP AND SHELF SHALL NOT EXCEED 1000 LB

COMPARTMENT	WEIGHT FOR EACH SIDE	HORIZONTAL CENTROID	LATERAL CENTROID
COCKPIT			
B1	*	184.0	+/-22.3
B2	*	228.7	0.0
CABIN			
D0	*	232.8	-18.5
D1	*	245.9	+28.0
D2	*	285.3	+8.6, +/-28.0
D3	*	317.3	+8.6, +/-28.0
D4	*	349.3	+8.6, +/-28.0
D5	*	381.3	+8.6, +/-28.0
D6	*	413.3	+8.6, +/-28.0
D7	*	445.3	+/-8.6, +/-28.0
BAGGAGE			
E1 (shelf)	** 150	481.0	+/-14.0
E2 (ramp)	*** 500	500.0	+/-14.0

Figure 489. S-92—Personnel and Baggage Centroids.



WEIGHT (LBS)	COCKPIT PILOT & COPILOT				COCKPIT OBSERVER				CABIN PASSENGERS										TRANSITION BAGGAGE/CARGO															
	B1		B2		B1		B2		D0		D1		D2		D3		D4		D5		D6		D7		D0		D1 THROUGH D7		E1		E2		E1 & E2	
	HORIZONTAL ARM=184.0 MOM/1000	LATERAL ARM=+22.3 MOM/1000	HORIZONTAL ARM=228.7 MOM/1000	LATERAL ARM=0.0 MOM/1000	HORIZONTAL ARM=232.8 MOM/1000	LATERAL ARM=245.9 MOM/1000	HORIZONTAL ARM=285.3 MOM/1000	LATERAL ARM=0.0 MOM/1000	HORIZONTAL ARM=317.3 MOM/1000	HORIZONTAL ARM=349.3 MOM/1000	HORIZONTAL ARM=381.3 MOM/1000	HORIZONTAL ARM=413.3 MOM/1000	HORIZONTAL ARM=445.3 MOM/1000	LATERAL ARM=18.5 MOM/1000	LATERAL ARM=+18.6 MOM/1000	LATERAL ARM=+28.0 MOM/1000	HORIZONTAL ARM=481.00 MOM/1000	HORIZONTAL ARM=500.0 MOM/1000	LATERAL ARM=+14.0 MOM/1000															
50	9	+/-1	11	0	12	14	0	16	17	19	21	22	12	14	16	17	19	21	23	25	27	28	22	-1	+0	+/-1	24	25	+/-1					
60	11	+/-1	14	0	14	17	0	19	21	23	25	27	15	17	19	21	23	25	27	29	31	33	34	-1	+/-1	+/-2	29	30	+/-1					
70	13	+/-2	16	0	16	20	0	22	24	27	29	31	17	20	22	24	27	29	31	33	35	36	38	-1	+/-1	+/-2	34	35	+/-1					
80	15	+/-2	18	0	19	23	0	25	28	31	33	35	20	23	25	28	31	33	35	37	39	40	42	-2	+/-1	+/-3	38	40	+/-1					
90	17	+/-2	21	0	21	26	0	29	31	34	37	40	22	26	29	31	34	37	39	41	43	45	47	-2	+/-1	+/-3	43	45	+/-1					
100	18	+/-2	23	0	23	29	0	32	35	38	41	45	25	29	32	35	38	41	44	47	50	53	-2	+/-1	+/-3	48	50	+/-1						
110	20	+/-2	25	0	26	31	0	35	38	42	45	49	27	31	35	38	42	45	49	53	57	60	-2	+/-1	+/-3	53	55	+/-2						
120	22	+/-3	27	0	28	34	0	38	42	46	46	50	30	34	38	42	46	50	54	58	62	65	-2	+/-1	+/-4	58	60	+/-2						
130	24	+/-3	30	0	30	37	0	41	45	49	51	55	32	37	41	45	50	54	58	62	66	70	-3	+/-1	+/-4	63	65	+/-2						
140	26	+/-3	32	0	33	40	0	44	49	53	58	62	34	40	44	49	53	58	62	66	70	74	-3	+/-1	+/-4	67	70	+/-2						
150	28	+/-3	34	0	35	43	0	48	52	57	61	66	37	43	48	52	57	61	66	71	76	80	-3	+/-1	+/-4	72	75	+/-2						
160	29	+/-4	37	0	37	46	0	51	56	61	66	71	39	46	51	56	61	66	71	77	82	87	-3	+/-1	+/-4	77	80	+/-2						
170	31	+/-4	39	0	40	49	0	54	59	65	70	76	42	49	54	59	65	70	76	81	87	92	-3	+/-1	+/-5	82	85	+/-2						
180	33	+/-4	41	0	42	51	0	57	63	69	74	80	44	51	57	63	69	74	80	86	91	96	-4	+/-2	+/-5	87	90	+/-3						
190	35	+/-4	43	0	44	54	0	60	66	72	79	85	47	54	60	66	72	79	85	91	97	102	-4	+/-2	+/-6	91	95	+/-3						
200	37	+/-4	46	0	47	57	0	63	70	76	83	89	49	57	63	70	76	83	89	94	100	106	-4	+/-2	+/-6	96	100	+/-3						
210	39	+/-5	48	0	49	60	0	67	73	80	87	94	52	60	67	73	80	87	94	101	108	115	-4	+/-2	+/-6	101	105	+/-3						
220	40	+/-5	50	0	51	63	0	70	77	84	91	98	54	63	70	77	84	91	98	106	113	120	-4	+/-2	+/-6	106	110	+/-3						
230	42	+/-5	52	0	54	66	0	73	80	88	95	102	54	66	73	80	88	95	102	110	117	124	-4	+/-2	+/-6	110	115	+/-3						
240	44	+/-5	54	0	56	68	0	76	84	92	99	107	56	68	76	84	92	99	107	115	122	130	-4	+/-2	+/-7	115	120	+/-3						
250	46	+/-6	56	0	58	71	0	79	87	95	103	111	58	71	79	87	95	103	111	119	127	135	-4	+/-2	+/-7	120	125	+/-4						
260	48	+/-6	58	0	60	74	0	82	91	99	107	116	60	74	82	91	99	107	116	124	132	140	-4	+/-2	+/-7	125	130	+/-4						
270	50	+/-6	60	0	62	77	0	86	94	103	112	120	62	77	86	94	103	112	120	128	136	144	-4	+/-2	+/-8	130	135	+/-4						
280	52	+/-6	62	0	64	80	0	89	98	107	116	125	64	80	89	98	107	116	125	133	142	150	-4	+/-2	+/-8	135	140	+/-4						
290	53	+/-6	64	0	66	83	0	92	101	111	120	129	66	83	92	101	111	120	129	137	146	155	-4	+/-2	+/-8	139	145	+/-4						
300	55	+/-7	66	0	68	86	0	95	105	114	124	134	68	86	95	105	114	124	133	142	151	160	-4	+/-2	+/-8	144	150	+/-4						
310	57	+/-7	68	0	70	88	0	98	108	118	128	138	70	88	98	108	118	128	137	146	155	164	-4	+/-2	+/-9	144	155	+/-4						
320	59	+/-7	70	0	72	91	0	102	112	122	132	142	72	91	102	112	122	132	141	150	159	168	-4	+/-2	+/-9	144	155	+/-4						
330	61	+/-7	72	0	74	94	0	105	115	125	135	145	74	94	105	115	125	135	144	153	162	171	-4	+/-2	+/-9	144	155	+/-4						
340	63	+/-8	74	0	76	97	0	108	119	129	139	149	76	97	108	119	129	139	148	157	166	175	-4	+/-2	+/-10	144	155	+/-4						
350	64	+/-8	76	0	78	100	0	111	122	133	144	155	78	100	111	122	133	144	153	162	171	180	-4	+/-2	+/-10	144	155	+/-4						
360	66	+/-8	78	0	80	103	0	114	126	137	149	160	80	103	114	126	137	149	158	167	176	185	-4	+/-2	+/-10	144	155	+/-4						
370	68	+/-8	80	0	82	106	0	117	129	141	153	165	82	106	117	129	141	153	162	171	180	189	-4	+/-2	+/-10	144	155	+/-4						
380	70	+/-8	82	0	84	108	0	121	133	145	157	169	84	108	121	133	145	157	166	175	184	193	-4	+/-2	+/-10	144	155	+/-4						
390	72	+/-9	84	0	86	111	0	124	136	149	161	174	86	111	124	136	149	161	170	179	188	197	-4	+/-2	+/-10	144	155	+/-4						
400	74	+/-9	86	0	88	114	0	127	140	153	165	178	88	114	127	140	153	165	174	183	192	201	-4	+/-2	+/-10	144	155	+/-4						
410	75	+/-9	88	0	90	117	0	130	143	156	169	183	90	117	130	143	156	169	178	187	196	205	-4	+/-2	+/-10	144	155	+/-4						
420	77	+/-9	90	0	92	120	0	133	147	160	174	187	92	120	133	147	160	174	183	192	201	210	-4	+/-2	+/-10	144	155	+/-4						
430	79	+/-10	92	0	94	123	0	136	150	164	178	191	94	123	136	150	164	178	187	196	205	214	-4	+/-2	+/-10	144	155	+/-4						
440	81	+/-10	94	0	96	126	0	140	154	168	182	196	96	126	140	154	168	182	191	200	209	218	-4	+/-2	+/-10	144	155	+/-4						
450	83	+/-10	96	0	98	128	0	143	157	172	186	200	98	128	143	157	172	186	195	204	213	222	-4	+/-2	+/-10	144	155	+/-4						
460	85	+/-10	98	0	100	131	0	146	161	175	190	205	100	131	146	161	175	190	199	208	217	226	-4	+/-2	+/-10	144	155	+/-4						
470	87	+/-10	100	0	102	134	0	149	164	179	194	209	102	134	149	164	179	194	203	212	221	230	-4	+/-2	+/-10	144	155	+/-4						
480	89	+/-10	102	0	104	137	0	152	168	183	198	214	104	137	152	168	183	198	207	216	225	234	-4	+/-2	+/-10	144	155	+/-4						
490	91	+/-10	104	0	106	140	0	155	171	187	203	218	106	140	155	171	187	203	212	221	230	239	-4	+/-2	+/-10	144	155	+/-4						
500	93	+/-10	106	0	108	143	0	159	175	191	207	223	108	143	159	175	191	207	216	225	234	243	-4	+/-2	+/-10	144	155	+/-4						
510	95	+/-10	108	0	110	146	0	162	178	194	211	227	110	146	162	178	194	211	220	229	238	247	-4	+/-2	+/-10	144	155	+/-4						
520	97	+/-10	110	0	112	148	0	165	182	198	215	232	112	148	165	182	198	215	224	233	242	251	-4	+/-2	+/-10	144	155	+/-4						
530	99	+/-10	112	0	114	151	0	168	185	202	219	236	114	151	168	185	202	219	228	237	246	255	-4	+/-2	+/-10	144	155	+/-4						
540	101	+/-10	114	0	116	154	0	171	189	206	223	240	116	154	171	189	206	223	232	241	250	259	-4	+/-2	+/-10	144	155	+/-4						

Figure 490. S-92—Cockpit and Cabin Weight and Moment Table.



WEIGHT (LBS)	COCKPIT & COPILOT				COCKPIT OBSERVER				CABIN PASSENGERS								TRANSITION BAGGAGE/CARGO						
	B1		B2		B1		B2		D0	D1	D2	D3	D4	D5	D6	D7	D0	D1 THROUGH D7	E1	E2	E1 & E2		
	HORIZONTAL ARM=184.0 MOM/1000	LATERAL ARM=+/-22.3 MOM/1000	HORIZONTAL ARM=228.7 MOM/1000	LATERAL ARM=00.0 MOM/1000	HORIZONTAL ARM=232.8 MOM/1000	HORIZONTAL ARM=245.9 MOM/1000	HORIZONTAL ARM=285.3 MOM/1000	HORIZONTAL ARM=317.3 MOM/1000	HORIZONTAL ARM=349.3 MOM/1000	HORIZONTAL ARM=381.3 MOM/1000	HORIZONTAL ARM=413.3 MOM/1000	HORIZONTAL ARM=445.3 MOM/1000	LATERAL ARM=18.5 MOM/1000	LATERAL ARM=+/-8.6 MOM/1000	LATERAL ARM=+/-28.0 MOM/1000	HORIZONTAL ARM=481.0 MOM/1000	HORIZONTAL ARM=500.0 MOM/1000	LATERAL ARM=-14.0 MOM/1000					
550				157	175	192	210	227	245												275	+/-8	
560				160	178	196	214	231	249													280	+/-8
570				163	181	199	217	236	254													285	+/-8
580				165	184	203	221	240	258													290	+/-8
590				168	187	206	225	244	263													295	+/-8
600				171	190	210	229	248	267													300	+/-8
610				174	194	213	233	252	272													305	+/-9
620				177	197	217	236	256	276													310	+/-9
630				180	200	220	240	260	281													315	+/-9
640				183	203	224	244	265	285													320	+/-9
650				185	206	227	248	269	289													325	+/-9
660				188	209	231	252	273	294													330	+/-9
670									298													335	+/-9
680									303													340	+/-10
690									307													345	+/-10
700									312													350	+/-10
710									316													355	+/-10
720									321													360	+/-10
730									325													365	+/-10
740									330													370	+/-10
750									334													375	+/-11
760									338													380	+/-11
770									343													385	+/-11
780									347													390	+/-11
790									352													395	+/-11
800									356													400	+/-11
810									361													405	+/-11
820									365													410	+/-11
830									370													415	+/-12
840									374													420	+/-12
850									379													425	+/-12
860									383													430	+/-12
870									387													435	+/-12
880									392													440	+/-12
890																						445	+/-13
900																						450	+/-13
910																						455	+/-13
920																						460	+/-13
930																						465	+/-13
940																						470	+/-13
950																						475	+/-13
960																						480	+/-13
970																						485	+/-14
980																						490	+/-14
990																						495	+/-14
1000																						500	+/-14

NOTE:
CAUTION MUST BE TAKEN TO ENSURE THAT PASSENGER OR BAGGAGE/CARGO COMPARTMENT LOADING DOES NOT CAUSE THE AIRCRAFT MAXIMUM WEIGHT OR CENTER OF GRAVITY OR CENTER OF GRAVITY LIMITS TO BE EXCEEDED.

Figure 491. S-92—Cockpit and Cabin Weight and Moment Table.



USABLE FUEL WEIGHT AND MOMENT TABLE

FUEL SYSTEM - 2 TANKS								
CAPACITY = 760 GALLONS								
TOTAL WT (LB)	HORIZONTAL MOM/1000	LAT=+/-60.3 MOM/1000	TOTAL WT (LB)	HORIZONTAL MOM/1000	LAT=+/-60.3 MOM/1000	TOTAL WT (LB)	HORIZONTAL MOM/1000	LAT=+/-60.3 MOM/1000
100	36	+/-6	1900	685	+/-115	3600	1303	
200	73	+/-12	2000	722	+/-121	3700	1339	
300	109	+/-18	2100	758	+/-127	3800	1375	
400	144	+/-24	2200	794	+/-133	3900	1412	
500	180	+/-30	2300	831	+/-139	4000	1448	
600	215	+/-36	2400	867	+/-145	4100	1484	
700	251	+/-42	2500	903	+/-151	4200	1521	
800	287	+/-48	**2565		+/-155	4300	1557	
900	323	+/-54	2600	940		4400	1593	
1000	359	+/-60	2700	976		4500	1630	
1100	395	+/-66	2800	1012		4600	1666	
1200	431	+/-72	2900	1049		4700	1702	
1300	468	+/-78	3000	1085		4800	1739	
1400	504	+/-84	3100	1121		4900	1775	
1500	540	+/-90	3200	1158		5000	1812	
1600	577	+/-96	3300	1194		5100	1848	
1700	613	+/-103	3400	1230		*5130	1859	
1800	649	+/-109	3500	1267				

* THIS REPRESENTS THE APPROXIMATE MAXIMUM WEIGHT AND MOMENT / 1000 FOR FULL FUEL WITH JET-A AT STANDARD CONDITIONS (60 °F / 15 °C).

** THIS REPRESENTS THE APPROXIMATE MAXIMUM WEIGHT AND MOMENT / 1000 FOR FULL FUEL IN ONE SPONSON, LEFT OR RIGHT HAND SIDE

NOTE:

- THE TOTAL USABLE CAPACITY OF 380 U.S. GALLONS PER TANK IS BASED ON CALCULATION.
- SEE FIGURE 2-15 FOR A PLOT OF FUEL C.G. AT VARIOUS FUEL WEIGHTS

Figure 492. S-92—Usable Fuel Weight and Moment Table.



S-92 Lateral CG Limits

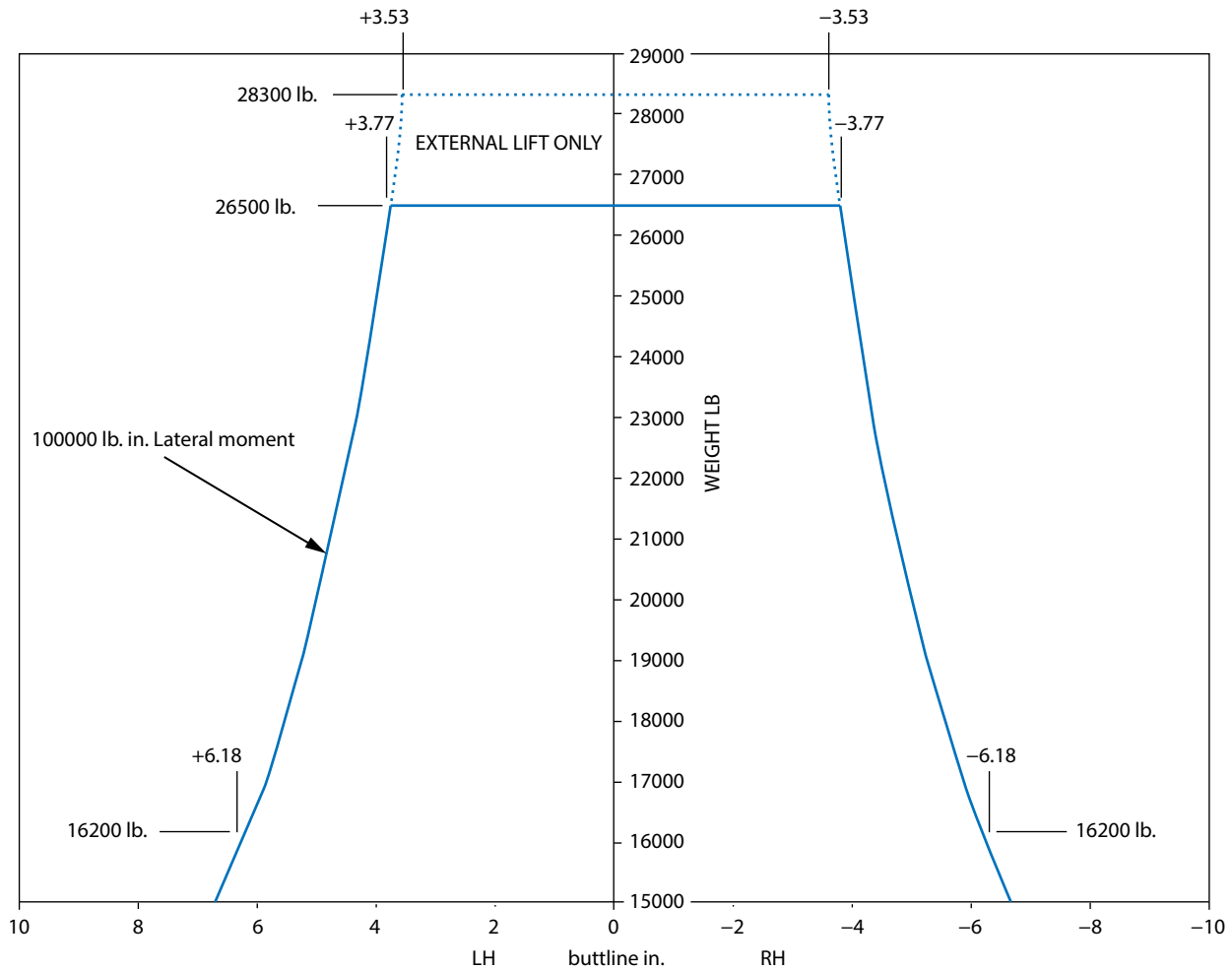


Figure 493. S-92—Lateral CG Limits.

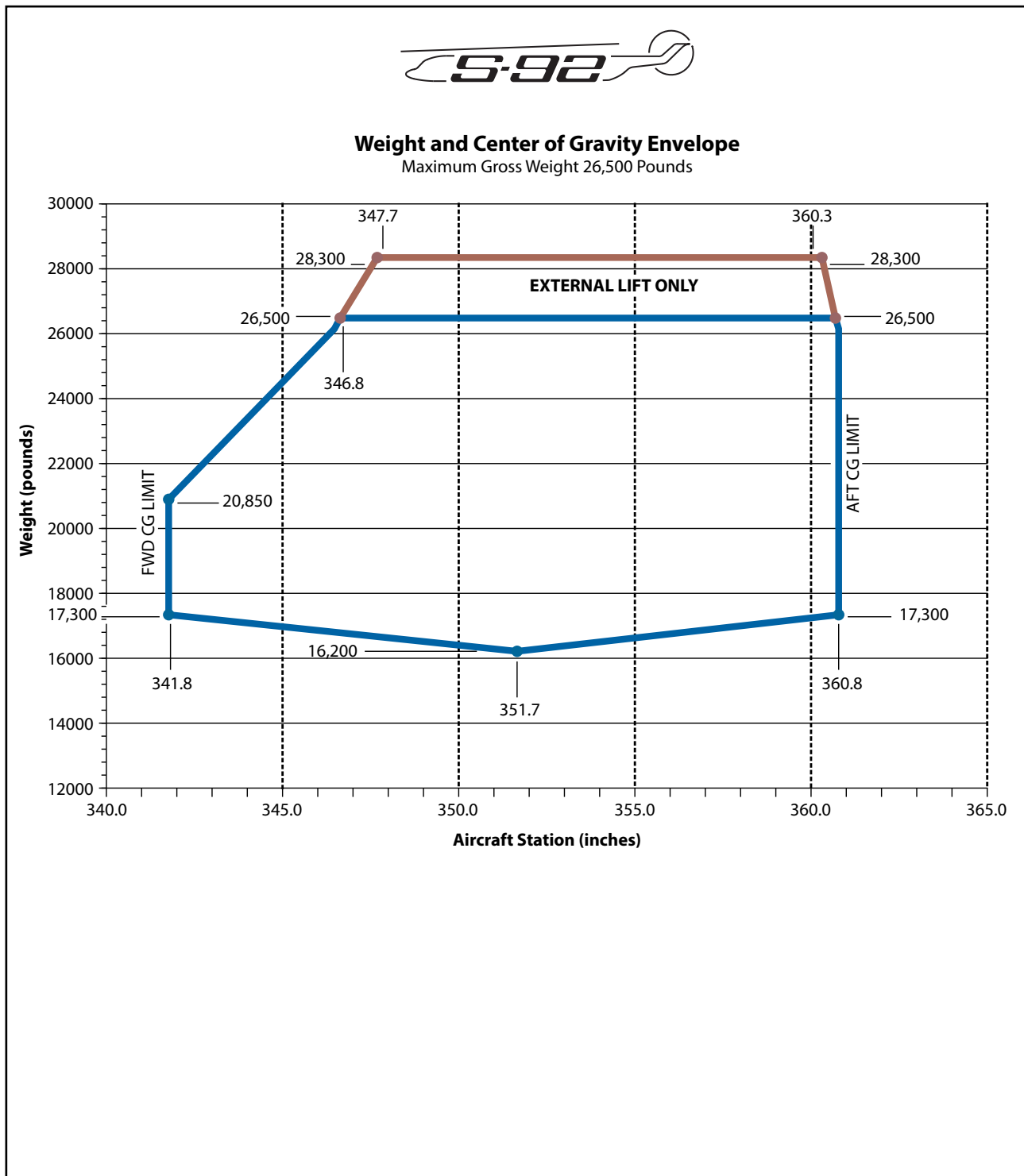


Figure 494. S-92—Weight and Center of Gravity Envelope.

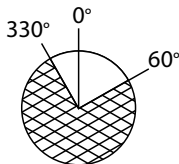


HOVER OUT OF GROUND EFFECT MAXIMUM GROSS WEIGHT

TAKEOFF POWER BLEED OFF

REDUCE GROSS WEIGHT DETERMINED FROM CHART BY AMOUNT SHOWN IN TABLE:

WIND DIRECTION
RELATIVE TO NOSE



FOR OTHER THAN CALM WIND CONDITIONS IF RELATIVE WIND IS IN THE HASHED AREA SHOWN TO THE LEFT, REDUCE MAXIMUM GROSS WEIGHT BY AMOUNT SHOWN IN THE TABLE TO THE RIGHT.

AMBIENT TEMPERATURE ~ °C	CROSSWIND OR TAILWIND	AIR CONDITIONER ON	ANTI ICE ON
-40	600	ON	425
-30	600	*	925
-20	600	*	1275
-10	600	*	1450
0	575	375	1400
10	575	350	1150
20	600	350	*
30	600	400	*
40	625	425	*
50	675	425	*

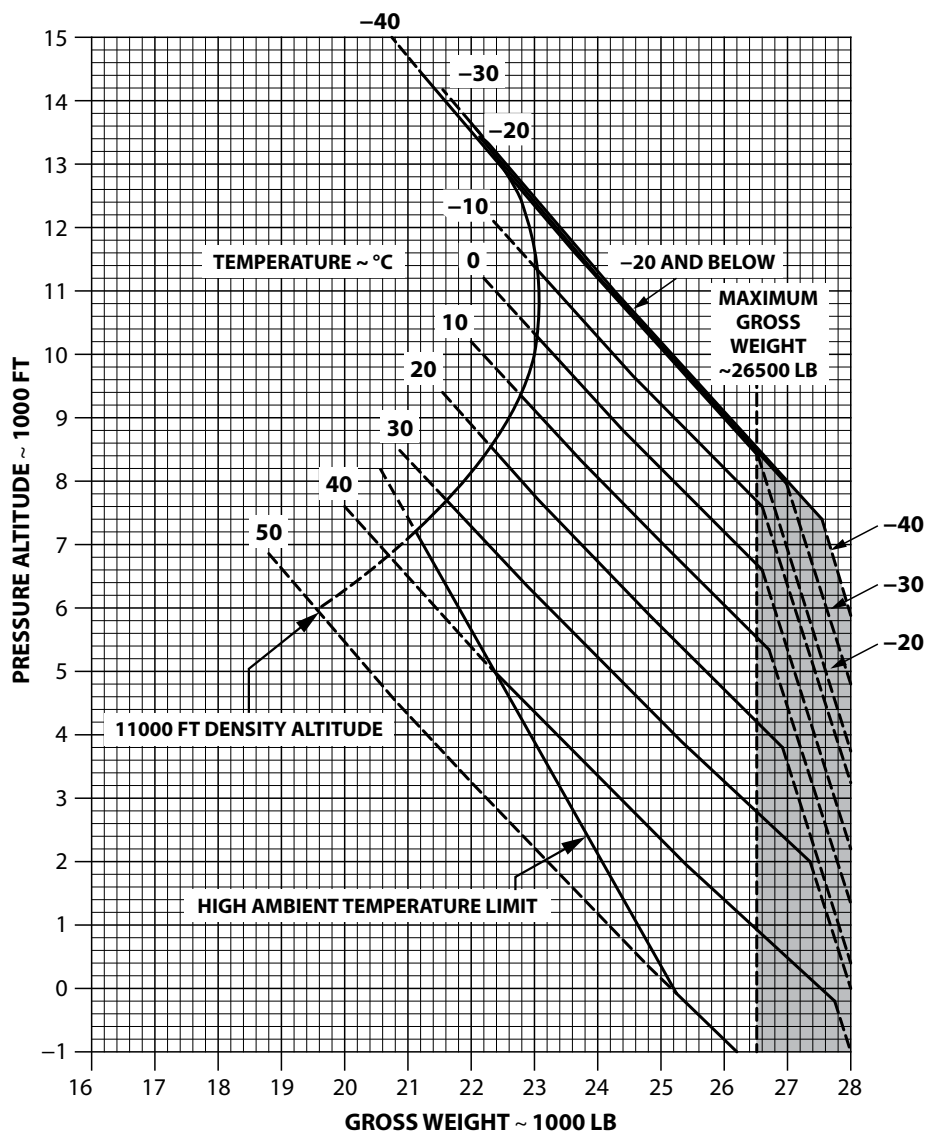


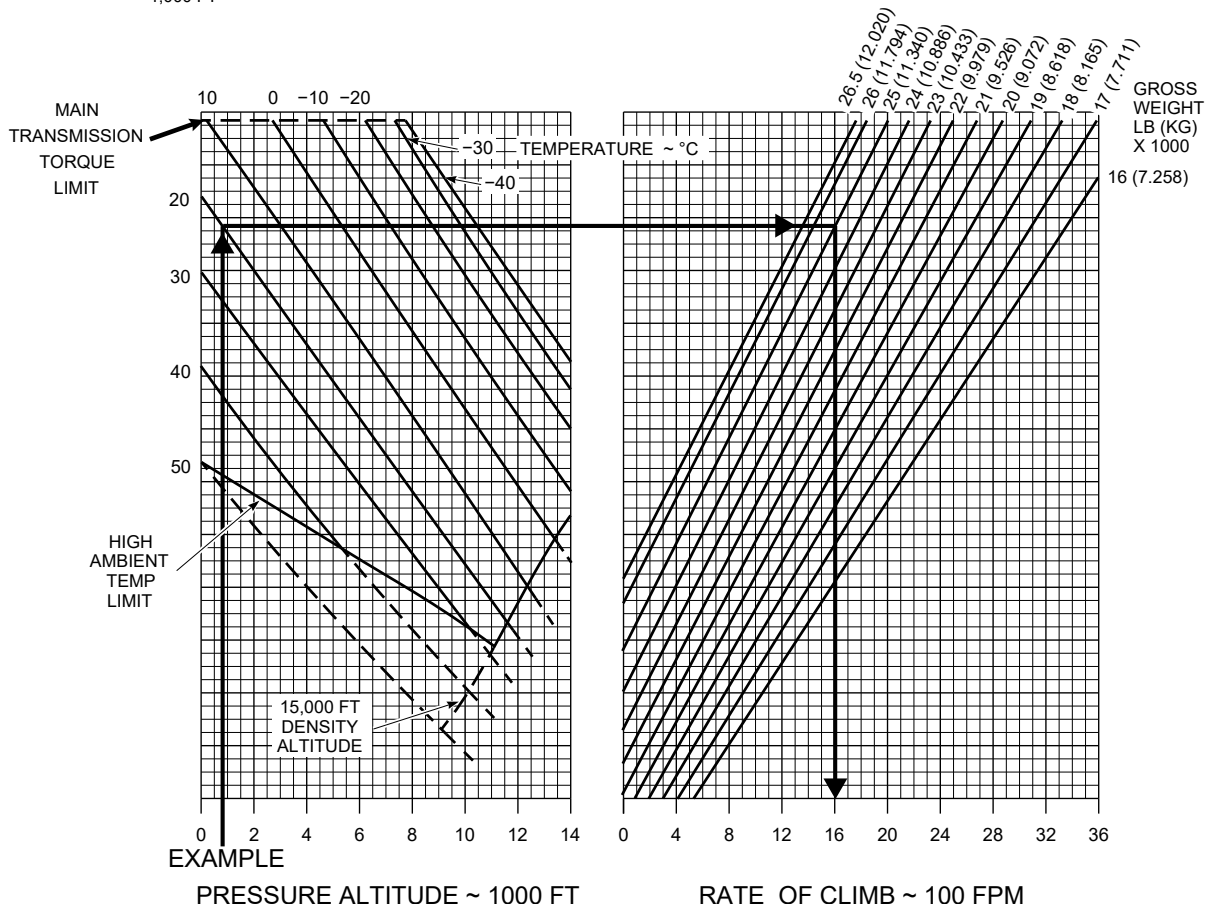
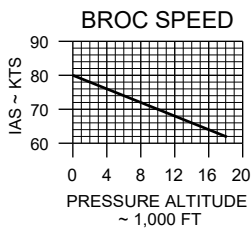
Figure 495. S-92—Hover Out of Ground Effect Maximum Gross Weight.



FORWARD CLIMB PERFORMANCE

DUAL ENGINE
BEST RATE OF CLIMB SPEED
GEAR UP

MAXIMUM CONTINUOUS POWER
105% Nr
< 14,000 FT HP



DASHED LINES ARE FOR INTERPOLATION ONLY

REDUCE RATE OF CLIMB DETERMINED FROM CHART BY AMOUNT SHOWN IN TABLE

GROSS WEIGHT-LB	REDUCTION ANTI-ICE ON	REDUCTION AIR CONDITIONER ON	REDUCTION BLEED AIR ON	REDUCTION BLEED AIR AND ANTI-ICE ON	REDUCTION LANDING GEAR DOWN	REDUCTION RESCUE HOIST	REDUCTION RIPS AND ANTI-ICE ON FOR ALTITUDES ≤4000FT	REDUCTION RIPS AND ANTI-ICE ON FOR ALTITUDES >4000FT
16,000	100	105	750	750	45	15	1225	1225
18,000	90	90	600	650	40	15	1100	1100
20,000	85	80	500	600	40	15	975	975
22,000	75	75	475	550	35	15	850	950
24,000	75	75	450	500	35	15	725	1125
26,000	70	70	450	450	35	15	600	1275
26,500	70	70	450	450	35	15	600	1300

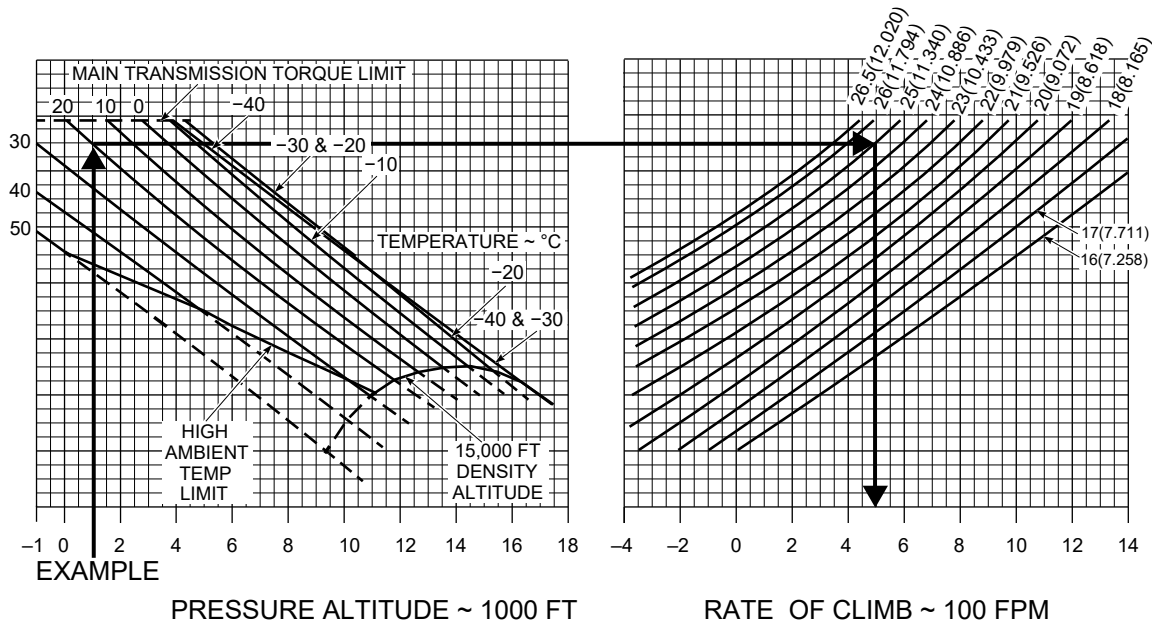
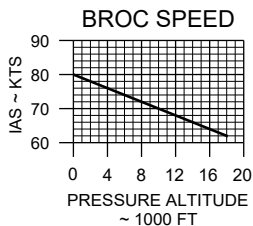
Figure 497. S-92—AEO Forward Climb Performance, Best Rate of Climb Speed.



FORWARD CLIMB PERFORMANCE

SINGLE CT7-8A ENGINE
BEST RATE OF CLIMB SPEED
GEAR UP

MAXIMUM CONTINUOUS POWER
100% Nr



DASHED LINES ARE FOR INTERPOLATION ONLY

REDUCE RATE OF CLIMB DETERMINED FROM CHART BY AMOUNT SHOWN IN TABLE

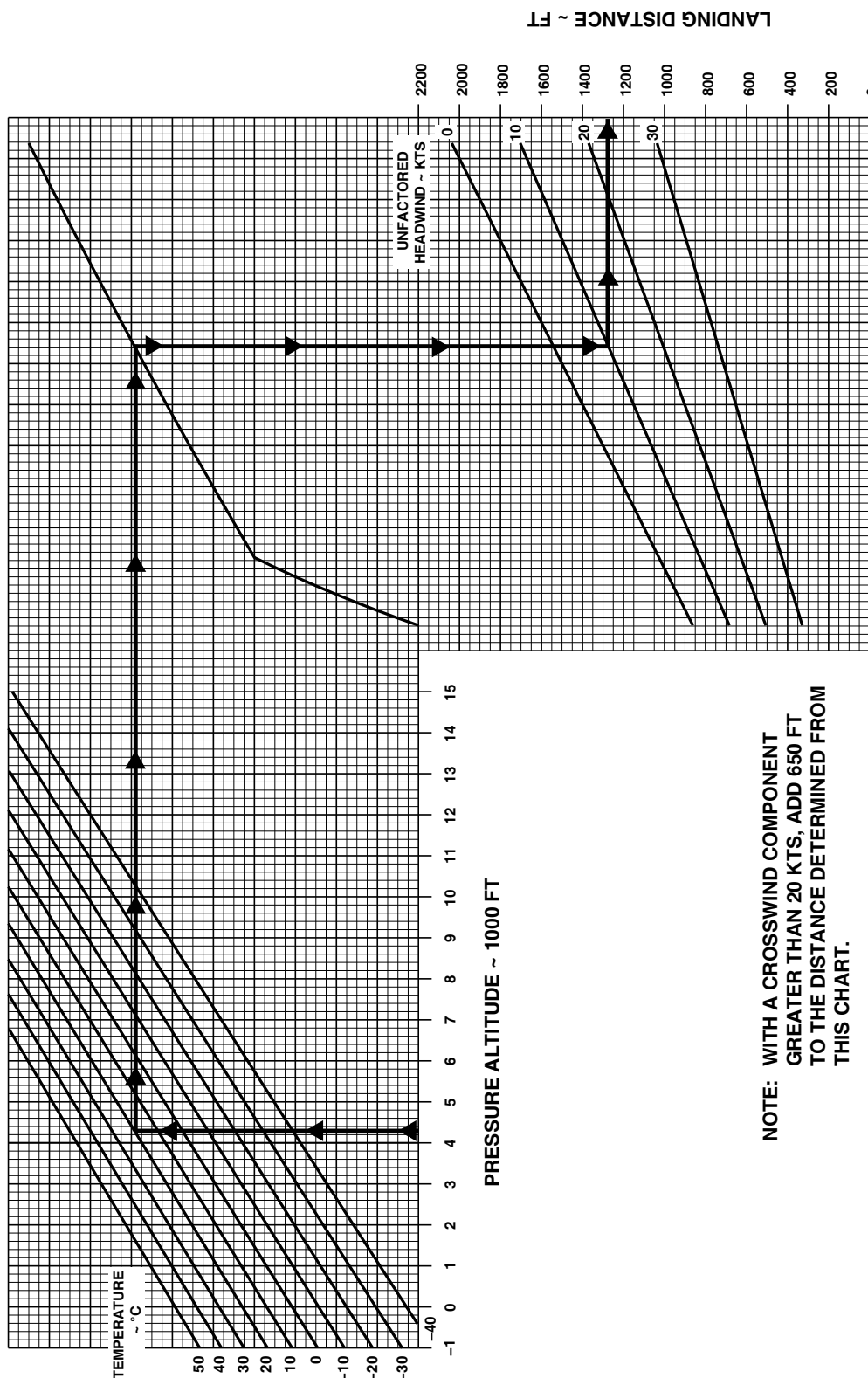
GROSS WEIGHT-LB	REDUCTION ANTI-ICE ON	REDUCTION AIR CONDITIONER ON	REDUCTION LANDING GEAR DOWN	REDUCTION RESCUE HOIST INSTALLED	REDUCTION RIPS ON (MANUAL HEAVY MODE) ANTI-ICE ON
16,000	110	105	50	15	650
18,000	100	95	45	15	590
20,000	95	90	45	15	530
22,000	90	85	40	15	490
24,000	90	85	40	15	460
26,000	85	80	35	15	440
26,500	85	80	35	15	440

Figure 498. S-92—OEI Forward Climb Performance, Best Rate of Climb Speed.



CATEGORY "A"
LANDING DISTANCE FROM 50FT HEIGHT TO STOP

VAPPR = 50 KIAS ROD = 600 FPM
 ANTI-ICE ON OR OFF BLEED AIR OFF
 ONE ENGINE INOPERATIVE HARD SURFACE RUNWAY
 35 KNOTS OF CROSSWIND COMPONENT OR LESS



NOTE: WITH A CROSSWIND COMPONENT GREATER THAN 20 KTS, ADD 650 FT TO THE DISTANCE DETERMINED FROM THIS CHART.

Figure 499. S-92—Category "A" Landing Distance From 50 ft. Height to Stop.

PRIVACY ACT STATEMENT: This statement is provided pursuant to the Privacy Act of 1974, 5 USC § 552a: The authority for collecting this information is contained in 49 U.S.C. §§ 40113, 44702, 44703, 44709, and 14 C.F.R. Part 6 - [Part 61, 63, 65, or 67. The principal purpose for which the information is intended to be used is to allow you to submit your flight plan. Submission of the data is voluntary. Failure to provide all required information may result in you not being able to submit your flight plan. The information collected on this form will be included in a Privacy Act System of Records known as DOT/FAA 847, titled "Aviation Records on Individuals" and will be subject to the routine uses published in the System of Records Notice (SORN) for DOT/FAA 847 (see www.dot.gov/privacy/privacyactnotices).

Paperwork Reduction Act Statement: A federal agency may not conduct or sponsor, and a person is not required to respond to, nor shall a person be subject to a penalty for failure to comply with a collection of information subject to the requirements of the Paperwork Reduction Act unless that collection of information displays a currently valid OMB Control Number. The OMB Control Number for this information collection is 2120-0026. Public reporting for this collection of information is estimated to be approximately 2.5 minutes per response, including the time for reviewing instructions, searching existing data sources, gathering and maintaining the data needed, completing and reviewing the collection of information. All responses to this collection of information are required to obtain or retain a benefit per 14 CFR Part 91. Send comments regarding this burden estimate or any other aspect of this collection of information, including suggestions for reducing this burden to the FAA at: 800 Independence Ave. SW, Washington, DC 20591, Attn: Information Collection Clearance Officer, ASP-110.

Pre-Flight Pilot Checklist

Approved OMB No. 2120-0026
Exp. 7/31/2020


Aircraft Identification		Time of Briefing			
Weather <i>(Destination)</i> <i>(Alternate)</i>	<input type="checkbox"/> Present	Remarks	Report Weather Conditions Aloft		
	<input type="checkbox"/> Forecast		<i>Report immediately weather conditions encountered---particularly cloud tops, upper cloud layers, thunderstorms, ice, turbulence, winds and temperature</i>		
			Position	Altitude	Time
Weather <i>(En Route)</i>	<input type="checkbox"/> Present				
	<input type="checkbox"/> Forecast				
	<input type="checkbox"/> Pireps				
Winds Aloft	Best Crzg. Alt.				
Nav. Aid & Comm. Status.	<input type="checkbox"/> Destination				
	<input type="checkbox"/> En Route				
Airport Conditions	<input type="checkbox"/> Destination				
	<input type="checkbox"/> Alternate				
ADIZ	<input type="checkbox"/> Airspace Restrictions				

Civil Aircraft Pilots

FAR Part 91 states that each person operating a civil aircraft of U S. registry over the high seas shall comply with Annex 2 to the Convention of International Civil Aviation, International Standards - Rules of the Air. Annex 2 requires the submission of a flight plan containing items 1-1 9 prior to operating any flight across international waters. 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).

International briefing information may not be current or complete. Data should be secured, at the first opportunity, from the country in whose airspace the flight will be conducted.

Figure 500. FAA International Flight Plan Form - Pre-Flight Pilot Checklist.

 U.S. Department of Transportation Federal Aviation Administration		International Flight Plan	
PRIORITY <=FF	ADDRESSEE(S) _____ _____ _____		
FILING TIME _____	ORIGINATOR _____		<=
SPECIFIC IDENTIFICATION OF ADDRESSEE(S) AND / OR ORIGINATOR _____			
3 MESSAGE TYPE <=(FPL	7 AIRCRAFT IDENTIFICATION _____	8 FLIGHT RULES _____	TYPE OF FLIGHT _____ <=
9 NUMBER _____	TYPE OF AIRCRAFT _____	WAKE TURBULENCE CAT. / _____	10 EQUIPMENT _____ / _____ <=
13 DEPARTURE AERODROME _____		TIME _____	<=
15 CRUISING SPEED _____	LEVEL _____	ROUTE _____	
16 DESTINATION AERODROME _____		TOTAL EET HR MIN _____	<=
18 OTHER INFORMATION _____		ALTN AERODROME _____	2ND ALTN AERODROME _____ <=
<=			
SUPPLEMENTARY INFORMATION (NOT TO BE TRANSMITTED IN FPL MESSAGES)			
19 ENDURANCE HR MIN E/ _____	PERSONS ON BOARD P/ _____	EMERGENCY RADIO UHF VHF ELT R/ <input type="checkbox"/> U <input type="checkbox"/> V <input type="checkbox"/> E	
SURVIVAL EQUIPMENT POLAR DESERT MARITIME JUNGLE <input type="checkbox"/> / <input type="checkbox"/> P <input type="checkbox"/> D <input type="checkbox"/> M <input type="checkbox"/> J		JACKETS LIGHT FLUORES UHF VHF <input type="checkbox"/> / <input type="checkbox"/> L <input type="checkbox"/> F <input type="checkbox"/> U <input type="checkbox"/> V	
DINGHIES NUMBER CAPACITY COVER COLOR D/ _____ <input type="checkbox"/> C _____ <=		AIRCRAFT COLOR AND MARKINGS A/ _____	
REMARKS N/ _____ <=		PILOT-IN-COMMAND C/ _____) <=	
FILED BY _____	ACCEPTED BY _____	ADDITIONAL INFORMATION _____	

FAA Form 7233-4 (7/15)


Figure 500A. FAA International Flight Plan Form.

Appendix 2

PRIVACY ACT STATEMENT: This statement is provided pursuant to the Privacy Act of 1974, 5 USC § 552a: The authority for collecting this information is contained in 49 U.S.C. §§ 40113, 44702, 44703, 44709, and 14 C.F.R. Part 6 - [Part 61, 63, 65, or 67]. The principal purpose for which the information is intended to be used is to allow you to submit your flight plan. Submission of the data is voluntary. Failure to provide all required information may result in you not being able to submit your flight plan. The information collected on this form will be included in a Privacy Act System of Records known as DOT/FAA 847, titled "Aviation Records on Individuals" and will be subject to the routine uses published in the System of Records Notice (SORN) for DOT/FAA 847 (see www.dot.gov/privacy/privacyactnotices).

Paperwork Reduction Act Statement: A federal agency may not conduct or sponsor, and a person is not required to respond to, nor shall a person be subject to a penalty for failure to comply with a collection of information subject to the requirements of the Paperwork Reduction Act unless that collection of information displays a current valid OMB Control Number. The OMB Control Number for this information collection is 2120-0026. Public reporting for this collection of information is estimated to be approximately 2.5 minutes per response, including the time for reviewing instructions, completing and reviewing the collection of information. All responses to this collection of information are mandatory per 14 CFR Part 91. Comments concerning the accuracy of this burden and suggestions for reducing the burden should be directed to the FAA at: 800 Independence Ave. SW, Washington, DC 20591, Attn: Information Collection Clearance Officer, ASP-110.

Form Approved: OMB No. 2120-0026 Exp. 7/31/2020

 FLIGHT PLAN U.S. DEPARTMENT OF TRANSPORTATION FEDERAL AVIATION ADMINISTRATION		(FAA USE ONLY) <input type="checkbox"/> PILOT BRIEFING <input type="checkbox"/> VNR			TIME STARTED		SPECIALIST INITIALS	
		<input type="checkbox"/> STOPOVER						
1. TYPE	2. AIRCRAFT IDENTIFICATION		3. AIRCRAFT TYPE / SPECIAL EQUIPMENT	4. TRUE AIRSPEED	5. DEPARTURE POINT		6. DEPARTURE TIME	
VFR							PROPOSED (Z)	ACTUAL (Z)
IFR								
DVFR				KTS				7. CRUISING ALTITUDE
8. ROUTE OF FLIGHT								
9. DESTINATION (Name of airport and city)			10. EST. TIME ENROUTE		11. REMARKS			
			HOURS	MINUTES				
12. FUEL ON BOARD		13. ALTERNATE AIRPORT(S)		14. PILOT'S NAME, ADDRESS & TELEPHONE NUMBER & AIRCRAFT HOME BASE			15. NUMBER ABOARD	
HOURS	MINUTES							
				17. DESTINATION CONTACT/TELEPHONE (OPTIONAL)				
16. COLOR OF AIRCRAFT			CIVIL AIRCRAFT PILOTS. 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)
Electronic Version (Adobe)

CLOSE VFR FLIGHT PLAN WITH _____ FSS ON ARRIVAL

MILITARY STOPOVER (FAA USE ONLY)							
TYPE	AIRCRAFT IDENTIFICATION		AIRCRAFT TYPE/SPECIAL EQUIPMENT		REMARKS		
<input type="checkbox"/> IFR							
<input type="checkbox"/> VFR							
DEPARTURE POINT		DESTINATION		ETA			
TAS	DEP. PT	ETD	ALTITUDE	ROUTE OF FLIGHT	DESTINATION	ETE	REMARKS
KTS							
KTS							
KTS							
KTS							
REMARKS							INITIALS

FAA Form 7233-1 (8-82)

Electronic Version (Adobe)

Figure 501. FAA Domestic Flight Plan Form.

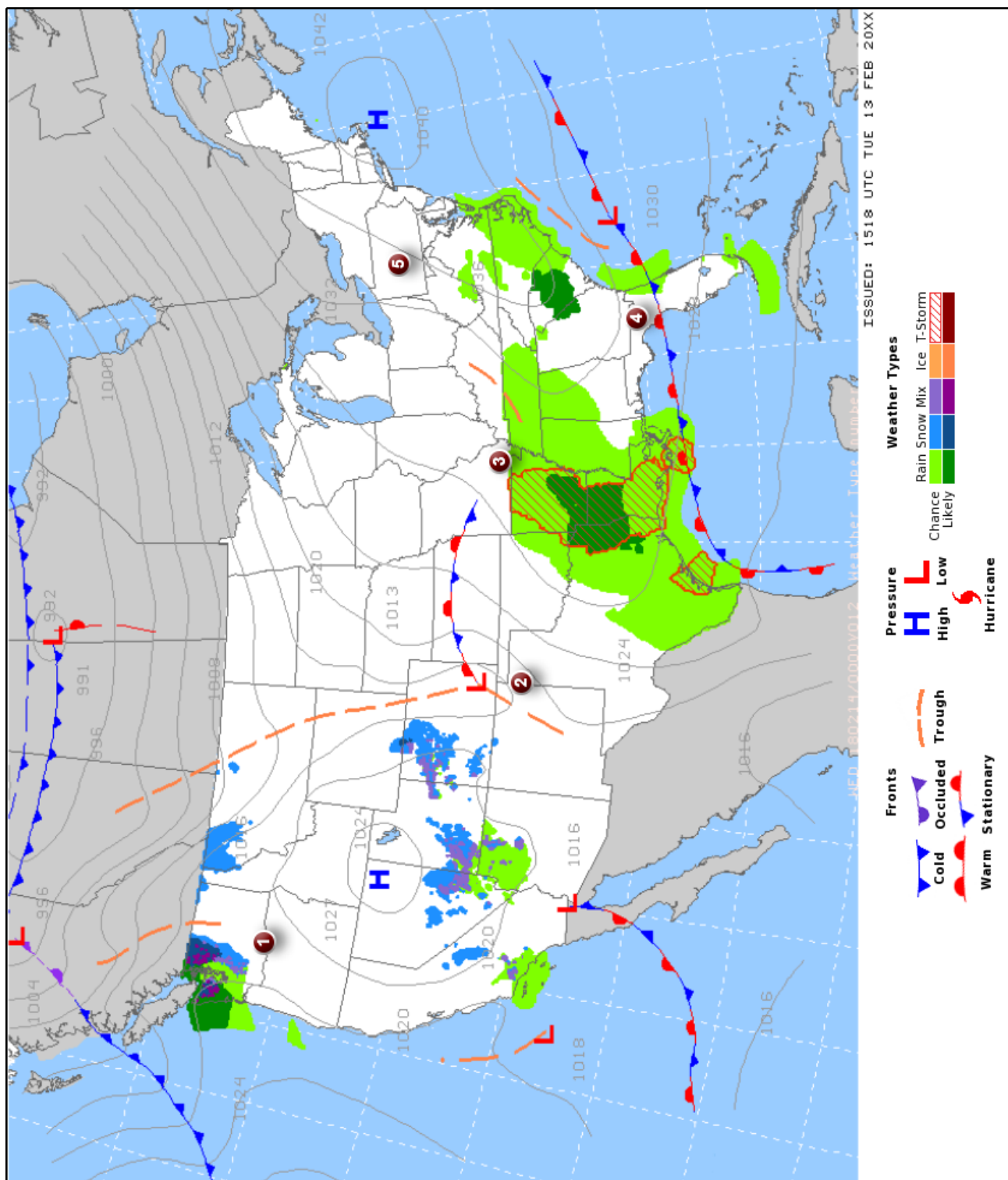


Figure 502. Weather Prediction Center (WPC) Surface Prog Chart.

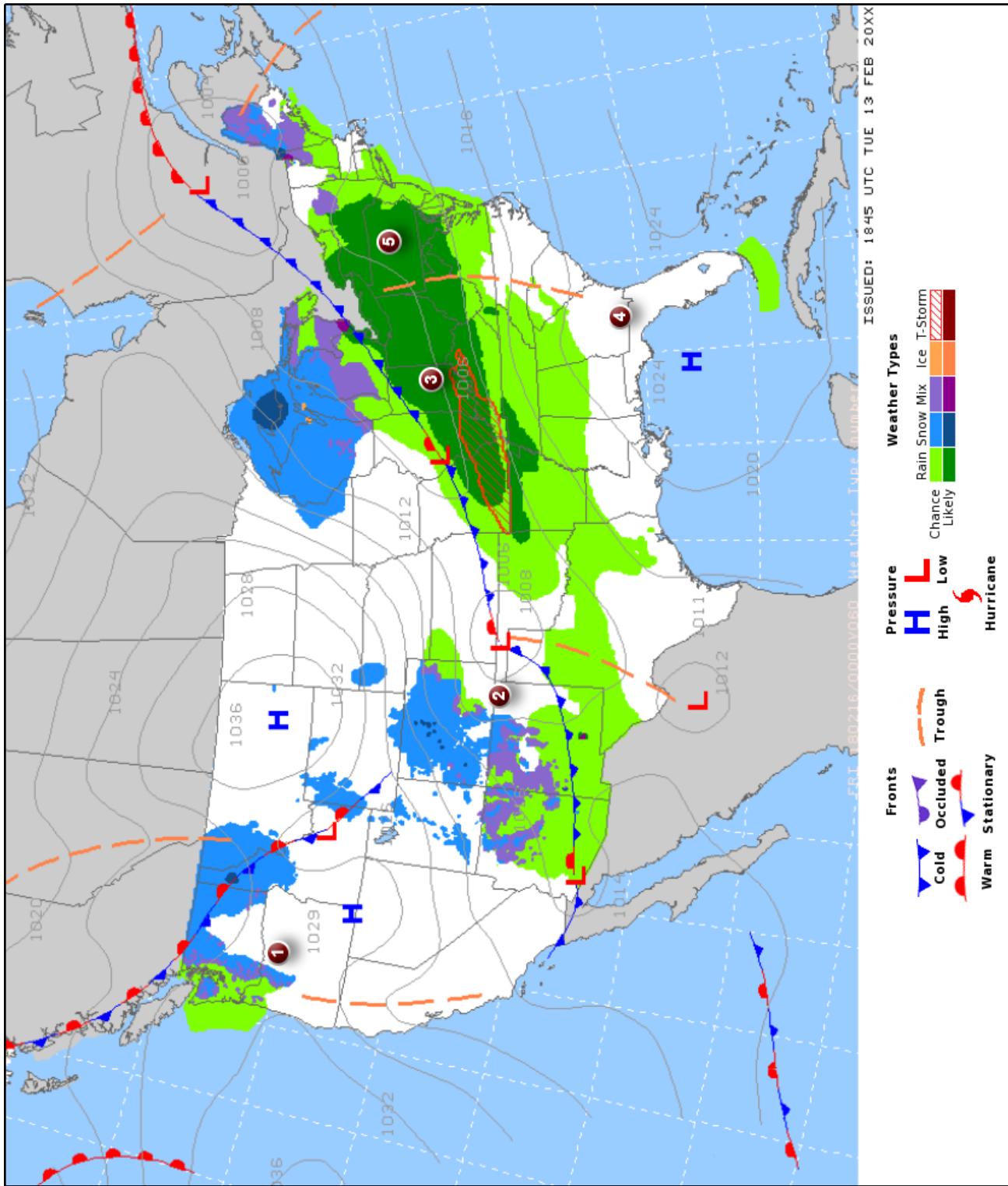


Figure 503. Weather Prediction Center (WPC) Surface Prog Chart.