

# Civil Aviation Organization Instrument Rating Written Exam

Jul 2017



# ***IN THE NAME OF GOD***

This book shares new upcoming issues and questions regarding nowadays ongoing aviation knowledge.

By developing aviation industry, continuously control for updating this question bank is highly in need of attention.

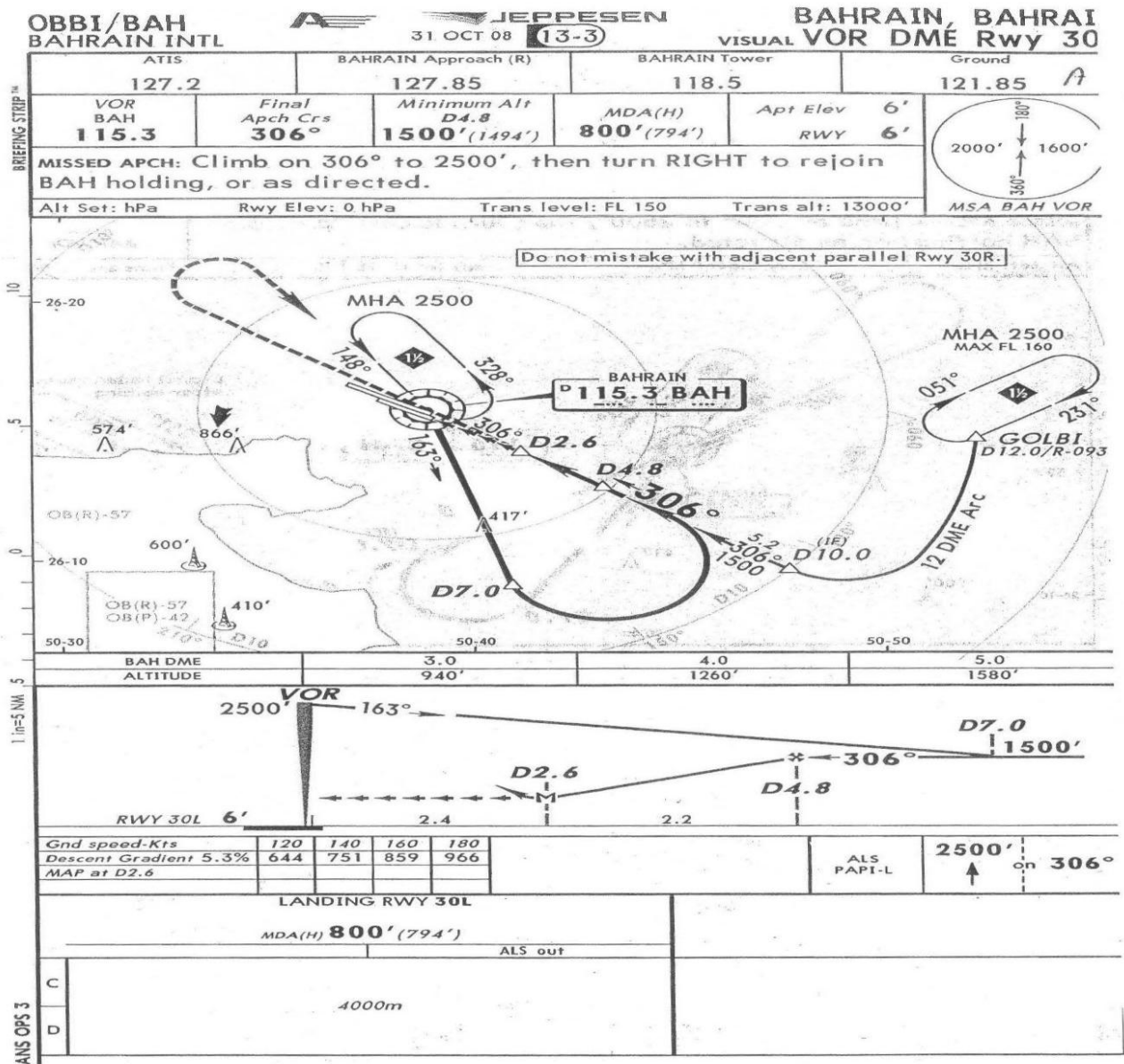
Please do not hesitate to contact us, if there is any suggestion for implementing in 3<sup>rd</sup> edition.

Jul 2017

# Table of Content

Subject	Qs	Page
AERONAUTICAL INFORMATION PUBLICATION	100	1
AIRCRAFT PERFORMANCE	220	19
AIRWAY MANUAL	500	60
ANNEX 2	200	146
ANNEX 3	135	183
ANNEX 6 (Part I)	170	208
ANNEX 10	125	240
ANNEX 11	30	264
ANNEX 14	50	272
DOCUMENT 4444	120	283
FLIGHT PLANNING	100	307
HUMAN PERFORMANCE	300	334
INSTRUMENTATION	200	391
METEOROLOGY	495	429
RADIO NAVIGATION	220	516
FIGURES		559
REFERENCES		603

# FIGURES





OIZC

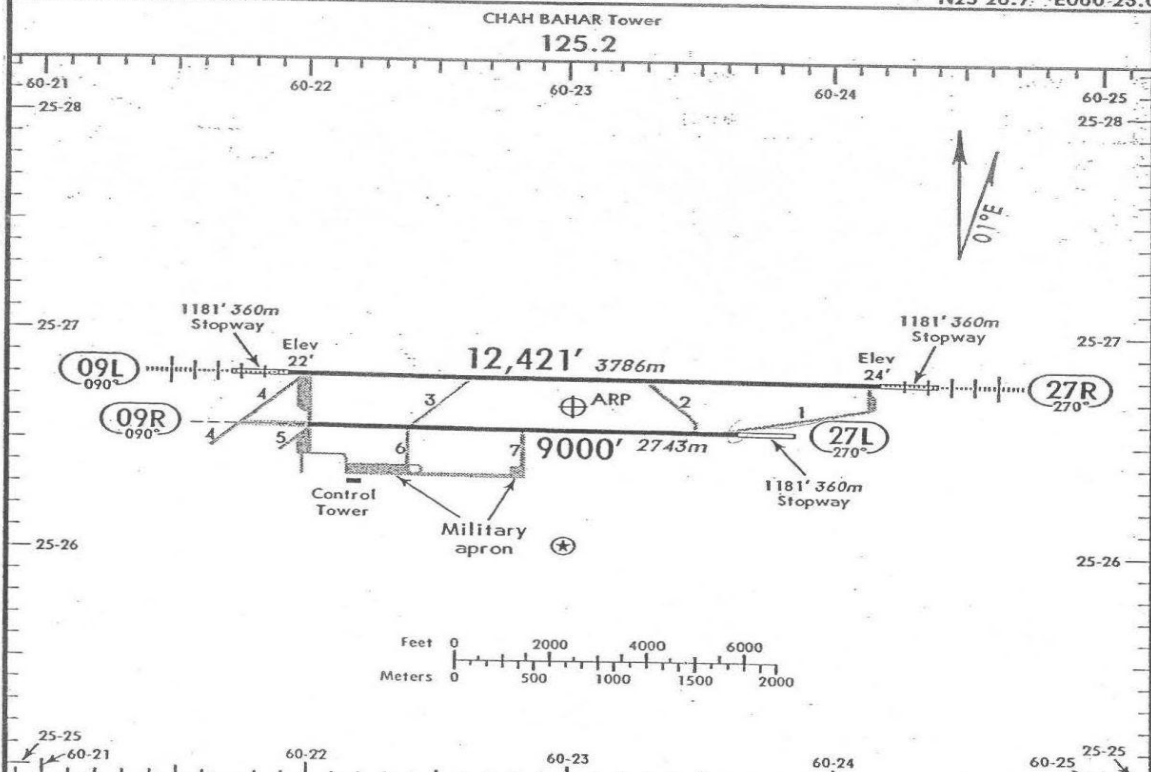
Apt. Elev 24'  
266.2°/2.0 from CBH-116.9

REPRESN

31 MAR 00: (13-1)

CHAH BAHAR, IRAN

KONARAK AB  
N25 26.7' E060 23.0



ADDITIONAL RUNWAY INFORMATION

RWY		USABLE LENGTHS			WIDTH
		LANDING BEYOND		TAKE-OFF	
		Threshold	Glide Slope		
09L	HIRL HIALS				150' 46m
27R					
09R	RL ALS (configuration unknown)				150' 46m
27L					

TAKE-OFF  
AIR CARRIER  
All Rwys

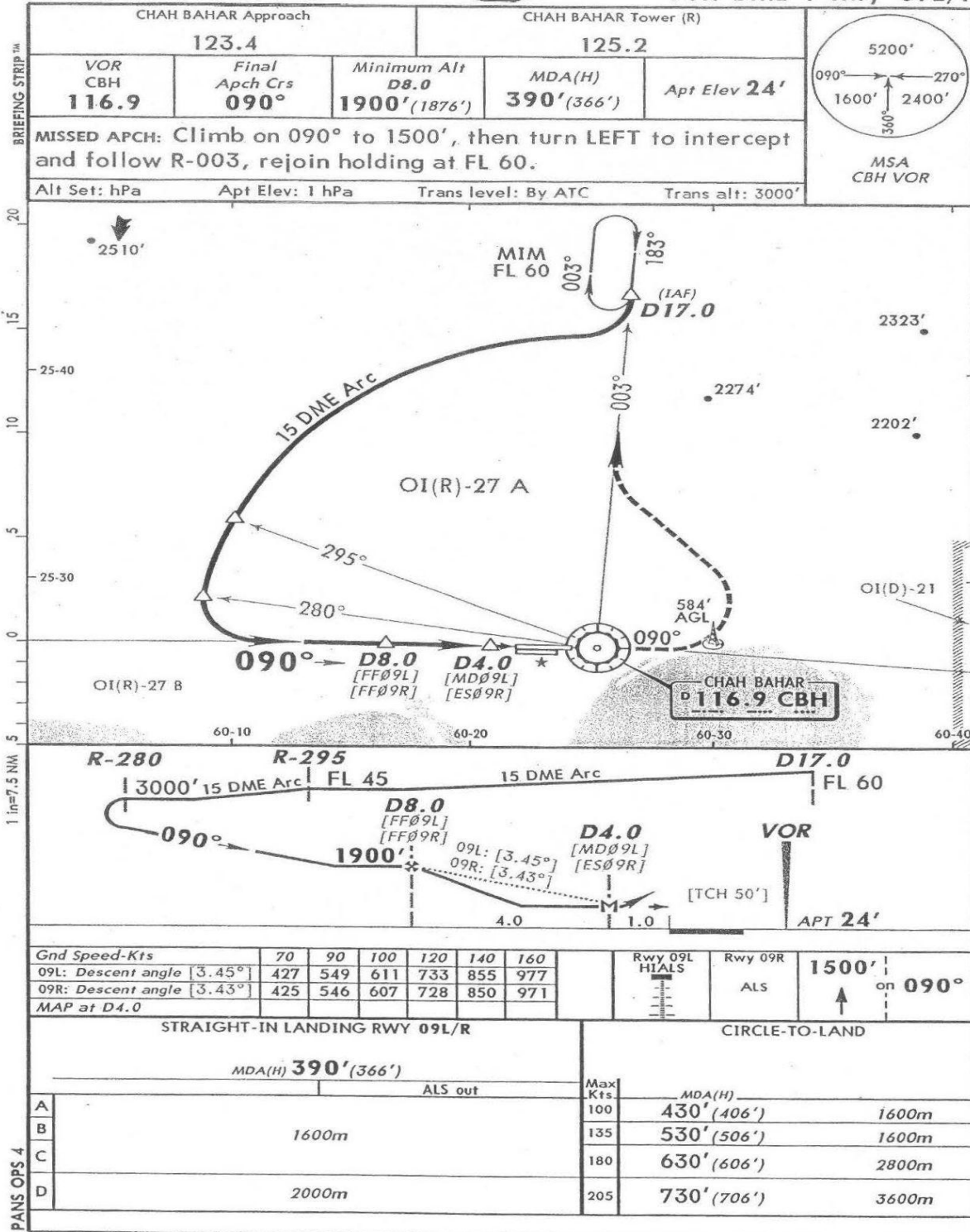
A  
B  
C

400m

OIZC/ZBR  
KONARAK

JEPPESSEN  
23 JAN 09 (13-1)

CHAH BAHAR, IRAN  
VOR DME-1 Rwy 09L/R



CHANGES: Communications. Descent angle.

© JEPPESSEN, 1998, 2009. ALL RIGHTS RESERVED.

**OMDB/DXB**  
**DUBAI INTL**

**JEPPESEN**  
10 APR 09 **(11-1)**

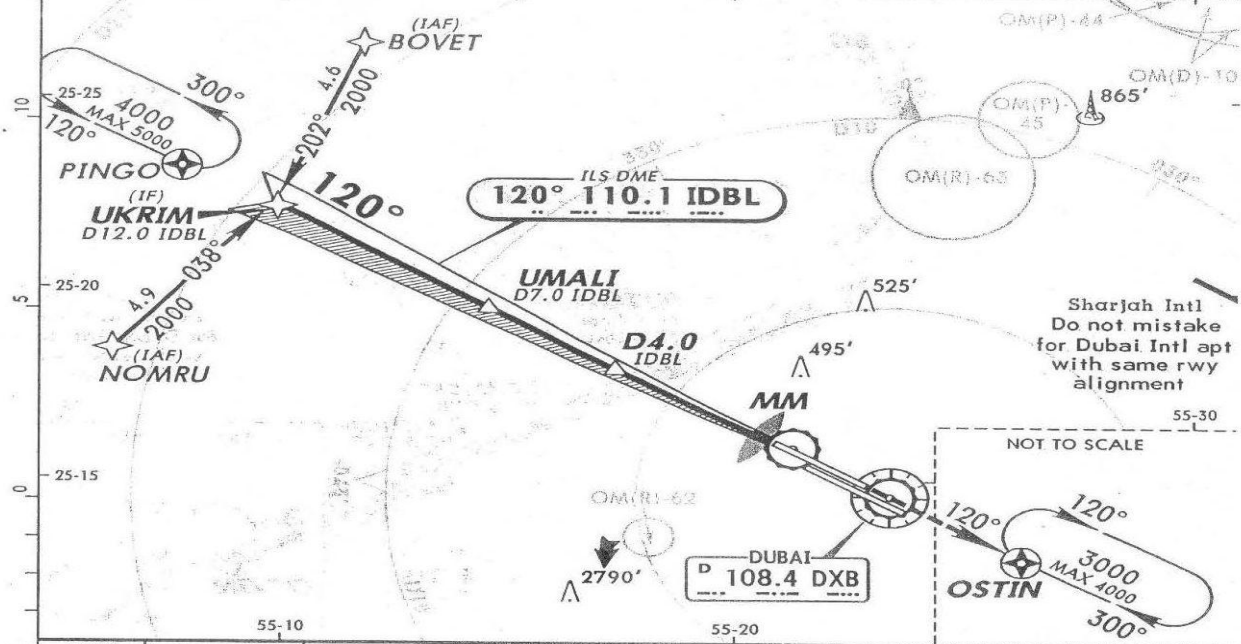
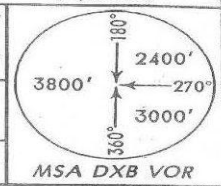
**DUBAI, UAE**  
**ILS Rwy 12L**

D-ATIS <b>131.7</b>	DUBAI Arrivals (APP/R) <b>124.9</b>	DUBAI Director (APP/R) <b>127.9</b>	DUBAI Tower <b>118.75 119.55</b>	Ground <b>118.35</b>
LOC IDBL <b>110.1</b>	Final Apch Crs <b>120°</b>	GS <b>D4.0 IDBL</b> <b>1287' (1277')</b>	CAT IIIA ILS <b>DH 50'</b>	CAT I & II ILS Refer to Minimums
Apt Elev 59'				RWY 10'

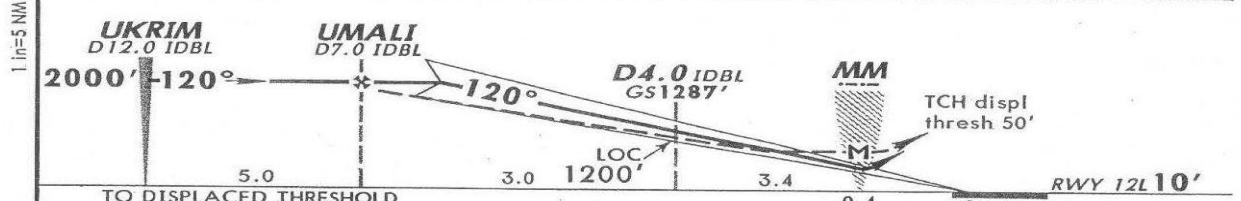
**MISSED APCH: Climb to 3000' direct to OSTIN and hold.**

Alt Set: MB Rwy Elev: 0 MB Trans level: FL 150 Trans alt: 13000'

1. RNAV/RNP5 required. 2. ILS DME reads zero at TDZ.



LOC (GS out)	IDBL DME ALTITUDE	6.0 1860'	5.0 1550'	4.0 1240'	3.0 930'	2.0 620'	1.0 310'
--------------	-------------------	-----------	-----------	-----------	----------	----------	----------



Gnd speed-Kts	120	140	160	180
ILS GS	3.00°	647	755	862
LOC Descent Gradient	4.7%	571	666	762
MAP at MM				

STRAIGHT-IN LANDING RWY 12L					LOC (GS out)		CIRCLE-TO-LANE	
CAT IIIA DH 50'	CAT II RA 100' DA(H) 110' (100')	CAT I DA(H) 210' (200')		MDA(H) 590' (580')				
		FULL	TDZ or CL out	ALS out	MM out	ALS out		
C	RVR 200m	RVR 350m	RVR 550m VIS 800m	RVR 720m VIS 800m	1200m	RVR 1500m VIS 1600m	2400m	NOT AUTHORIZED
D						2000m	2800m	

ANS OPS 3 CAT III: Min RVR 50m



**OMDB/DXB**  
**DUBAI INTL**



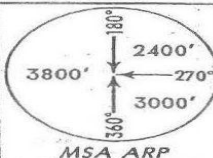
**JEPPESSEN**

6 JUN 08 **(12:1)**

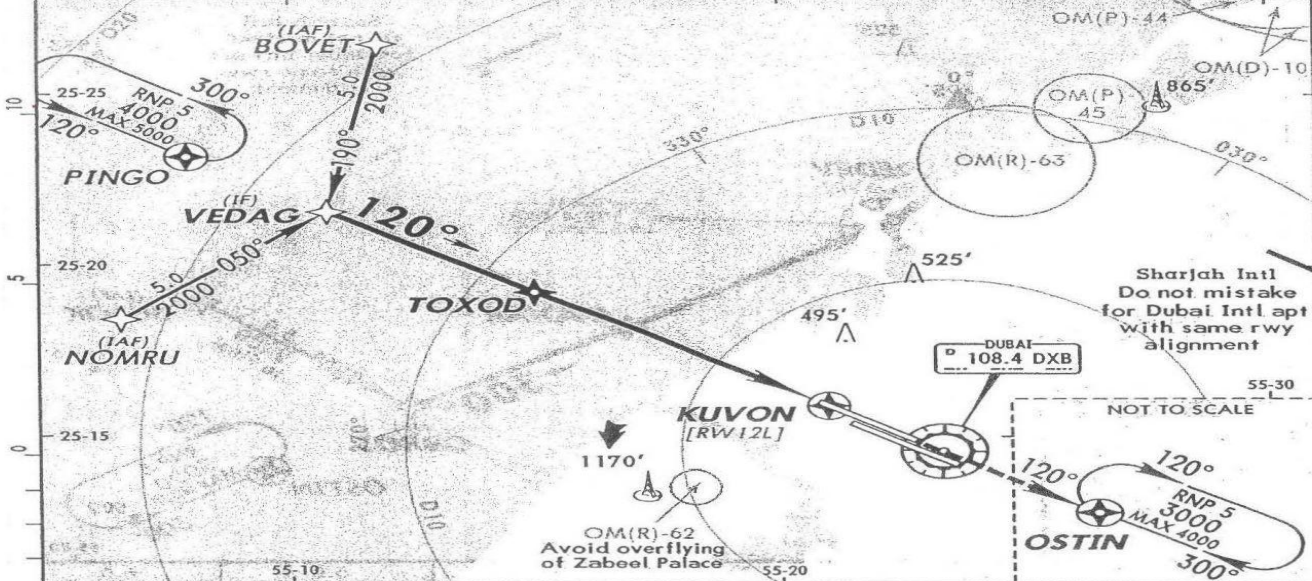
**DUBAI, UAE**  
**RNAV (GNSS) Rwy 12L**

D-ATIS <b>131.7</b>	DUBAI Arrivals (APP/R) <b>124.9</b>	DUBAI Director (APP/R) <b>127.9</b>	DUBAI Tower <b>118.75</b>	Ground <b>118.35</b>
RNAV	Final Apch Crs <b>120°</b>	Minimum Alt <b>TOXOD</b> <b>2000' (1990')</b>	MDA(H) <b>590' (580')</b>	Apt Elev <b>62'</b> RWY <b>10'</b>

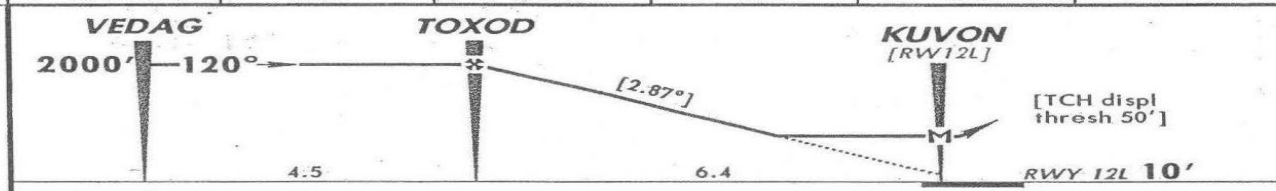
**MISSED APCH: Climb to 3000' direct to OSTIN and hold.**



Alt Set: MB Rwy Elev: 0 MB Trans level: FL 150 Trans alt: 13000'



DIST to KUVON	6.0	5.0	4.0	3.0	2.0
ALTITUDE	1880'	1580'	1280'	970'	670'



Gnd speed-Kts	120	140	160	180	HTALS-II REIL PAPI 3000' -D- OSTIN
Descent angle	[2.87°]	609	711	812	

MAP at KUVON  
STRAIGHT-IN LANDING RWY 12L  
CIRCLE-TO-LAND  
MDA(H) **590' (580')**  
ALS out

C	RVR 1500m VIS 1600m	2400m	NOT AUTHORIZED
D	2000m	2800m	

BRIEFING STRIP™

1 in = 5 NM

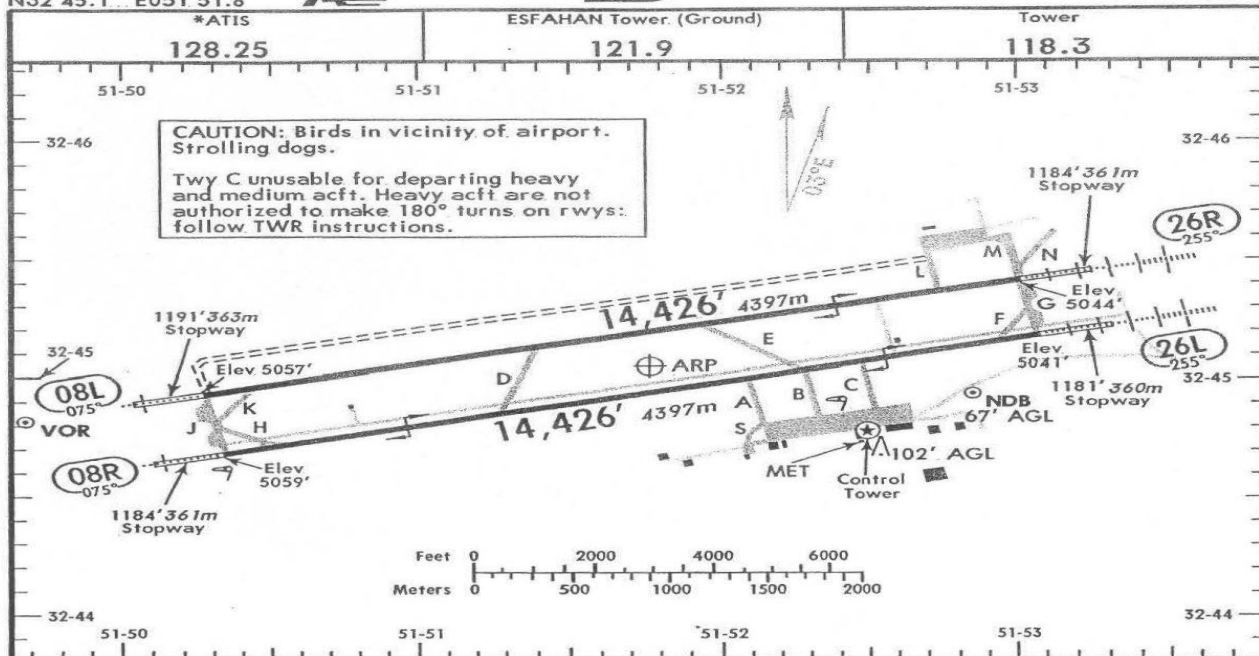
INS OPS 3

OIFM/IFN  
Apt Elev 5059'  
N32 45.1 E051 51.8



JEPPESSEN  
7 DEC 07 (11-1)

ESFAHAN, IRAN  
SHAHID BEHESHTI INTL



ADDITIONAL RUNWAY INFORMATION

RWY		USABLE LENGTHS		TAKE-OFF	WIDTH
		Threshold	Glide Slope		
08L	HIRL(60m) ALS HST-1 PAPI-L(angle 3.00°)				148'
26R	HIRL(60m) HIALS HST PAPI-L(angle 2.65°)		13,211' 4027m		45m
08R	HIRL(60m) ALS PAPI-L(angle 3.00°)				148'
26L	HIRL(60m) HIALS PAPI-L(angle 3.02°)				45m

① Rwy 08R/26L primarily used as taxiway.

TAKE-OFF AIR CARRIER (JAA) All Rwys	
C	RL & RCLM
D	400m
	NIL (DAY only)
	500m

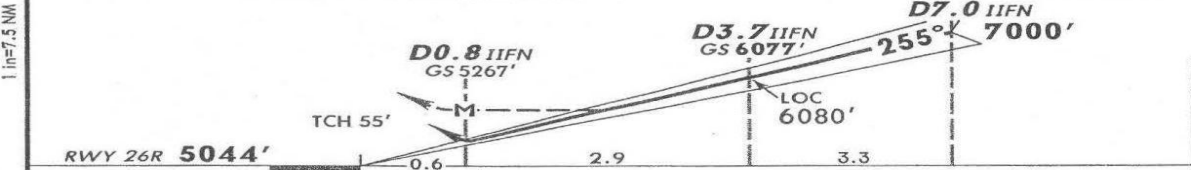
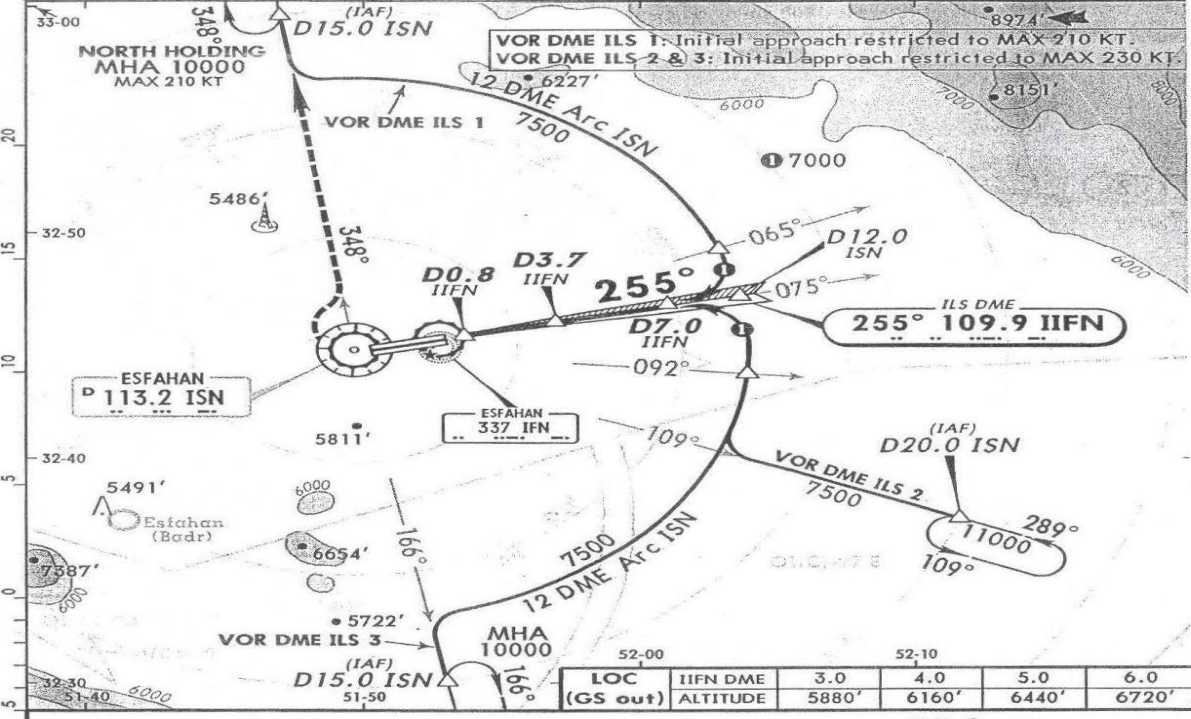
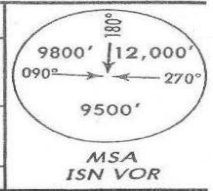
CHANGES: None.

© JEPPESSEN SANDERSON, INC., 1998, 2007. ALL RIGHTS RESERVED.



**OIFM/IFN** **JEPPESEN** **ESFAHAN, IRAI**  
**SHAHID BEHESHTI INTL** 7 DEC 07 **(11-1) VOR DME ILS 1, 2 & 3 Rwy 26F**

*ATIS <b>128.25</b>	ESFAHAN Approach <b>124.6</b>	ESFAHAN Tower <b>118.3</b>	Ground <b>121.9</b>
LOC IIFN <b>109.9</b>	Final Apch Crs <b>255°</b>	GS <b>D3.7 IIFN</b> <b>6077' (1033')</b>	ILS DA(H) <b>5277' (233')</b>
MISSED APCH: Climb STRAIGHT AHEAD to VOR, then turn RIGHT to intercept R-348 and rejoin NORTH holding at 10000'.			Apt Elev 5059' <b>RWY 5044'</b>
Alt Set: hPa	Rwy Elev: 172 hPa	Trans level: By ATC	Trans alt: 13000'



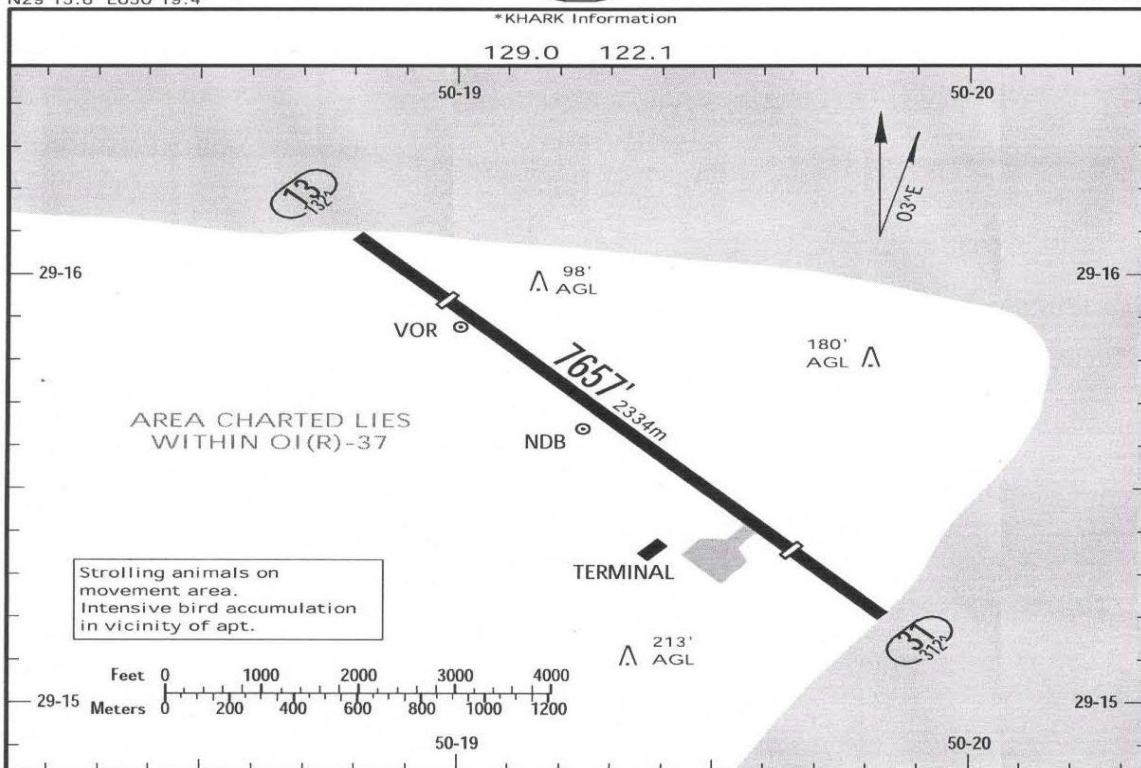
Gnd speed-Kts	120	140	160	180	HIALS	ISN 113.2	10000'	ISN on 113.2
ILS GS 2.63° or LOC Descent Gradient 4.6%	568	663	758	852				
MAP at D0.8 IIFN								
STRAIGHT-IN LANDING RWY 26R ILS					CIRCLE-TO-LAND			
LOC (GS out)					Not authorized South of airport			
DA(H) 5277' (233')		MDA(H) 5710' (666')						
FULL		ALS out			Max Kts			
					MDA(H)			
C	800m	1200m	2800m		180	5760' (701')	3200m	
D			3200m		205	5780' (721')	3600m	

CHANGES: Trans alt. © JEPPESEN SANDERSON, INC., 1998, 2007. ALL RIGHTS RESERVED.

**OIBQ/KHK**  
Apt Elev 29'  
N29 15.6 E050 19.4

**JEPPESEN**  
9 SEP 11 (10-9)

**KHARK ISLAND, IRAN**  
KHARK



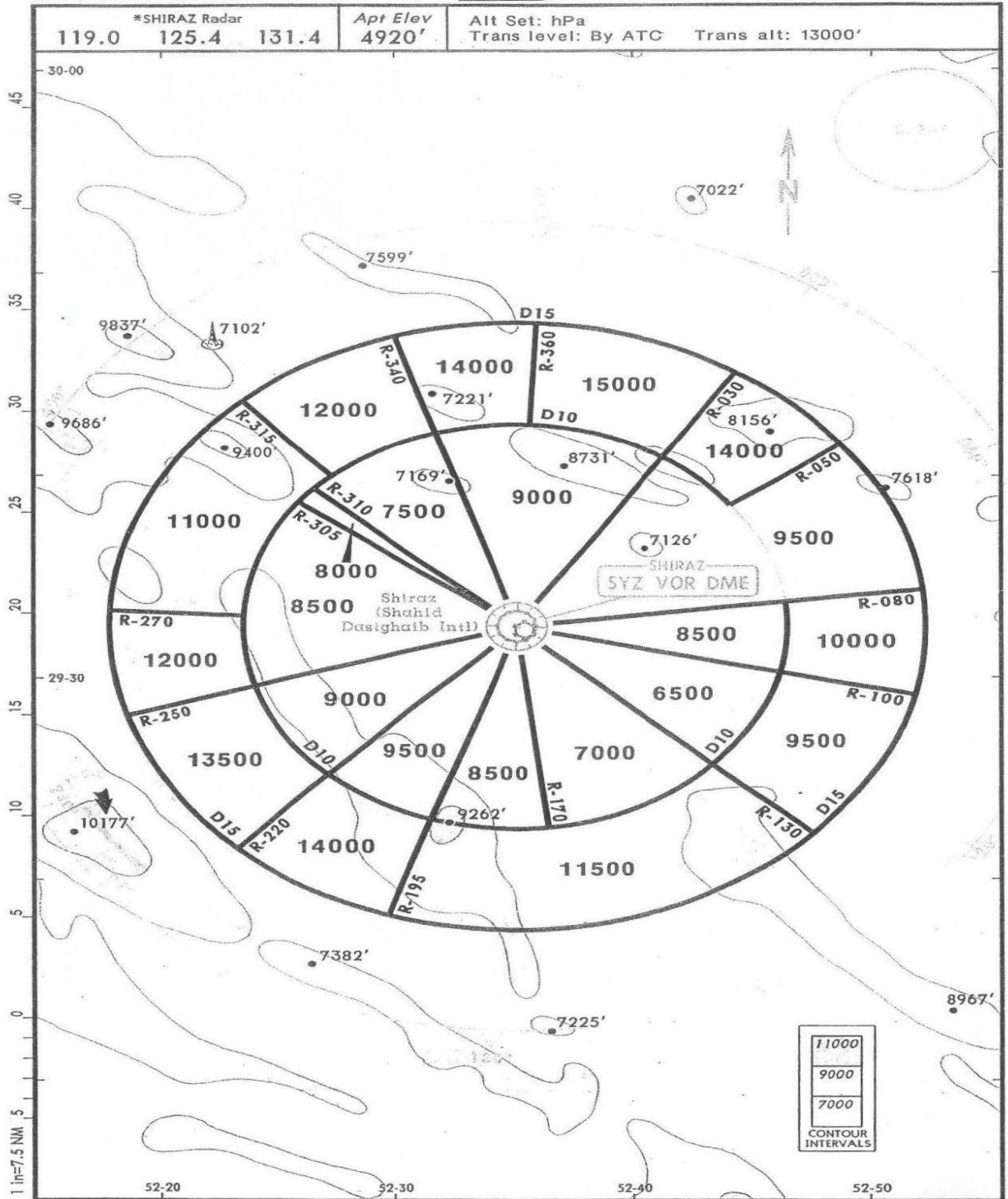
RWY	ADDITIONAL RUNWAY INFORMATION		USABLE LENGTHS			
			LANDING BEYOND Threshold	GLIDE SLOPE	TAKE-OFF	WIDTH
13			6345' 1934m		6332' 1930m	148'
31	HIRL (60m) PAPI-L (angle 3.0°)		6332' 1930m		6345' 1934m	45m

A B C D	TAKE-OFF	
	RL & RCLM	NIL (DAY only)
	AIR CARRIER (JAA) All Rws	
	400m	500m
	NOT APPLICABLE	

CHANGES: Runway designator, Lights, Minimums.

JEPPESEN, 1998, 2011. ALL RIGHTS RESERVED.

OISS/SYZ **A** JEPPESEN SHIRAZ, IRAN  
 SHAHID DASTGHAIB INTL 11 APR 08 (10-1R) RADAR MINIMUM ALTITUDES





OISS/SYZ

JEPPESSEN

SHIRAZ, IRAN

SHAHID DASTGHAIB INTL

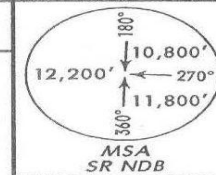
21 APR 06

10-3E

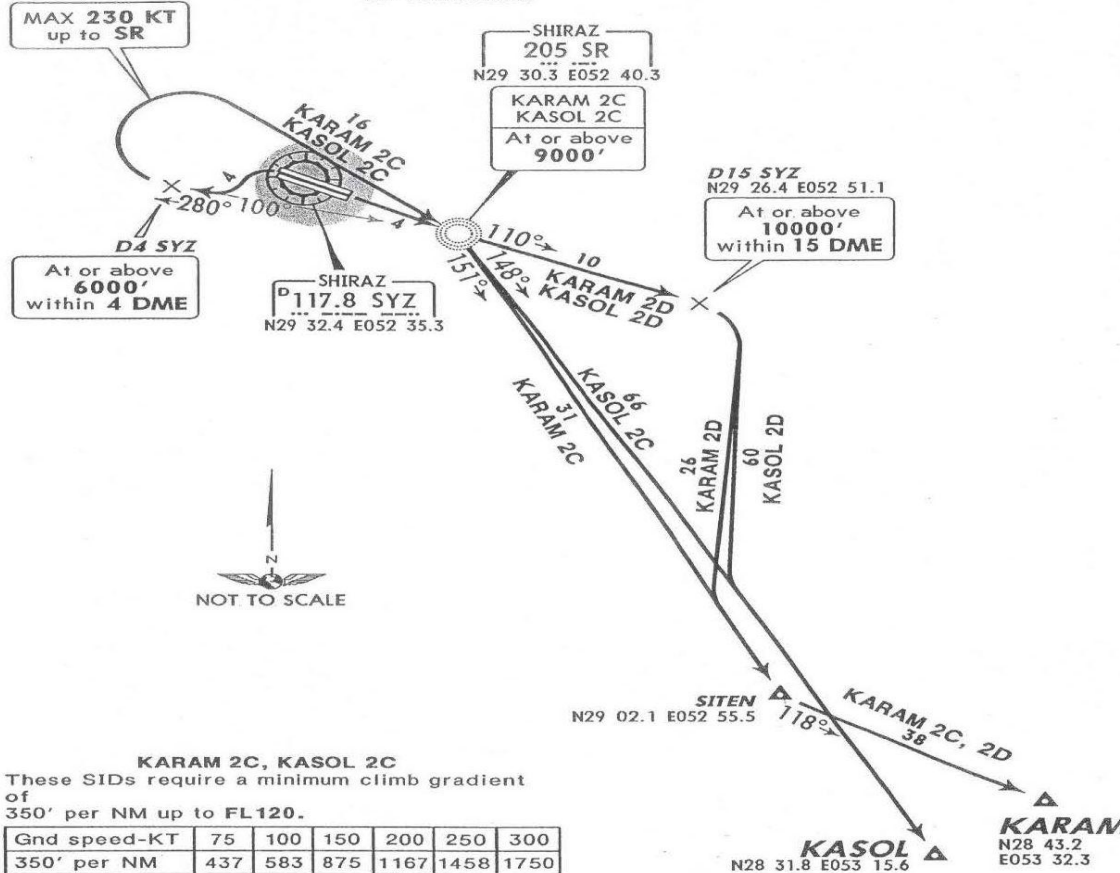
SID

Apt Elev  
4920'

Trans level: By ATC Trans alt: 13000'



**KARAM 2C [KARA2C], KARAM 2D [KARA2D]  
KASOL 2C [KASO2C], KASOL 2D [KASO2D]  
RWYS 29L/R, 11R/L DEPARTURES  
BASED ON SR  
TO SOUTHEAST**



**KARAM 2C, KASOL 2C**  
These SIDs require a minimum climb gradient of 350' per NM up to FL120.

Gnd speed-KT	75	100	150	200	250	300
350' per NM	437	583	875	1167	1458	1750

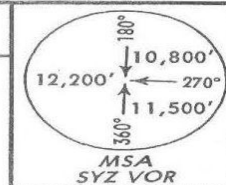
SID	RWY	ROUTING
KARAM 2C	29L/R	Turn LEFT, intercept 280° bearing from SR climbing to 6000' or above within SYZ 4 DME, at D4 SYZ turn RIGHT to SR, turn RIGHT, 151° bearing to SITEN, turn LEFT, 118° track to KARAM, climb to cleared FL.
KARAM 2D	11R/L	To SR, 110° bearing climbing to 10000' or above within SYZ 15 DME, at D15 SYZ turn RIGHT, intercept 151° bearing from SR to SITEN, turn LEFT, 118° track to KARAM, climb to cleared FL.
KASOL 2C	29L/R	Turn LEFT, intercept 280° bearing from SR climbing to 6000' or above within SYZ 4 DME, at D4 SYZ turn RIGHT to SR, turn RIGHT, 148° bearing to KASOL, climb to cleared FL.
KASOL 2D	11R/L	To SR, 110° bearing climbing to 10000' or above within SYZ 15 DME, at D15 SYZ turn RIGHT, intercept 148° bearing from SR to KASOL, climb to cleared FL.

CHANGES: Trans. altitude raised.

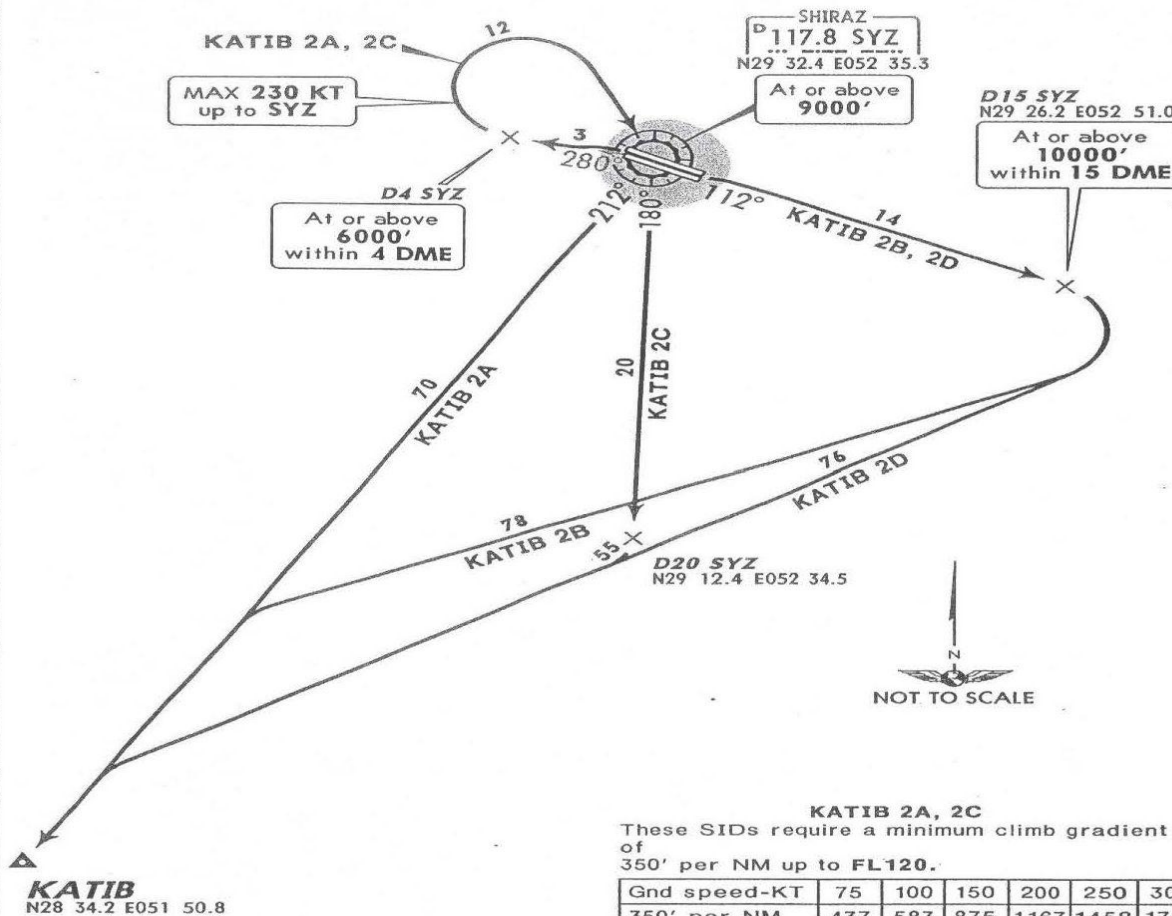
© JEPPESSEN SANDERSON, INC., 2002, 2006. ALL RIGHTS RESERVED.

Apt Elev  
 4920'

Trans level: By ATC Trans alt: 13000'



**KATIB 2A [KATI2A], KATIB 2B [KATI2B]  
 KATIB 2C [KATI2C], KATIB 2D [KATI2D]  
 RWYS 29L/R, 11R/L DEPARTURES  
 BASED ON SYZ  
 TO SOUTHSOUTHWEST**



**KATIB 2A, 2C**  
 These SIDs require a minimum climb gradient of 350' per NM up to FL120.

Gnd speed-KT	75	100	150	200	250	300
350' per NM	437	583	875	1167	1458	1750

SID	RWY	ROUTING
KATIB 2A	29L/R	Turn LEFT, intercept SYZ R-280 climbing to 6000' or above within SYZ 4 DME, at D4 SYZ turn RIGHT to SYZ, turn RIGHT, SYZ R-212 to KATIB, climb to cleared FL.
KATIB 2B	11R/L	Intercept SYZ R-112 climbing to 10000' or above within SYZ 15 DME, at D15 SYZ turn RIGHT, intercept SYZ R-212 to KATIB, climb to cleared FL.
KATIB 2C	29L/R	Turn LEFT, intercept SYZ R-280 climbing to 6000' or above within SYZ 4 DME, at D4 SYZ turn RIGHT to SYZ, turn RIGHT, SYZ R-180, at D20 SYZ turn RIGHT, intercept SYZ R-212 to KATIB, climb to cleared FL.
KATIB 2D	11R/L	Intercept SYZ R-112 climbing to 10000' or above within SYZ 15 DME, at D15 SYZ turn RIGHT, pass SYZ R-180 beyond SYZ 20 DME, intercept SYZ R-212 to KATIB, climb to cleared FL.

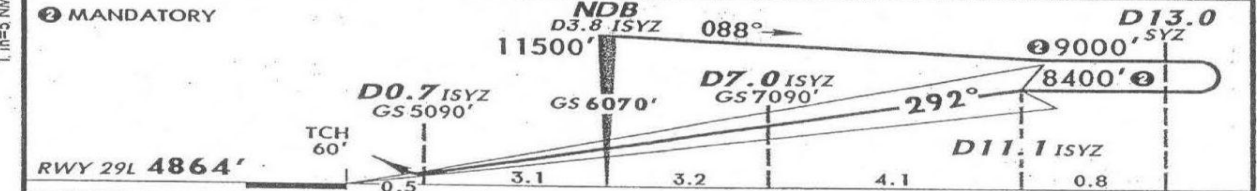
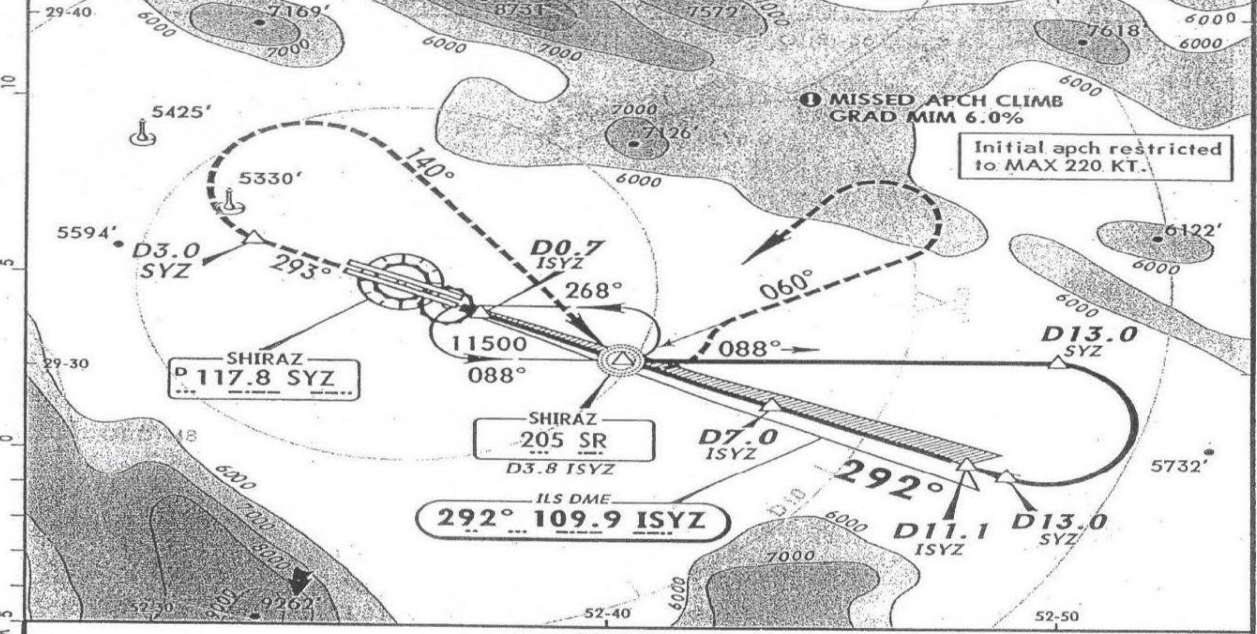
CHANGES: Trans altitude raised.

© JEPPESEN SANDERSON, INC., 2002, 2006. ALL RIGHTS RESERVED.



**OISS/SYZ** **SHAHID DASTGHAIB INTL** **25 AUG 06** **JEPPESSEN** **(11-5)** **NDB DME ILS-2 Rwy 29L** **SHIRAZ, IRAN**

ATIS <b>127.0</b>		SHIRAZ Approach (R) <b>119.0 125.4 131.4 134.1</b>			SHIRAZ Tower <b>118.1 121.9</b>	
LOC ISYZ <b>109.9</b>	Final Apch Crs <b>292°</b>	GS NDB <b>6070' (1206')</b>	ILS DA(H) <b>5090' (226')</b>	Apt Elev <b>4920'</b> RWY <b>4864'</b>		
<b>MISSED APCH:</b> Climb on 293° from NDB to 7000' within D3.0 SYZ, then climbing turn RIGHT onto 140° to NDB. After passing NDB turn LEFT and climb onto 060° to 10000', then turn LEFT to rejoin holding at 11500'.						
Alt Set: hPa		Rwy Elev: 166 hPa		Trans level: By ATC		Trans alt: 13000'

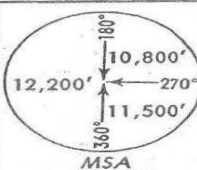


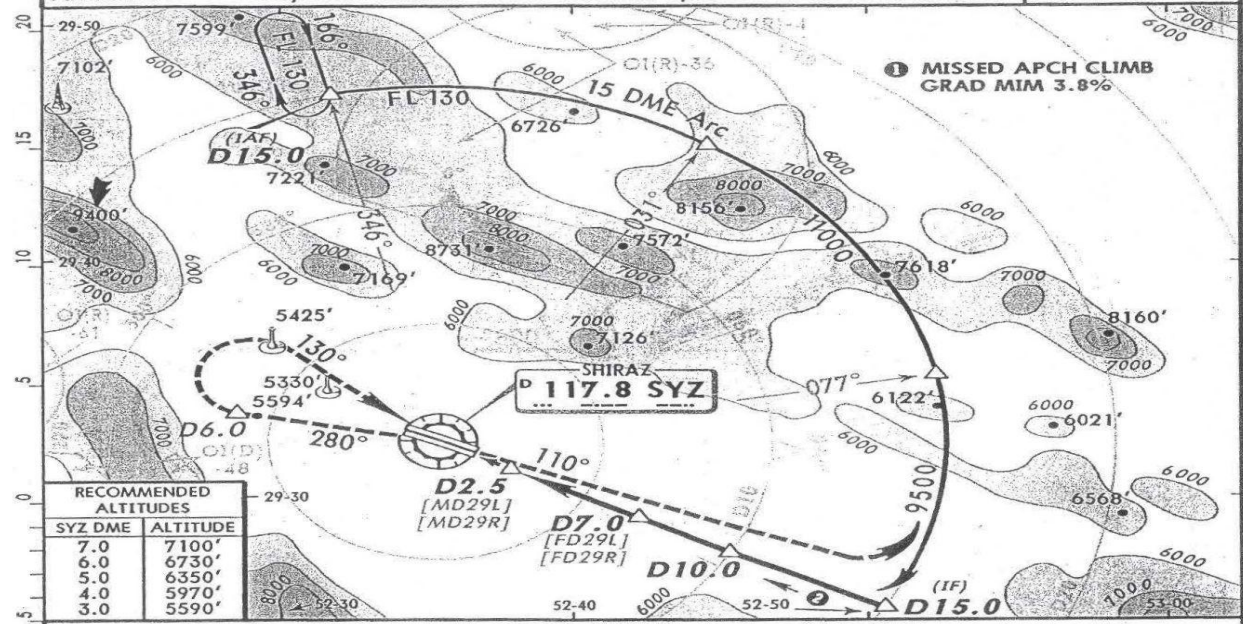
Gnd speed-Kts 120 140 160 180 3.00° 646 753 861 968				HIALS PAPI-L 7000' on 293° from within 205' D3.0 SYZ	
<b>STRAIGHT-IN LANDING RWY 29L</b> Missed apch climb gradient mim 6.0% ILS DA(H) <b>5087' (223')</b> LOC (GS out)			<b>CIRCLE-TO-LAND</b> Not authorized North of airport MDA(H) _____		
FULL		ALS out		Max Kts	MDA(H)
800m		1200m			
C		D		205	4800m
NOT APPLICABLE					

CHANGES: Procedure. Chart reindexed.

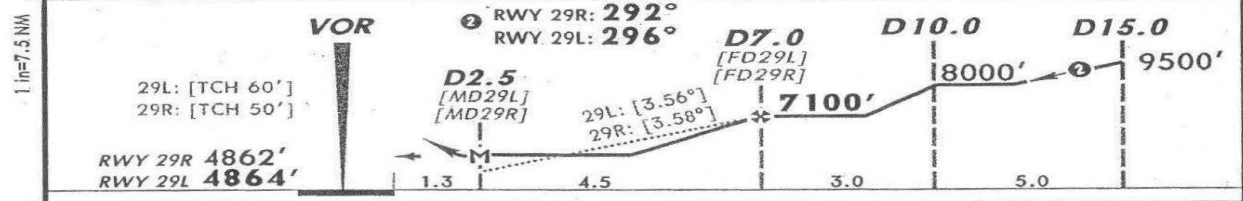
© JEPPESSEN SANDERSON, INC., 2001, 2006. ALL RIGHTS RESERVED

**OISS/SYZ** **SHAHID DASTGHAIB INTL** **25 AUG 06** **JEPPESSEN** **SHIRAZ, IRAN**  
**117.8** **117.8** **13-1** **VOR DME-1 Rwy 29L/R**

ATIS <b>127.0</b>		SHIRAZ Approach (R) <b>119.0 125.4 131.4 134.1</b>			SHIRAZ Tower <b>118.1 121.9</b>		
VOR SYZ <b>117.8</b>	Final Apch Crs RWY 29L <b>296°</b> RWY 29R <b>292°</b>	Minimum Alt D7.0 <b>7100'</b> (2236')	MDA(H) Refer to Minimums	Apt Elev <b>4920'</b> RWY 29L <b>4864'</b> RWY 29R <b>4862'</b>			
<b>MISSED APCH: Climb STRAIGHT AHEAD to VOR, then turn LEFT to continue climb on R-280 to 7400' within D6.0. Turn RIGHT and proceed on 130° to overhead VOR, then proceed on R-110. Turn LEFT to maintain 15 DME Arc to rejoin holding at FL 130. MAX 185 KT until overhead VOR.</b>							
Alt Set: hPa		Rwy Elev: 166 hPa		Trans level: By ATC		Trans alt: 13000'	



RECOMMENDED ALTITUDES	
SYZ DME	ALTITUDE
7.0	7100'
6.0	6730'
5.0	6350'
4.0	5970'
3.0	5590'



Gnd Speed-Kts	120	140	160	180
29L: Descent angle [3.56°]	756	882	1008	1134
29R: Descent angle [3.58°]	760	887	1014	1140

HIALS PAPI-L	<b>185 KT MAX</b>	SYZ <b>117.8</b>
--------------	-------------------	------------------

<b>STRAIGHT-IN LANDING RWY 29L/R</b> Missed apch climb gradient mim 3.8% MDA(H) RWY 29L: <b>5510'</b> (646') RWY 29R: <b>5510'</b> (648')		<b>CIRCLE-TO-LAND</b> Not authorized North of airport MDA(H) _____	
C	2000m	2800m	180
D	2400m	3200m	205

CHANGES: None. © JEPPESSEN SANDERSON, INC., 2001, 2006. ALL RIGHTS RESERVED.

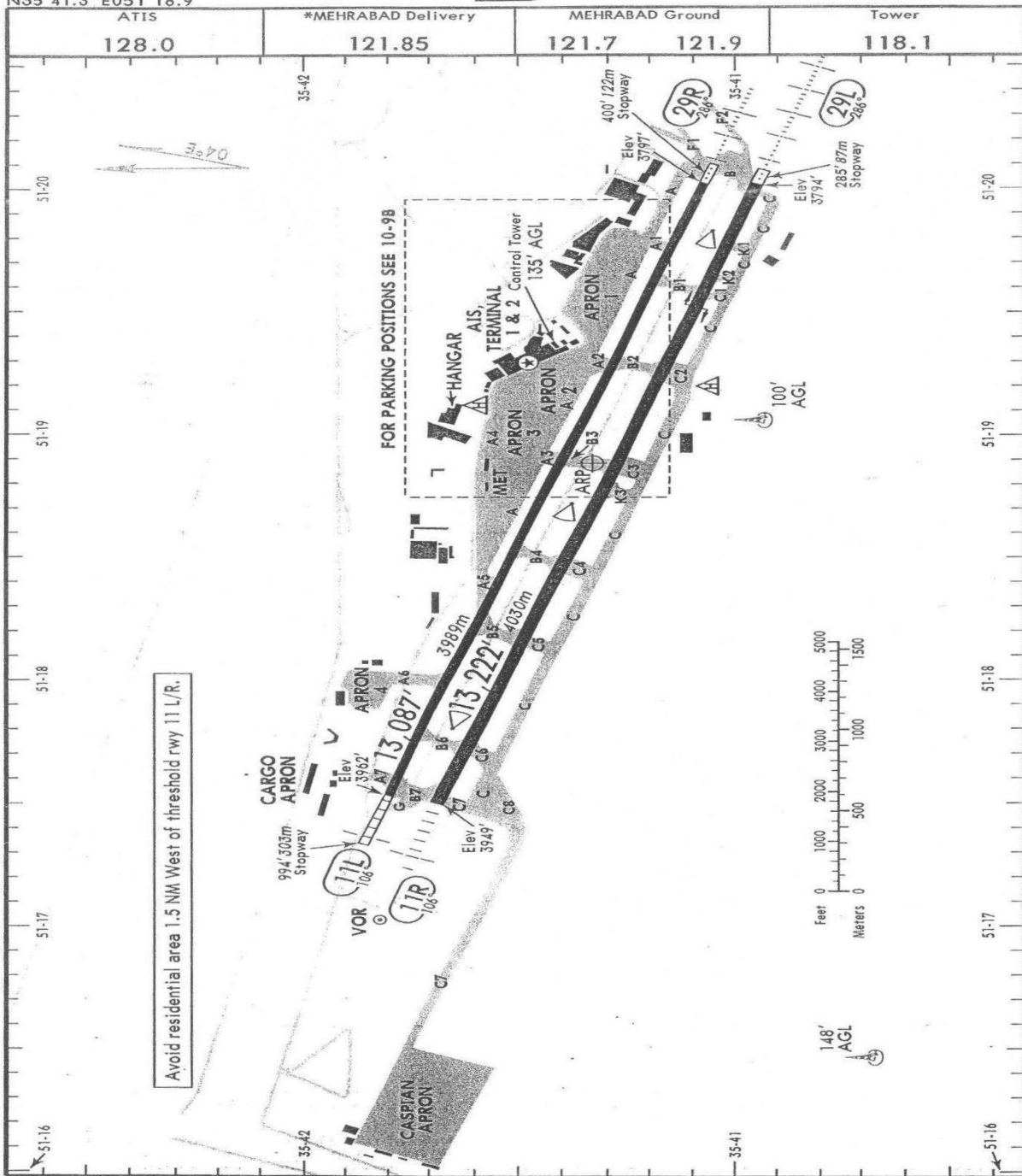


OIII/THR  
Apt Elev 3962'  
N35 41.3 E051 18.9



31 JUL 09 (10-9)

TEHRAN, IRAN  
MEHRABAD INTL



OIII/THR



JEPPESSEN  
16 MAR 07 (10-9A)

TEHRAN, IRAN  
MEHRABAD INTL

INS COORDINATES					
STAND No.	COORDINATES		STAND No.	COORDINATES	
1, 2	N35 41.5	E051 19.0	23	N35 41.3	E051 19.7
3	N35 41.5	E051 19.1	24	N35 41.3	E051 19.6
4, 5	N35 41.5	E051 19.0	25	N35 41.3	E051 19.7
6, 7	N35 41.5	E051 19.1	26	N35 41.3	E051 19.6
8, 9	N35 41.5	E051 19.2	27	N35 41.3	E051 19.8
13	N35 41.4	E051 19.3	28	N35 41.3	E051 19.7
14	N35 41.3	E051 19.4	29	N35 41.3	E051 19.8
15	N35 41.4	E051 19.5	30, 32	N35 41.2	E051 19.7
16	N35 41.3	E051 19.5	J1	N35 41.5	E051 19.2
17	N35 41.4	E051 19.6	J2, J3	N35 41.4	E051 19.3
18	N35 41.3	E051 19.5			
19	N35 41.3	E051 19.6			
20	N35 41.3	E051 19.5			
21	N35 41.3	E051 19.7			
22	N35 41.3	E051 19.6			

**GENERAL**

Birds and stray dogs in vicinity of airport.  
RWY 11L/R right-hand circuit.

**ADDITIONAL RUNWAY INFORMATION**

RWY		USABLE LENGTHS		TAKE-OFF	WIDTH
		Threshold	Glide Slope		
11L	HIRL(60m) ALS PAPI-L (angle 3.22°)				148'
29R	HIRL(60m) HIALS PAPI-L (angle 3.22°)			①	45m
① MIL jet barrier 100' West of RWY 11L height 12' AGL is in up psn and can be lowered on request.					
11R	HIRL(60m) ALS PAPI-L (angle 3.36°)				197'
29L	HIRL(60m) HIALS SFL PAPI-L (angle 3.30°)	②	12,397' 3779m	②	60m
② Single engine aircraft should use portion of runway West of arrester gear which is installed 2598'/792m inwards from threshold 29L.					

**TAKE-OFF & DEPARTURE PROCEDURE**

AIR CARRIER (JAA)	
All Rwys	
	NIL (DAY only)
C	400m
D	500m

Departure rwy 11 L/R: Rwy 11 not used for T/O during 1730 - 0430 except tail wind component of rwy 29 is 10 KT or more.

Departure rwy 29 L/R: To avoid residential area 1.5 NM West of rwy 11 all JET acft are to make a LEFT turn as soon as practicable after passing end of rwy and follow assigned SID.

CHANGES: Minimums.

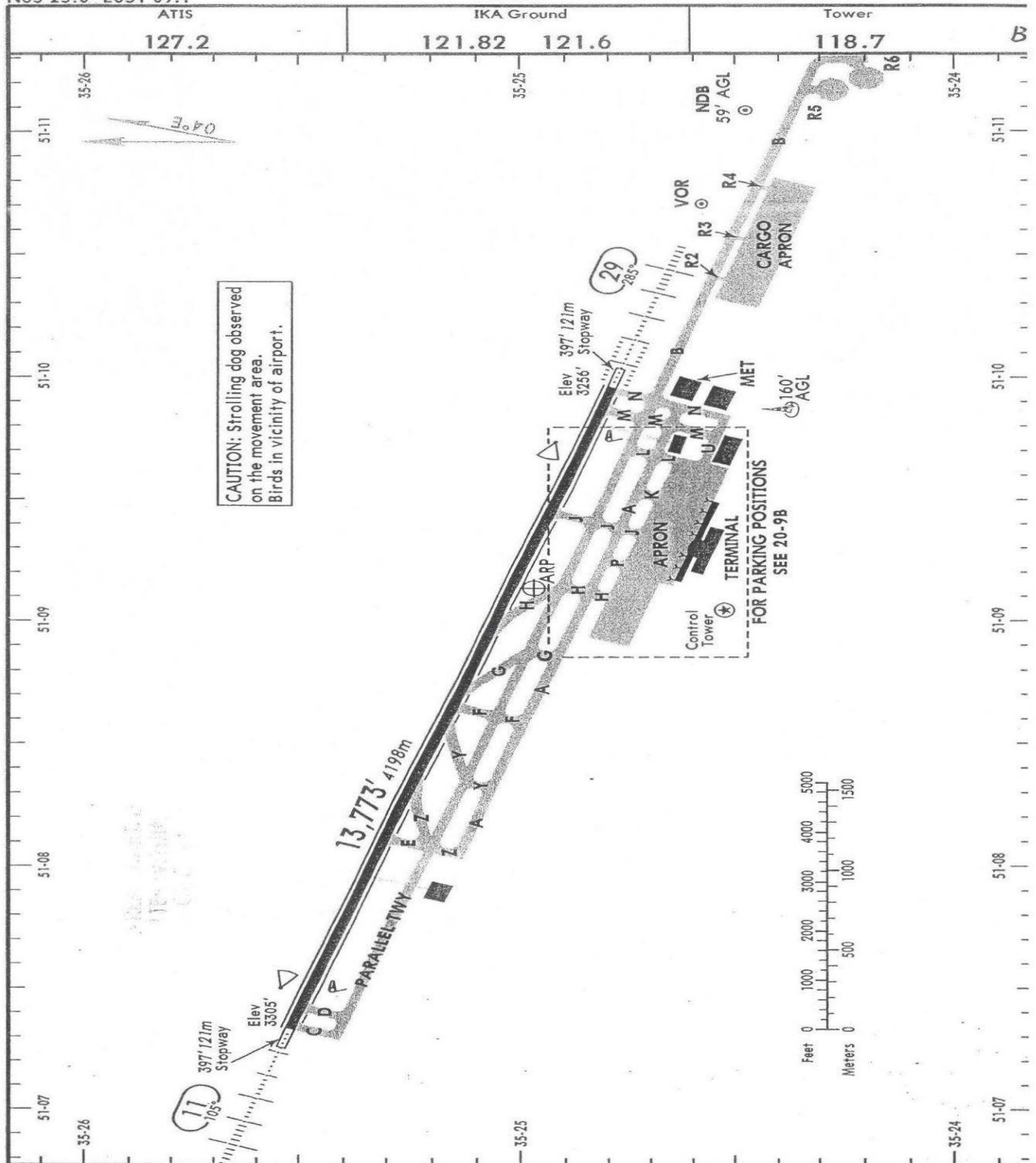
© JEPPESEN SANDERSON, INC., 1998, 2007. ALL RIGHTS RESERVED.

OIIE/IKA  
Apt Elev 3305'  
N35 25.0 E051 09.1



JEPPESSEN  
5 DEC 08 20-9 Eff: 18 Dec

TEHRAN, IRAN  
IMAM KHOMAINI INTL



CAUTION: Strolling dog observed on the movement area. Birds in vicinity of airport.

FOR PARKING POSITIONS SEE 20-9B

CHANGES: None.

© JEPPESSEN, 2004, 2007. ALL RIGHTS RESERVED.





OIIE/IKA



JEPPESEN  
5 DEC 08 20-9A Eff. 18 Dec

IEHKN, IRAN  
IMAM KHOMAINI INTL

RWY	ADDITIONAL RUNWAY INFORMATION					USABLE LENGTHS		TAKE-OFF	WIDTH
	LANDING BEYOND					Threshold	Glide Slope		
11	HIRL (60m)	CL (30m)	HIALS	PAPI-L (3.0°)	RVR				148'
29	HIRL (60m)	CL (30m)	HIALS-II	SFL TDZ ①	RVR		12,801' 3902m		45m

① PAPI-L (angle 3.0°).

**MINIMUM RUNWAY OCCUPANCY TIME**

**ARRIVALS:**

In order to minimize the occurrence of "go-around", lessen the runway occupancy time and, therefore, get the maximum runway utilization, pilots shall exit the rwy as soon as possible and this will not affect the acft safety and standard operation.

**DEPARTURES:**

Pilots, when the corresponding clearance is issued, shall be able to taxi to the take-off position in the rwy as soon as the preceding departure acft had began the take-off or the preceding arrival acft had passed their holding position.  
Acft shall be able to initiate the take-off immediately after clearance is issued.  
Pilots unable to comply with this requirement shall notify to ATC as soon as possible and once in contact with Tower.  
Acft not ready to initiate take-off run immediately when cleared for take-off, will have take-off clearance cancelled and will receive instructions to vacate the rwy at the first available twy.

	TAKE-OFF AIR CARRIER (JAA) All Rwys		
	LVP must be in force RL & CL & RCLM	RL & RCLM	NIL (DAY only)
C	300m	400m	500m
D			

CHANGES: Usable lengths.

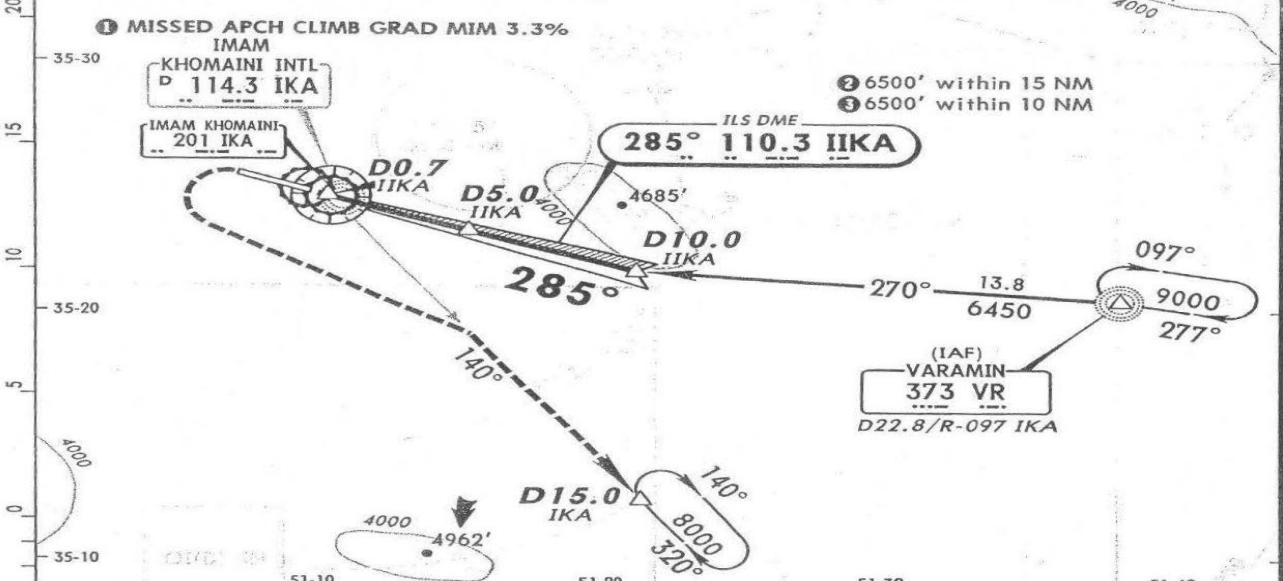
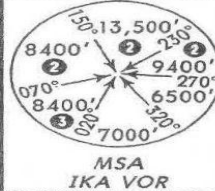
© JEPPESEN, 2004, 2008. ALL RIGHTS RESERVED.

**OIIIE/IKA**  
IMAM KHOMAINI INTL

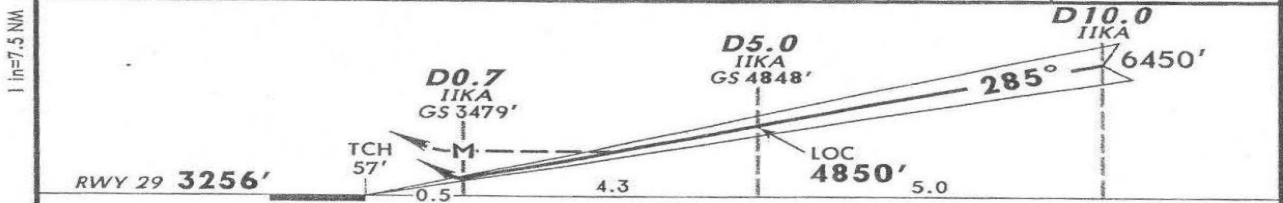
JEPPESSEN  
20 MAR 09 **21-1**

**VOR DME ILS-1 Rwy 29**

ATIS 127.2	MEHRABAD Approach (R) 119.7 125.1 124.45			IKA Tower 118.7	Ground 121.82 121.6
LOC IKA <b>110.3</b>	Final Apch Crs <b>285°</b>	GS <b>D5.0 IKA</b> 4848' (1592')	ILS DA(H) <b>3479' (223')</b>	Apt Elev 3305'	RWY 3256'
<b>MISSED APCH: Climb on R-285 to 4300', then turn LEFT to intercept R-140 to join D15.0 IKA holding at 8000'.</b>					
Alt Set: hPa		Rwy Elev: 114 hPa	Trans level: By ATC		Trans alt: 9000'
Procedure restricted to MAX 220 KT.					



LOC (GS out)	IKA DME	2.0	3.0	4.0	5.0
	ALTITUDE	3880'	4200'	4510'	4850'



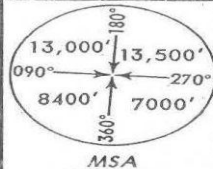
Gnd speed-Kts	120	140	160	180		HIALS-II	4300'	IKA
ILS GS 3.00° or LOC Desc Grad 5.2%	646	753	861	968		PAP	↑	on 114.3 R-285
MAP at D0.7 IKA								

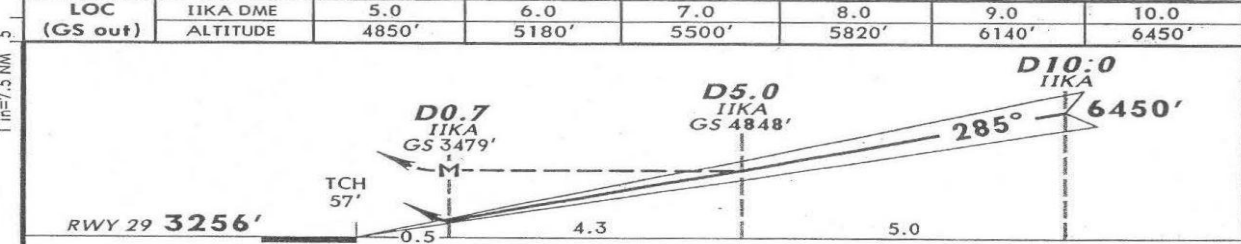
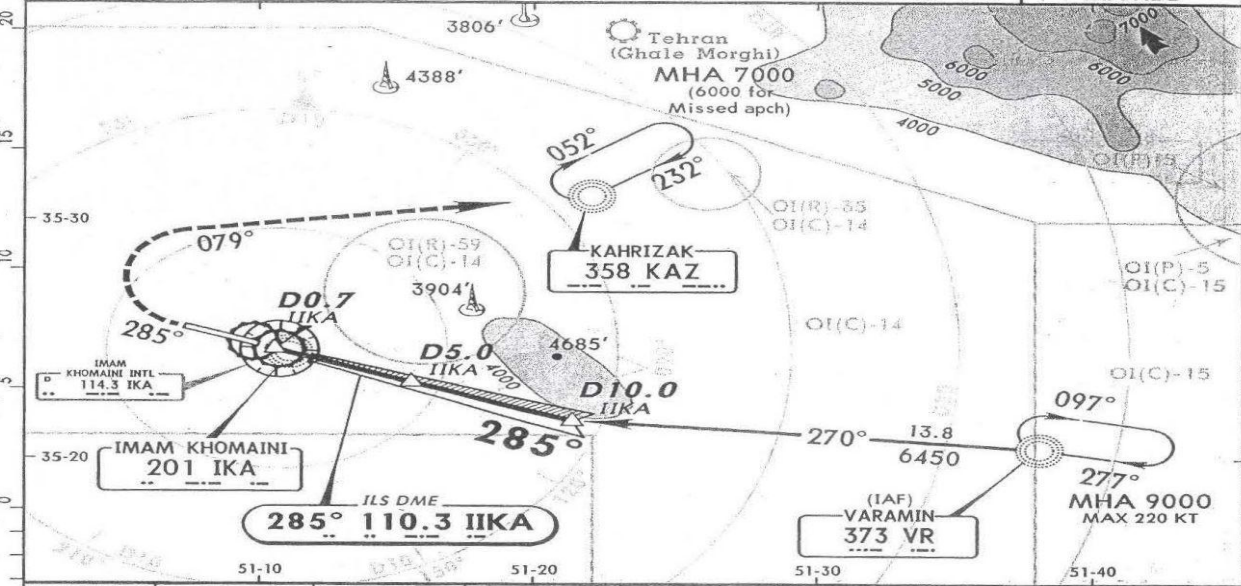
STRAIGHT-IN LANDING RWY 29 Missed apch climb gradient mim 3.3%					CIRCLE-TO-LAND			
ILS DA(H) <b>3479' (223')</b>			LOC (GS out) MDA(H) <b>3690' (434')</b>					
FULL	TDZ or CL out	ALS out	ALS out	ALS out	Max Kts	MDA(H)		
C	RVR 550m VIS 800m	RVR 720m VIS 800m	1200m	2000m	180	3900'(595')	2400m	
D		1200m	RVR 1500m VIS 1600m	2400m	205	4010'(705')	3600m	

CHANGES: Minimums. © JEPPESSEN, 2004, 2009. ALL RIGHTS RESERVED.



**OIIIE/IKA** **JEPPESEN** **TEHRAN, IRAN**  
**IMAM KHOMAINI INTL** 20 MAR 09 **21-7** **MISSED APCH CLIMB** **NDB ILS-1 Rwy 29**  
**GRAD MIM 3.3%**

ATIS 127.2		MEHRABAD Approach (R) 119.7 125.1 124.45		IKA Tower 118.7	Ground 121.82 121.6
LOC IIKA <b>110.3</b>	Final Apch Crs <b>285°</b>	GS D5.0 IIKA <b>4848' (1592')</b>	ILS DA(H) <b>3479' (223')</b>	Apt Elev 3305' RWY <b>3256'</b>	 <p>MSA IKA NDB</p>
<b>MISSED APCH: Climb on 285° to 4300', then turn RIGHT onto 079° to KAZ NDB and join holding at 6000'.                  MAX 185 KT.</b>					
Alt Set: hPa		Rwy Elev: 114 hPa		Trans level: By ATC	
				Trans alt: 9000'	



Gnd speed-Kts	120	140	160	180	HTALS-II PAPI 185 KT MAX 4300' on 285°
ILS GS 3.00° or LOC Desc Grad 5.2%	646	753	861	968	
MAP at D0.7 IIKA					

STRAIGHT-IN LANDING RWY 29 Missed apch climb gradient mim 3.3% ILS					CIRCLE-TO-LAND <input checked="" type="checkbox"/>	
DA(H) <b>3479' (223')</b>			LOC (GS out) MDA(H) <b>4840' (1584')</b>			
FULL	TDZ or CL out	ALS out	ALS out	ALS out	Max Kts	MDA(H)
C	RVR 550m VIS 800m	RVR 720m VIS 800m	1200m	4000m	180	4840' (1584') 4800m
D				4800m	205	

Circling height based on rwy 29 thresh elev of 3256'

- 1=Snow 2=Widespread haze 3=Thunderstorm 4=Tropical cyclone 5=Squall line  
 6=Moderate turbulence 7=Severe turbulence 8=Mountain waves 9=Severe icing  
 10=Shower 11=Hail 12=Drizzle 13=Moderate rain 14=Rain  
 15=Center of the tropopause at FL400 16=Widespread mist 17=Widespread fog 18=?

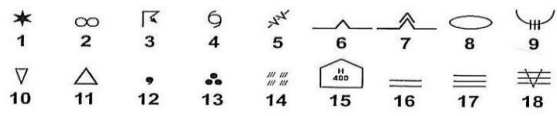


Figure I-01

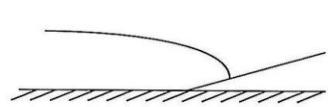


Figure I-02

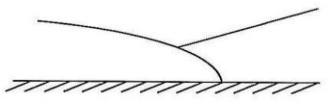


Figure I-03



Figure I-04

- B = Altocumulus Standing Lenticular  
 C = Altocumulus Castellanus  
 D = Cumulonimbus

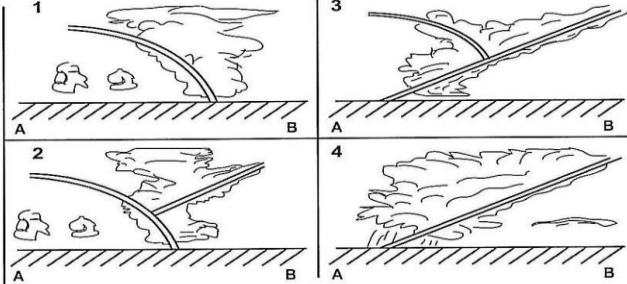


Figure I-05

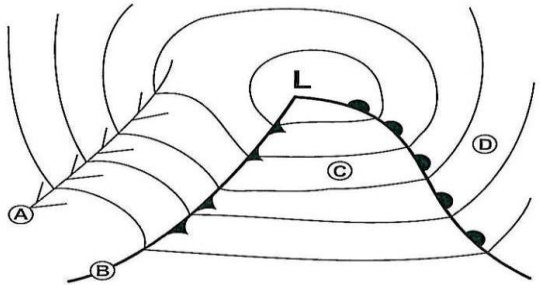
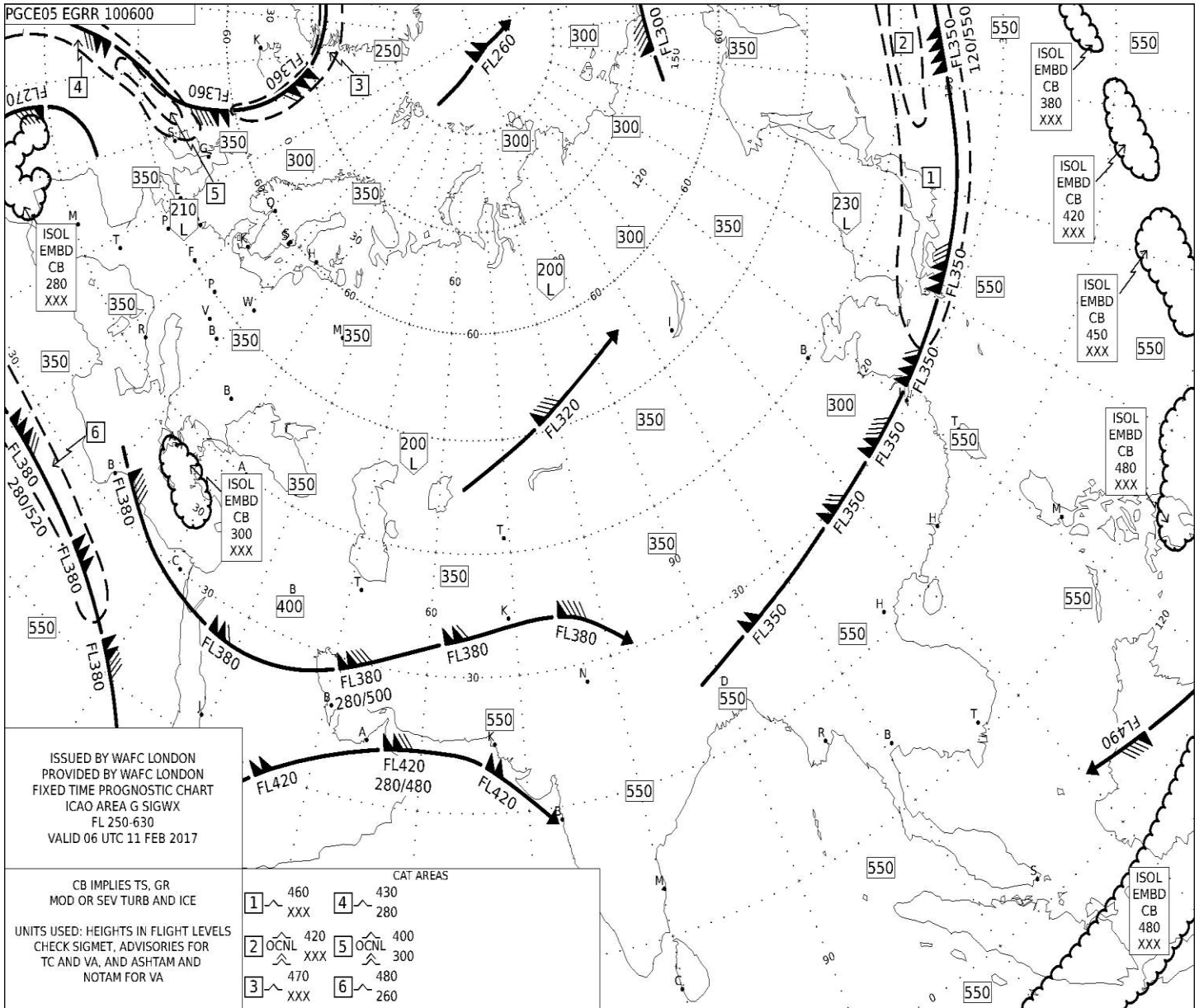


Figure I-06

Figure I-07





I.R. of IRAN Met. Org.(IRIMO)  
 TEHRAN FORECASTING CENTER  
 GFS's GPs

FLT340  
 Wind(KT)& Temperature(degC)

DT: 00UTC Sat 11 feb 2017  
 PROG CHART: 250 UGR&VGR&TMPprs +24  
 VT: 00UTC Sun 12 feb 2017

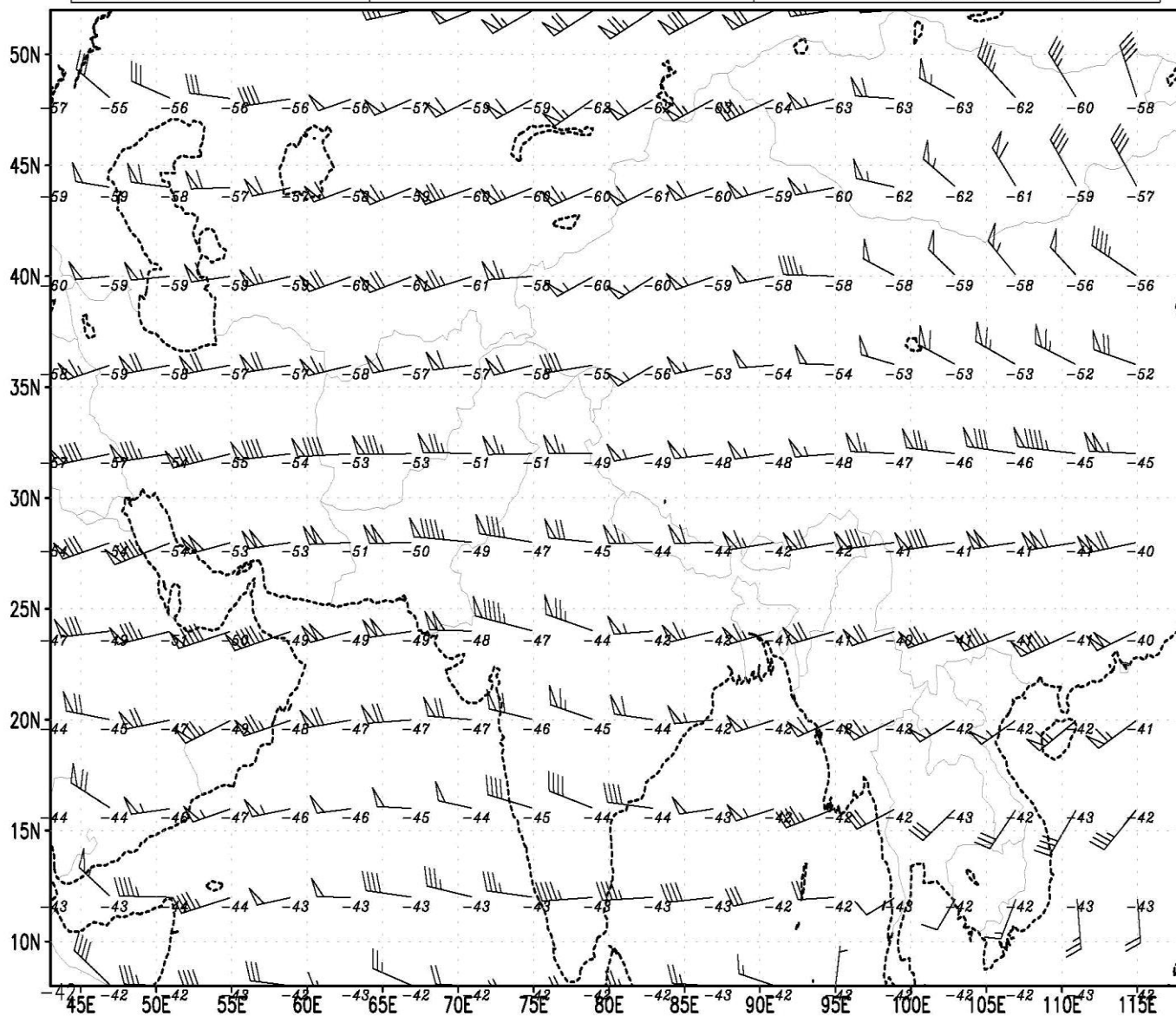


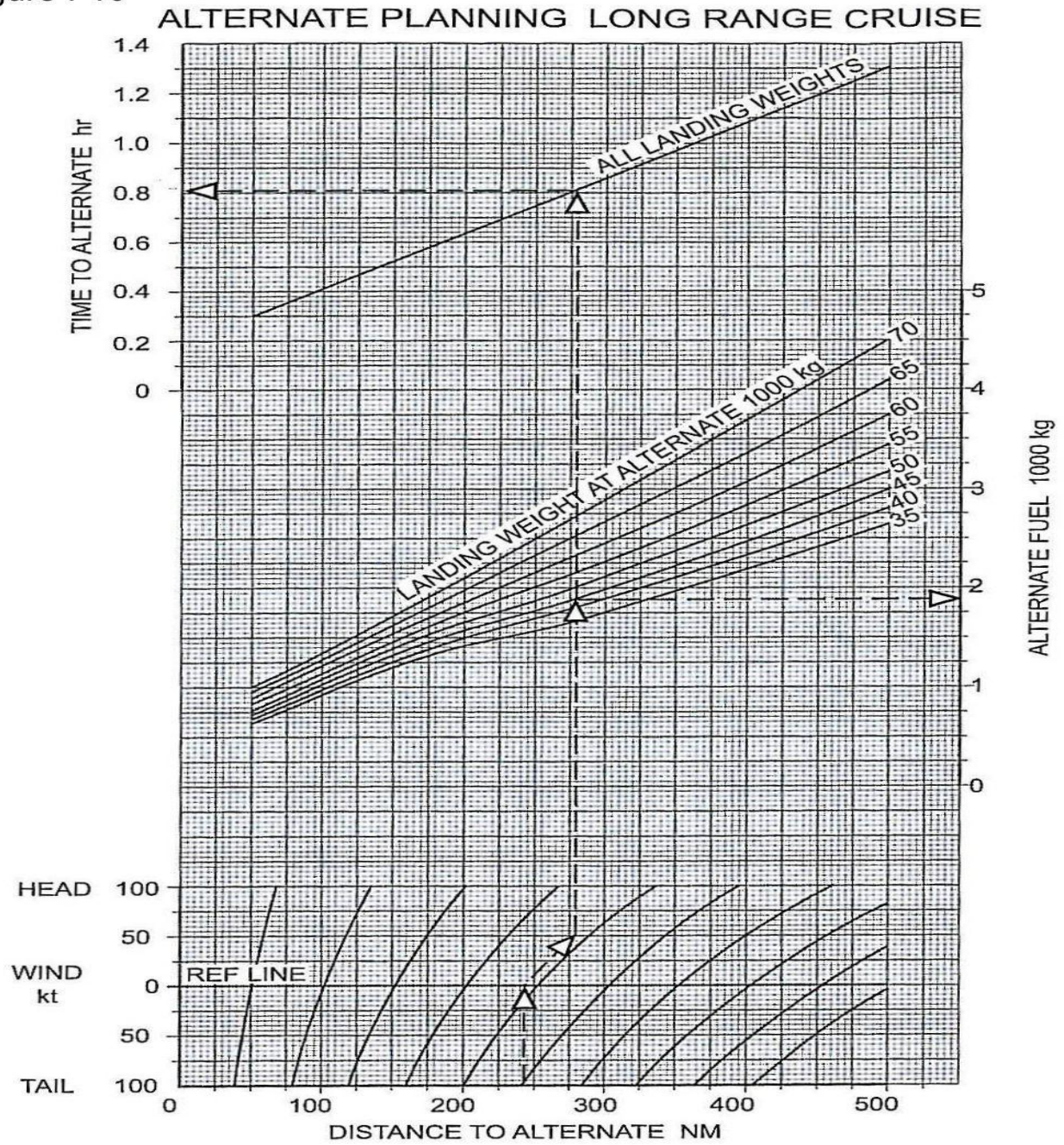
Figure 1-08

Figure I-09

ZCZC  
TAF OKBK 110445Z 1106/1212 35010KT 7000 NSC BECMG 1114/1116 VRB03KT SCT040 BKN080  
=  
TAF OBBI 110500Z 1106/1212 33008KT 5000 SCT020 BKN080 TEMPO 1106/1212 3000 SHRA  
PROB30 TEMPO 1106/1113 33020G30KT -TSRA FEW040CB BECMG 1203/1205 14010KT=  
TAF OMDB 110502Z 1106/1212 12005KT 8000 NSC BECMG 1109/1111 33013KT  
BECMG 1115/1117 08007KT BECMG 1204/1206 17010KT BECMG 1209/1211 34010KT=  
TAF OMRK 110502Z 1106/1212 VRB02KT 8000 NSC BECMG 1109/1111 34014KT  
BECMG 1115/1117 11005KT BECMG 1209/1211 35010KT=  
TAF OMSJ 110502Z 1106/1212 12005KT 8000 NSC BECMG 1109/1111 34014KT  
BECMG 1115/1117 08007KT BECMG 1204/1206 17010KT BECMG 1209/1211 34010KT=  
TAF OEJN 110500Z 1106/1212 33006G16KT 8000 FEW035 SCT100  
TEMPO 1106/1112 SCT035 BECMG 1017/1019 36010KT=  
TAF OEMA 110500Z 1106/1212 26006G16KT 8000 FEW045 SCT100  
TEMPO 1111/1114 4000 DU/BLDU BECMG 1118/1120 28006KT=  
TAF CERK 110500Z 1106/1212 10006G16KT 7000 FEW040 SCT100  
TEMPO 1106/1112 3500 TS/BLDU FEW035CB SCT040 BECMG 1120/1122 14012KT=  
TAF COR OERY 102300Z 1100/1206 06008G18KT 7000 SCT040 BKN080  
TEMPO 1100/1112 3000 DU/ST FEW030CB BKN040=  
TAF OEDF 110400Z 1106/1212 01010KT CAVOK TEMPO 1106/1112 -TSRA FEW030CB BKN090  
PROB30 TEMPO 1200/1212 VRB30KT 2000 TSRA FEW030CB OVC090=  
TAF OETF 110500Z 1106/1224 24010G20KT 7000 FEW030 SCT100 TEMPO 1108/1118 SCT030=  
TAF OSDI 1100/1206 VRB03KT 9999 FEW030 SCT100  
TEMPO 1109/1206 22010G20KT 8000 SHRA FEW025 CB SCT030 BKN100=  
TAF UDYZ 110506Z 1106/1206 VRB04KT 0800 FZFG OVC007 TEMPO 1106/1118 0200 SN FZFG  
VV001=  
TAF LTBA 110440Z 1106/1212 04015G30KT 9999 SCT016 BKN030  
TEMPO 1106/1110 -RASN SCT010 BKN025 BECMG 1114/1118 -RASN SCT010 BKN025=  
TAF LTAC 110440Z 1106/1206 VRB02KT 2500 BR BKN004 TEMPO 1106/1108 0500 FZFG VV001  
  
BECMG 1108/1110 8000 SCT040 BECMG 1116/1118 CAVOK  
BECMG 1118/1121 4000 BR PROB30 1203/1206 1200 BCFG BKN005=  
TAF OPKC 110400Z 1106/1212 26010KT 7000 NSC FM111600 02007KT 6000 NSC  
TEMPO 1200/1204 05005KT 5000 HZ NSC FM120400 05005G15KT 7000 NSC=  
NNNN



Figure I-10



Simplified Flight Planning – Alternate Distances to 500 NM



Figure I-11

		All Engines					Maximum Cruise Thrust Limits					A/C Auto				
<b>PRESSURE ALTITUDE</b>		<b>35,000 ft</b>					<b>LONG RANGE CRUISE</b>									
<b>GROSS</b>		0	100	200	300	400	500	600	700	800	900					
<b>WT. kg</b>	<b>TAS</b>	<b>CRUISE DISTANCE NAUTICAL AIR MILES</b>														
35000	410	0	23	47	71	95	119	143	167	191	214					
36000	414	238	262	285	309	333	356	380	403	427	450					
37000	417	474	497	521	544	567	590	614	637	660	683					
38000	420	707	730	753	776	798	821	844	867	890	913					
39000	422	936	959	982	1004	1027	1050	1072	1095	1117	1140					
40000	425	1163	1185	1207	1230	1252	1275	1297	1319	1342	1364					
41000	426	1386	1408	1430	1452	1474	1496	1519	1541	1563	1585					
42000	428	1607	1628	1650	1672	1694	1715	1737	1759	1781	1802					
43000	429	1824	1845	1867	1888	1910	1931	1953	1974	1996	2017					
44000	429	2039	2060	2081	2102	2123	2144	2165	2187	2208	2229					
45000	429	2250	2271	2292	2313	2334	2355	2375	2396	2417	2438					
46000	429	2459	2480	2500	2521	2541	2562	2582	2603	2624	2644					
47000	429	2665	2685	2705	2726	2746	2766	2787	2807	2827	2848					
48000	429	2868	2888	2908	2928	2948	2968	2988	3008	3028	3048					
49000	429	3068	3088	3107	3127	3147	3166	3186	3206	3226	3245					
50000	429	3265	3284	3304	3323	3343	3362	3381	3401	3420	3440					
51000	429	3459	3478	3497	3516	3536	3555	3574	3593	3612	3631					
52000	429	3650	3669	3688	3707	3726	3744	3763	3782	3801	3820					
53000	429	3838	3857	3875	3894	3913	3931	3950	3968	3987	4005					
54000	429	4024	4042	4060	4078	4097	4115	4133	4151	4170	4188					
55000	430	4206	4224	4242	4260	4278	4296	4314	4331	4349	4367					
56000	430	4385	4403	4420	4438	4456	4473	4491	4509	4526	4544					
57000	430	4561	4579	4596	4613	4631	4648	4665	4682	4700	4717					
58000	429	4734	4751	4768	4785	4802	4819	4836	4853	4870	4887					
59000	429	4904	4921	4937	4954	4971	4987	5004	5021	5037	5054					
60000	429	5070	5087	5103	5119	5136	5152	5168	5184	5201	5217					
61000	429	5233	5249	5265	5281	5297	5313	5329	5345	5361	5377					
62000	429	5393	5408	5424	5439	5455	5470	5486	5501	5517	5532					
63000	428	5548	5563	5578	5593	5608	5623	5638	5654	5669	5684					
64000	428	5699	5714	5728	5743	5758	5772	5787	5802	5817	5831					
65000	427	5846	5860	5874	5889	5903	5917	5932	5946	5960	5974					

**NOTE 1:** OPTIMUM WEIGHT FOR PRESSURE ALTITUDE IS 53,000 kg  
A) THRUST LIMITED WEIGHT FOR ISA +10 AND COLDER IS 64,500 kg  
B) THRUST LIMITED WEIGHT FOR ISA +15 IS 63,100 kg  
C) THRUST LIMITED WEIGHT FOR ISA +20 IS 61,600 kg

**NOTE 2:** ADJUSTMENTS FOR OPERATION AT NON-STANDARD TEMPERATURES  
A) INCREASE FUEL REQUIRED BY 0.6 PERCENT PER 10 DEGREES C ABOVE ISA  
B) DECREASE FUEL REQUIRED BY 0.6 PERCENT PER 10 DEGREES C BELOW ISA  
C) INCREASE TAS BY 1 KNOT PER DEGREE C ABOVE ISA  
D) DECREASE TAS BY 1 KNOT PER DEGREE C BELOW ISA

Long Range Cruise – Pressure Altitude 35,000 ft

Figure I-12

GROUND DIST (NM)	AIR DISTANCE (NM)						
	TAIL WIND		WIND COMPONENT (KTS)			HEAD WIND	
	+150	+100	+50	0	-50	-100	-150
10	8	8	9	10	11	13	15
20	15	16	18	20	22	25	29
30	23	25	27	30	34	38	44
40	30	33	36	40	45	51	59
50	38	41	45	50	56	64	74
100	76	82	90	100	112	127	147
200	151	165	181	200	224	254	295
300	227	247	271	300	336	382	442
400	303	330	361	400	448	509	589
500	379	412	452	500	560	636	736
1000	757	824	903	1000	1120	1272	1473
1500	1136	1236	1355	1500	1680	1908	2209
2000	1514	1648	1807	2000	2240	2544	2945
2500	1893	2059	2258	2500	2799	3180	3681
3000	2271	2471	2710	3000	3359	3817	4418
3500	2650	2883	3162	3500	3919	4453	5154
4000	3028	3295	3613	4000	4479	5089	5890
4500	3407	3707	4065	4500	5039	5725	6627
5000	3785	4119	4517	5000	5599	6361	7363
5500	4164	4531	4968	5500	6159	6997	8099
6000	4542	4943	5420	6000	6719	7633	8836
6500	4921	5354	5872	6500	7279	8269	9572
7000	5299	5766	6324	7000	7839	8905	10308
7500	5678	6178	6775	7500	8398	9541	11044
8000	6056	6590	7227	8000	8958	10177	11781
8500	6435	7002	7679	8500	9518	10814	12517
9000	6813	7414	8130	9000	10078	11450	13253
9500	7192	7826	8582	9500	10638	12086	13990
10000	7570	8238	9043	10000	11198	12722	14726

LONG RANGE CRUISE ABOVE FL250



Figure I-13

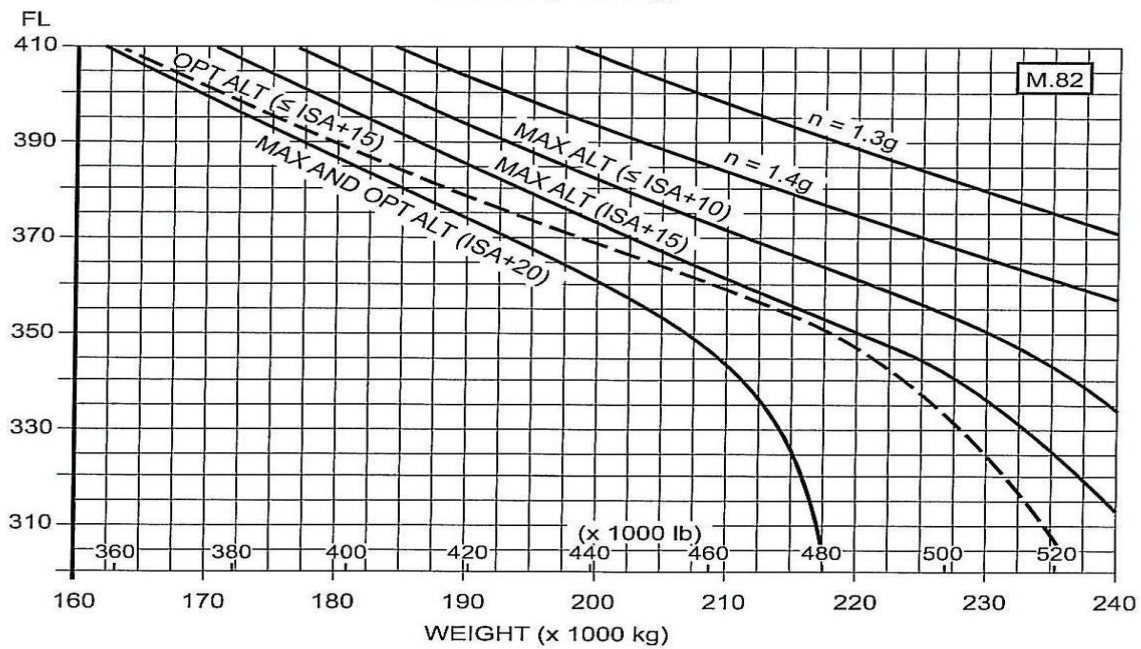
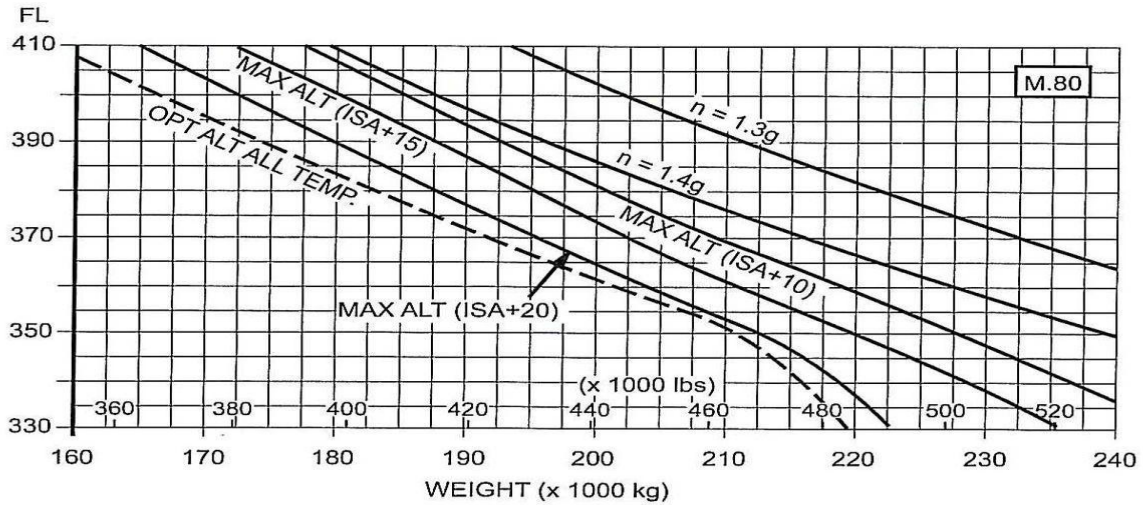
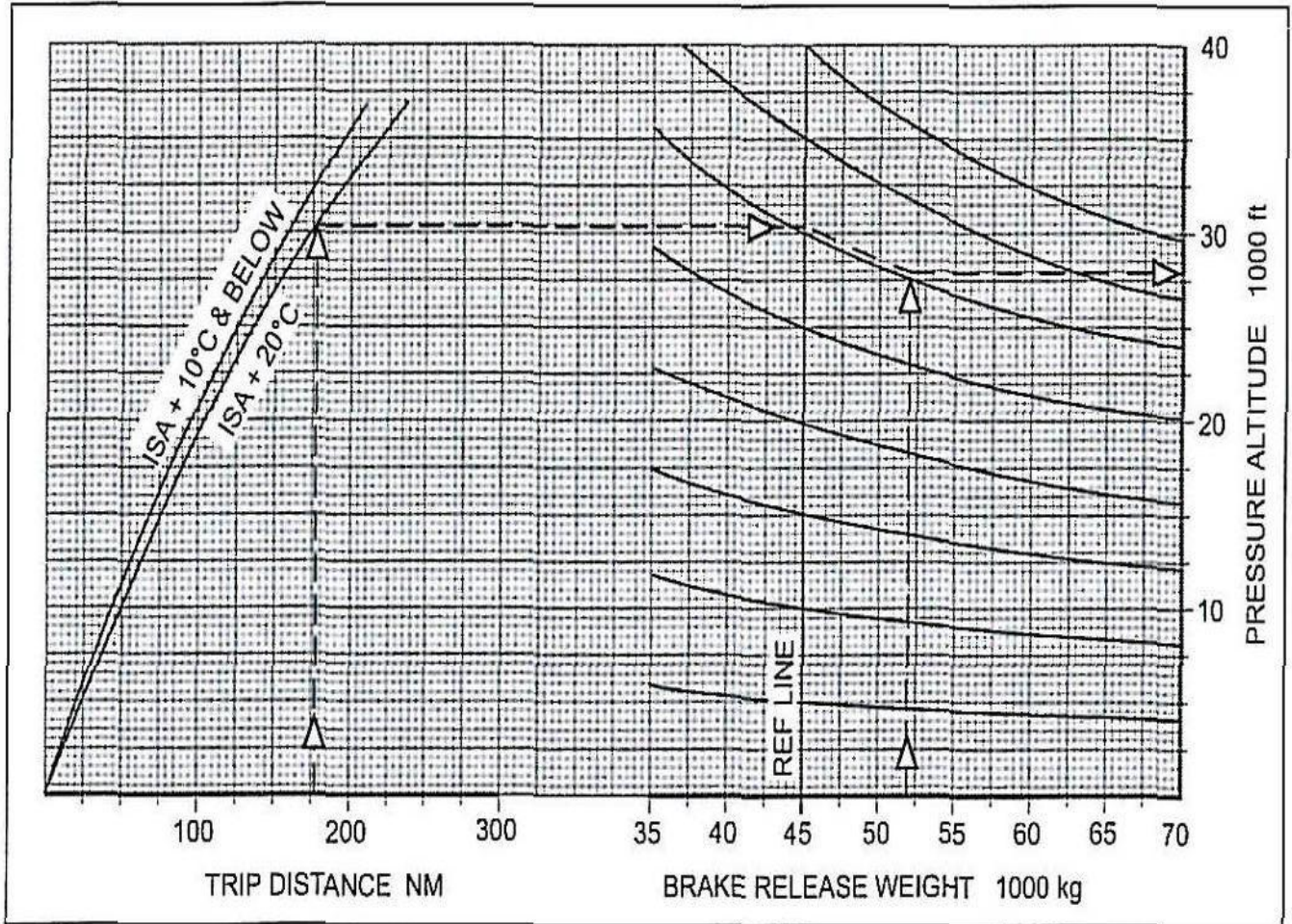




Figure I-14



Short Distance Cruise Altitude

Figure I-15

All Engines		Maximum Cruise Thrust Limits									A/C Auto
PRESSURE ALTITUDE 31,000 ft MACH 0.74 CRUISE TAS 434 kt											
GROSS WT. kg	0	100	200	300	400	500	600	700	800	900	
	CRUISE DISTANCE NAUTICAL AIR MILES										
35000	0	21	42	63	84	105	126	147	168	189	
36000	210	231	252	273	294	315	336	357	378	399	
37000	420	440	461	482	503	524	544	565	586	607	
38000	628	648	669	689	710	731	751	772	793	813	
39000	834	854	875	895	916	936	957	977	998	1018	
40000	1039	1059	1079	1100	1120	1140	1161	1181	1201	1222	
41000	1242	1262	1282	1303	1323	1343	1363	1383	1403	1423	
42000	1444	1464	1484	1504	1524	1544	1564	1584	1604	1624	
43000	1644	1663	1683	1703	1723	1743	1763	1782	1802	1822	
44000	1842	1862	1881	1901	1921	1940	1960	1979	1999	2019	
45000	2038	2058	2077	2097	2116	2136	2155	2175	2194	2214	
46000	2233	2252	2272	2291	2310	2330	2349	2368	2388	2407	
47000	2426	2445	2464	2483	2503	2522	2541	2560	2579	2598	
48000	2617	2636	2655	2674	2693	2712	2731	2750	2769	2788	
49000	2807	2825	2844	2863	2882	2900	2919	2938	2956	2975	
50000	2994	3013	3031	3050	3068	3087	3105	3124	3142	3161	
51000	3179	3198	3216	3235	3253	3271	3290	3308	3326	3345	
52000	3363	3381	3399	3417	3436	3454	3472	3490	3508	3526	
53000	3545	3563	3580	3598	3616	3634	3652	3670	3688	3706	
54000	3724	3742	3760	3777	3795	3813	3831	3848	3866	3884	
55000	3902	3919	3937	3954	3972	3989	4007	4024	4042	4060	
56000	4077	4094	4112	4129	4146	4164	4181	4198	4216	4233	
57000	4251	4268	4285	4302	4319	4336	4353	4370	4388	4405	
58000	4422	4439	4456	4473	4490	4507	4523	4540	4557	4574	
59000	4591	4608	4625	4641	4658	4675	4691	4708	4725	4742	
60000	4758	4775	4791	4808	4824	4841	4857	4874	4890	4907	
61000	4923	4940	4956	4972	4989	5005	5021	5038	5054	5070	
62000	5086	5103	5119	5135	5151	5167	5183	5199	5215	5231	
63000	5247	5263	5279	5295	5311	5327	5343	5358	5374	5390	
64000	5406	5422	5437	5453	5469	5484	5500	5516	5531	5547	
65000	5563	5578	5594	5609	5624	5640	5655	5671	5686	5702	
66000	5717	5732	5748	5763	5778	5793	5809	5824	5839	5854	
67000	5870	5885	5900	5915	5930	5945	5960	5975	5990	6005	

**NOTE 1:** OPTIMUM WEIGHT FOR PRESSURE ALTITUDE IS 63,500 kg  
 A) THRUST LIMITED WEIGHT FOR ISA +10 AND COLDER EXCEEDS STRUCTURAL LIMIT  
 B) THRUST LIMITED WEIGHT FOR ISA +15 EXCEEDS STRUCTURAL LIMIT  
 C) THRUST LIMITED WEIGHT FOR ISA +20 EXCEEDS STRUCTURAL LIMIT

**NOTE 2:** ADJUSTMENTS FOR OPERATION AT NON-STANDARD TEMPERATURES  
 A) INCREASE FUEL REQUIRED BY 0.6 PERCENT PER 10 DEGREES C ABOVE ISA  
 B) DECREASE FUEL REQUIRED BY 0.6 PERCENT PER 10 DEGREES C BELOW ISA  
 C) INCREASE TAS BY 1 KNOT PER DEGREE C ABOVE ISA  
 D) DECREASE TAS BY 1 KNOT PER DEGREE C BELOW ISA

Mach 0.74 Cruise – Pressure Altitude 31,000 ft



Figure I-16

**0.74 M/250 KIAS (Economy) Descent**

PRESS. ALT. ft	TIME min	FUEL kg	AIR DISTANCE TRAVELLED NM				
			LANDING WEIGHT kg				
			35,000	45,000	55,000	65,000	75,000
37,000	23	295	98	109	114	114	110
35,000	22	290	94	105	110	110	106
33,000	21	285	89	99	103	103	101
31,000	20	280	83	93	97	98	95
29,000	19	275	78	87	91	91	89
27,000	19	270	73	81	85	85	83
25,000	18	260	68	75	79	79	77
23,000	16	255	63	69	72	73	71
21,000	15	245	58	64	66	67	66
19,000	14	235	53	58	60	61	60
17,000	13	225	48	52	54	55	54
15,000	12	215	43	46	48	49	48
10,000	9	185	30	32	33	34	33
5,000	6	140	18	18	18	18	18
3,700	5	130	14	14	14	14	14

Economy Descent

**0.70 M/280/250 KIAS (Turbulence Penetration) Descent**

PRESS. ALT. ft	TIME min	FUEL kg	AIR DISTANCE TRAVELLED NM				
			LANDING WEIGHT kg				
			35,000	45,000	55,000	65,000	75,000
37,000	21	280	88	100	107	110	109
35,000	20	275	84	96	102	105	105
33,000	20	275	80	91	98	101	101
31,000	19	270	76	86	93	96	96
29,000	18	265	72	82	88	91	92
27,000	17	260	69	78	84	87	87
25,000	17	255	64	73	78	80	81
23,000	16	250	60	67	72	74	74
21,000	15	240	55	62	66	68	68
19,000	14	230	51	57	60	62	62
17,000	13	225	46	52	55	56	56
15,000	12	215	42	46	49	50	50
10,000	9	185	30	32	33	34	33
5,000	6	140	18	18	18	18	18
3,700	5	130	14	14	14	14	14

Turbulence Penetration Descent



Figure I-17

ISA +6°C TO +15°C

Press. Alt. ft	Units Min/kg. NAM/Kt	BRAKE RELEASE WEIGHT KG										
		68000	66000	64000	62000	60000	58000	56000	52000	48000	44000	40000
37000	Time/Fuel				33/2350	27/2000	24/1850	22/1700	18/1500	16/1300	14/1150	12/1000
	Dist/TAS				212/409	169/404	147/402	132/400	111/397	95/396	82/394	72/393
36000	Time/Fuel			30/2250	26/2000	23/1650	21/1700	20/1600	17/1400	15/1250	13/1100	12/1000
	Dist/TAS			189/405	161/402	143/400	130/398	119/397	102/395	89/393	77/392	68/391
35000	Time/Fuel	35/2600	29/2250	26/2050	23/1900	21/1750	20/1650	19/1550	16/1350	14/1200	13/1100	11/950
	Dist/TAS	224/407	180/402	157/399	141/397	129/396	119/395	110/394	95/392	83/391	73/390	64/389
34000	Time/Fuel	28/2250	25/2050	23/1900	21/1800	20/1650	19/1550	18/1500	16/1300	14/1200	12/1050	11/950
	Dist/TAS	173/400	154/397	140/395	128/394	118/393	110/392	102/391	89/389	78/388	69/387	61/386
33000	Time/Fuel	25/2100	23/1950	21/1800	20/1700	19/1600	18/1500	17/1450	15/1300	13/1150	12/1050	10/900
	Dist/TAS	151/394	138/393	127/391	118/390	109/389	102/388	95/388	84/386	74/385	65/385	58/384
32000	Time/Fuel	23/1950	21/1850	20/1750	19/1650	18/1550	17/1450	16/1400	14/1250	13/1100	11/1000	10/900
	Dist/TAS	136/390	126/389	117/388	109/387	102/386	95/385	89/384	79/383	70/383	62/382	55/381
31000	Time/Fuel	22/1850	20/1750	19/1650	18/1550	17/1500	16/1400	15/1350	13/1200	12/1100	11/1000	10/900
	Dist/TAS	125/386	116/385	108/384	101/383	95/382	89/382	84/381	74/380	66/380	59/379	52/378
30000	Time/Fuel	20/1800	19/1700	18/1600	17/1500	16/1450	15/1350	14/1300	13/1150	12/1050	10/950	9/850
	Dist/TAS	115/382	108/381	101/380	95/379	89/379	84/378	77/378	70/377	62/376	56/376	49/375
29000	Time/Fuel	19/1700	18/1600	17/1550	16/1450	15/1400	14/1300	14/1250	12/1150	11/1000	10/900	9/850
	Dist/TAS	105/376	98/376	92/375	87/374	82/374	77/374	73/373	65/373	58/372	52/372	46/371
28000	Time/Fuel	17/1600	17/1550	16/1450	15/1400	14/1300	13/1250	13/1200	12/1100	10/1000	9/900	8/800
	Dist/TAS	95/371	90/371	84/370	80/370	75/369	71/369	67/369	60/368	54/368	48/367	42/367
27000	Time/Fuel	16/1550	15/1450	15/1400	14/1350	13/1250	13/1200	12/1150	11/1050	10/950	9/850	8/750
	Dist/TAS	87/366	82/366	77/366	73/365	69/365	66/365	62/364	56/364	50/363	44/363	39/363
26000	Time/Fuel	15/1450	15/1400	14/1350	13/1250	13/1200	12/1150	11/1100	10/1000	9/900	8/800	8/750
	Dist/TAS	80/362	75/362	71/361	67/361	64/361	60/360	57/360	51/360	46/359	41/359	37/359
25000	Time/Fuel	14/1400	14/1350	13/1250	12/1200	12/1150	11/1100	11/1050	10/950	9/850	8/800	7/700
	Dist/TAS	73/356	69/357	65/357	62/357	59/367	56/356	53/356	47/356	43/356	38/355	34/355
24000	Time/Fuel	13/1350	13/1250	12/1200	12/1150	11/1100	11/1050	10/1000	9/900	8/850	8/750	7/700
	Dist/TAS	67/354	63/353	60/353	57/353	54/353	51/353	49/352	44/352	39/352	35/352	32/351
23000	Time/Fuel	13/1250	12/1200	11/1150	11/1100	10/1050	10/1000	10/950	9/900	8/800	7/750	7/650
	Dist/TAS	61/350	58/350	55/349	53/349	50/349	47/349	45/349	41/348	37/348	33/348	29/348
22000	Time/Fuel	12/1200	11/1150	11/1100	10/1050	10/1000	9/950	9/950	8/850	8/750	7/700	6/650
	Dist/TAS	56/346	54/346	51/346	48/346	46/345	44/345	42/345	37/345	34/345	30/345	27/344
21000	Time/Fuel	11/1150	11/1100	10/1050	10/1000	9/950	9/950	9/900	8/800	7/750	6/700	6/600
	Dist/TAS	52/343	49/342	47/342	44/342	42/342	40/342	38/342	35/342	31/341	28/341	25/341
20000	Time/Fuel	10/1100	10/1050	10/1000	9/950	9/950	8/900	8/850	7/800	7/700	6/650	6/600
	Dist/TAS	47/339	45/339	43/339	41/339	39/339	37/338	35/338	32/338	29/338	26/338	23/338
19000	Time/Fuel	10/1050	9/1000	9/950	9/950	8/900	8/850	8/800	7/750	6/700	6/600	5/550
	Dist/TAS	43/336	41/336	39/335	37/335	36/335	34/335	32/335	29/335	26/335	24/335	21/335
18000	Time/Fuel	9/1000	9/950	8/900	8/900	8/850	7/800	7/800	7/700	6/650	6/600	5/550
	Dist/TAS	39/332	38/332	36/332	34/332	33/332	31/332	30/332	27/332	24/332	22/332	19/332
17000	Time/Fuel	9/950	8/900	8/900	8/850	7/800	7/750	7/750	6/700	6/600	5/550	5/500
	Dist/TAS	36/329	34/329	33/329	31/329	30/329	28/329	27/329	24/329	22/329	20/329	18/329
16000	Time/Fuel	8/900	8/850	7/850	7/800	7/750	7/750	6/700	6/650	5/600	5/550	4/500
	Dist/TAS	33/326	31/326	30/326	28/326	27/326	26/326	25/326	22/326	20/326	18/326	16/326
15000	Time/Fuel	8/850	7/800	7/800	7/750	6/750	6/700	6/650	5/600	5/550	5/500	4/450
	Dist/TAS	29/323	28/323	27/323	26/323	24/323	23/323	22/323	20/323	18/323	16/323	15/323
14000	Time/Fuel	7/800	7/800	7/750	6/700	6/700	6/650	6/650	5/600	5/550	4/500	4/450
	Dist/TAS	26/321	25/321	24/321	23/320	22/320	21/320	20/320	18/320	17/320	15/320	13/320
13000	Time/Fuel	7/750	6/750	6/700	6/700	6/650	5/650	5/600	5/550	4/500	4/450	4/450
	Dist/TAS	24/318	23/318	22/318	21/318	20/318	19/318	18/318	16/318	15/318	13/318	12/318
12000	Time/Fuel	6/700	6/700	6/650	5/650	5/600	5/600	5/550	5/500	4/500	4/450	4/400
	Dist/TAS	21/315	20/315	19/315	18/315	18/315	17/315	16/315	15/315	13/315	12/315	11/315
11000	Time/Fuel	6/650	5/650	5/600	5/600	5/550	5/550	5/500	4/500	4/450	4/400	3/400
	Dist/TAS	19/313	18/313	17/313	16/313	16/313	15/312	14/312	13/312	12/312	11/312	9/312
10000	Time/Fuel	5/600	5/600	5/600	5/550	5/550	4/500	4/500	4/450	4/450	3/400	3/350
	Dist/TAS	16/310	16/310	15/310	14/310	14/310	13/310	12/310	11/310	10/310	9/310	8/310
8000	Time/Fuel	4/550	4/500	4/500	4/500	4/450	4/450	4/450	3/400	3/350	3/350	3/300
	Dist/TAS	12/305	11/305	11/305	10/305	10/305	10/305	9/305	8/305	8/305	7/305	6/305
6000	Time/Fuel	4/450	4/450	3/400	3/400	3/400	3/400	3/350	3/350	3/300	2/300	2/250
	Dist/TAS	8/301	8/301	7/301	7/301	7/301	6/301	6/301	6/301	5/301	5/301	4/301
1500	Time/Fuel	2/250	2/250	2/250	2/250	2/250	2/250	2/250	2/200	2/200	2/200	1/150

Fuel Adjustment for high elevation airports	Airport Elevation	2000	4000	6000	8000	10000	12000
Effect on time and distance is negligible	Fuel Adjustment	-50	-100	-200	-250	-300	-400

En-route Climb 280/.74

Figure I-18

All Engines		Maximum Cruise Thrust Limits									A/C Auto
PRESSURE ALTITUDE		34,000 ft					LONG RANGE CRUISE				
GROSS WT. kg	0 100 200 300 400 500 600 700 800 900										
	TAS	CRUISE DISTANCE NAUTICAL AIR MILES									
35000	405	0	23	46	70	93	117	140	164	187	210
36000	409	234	257	280	303	326	350	373	396	419	442
37000	413	465	488	511	534	557	579	602	625	648	671
38000	416	694	716	739	761	784	806	829	851	874	896
39000	419	919	941	963	986	1008	1030	1053	1075	1097	1119
40000	422	1142	1164	1186	1207	1229	1251	1273	1295	1317	1339
41000	424	1361	1383	1405	1426	1448	1470	1492	1513	1535	1557
42000	427	1578	1600	1621	1643	1664	1685	1707	1728	1750	1771
43000	428	1792	1814	1835	1856	1877	1898	1919	1940	1961	1983
44000	430	2004	2025	2045	2066	2087	2108	2129	2150	2171	2191
45000	431	2212	2233	2253	2274	2295	2315	2336	2356	2377	2398
46000	431	2418	2438	2459	2479	2499	2520	2540	2560	2581	2601
47000	431	2621	2641	2661	2682	2702	2722	2742	2762	2782	2802
48000	431	2822	2842	2862	2881	2901	2921	2941	2960	2980	3000
49000	431	3020	3039	3059	3078	3098	3118	3137	3157	3176	3196
50000	431	3215	3234	3254	3273	3292	3311	3331	3350	3369	3389
51000	431	3408	3427	3446	3465	3484	3503	3522	3541	3560	3579
52000	431	3598	3616	3635	3654	3673	3691	3710	3729	3747	3766
53000	431	3785	3803	3822	3840	3859	3877	3896	3914	3932	3951
54000	431	3969	3987	4006	4024	4042	4060	4078	4096	4115	4133
55000	431	4151	4169	4187	4205	4223	4240	4258	4276	4294	4312
56000	431	4330	4348	4365	4383	4400	4418	4436	4453	4471	4489
57000	431	4506	4524	4541	4558	4576	4593	4610	4628	4645	4662
58000	431	4680	4697	4714	4731	4748	4765	4782	4799	4816	4833
59000	431	4851	4867	4884	4901	4918	4934	4951	4968	4985	5002
60000	431	5018	5035	5051	5068	5084	5101	5117	5134	5150	5167
61000	431	5183	5200	5216	5232	5248	5264	5281	5297	5313	5329
62000	431	5345	5361	5377	5393	5409	5425	5441	5457	5472	5488
63000	431	5504	5520	5535	5551	5566	5582	5598	5613	5629	5644
64000	431	5660	5675	5690	5706	5721	5736	5751	5766	5782	5797
65000	430	5812	5827	5842	5857	5872	5886	5901	5916	5931	5946
66000	430	5961	5975	5990	6004	6019	6033	6048	6062	6077	6091
67000	430	6106	6120	6134	6148	6162	6176	6190	6204	6219	6233

**NOTE 1:** OPTIMUM WEIGHT FOR PRESSURE ALTITUDE IS 55,500 kg  
A) THRUST LIMITED WEIGHT FOR ISA +10 AND COLDER IS 67,100 kg  
B) THRUST LIMITED WEIGHT FOR ISA +15 IS 65,700 kg  
C) THRUST LIMITED WEIGHT FOR ISA +20 IS 64,000 kg

**NOTE 2:** ADJUSTMENTS FOR OPERATION AT NON-STANDARD TEMPERATURES  
A) INCREASE FUEL REQUIRED BY 0.6 PERCENT PER 10 DEGREES C ABOVE ISA  
B) DECREASE FUEL REQUIRED BY 0.6 PERCENT PER 10 DEGREES C BELOW ISA  
C) INCREASE TAS BY 1 KNOT PER DEGREE C ABOVE ISA  
D) DECREASE TAS BY 1 KNOT PER DEGREE C BELOW ISA

Long Range Cruise – Pressure Altitude 34,000 ft

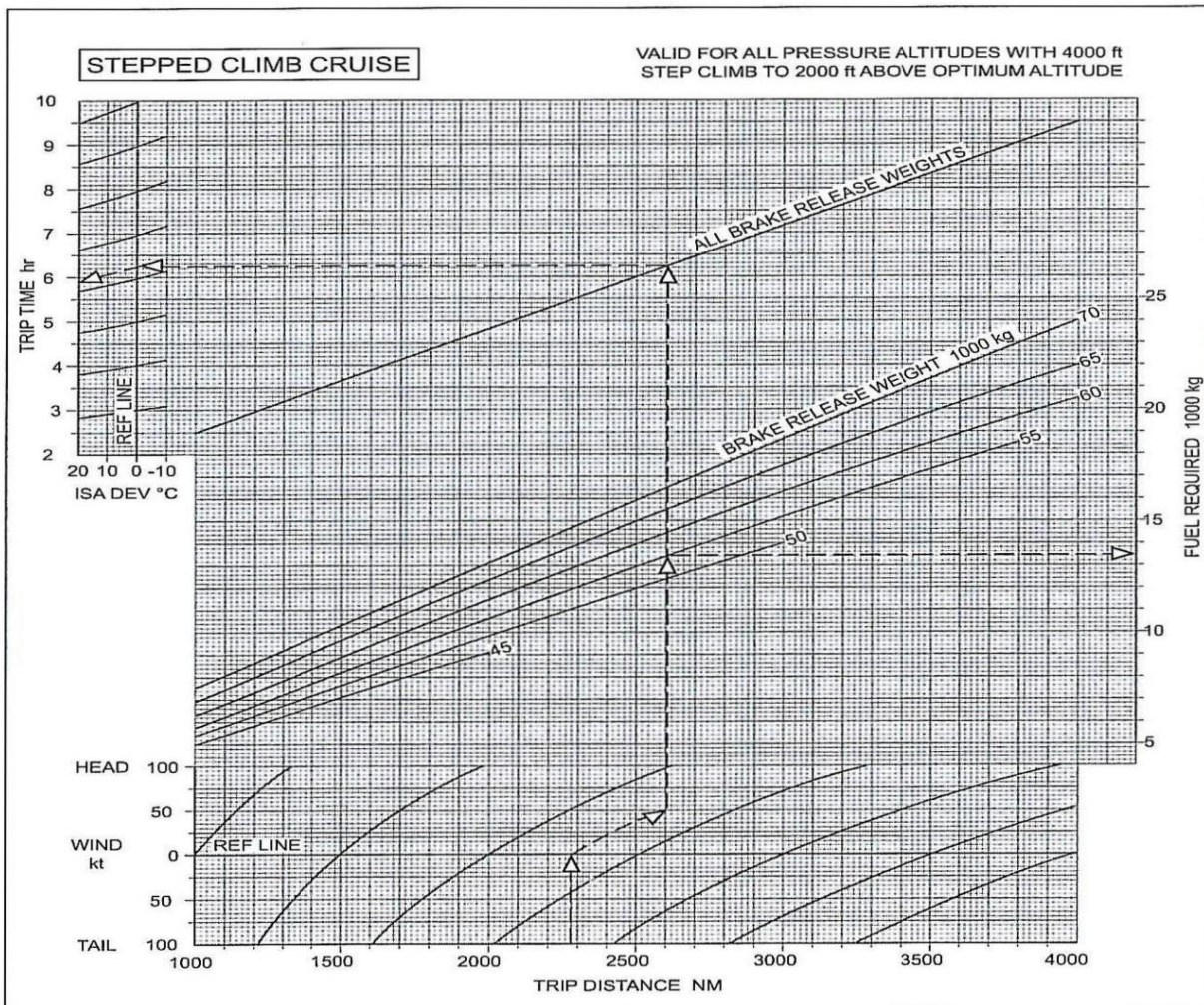


Figure I-19

**Step Climb Simplified Fuel Planning**

This chart allows the planner to optimise aeroplane performance by increasing the cruise altitude in 4000 ft steps in order to allow for the increase in optimum altitude as aeroplane weight decreases.

The graph is valid for altitudes with 'Step Climb' of 4,000 ft to 2,000 ft above optimum altitude. The graph provides trip fuel and time, at LRC or 0.74 M, from brake release to touchdown. The method of use is the same as that for the constant altitude charts except that the argument of 'Brake Release Weight' is used in place of 'Cruise Pressure Altitude' - see example on chart.



Simplified Flight Planning – Trip Distances 1,000 NM to 4,000 NM



Figure I-20

ISA -6°C TO -15°C

Press. Alt. ft	Units Min/kg. NAM/Kt	BRAKE RELEASE WEIGHT KG										
		68000	66000	64000	62000	60000	58000	56000	52000	48000	44000	40000
37000	Time/Fuel				30/2100	25/1800	22/1650	20/1550	17/1350	15/1200	13/1050	12/950
	Dist/TAS				184/391	148/387	130/385	117/383	98/381	85/379	73/378	64/377
36000	Time/Fuel			28/2050	24/1800	22/1650	20/1550	19/1450	16/1300	14/1150	13/1100	11/900
	Dist/TAS			166/388	142/385	127/383	115/381	106/380	91/378	79/377	69/376	60/375
35000	Time/Fuel	32/2350	27/2000	24/1850	22/1700	20/1600	19/1500	17/1400	15/1250	13/1100	12/1000	11/900
	Dist/TAS	195/390	156/385	139/383	125/381	114/380	105/378	97/377	85/376	74/375	65/374	57/373
34000	Time/Fuel	26/2000	23/1850	21/1700	20/1600	19/1500	17/1400	16/1350	14/1200	13/1100	11/950	10/850
	Dist/TAS	152/383	136/381	123/379	113/378	105/376	97/375	90/375	79/373	70/372	61/371	54/371
33000	Time/Fuel	23/1850	21/1750	20/1650	19/1550	17/1450	16/1350	15/1300	14/1150	12/1050	11/950	10/850
	Dist/TAS	133/378	121/376	112/375	104/374	97/373	90/372	84/372	74/371	66/370	58/369	51/368
32000	Time/Fuel	21/1750	20/1650	19/1550	17/1500	16/1400	16/1300	15/1250	13/1150	12/1000	11/900	9/800
	Dist/TAS	120/374	111/373	103/372	96/371	90/370	84/369	79/369	70/368	62/367	55/366	48/366
31000	Time/Fuel	20/1700	19/1600	18/1500	17/1400	16/1350	15/1300	14/1200	13/1100	11/1000	10/900	9/800
	Dist/TAS	110/370	102/369	95/368	89/367	84/367	79/366	74/366	66/365	58/364	52/364	46/363
30000	Time/Fuel	19/1600	18/1550	17/1450	16/1350	15/1300	14/1250	13/1200	12/1050	11/950	10/850	9/800
	Dist/TAS	101/366	95/365	89/364	83/364	78/363	74/363	70/362	62/362	55/361	49/361	43/360
29000	Time/Fuel	17/1550	16/1450	16/1400	15/1300	14/1250	13/1200	13/1150	11/1050	10/950	9/850	8/750
	Dist/TAS	92/361	87/360	81/360	77/359	72/359	68/358	64/358	57/357	51/357	46/357	41/356
28000	Time/Fuel	16/1450	15/1400	15/1300	14/1250	13/1200	13/1150	12/1100	11/1000	10/900	9/800	8/750
	Dist/TAS	84/356	79/356	75/355	70/355	67/355	63/354	59/354	53/353	48/353	42/353	38/352
27000	Time/Fuel	15/1400	14/1350	14/1250	13/1200	12/1150	12/1100	11/1050	10/950	9/850	8/800	8/700
	Dist/TAS	77/352	73/351	69/351	65/351	61/350	58/350	55/350	49/349	44/349	39/349	35/348
26000	Time/Fuel	14/1350	14/1250	13/1200	12/1150	12/1100	11/1050	11/1000	10/900	9/850	8/750	7/700
	Dist/TAS	71/348	67/347	63/347	60/347	57/347	54/346	51/346	46/346	41/345	37/345	33/345
25000	Time/Fuel	13/1300	13/1200	12/1150	12/1100	11/1050	11/1000	10/950	9/900	8/800	8/750	7/650
	Dist/TAS	65/344	61/343	58/343	55/343	52/343	50/343	47/342	42/342	38/342	34/342	30/341
24000	Time/Fuel	13/1200	12/1150	11/1100	11/1050	10/1000	10/950	10/900	9/850	8/750	7/700	6/650
	Dist/TAS	60/340	56/340	54/340	51/339	48/339	46/339	43/339	39/339	35/338	32/338	28/338
23000	Time/Fuel	12/1150	11/1100	11/1050	10/1000	10/1000	9/950	9/900	8/800	7/750	7/700	6/600
	Dist/TAS	55/336	52/336	49/336	47/336	44/336	42/335	40/335	36/335	33/335	29/335	26/335
22000	Time/Fuel	11/1100	11/1050	10/1000	10/1000	9/950	9/900	9/850	8/800	7/700	6/650	6/600
	Dist/TAS	50/333	48/333	45/333	43/332	41/332	39/332	37/332	33/332	30/332	27/332	24/331
21000	Time/Fuel	10/1050	10/1000	10/1000	9/950	9/900	8/850	8/800	7/750	7/700	6/650	6/550
	Dist/TAS	46/330	44/329	42/329	40/329	38/329	36/329	34/329	31/329	28/328	25/328	22/328
20000	Time/Fuel	10/1000	9/950	9/950	9/900	8/850	8/800	8/800	7/700	6/650	6/600	5/550
	Dist/TAS	42/326	40/326	38/326	36/326	35/326	33/326	31/326	28/326	26/325	23/325	21/325
19000	Time/fuel	9/950	9/950	8/900	8/850	8/800	7/800	7/750	7/700	6/650	6/600	5/500
	Dist/TAS	39/323	37/323	35/323	33/323	30/323	30/323	29/323	26/323	24/322	21/322	19/322
18000	Time/Fuel	9/900	8/900	8/850	8/800	7/800	7/750	7/700	6/650	6/600	5/550	5/500
	Dist/TAS	35/320	34/320	32/320	31/320	29/320	28/320	26/320	24/320	22/320	19/319	17/319
17000	Time/Fuel	8/900	8/850	8/800	7/800	7/750	7/700	6/700	6/650	5/600	5/550	5/500
	Dist/TAS	32/317	31/317	29/317	28/317	27/317	25/317	24/317	22/317	20/317	18/317	16/317
16000	Time/Fuel	8/850	7/800	7/750	7/700	7/700	6/700	6/650	6/600	5/550	5/500	4/450
	Dist/TAS	29/314	28/314	27/314	25/314	24/314	23/314	22/314	20/314	18/314	16/314	15/314
15000	Time/Fuel	7/800	7/750	7/700	6/700	6/700	6/650	6/600	5/550	5/500	4/500	4/450
	Dist/TAS	26/312	25/312	24/312	23/311	22/311	21/311	20/311	18/311	16/311	15/311	13/311
14000	Time/Fuel	7/750	6/700	6/700	6/650	6/600	6/600	5/600	5/550	5/500	4/450	4/400
	Dist/TAS	24/309	23/309	22/309	21/309	20/309	19/309	18/309	16/309	15/309	13/309	12/309
13000	Time/Fuel	6/700	6/700	6/650	6/600	5/600	5/600	5/550	5/500	4/500	4/450	4/400
	Dist/TAS	21/306	20/306	19/306	19/306	18/306	17/306	16/306	15/306	13/306	12/306	11/306
12000	Time/Fuel	6/650	6/600	5/600	5/600	5/600	5/550	5/500	4/500	4/450	4/400	3/400
	Dist/TAS	19/304	18/304	17/304	17/304	16/304	15/304	14/304	13/304	12/304	11/304	10/304
11000	Time/Fuel	5/650	5/600	5/600	5/550	5/500	5/500	4/500	4/450	4/400	3/400	3/350
	Dist/TAS	17/301	16/301	15/301	15/301	14/301	13/301	13/301	12/301	11/301	10/301	9/301
10000	Time/Fuel	5/600	5/550	5/550	5/500	4/500	4/500	4/500	4/450	4/400	3/350	3/350
	Dist/TAS	15/299	14/299	13/299	13/299	12/299	12/299	11/299	10/299	9/299	8/299	7/299
8000	Time/Fuel	4/500	4/500	4/500	4/450	4/450	4/450	3/400	3/400	3/350	3/350	3/300
	Dist/TAS	11/294	10/294	10/294	9/294	9/294	8/294	8/294	7/294	6/294	6/294	6/294
6000	Time/Fuel	4/450	3/400	3/400	3/400	3/400	3/350	3/350	3/350	3/300	2/300	2/250
	Dist/TAS	7/290	7/290	6/290	6/290	6/290	6/290	5/290	5/290	4/290	4/290	4/290
1500	Time/Fuel	2/250	2/250	2/250	2/250	2/250	2/250	2/250	2/200	2/200	2/200	1/150

Fuel Adjustment for high elevation airports	Airport Elevation	2000	4000	6000	8000	10000	12000
Effect on time and distance is negligible	Fuel Adjustment	-50	-100	-150	-250	-300	-350

En-route Climb 280/.74



Figure I-21

ISA +16°C TO +25°C

Press. Alt. ft	Units Min/kg. NAM/Kt	BRAKE RELEASE WEIGHT KG										
		68000	66000	64000	62000	60000	58000	56000	52000	48000	44000	40000
37000	Time/Fuel					37/2550	31/2150	27/1950	22/1650	19/1450	17/1300	15/1150
	Dist/TAS					246/417	198/413	172/410	140/407	118/405	101/403	88/402
36000	Time/Fuel				35/2450	30/2200	27/2000	24/1850	21/1600	18/1400	16/1250	14/1100
	Dist/TAS				227/414	192/411	170/408	153/406	128/404	110/402	95/400	82/399
35000	Time/Fuel		42/2950	34/2500	30/2200	27/2050	25/1900	23/1750	20/1550	17/1350	15/1200	13/1050
	Dist/TAS		281/418	220/412	190/409	169/406	153/405	140/403	119/401	103/399	90/398	78/397
34000	Time/Fuel	40/2850	34/2500	30/2250	27/2100	25/1950	23/1800	21/1700	19/1500	16/1300	14/1150	13/1050
	Dist/TAS	260/414	215/409	188/406	169/404	153/403	141/401	130/400	112/398	97/397	85/396	74/395
33000	Time/Fuel	33/2500	30/2300	27/2100	25/1950	23/1850	21/1700	20/1600	18/1450	16/1300	14/1150	12/1000
	Dist/TAS	210/407	186/404	168/402	153/400	141/399	130/398	121/397	105/395	92/394	80/393	70/392
32000	Time/Fuel	30/2350	27/2150	25/2000	23/1900	22/1750	20/1650	19/1550	17/1400	15/1250	13/1100	12/1000
	Dist/TAS	185/401	167/399	153/398	141/396	130/395	121/394	113/394	98/392	86/391	76/390	67/389
31000	Time/Fuel	27/2200	25/2050	23/1900	22/1800	20/1700	19/1600	18/1500	16/1350	14/1200	13/1100	11/950
	Dist/TAS	166/396	152/395	141/394	130/393	121/392	113/391	106/390	93/389	82/388	72/387	63/387
30000	Time/Fuel	25/2100	24/1950	22/1850	21/1750	19/1650	18/1550	17/1450	15/1300	14/1150	12/1050	11/950
	Dist/TAS	152/392	140/391	130/389	121/389	113/388	106/387	99/387	87/385	77/385	68/384	60/383
29000	Time/Fuel	23/1950	22/1850	20/1750	19/1650	18/1550	17/1450	16/1400	14/1250	13/1100	12/1000	10/900
	Dist/TAS	136/386	126/385	118/384	110/383	106/383	97/382	91/382	80/381	71/380	63/379	56/379
28000	Time/Fuel	21/1850	20/1750	19/1650	18/1550	17/1500	16/1400	15/1350	14/1200	12/1100	11/950	10/850
	Dist/TAS	123/380	114/379	107/379	100/378	94/378	89/377	83/377	74/376	66/375	58/375	52/375
27000	Time/Fuel	20/1750	19/1650	18/1550	17/1500	16/1400	15/1350	14/1250	13/1150	11/1050	10/950	9/850
	Dist/TAS	111/375	104/374	98/374	92/373	86/373	81/372	77/372	68/371	61/371	54/371	48/370
26000	Time/Fuel	18/1650	17/1550	16/1500	16/1400	15/1350	14/1300	13/1200	12/1100	11/1000	10/900	9/800
	Dist/TAS	101/370	95/370	89/369	84/369	79/368	75/368	70/368	63/367	56/367	50/366	44/366
25000	Time/Fuel	17/1550	16/1500	15/1400	15/1350	14/1300	13/1200	13/1150	11/1050	10/950	9/850	8/750
	Dist/TAS	92/365	86/365	81/365	77/364	73/364	69/364	65/363	58/363	52/363	46/362	41/362
24000	Time/Fuel	16/1500	15/1400	14/1350	14/1300	13/1200	12/1150	12/1100	11/1000	10/900	9/850	8/750
	Dist/TAS	84/361	79/361	75/360	70/360	67/360	63/360	60/359	53/359	48/359	43/358	38/358
23000	Time/Fuel	15/1400	14/1350	13/1300	13/1250	12/1150	12/1100	11/1050	10/950	9/900	8/800	7/700
	Dist/TAS	77/357	72/357	68/356	65/356	61/356	58/356	55/356	49/355	44/355	39/355	35/355
22000	Time/Fuel	14/1350	13/1300	13/1250	12/1150	11/1100	11/1050	10/1000	9/900	8/850	7/750	7/700
	Dist/TAS	70/353	66/353	63/352	59/352	56/352	53/352	50/352	45/351	41/351	36/351	32/351
21000	Time/Fuel	13/1300	12/1200	12/1150	11/1100	11/1050	10/1000	10/950	9/900	8/800	7/750	7/650
	Dist/TAS	64/349	60/349	57/349	54/349	52/348	49/348	46/348	42/348	37/348	34/348	30/347
20000	Time/Fuel	12/1200	12/1150	11/1100	11/1050	10/1000	10/950	9/950	8/850	8/750	7/700	6/650
	Dist/TAS	58/345	55/345	52/345	50/345	47/345	45/345	43/345	38/344	34/344	31/344	28/344
19000	Time/Fuel	11/1150	11/1100	10/1050	10/1000	9/950	9/900	9/900	8/800	7/750	7/650	6/600
	Dist/TAS	53/342	50/342	48/342	45/342	43/342	41/341	39/341	35/341	32/341	28/341	25/341
18000	Time/Fuel	11/1100	10/1050	10/1000	9/950	9/900	9/900	8/850	7/750	7/700	6/650	6/600
	Dist/TAS	48/339	46/339	44/338	42/338	39/338	38/338	36/338	32/338	29/338	26/338	23/338
17000	Time/Fuel	10/1050	10/1000	9/950	9/900	8/850	8/850	8/800	7/750	6/650	6/600	5/550
	Dist/TAS	44/335	42/335	40/335	38/335	36/335	34/335	33/335	29/335	27/335	24/335	21/335
16000	Time/Fuel	9/1000	9/950	9/900	8/850	8/850	7/800	7/750	7/700	6/650	5/600	5/550
	Dist/TAS	40/332	38/332	36/332	34/332	33/332	31/332	30/332	27/332	24/332	22/332	19/332
15000	Time/Fuel	9/950	8/900	8/850	8/800	7/800	7/750	7/700	6/650	6/600	5/550	5/500
	Dist/TAS	36/329	34/329	33/329	31/329	30/329	28/329	27/329	24/329	22/329	20/329	18/329
14000	Time/Fuel	8/850	8/650	7/800	7/750	7/750	6/700	6/700	6/650	5/550	5/500	4/500
	Dist/TAS	32/326	31/326	29/326	28/326	27/326	25/326	24/326	22/326	20/326	18/326	16/326
13000	Time/Fuel	7/800	7/800	7/750	7/750	6/700	6/650	6/650	5/600	5/550	5/500	4/450
	Dist/TAS	29/323	28/323	26/323	25/323	24/323	23/323	22/323	20/323	18/323	16/323	14/323
12000	Time/Fuel	7/750	7/750	6/700	6/700	6/650	6/650	5/600	5/550	5/500	4/450	4/450
	Dist/TAS	26/321	25/321	23/321	22/321	21/321	20/321	19/321	18/321	16/320	14/320	13/320
11000	Time/Fuel	6/700	6/700	6/650	6/650	5/600	5/600	5/550	5/500	4/500	4/450	4/400
	Dist/TAS	23/318	22/318	21/318	20/318	19/318	18/318	17/318	16/318	14/318	13/318	11/318
10000	Time/Fuel	6/650	6/650	5/600	5/600	5/550	5/550	5/550	4/500	4/450	4/400	3/400
	Dist/TAS	20/315	19/315	18/315	17/315	16/315	16/315	15/315	14/315	12/315	11/315	10/315
8000	Time/Fuel	5/550	5/550	5/550	4/500	4/500	4/500	4/450	4/400	3/400	3/350	3/350
	Dist/TAS	14/310	14/310	13/310	13/310	12/310	11/310	11/310	10/310	9/310	8/310	7/310
6000	Time/Fuel	4/450	4/450	4/450	4/450	3/400	3/400	3/400	3/350	3/350	3/300	2/300
	Dist/TAS	10/306	9/306	9/306	8/306	8/306	8/306	7/306	7/306	6/306	5/306	5/306
1500	Time/Fuel	2/250	2/250	2/250	2/250	2/250	2/250	2/250	2/200	2/200	1/150	1/150

Fuel Adjustment for high elevation airports	Airport Elevation	2000	4000	6000	8000	10000	12000
Effect on time and distance is negligible	Fuel Adjustment	-50	-150	-200	-300	-350	-400

En-route Climb 280/.74

Figure I-22

### Holding Fuel Planning

The table below provides fuel flow values for various hold entry weights and holding pressure altitudes to facilitate the calculation of the holding reserve fuel requirements for flight planning.

#### Calculation Procedure

- Enter Figure 4.4 with the Pressure Altitude at which the hold is planned and the weight at the start of the hold, interpolating as required.
- Extract the holding fuel flow in kg per hour.
- The fuel flow is based on a racetrack pattern at the minimum drag KIAS. The minimum speed that is permitted to be flown is 210 KIAS.
- If the hold is to be conducted in straight and level flight, reduce the fuel flow by 5%.

Press Alt. ft	Weight x 1,000 kg														
	66	64	62	60	58	56	54	52	50	48	46	44	42	40	38
FUEL FLOW in kg per hour															
37,000					2,740	2,540	2,400	2,260	2,160	2,080	1,980	1,900	1,800	1,740	1,680
35,000		3,020	2,820	2,660	2,520	2,420	2,320	2,220	2,140	2,060	1,960	1,880	1,800	1,720	1,660
30,000	2,840	2,740	2,660	2,560	2,480	2,400	2,300	2,220	2,140	2,060	1,960	1,880	1,800	1,740	1,680
25,000	2,840	2,760	2,660	2,580	2,500	2,420	2,320	2,240	2,160	2,080	2,000	1,920	1,840	1,780	1,720
20,000	2,840	2,760	2,680	2,580	2,500	2,420	2,340	2,260	2,180	2,100	2,020	1,940	1,860	1,800	1,760
15,000	2,880	2,800	2,700	2,620	2,540	2,460	2,380	2,300	2,220	2,140	2,060	1,980	1,920	1,860	1,800
10,000	2,920	2,820	2,740	2,660	2,580	2,500	2,420	2,340	2,260	2,180	2,100	2,020	1,980	1,920	1,880
5,000	2,960	2,860	2,780	2,700	2,620	2,540	2,460	2,380	2,300	2,220	2,140	2,080	2,020	1,960	1,920
1,500	3,000	2,900	2,820	2,740	2,660	2,580	2,520	2,440	2,360	2,280	2,220	2,140	2,080	2,020	1,980

Holding Fuel Flow – Flaps Retracted



Figure I-23

All Engines		Maximum Cruise Thrust Limits										A/C Auto
PRESSURE ALTITUDE		28,000 ft					LONG RANGE CRUISE					
GROSS		0	100	200	300	400	500	600	700	800	900	
WT. kg	TAS	CRUISE DISTANCE NAUTICAL AIR MILES										
35000	376	0	20	41	62	83	104	125	145	166	187	
36000	380	208	229	249	270	290	311	332	352	373	393	
37000	384	414	434	455	475	495	516	536	557	577	597	
38000	388	618	638	658	678	698	718	738	759	779	799	
39000	392	819	839	859	879	898	918	938	958	978	998	
40000	396	1018	1037	1057	1077	1096	1116	1136	1155	1175	1195	
41000	399	1214	1234	1253	1273	1292	1312	1331	1350	1370	1389	
42000	403	1409	1428	1447	1466	1486	1505	1524	1543	1563	1582	
43000	406	1601	1620	1639	1658	1677	1696	1715	1734	1753	1772	
44000	409	1791	1810	1829	1848	1866	1885	1904	1923	1942	1960	
45000	413	1979	1998	2016	2035	2054	2072	2091	2109	2128	2147	
46000	416	2165	2184	2202	2220	2239	2257	2275	2294	2312	2331	
47000	419	2349	2367	2385	2404	2422	2440	2458	2476	2495	2513	
48000	422	2531	2549	2567	2585	2603	2621	2639	2657	2675	2693	
49000	425	2711	2729	2747	2764	2782	2800	2818	2836	2853	2871	
50000	427	2889	2907	2924	2942	2960	2977	2995	3013	3030	3048	
51000	429	3065	3083	3100	3118	3135	3153	3170	3188	3205	3222	
52000	432	3240	3257	3274	3292	3309	3326	3344	3361	3378	3395	
53000	434	3413	3430	3447	3464	3481	3498	3515	3532	3549	3567	
54000	436	3584	3601	3617	3634	3651	3668	3685	3702	3719	3736	
55000	437	3753	3770	3786	3803	3820	3837	3853	3870	3887	3904	
56000	439	3920	3937	3953	3970	3987	4003	4020	4036	4053	4069	
57000	440	4086	4102	4119	4135	4152	4168	4184	4201	4217	4234	
58000	441	4250	4266	4282	4299	4315	4331	4347	4364	4380	4396	
59000	442	4412	4428	4444	4460	4476	4492	4509	4525	4541	4557	
60000	442	4573	4589	4605	4620	4636	4652	4668	4684	4700	4716	
61000	442	4732	4747	4763	4779	4795	4810	4826	4842	4858	4873	
62000	442	4889	4905	4920	4936	4951	4967	4983	4998	5014	5029	
63000	443	5045	5060	5076	5091	5106	5122	5137	5153	5168	5184	
64000	443	5199	5214	5229	5245	5260	5275	5290	5306	5321	5336	
65000	443	5351	5367	5382	5397	5412	5427	5442	5457	5472	5487	
66000	443	5502	5517	5532	5547	5562	5577	5592	5607	5622	5637	
67000	443	5652	5666	5681	5696	5711	5725	5740	5755	5770	5784	

**NOTE 1:** OPTIMUM WEIGHT FOR PRESSURE ALTITUDE EXCEEDS STRUCTURAL LIMIT  
A) THRUST LIMITED WEIGHT FOR ISA +10 AND COLDER EXCEEDS STRUCTURAL LIMIT  
B) THRUST LIMITED WEIGHT FOR ISA +15 EXCEEDS STRUCTURAL LIMIT  
C) THRUST LIMITED WEIGHT FOR ISA +20 EXCEEDS STRUCTURAL LIMIT

**NOTE 2:** ADJUSTMENTS FOR OPERATION AT NON-STANDARD TEMPERATURES  
A) INCREASE FUEL REQUIRED BY 0.6 PERCENT PER 10 DEGREES C ABOVE ISA  
B) DECREASE FUEL REQUIRED BY 0.6 PERCENT PER 10 DEGREES C BELOW ISA  
C) INCREASE TAS BY 1 KNOT PER DEGREE C ABOVE ISA  
D) DECREASE TAS BY 1 KNOT PER DEGREE C BELOW ISA

Long Range Cruise – Pressure Altitude 28,000 ft

Figure I-24

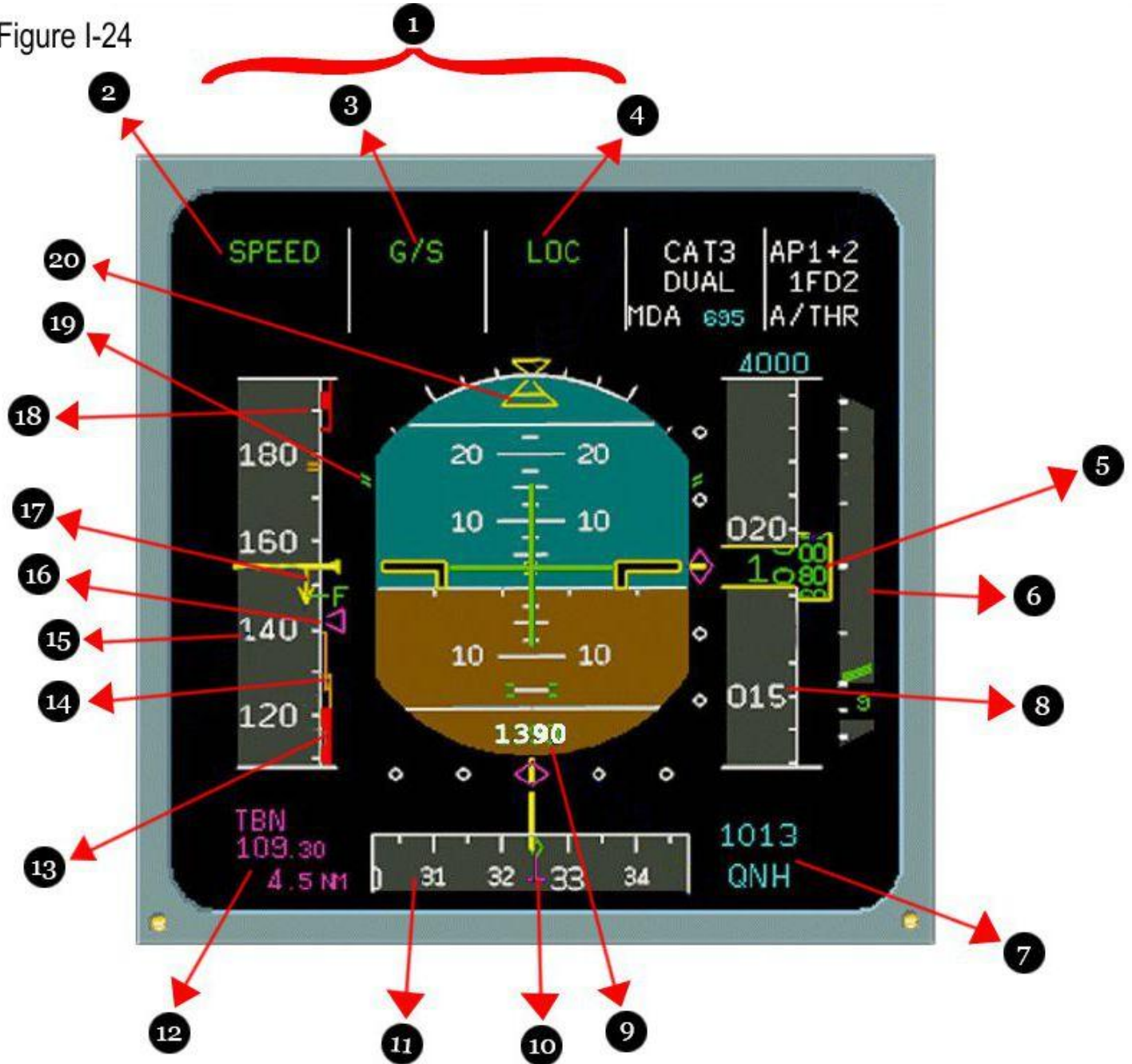
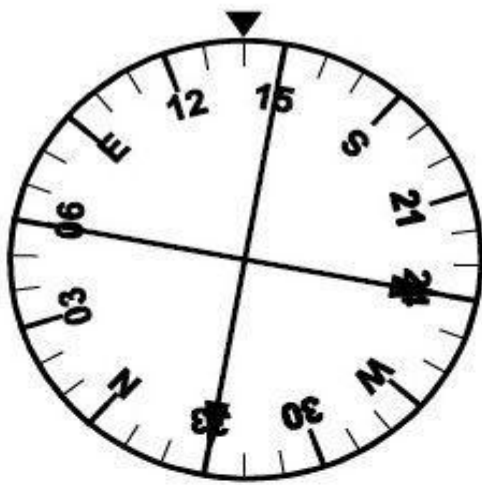


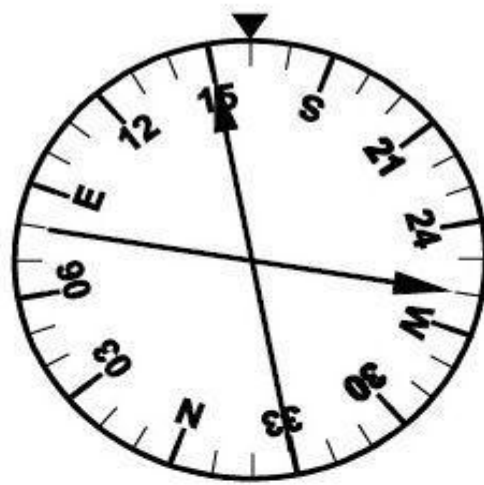
Figure I-25



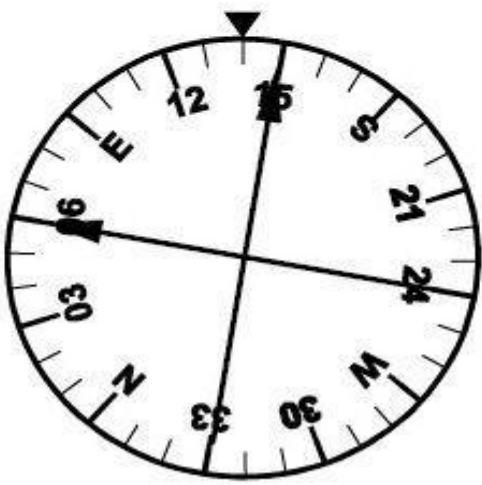




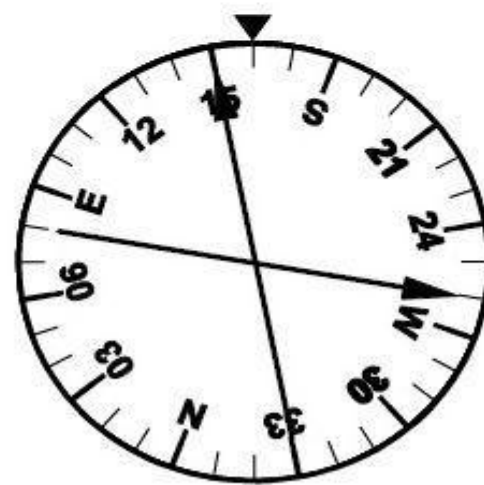
**a**



**b**



**c**



**d**

Figure I-26

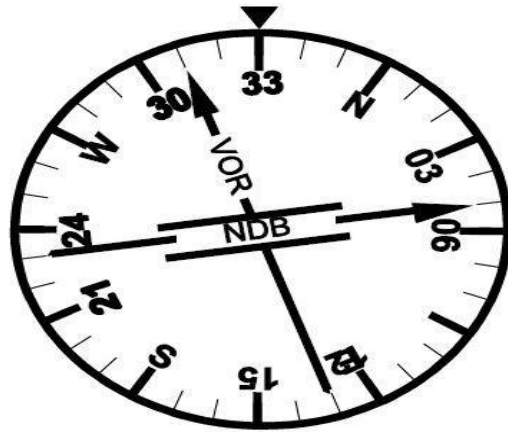
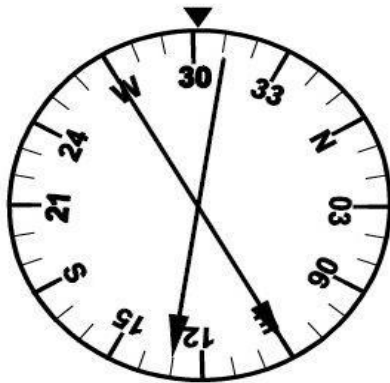
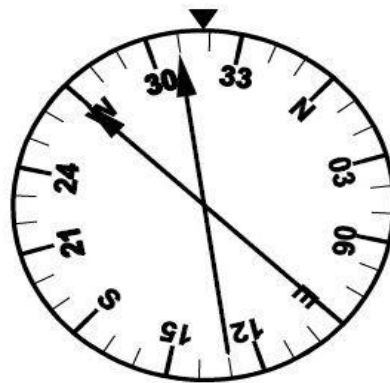


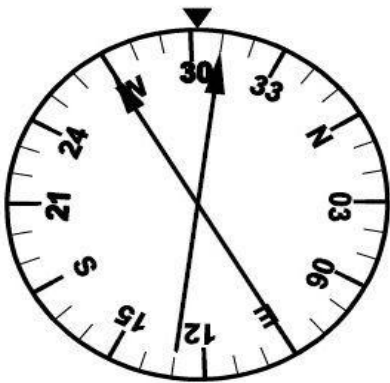
Figure I-27



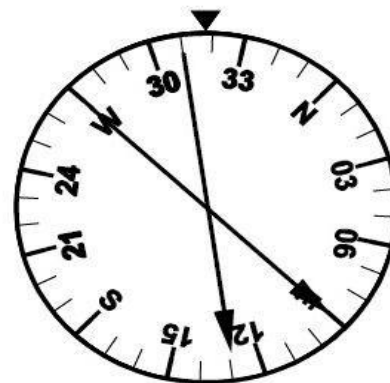
a



b



c



d

Figure I-28

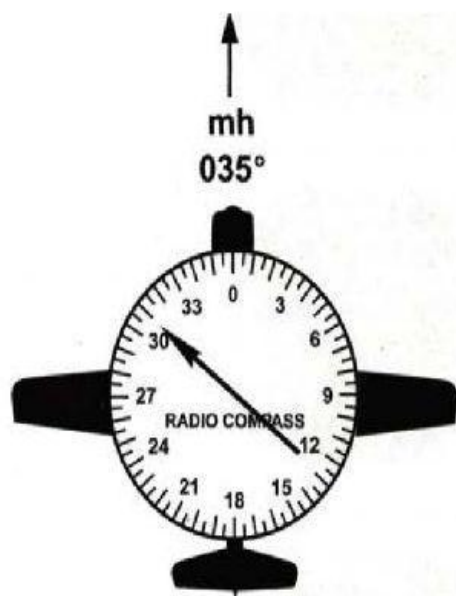


Figure I-29

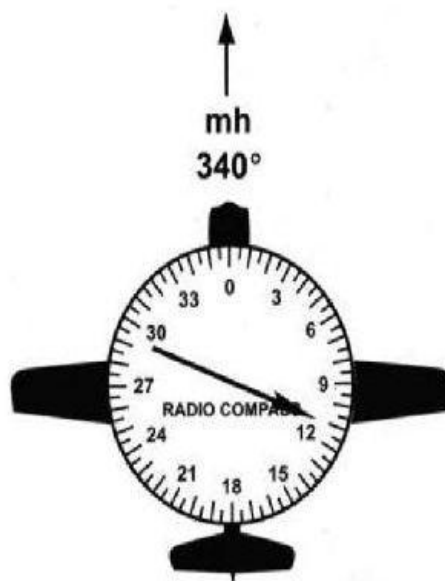


Figure I-30



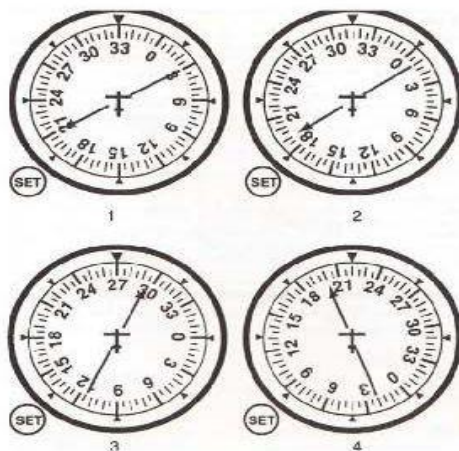


Figure I-31

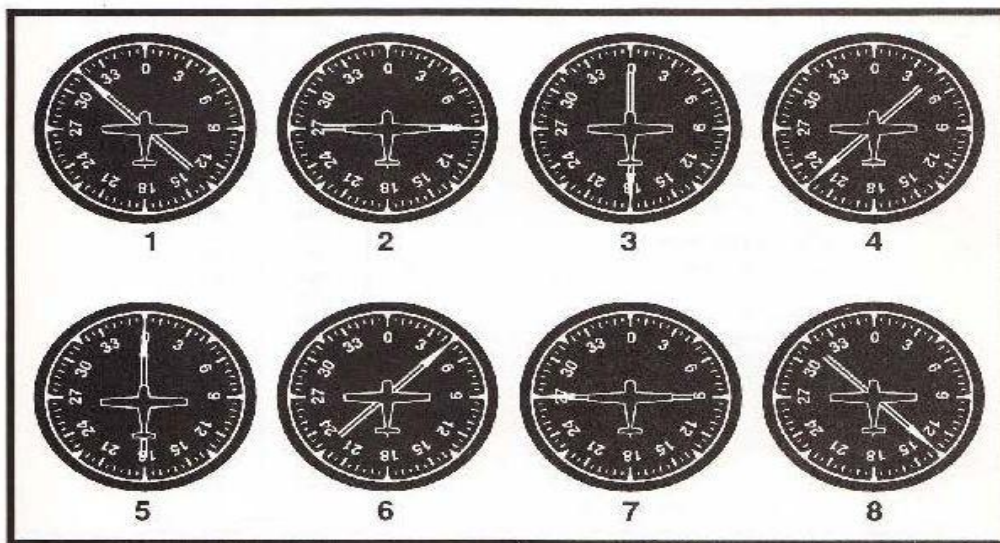
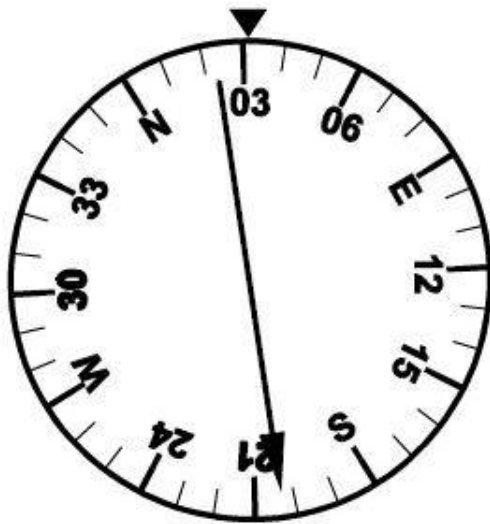
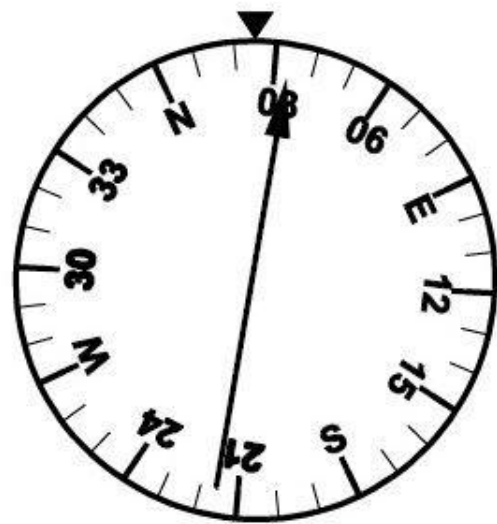


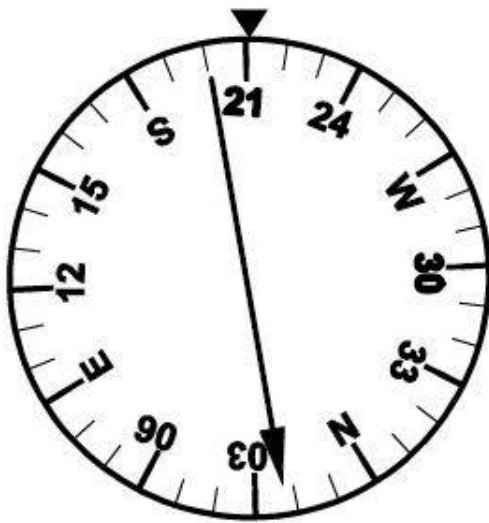
Figure I-32



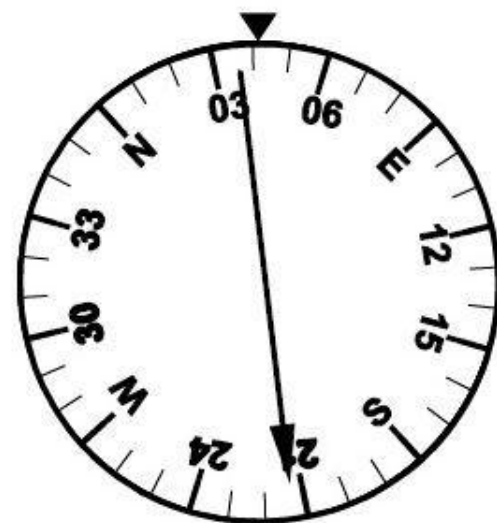
**a**



**b**



**c**



**d**

Figure I-33

# REFERENCES

- ASA Test Prep
- IRAN AIP AIRAC 3 – 2016
- Airway Manual – February 2017
- Annex 2, 10<sup>th</sup> edition - Amendment 44
- Annex 3, 18<sup>th</sup> edition - Amendment 76
- Annex 6, (P1) 10<sup>th</sup> edition - Amendment 40-A
- Annex 10, (Vol.2) 7<sup>th</sup> edition - Amendment 90
- Annex 11, 14<sup>th</sup> edition – Amendment 50-A
- Annex 14, (Vol.1) 5<sup>th</sup> edition - Amendment 10B
- Annex 15, 14<sup>th</sup> edition - Amendment 38
- Document 4444, 15<sup>th</sup> edition – Amendment 6
- Document 8168, 5<sup>th</sup> edition – Amendment 4
- FAA knowledge test
- Oxford Ground training series for ATPL
- GFD private pilot test book 2015
- GFD instrument commercial test book 2015
- JAA Test Prep aviation exam 2010