

**INSTRUMENT
APPROACH
CHART - ICAO**

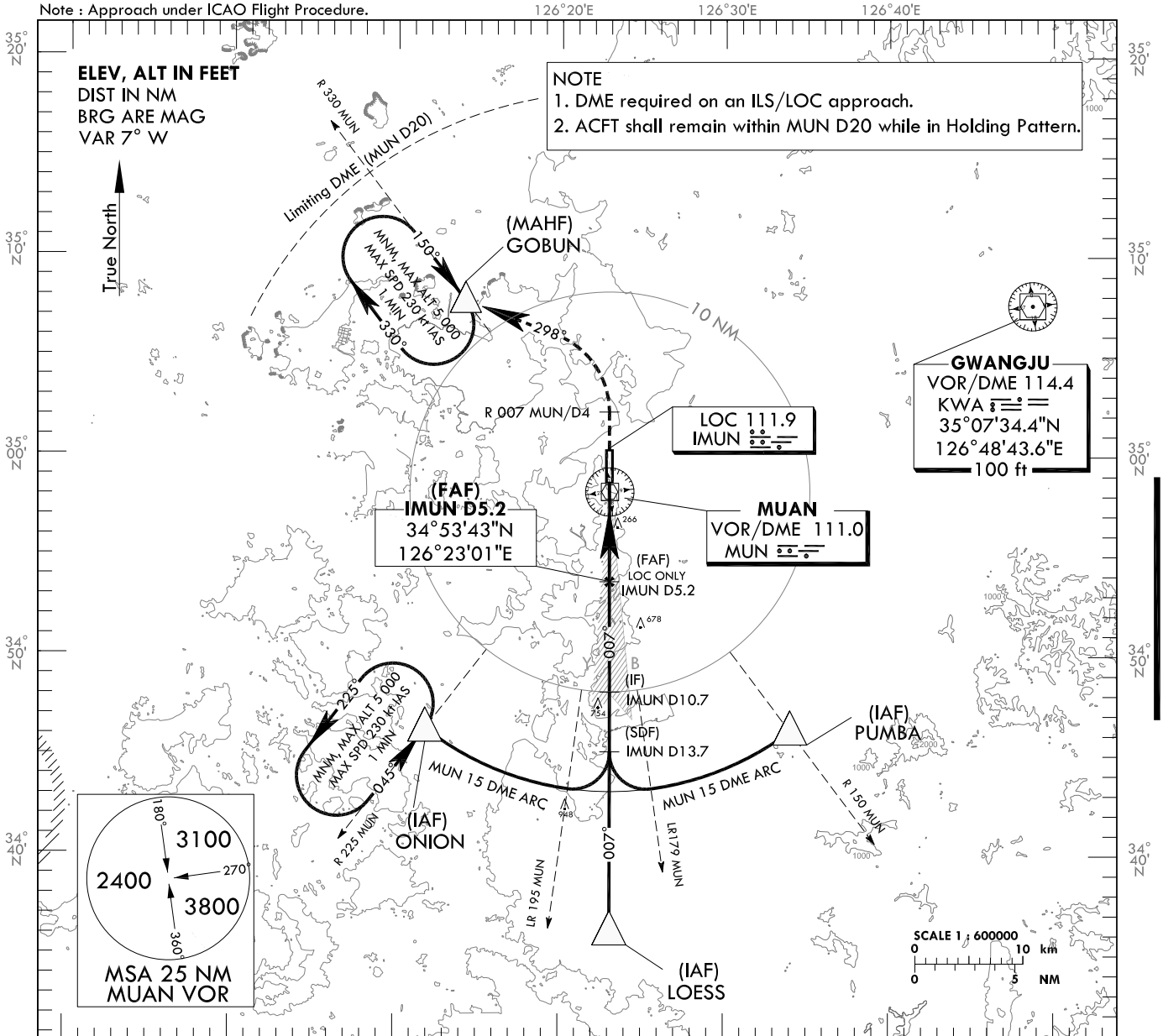
AERODROME ELEV 51 ft
HEIGHTS RELATED TO
THR RWY 01 - ELEV 32 ft

GWANGJU APP	120.475	130.0
	228.9	265.5
MUAN TWR	118.25	118.85

MUAN/Muan Intl(RKJB)

ILS or LOC Y RWY 01

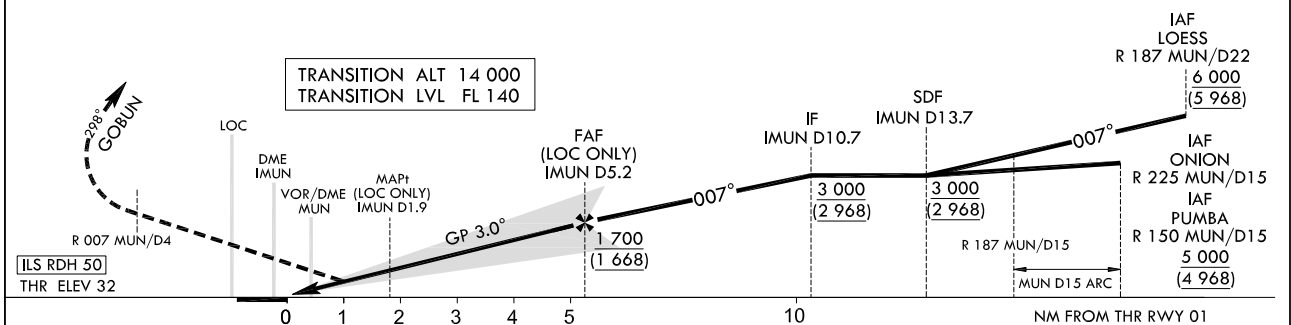
Note : Approach under ICAO Flight Procedure.



RECOMMENDED PROFILE(LOC ONLY)	DME IMUN	5	4	3	2
Final Approach Gradient 5.31%, 323 ft/NM	ALT(HGT)	1 645 (1 613)	1 322 (1 290)	999 (967)	660 (628)

MISSED APPROACH

Climb on R 007 MUN/D4, then turn left HDG 298° to GOBUN and Hold at 5 000 ft.



CATEGORY		DA(DH)/MDA(MDH)	A	B	C	D	Knots						
STA	CAT-I	FULL	RVR 550 m, VIS 800 m				Rate of descent	V/V fpm	318	478	637	796	955
		ALS INOP	1 200 m										
	LOC	FULL	2 600 m				* Timing Not authorized for defining MAPt. * Circling Not authorized.						
		ALS INOP	3 300 m										

Change : Amended ILS plan view symbol.

MUAN/Muan Intl(RKJB)
ILS or LOC Y RWY 01

AERONAUTICAL DATA TABULATION

ILS/LOC Approach to RWY 01 from ONION, LOESS or PUMBA		
Fix/point		Coordinates
ONION(IAF)	R 225 MUN /15.00 NM MUN	34°46'19.7"N 126°11'50.8"E
LOESS(IAF)	R 187 MUN /22.00 NM MUN	34°36'10.5"N 126°23'06.3"E
PUMBA(IAF)	R 150 MUN /15.00 NM MUN	34°46'14.4"N 126°34'00.9"E
D13.7 IMUN(SDF)	BRG 7.10°/13.67 NM IMUN	34°45'11.5"N 126°23'04.1"E
D10.7 IMUN(IF)	BRG 7.10°/10.69 NM IMUN	34°48'10.9"N 126°23'03.3"E
D5.2 IMUN(FAP)	BRG 7.10°/5.17 NM IMUN	34°53'42.6"N 126°23'00.5"E
D1.9 IMUN(MAP† LOC ONLY)	BRG 7.10°/1.90 NM IMUN	34°56'59.1"N 126°22'59.2"E
MUN VOR/DME		34°58'12.7"N 126°23'00.0"E
THR RWY01		34°58'43.64"N 126°22'58.45"E
IMUN DME		34°58'53.2"N 126°22'53.8"E
IMUN LOC		35°00'23.1"N 126°22'57.8"E
D4 MUN	BRG 7.10°/4.00 NM MUN	35°02'12.9"N 126°22'57.0"E
GOBUN	BRG 298.15°/12.00 NM MUN	35°07'46.6"N 126°14'09.0"E

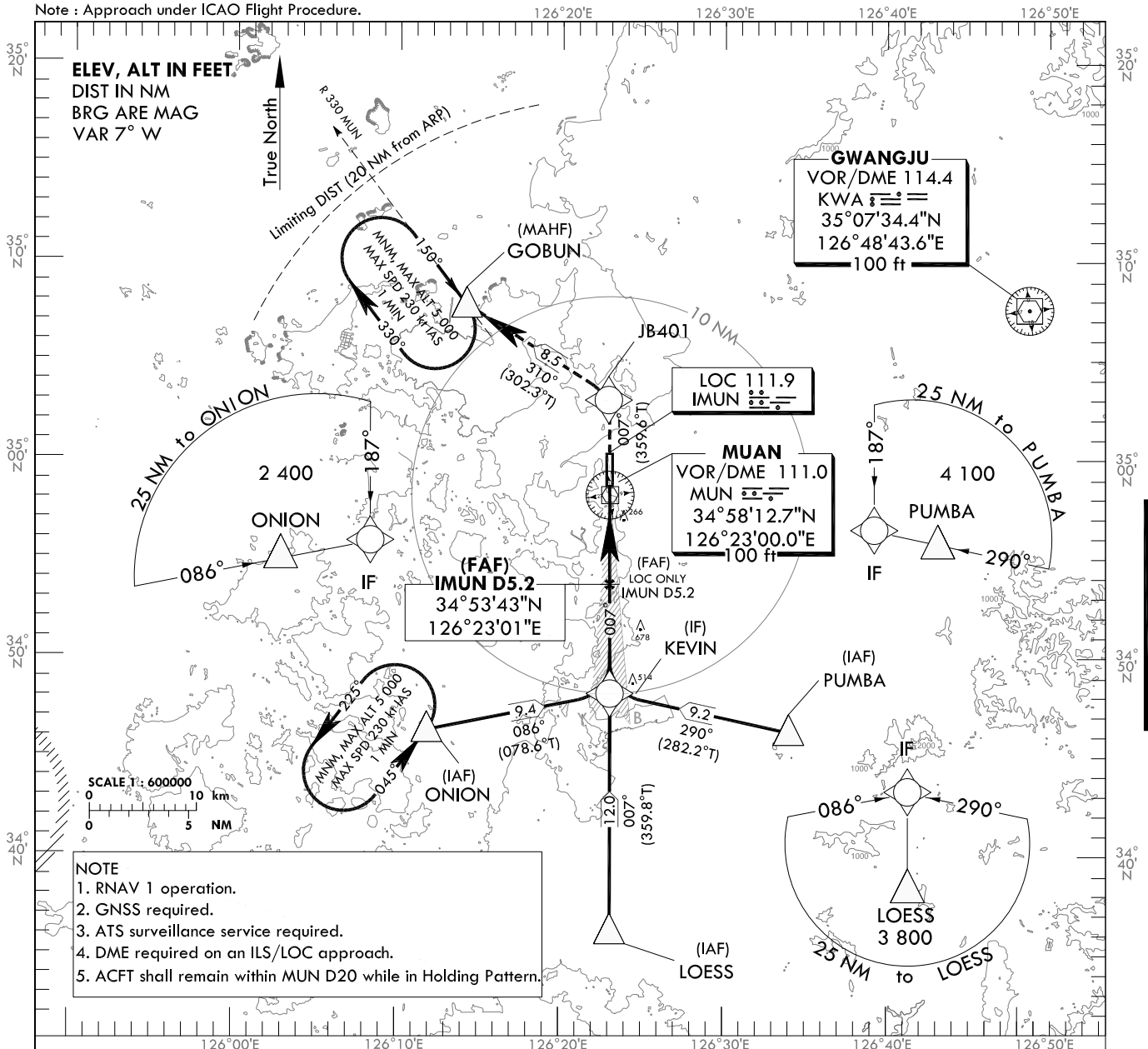
**INSTRUMENT
APPROACH
CHART - ICAO**

AERODROME ELEV 51 ft
HEIGHTS RELATED TO
THR RWY 01 - ELEV 32 ft

GWANGJU APP 120.475 130.0
228.9 265.5
MUN TWR 118.25 118.85

MUAN/Muan Intl(RKJB)
ILS or LOC Z RWY 01

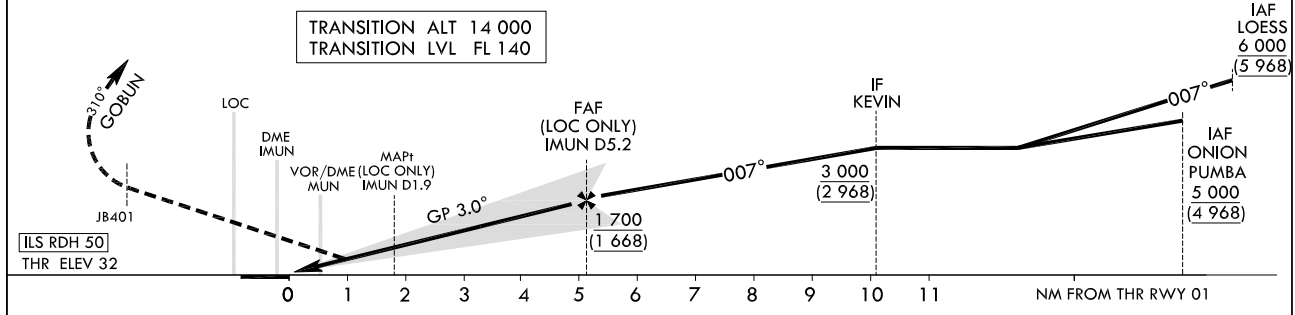
Note : Approach under ICAO Flight Procedure.



NOTE
1. RNAV 1 operation.
2. GNSS required.
3. ATS surveillance service required.
4. DME required on an ILS/LOC approach.
5. ACFT shall remain within MUN D20 while in Holding Pattern.

RECOMMENDED PROFILE(LOC ONLY)	DME IMUN	5	4	3	2
Final Approach Gradient 5.31%, 323 ft/NM	ALT(HGT)	1 645 (1 613)	1 322 (1 290)	999 (967)	660 (628)

MISSED APPROACH
Climb to 5 000 ft on track of 007° to JB401, then LEFT turn on track of 310° to GOBUN.



CATEGORY	DA(DH)/MDA(MDH)	A	B	C	D	Knots	60	90	120	150	180	
		RVR 550 m, VIS 800 m	1 200 m	2 600 m	3 300 m							Rate of descent
STA	CAT-I	FULL	RVR 550 m, VIS 800 m				* Timing Not authorized for defining MAPt. * Circling Not authorized.					
		ALS INOP										
	LOC	FULL										
		ALS INOP										

Change : Amended ILS plan view symbol.

MUAN/Muan Intl(RKJB)
ILS or LOC Z RWY 01

AERONAUTICAL DATA TABULATION

ILS/LOC Approach to RWY 01 from ONION, LOESS or PUMBA		
Fix/point		Coordinates
ONION(IAF)		34°46'19.7"N 126°11'50.8"E
LOESS(IAF)		34°36'10.5"N 126°23'06.3"E
PUMBA(IAF)		34°46'14.4"N 126°34'00.9"E
KEVIN(IF)	BRG 7.10°/10.69 NM IMUN	34°48'10.9"N 126°23'03.3"E
D5.2 IMUN(FAP)	BRG 7.10°/5.17 NM IMUN	34°53'42.6"N 126°23'00.5"E
D1.9 IMUN(MAP† LOC ONLY)	BRG 7.10°/1.90 NM IMUN	34°56'59.1"N 126°22'59.2"E
MUN VOR/DME		34°58'12.7"N 126°23'00.0"E
THR RWY01		34°58'43.64"N 126°22'58.45"E
IMUN DME		34°58'53.2"N 126°22'53.8"E
IMUN LOC		35°00'23.1"N 126°22'57.8"E
JB401		35°03'13.1"N 126°22'56.4"E
GOBUN		35°07'46.6"N 126°14'09.0"E

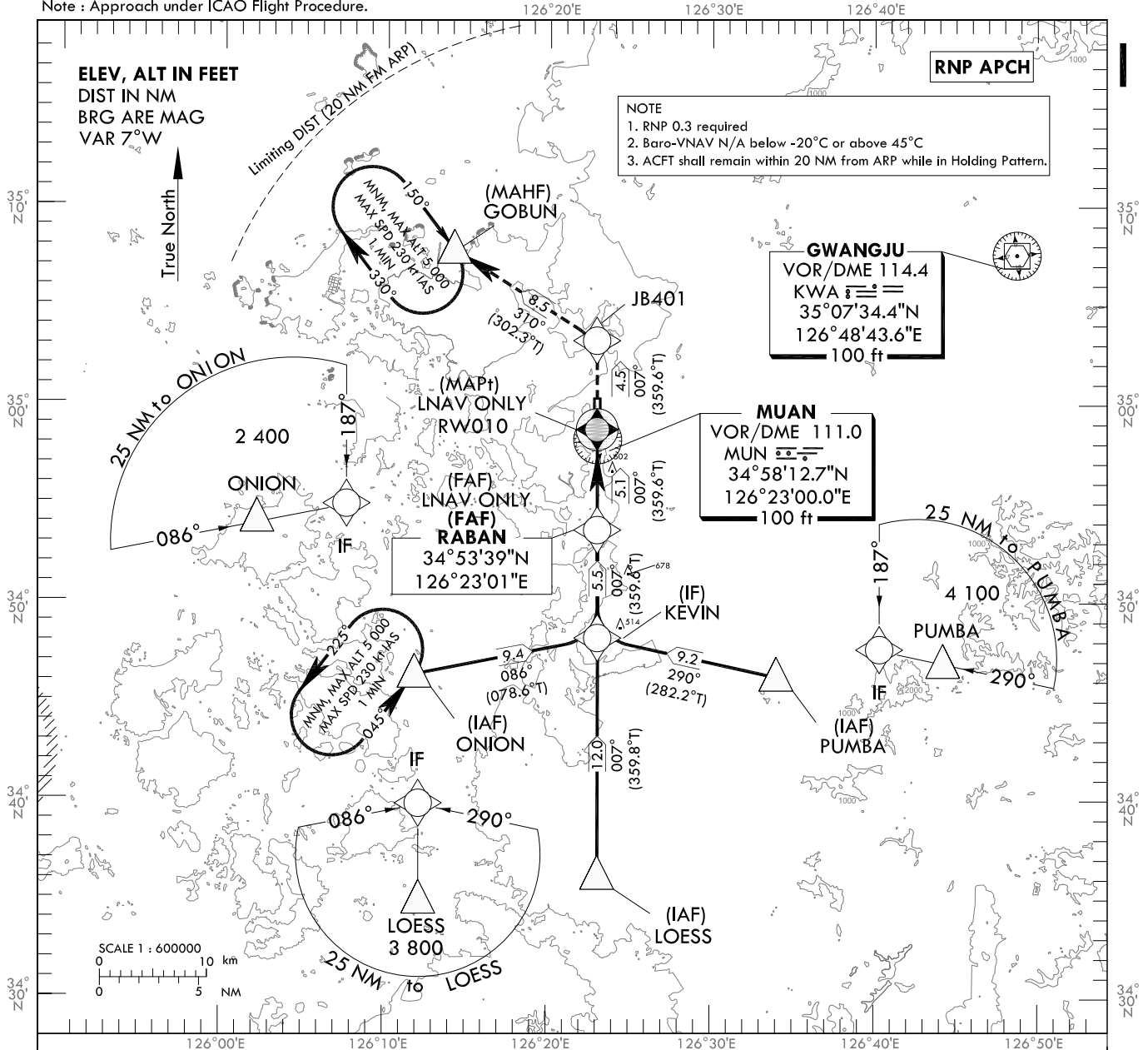
**INSTRUMENT
APPROACH
CHART - ICAO**

AERODROME ELEV 51 ft
HEIGHTS RELATED TO
THR RWY 01 - ELEV 32 ft

GWANGJU APP	120.475	130.0
	228.9	265.5
MUAN TWR	118.25	118.85

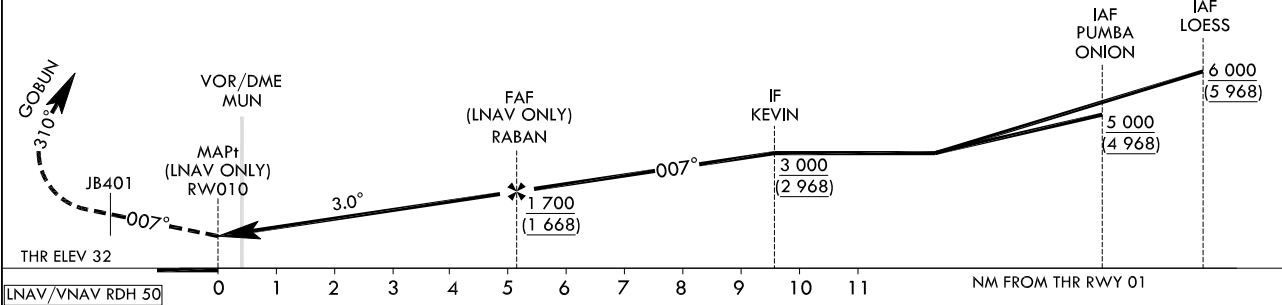
MUAN/Muan Intl(RKJB)
RNP RWY 01

Note : Approach under ICAO Flight Procedure.



TRANSITION ALT 14 000
TRANSITION LVL FL 140

MISSED APPROACH
Climb to 5 000 ft on track of 007° to JB401,
then LEFT turn on track of 310° to GOBUN.



CATEGORY	DA(H)/MDA(H)	A	B	C	D	Knots	60	90	120	150	180	Rate of descent		
												V/V fpm		
STA	LNAV/VNAV	FULL	790	2 700 m				319	478	638	797	957	* Timing Not authorized for defining MAPt.	* Circling Not authorized.
		ALS INOP	(758)	3 500 m										
	LNAV	FULL	850	3 100 m										
		ALS INOP	(818)	3 800 m										

Change : Amended procedure name(RNAV(GNSS) → RNP).

MUAN/Muan Intl(RKJB)
RNP RWY 01
HOLDING PROCEDURE

AERONAUTICAL DATA TABULATION

Instrument Approach Procedure Coding Tables

RNP RWY 01 - via ONION to KEVIN(IF)

Serial Number	Path Descriptor	Waypoint Identifier	Fly-over	Course/Track °M(°T)	Distance (NM)	Turn direction	Altitude (ft)	Speed (kt)	Coordinates	VPA/RDH	Navigation specification	Remarks
001	IF	ONION	-	-	-	-	+5 000	-	34°46'19.7"N 126°11'50.8"E	-	RNP APCH	IAF
002	TF	KEVIN	-	086(078.6)	9.4	-	+3 000	-	34°48'10.9"N 126°23'03.3"E	-	RNP APCH	IF

RNP RWY 01 - via LOESS to KEVIN(IF)

Serial Number	Path Descriptor	Waypoint Identifier	Fly-over	Course/Track °M(°T)	Distance (NM)	Turn direction	Altitude (ft)	Speed (kt)	Coordinates	VPA/RDH	Navigation specification	Remarks
001	IF	LOESS	-	-	-	-	+6 000	-	34°36'10.5"N 126°23'06.3"E	-	RNP APCH	IAF
002	TF	KEVIN	-	007(359.8)	12.0	-	+3 000	-	34°48'10.9"N 126°23'03.3"E	-	RNP APCH	IF

RNP RWY 01 - via PUMBA to KEVIN(IF)

Serial Number	Path Descriptor	Waypoint Identifier	Fly-over	Course/Track °M(°T)	Distance (NM)	Turn direction	Altitude (ft)	Speed (kt)	Coordinates	VPA/RDH	Navigation specification	Remarks
001	IF	PUMBA	-	-	-	-	+5 000	-	34°46'14.4"N 126°34'00.9"E	-	RNP APCH	IAF
002	TF	KEVIN	-	290(282.2)	9.2	-	+3 000	-	34°48'10.9"N 126°23'03.3"E	-	RNP APCH	IF

RNP RWY 01 - via KEVIN(IF) to GOBUN(MAHF)

Serial Number	Path Descriptor	Waypoint Identifier	Fly-over	Course/Track °M(°T)	Distance (NM)	Turn direction	Altitude (ft)	Speed (kt)	Coordinates	VPA/RDH	Navigation specification	Remarks
002	TF	KEVIN	-	-	-	-	+3 000	-	34°48'10.9"N 126°23'03.3"E	-	RNP APCH	IF
003	TF	RABAN	-	007(359.6)	5.5	-	+1 700	-	34°53'38.8"N 126°23'00.8"E	-	RNP APCH	FAF
004	TF	RW010	Y	007(359.6)	5.1	-	+850	-	34°58'43.64"N 126°22'58.45"E	-3.00/50	RNP APCH	MAPt
005	TF	JB401	-	007(359.6)	4.5	-	-	-	35°03'13.1"N 126°22'56.4"E	-	RNP APCH	-
006	TF	GOBUN	Y	310(302.3)	8.5	-	-	-	35°07'46.6"N 126°14'09.0"E	-	RNP APCH	-
007	HM	GOBUN	Y	150(142.8)	-	R	@5 000	-230	35°07'46.6"N 126°14'09.0"E	-	RNP APCH	1 min (Outbound timing)

HOLDING PROCEDURE

Holding Identification	Path Descriptor	Waypoint Identifier	Fly-over	Course/Track °M(°T)	Time (min)	Turn direction	Altitude (ft)	Speed (kt)	Coordinates	VPA/RDH	Navigation specification	Remarks
RNP RWY 01	HM	ONION	Y	045 (037.7)	1	L	@5 000	-230	34°46'19.7"N 126°11'50.8"E	-	RNAV 1	-

Change : Amended procedure name(RNAV(GNSS) → RNP).

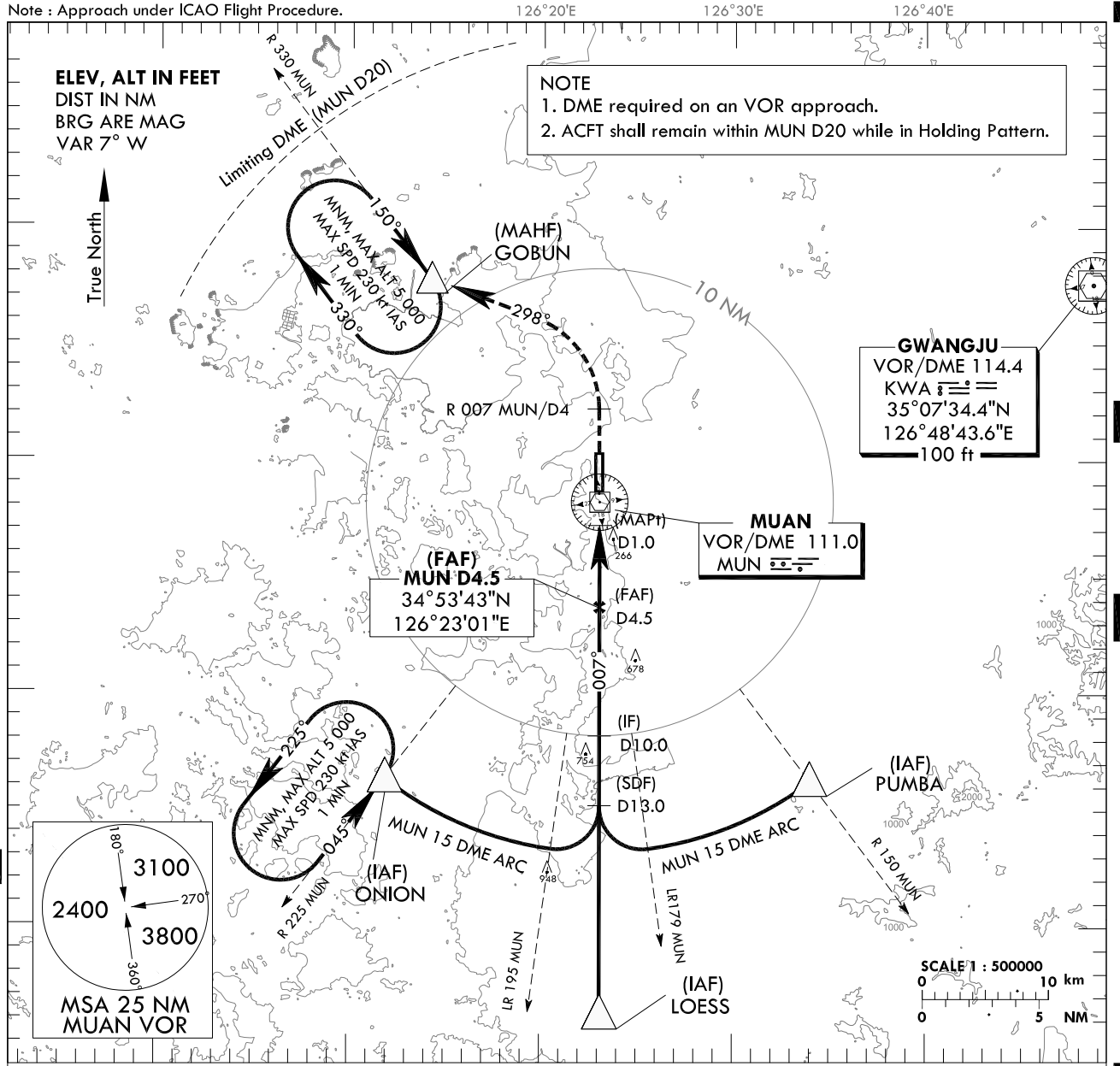
**INSTRUMENT
APPROACH
CHART - ICAO**

AERODROME ELEV 51 ft
HEIGHTS RELATED TO
THR RWY 01 - ELEV 32 ft

GWANGJU APP	120.475	130.0
	228.9	265.5
MUAN TWR	118.25	118.85

MUAN/Muan Intl(RKJB)
VOR RWY 01

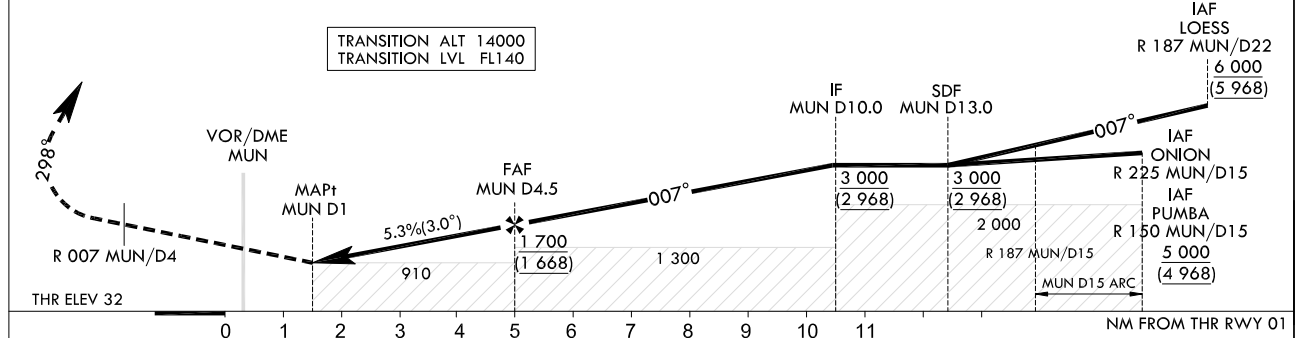
Note : Approach under ICAO Flight Procedure.



RECOMMENDED PROFILE	DME MUN	4	3	2.1
Final Approach Gradient 5.32%, 323 ft/NM	ALT(HGT)	1 540 (1 508)	1 217 (1 185)	910 (878)

MISSED APPROACH

Climb on R 007 MUN/D4, then turn left HDG 298° to GOBUN and Hold at 5 000 ft.



CATEGORY	MDA/(MDH)	A	B	C	D	Knots							
						60	90	120	150	180			
STA	FULL	910 (878)	3 300 m				Rate of descent	V/V fpm	323	484	646	807	968
	ALS INOP		4 000 m				* Circling Not authorized. * Timing Not authorized for defining the MAPt.						

Change : Amended coordinate format.

MUAN/Muan Intl(RKJB)
VOR RWY 01

AERONAUTICAL DATA TABULATION

VOR Approach to RWY 01 from ONION, LOESS or PUMBA		
	Fix/point	Coordinates
ONION(IAF)	R 225 MUN /15.00 NM MUN	34°46'19.7"N 126°11'50.8"E
LOESS(IAF)	R 187 MUN /22.00 NM MUN	34°36'10.5"N 126°23'06.3"E
PUMBA(IAF)	R 150 MUN /15.00 NM MUN	34°46'14.4"N 126°34'00.9"E
D13 MUN(SDF)	BRG 7.31°/13.00 NM MUN	34°45'11.5"N 126°23'03.7"E
D10 MUN(IF)	BRG 7.31°/10.0 NM MUN	34°48'10.9"N 126°23'03.3"E
D4.5 MUN(FAF)	BRG 7.31°/4.50 NM MUN	34°53'42.6"N 126°23'00.5"E
D1 MUN(MAPt)	BRG 7.31°/1.00 NM MUN	34°57'12.6"N 126°23'00.3"E
MUN VOR/DME		34°58'12.7"N 126°23'00.0"E
THR RWY01		34°58'43.64"N 126°22'58.45"E
D4 MUN	BRG 7.31°/4.00 NM MUN	35°02'12.9"N 126°22'57.0"E
GOBUN	BRG 298.35°/12.00 NM MUN	35°07'46.6"N 126°14'09.0"E

Change : Amended coordinate format.

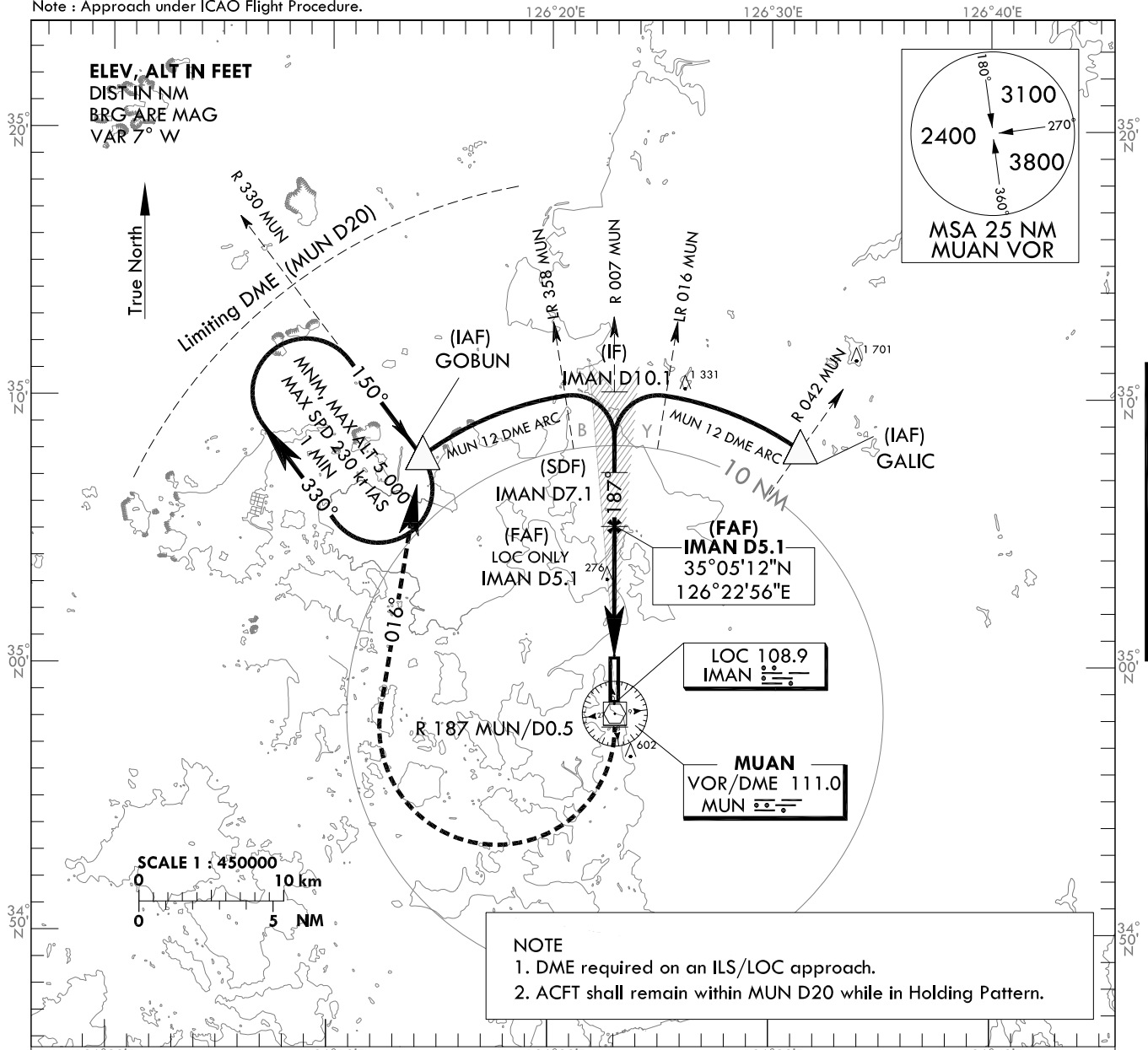
**INSTRUMENT
APPROACH
CHART - ICAO**

AERODROME ELEV 51 ft
HEIGHTS RELATED TO
THR RWY 19 - ELEV 51 ft

GWANGJU APP	120.475	130.0
	228.9	265.5
MUAN TWR	118.25	118.85

**MUAN/Muan Intl(RKJB)
ILS or LOC Y RWY 19**

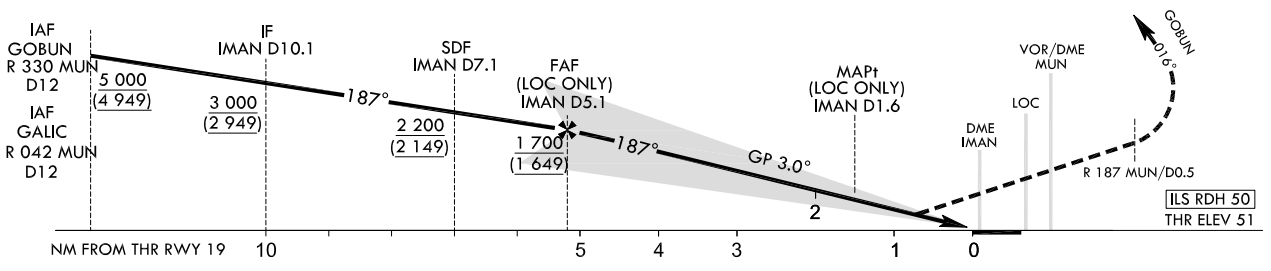
Note : Approach under ICAO Flight Procedure.



RECOMMENDED PROFILE(LOC ONLY)		DME IMAN	5	4	3	2	1.7
Final Approach Gradient 5.31%, 323 ft/NM		ALT(HGT)	1 660 (1 609)	1 338 (1 287)	1 015 (964)	692 (641)	590 (539)

MISSED APPROACH
Climb on R 187 MUN/D0.5, then turn right HDG 016° to GOBUN and Hold at 5 000 ft.

TRANSITION ALT 14 000
TRANSITION LVL FL 140



* Timing Not authorized for defining MAPt.
* Circling Not authorized.

Change : Amended ILS plan view symbol.

MUAN/Muan Intl(RKJB)
ILS or LOC Y RWY 19

AERONAUTICAL DATA TABULATION

ILS/LOC Approach to RWY 19 from GOBUN or GALIC		
	Fix/point	Coordinates
GOBUN(IAF)	R 330 MUN /12.00 NM MUN	35°07'46.6"N 126°14'09.0"E
GALIC(IAF)	R 042 MUN /12.00 NM MUN	35°08'04.8"N 126°31'20.7"E
D10.1 IMAN(IF)	BRG 187.14°/10.14 NM IMAN	35°10'13.8"N 126°22'53.6"E
D7.1 IMAN(SDF)	BRG 187.14°/7.14 NM IMAN	35°07'13.4"N 126°22'54.7"E
D5.1 IMAN(FAP)	BRG 187.14°/5.12 NM IMAN	35°05'12.3"N 126°22'55.7"E
D1.6 IMAN(MAP† LOC ONLY)	BRG 187.14°/1.60 NM IMAN	35°01'40.5"N 126°22'57.2"E
THR RWY19		35°00'14.49"N 126°22'57.82"E
IMAN DME		35°00'04.3"N 126°22'53.3"E
IMAN LOC		34°58'35.0"N 126°22'58.5"E
MUN VOR/DME		34°58'12.7"N 126°23'00.0"E
D0.5 MUN	BRG 187.14°/0.50 NM MUN	34°57'42.7"N 126°23'00.2"E
GOBUN	BRG 016.40°/12.00 NM MUN	35°07'46.6"N 126°14'09.0"E

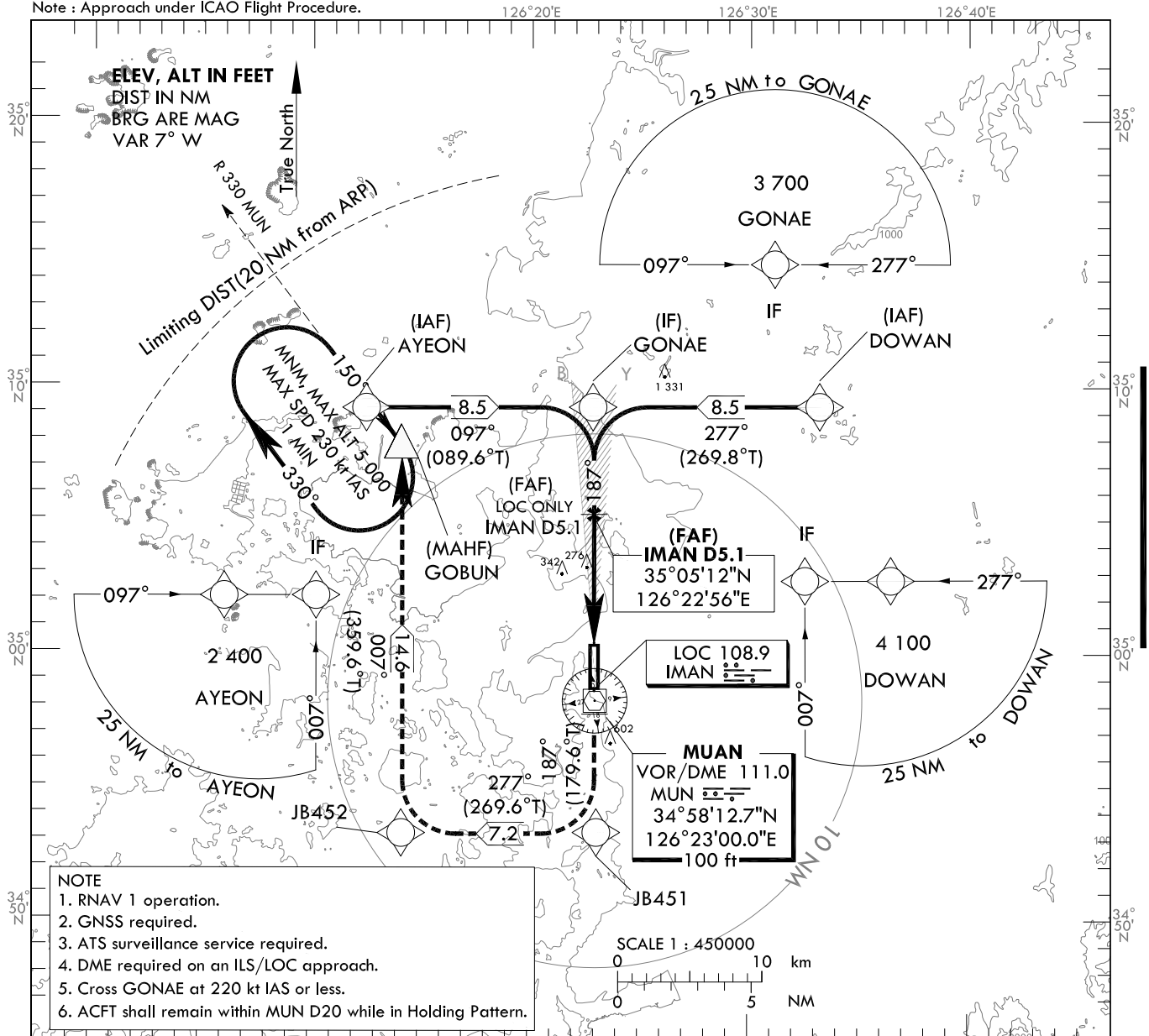
**INSTRUMENT
APPROACH
CHART - ICAO**

AERODROME ELEV 51 ft
HEIGHTS RELATED TO
THR RWY 19 - ELEV 51 ft

GWANGJU APP	120.475	130.0
	228.9	265.5
MUAN TWR	118.25	118.85

MUAN/Muan Intl(RKJB)
ILS or LOC Z RWY 19

Note : Approach under ICAO Flight Procedure.



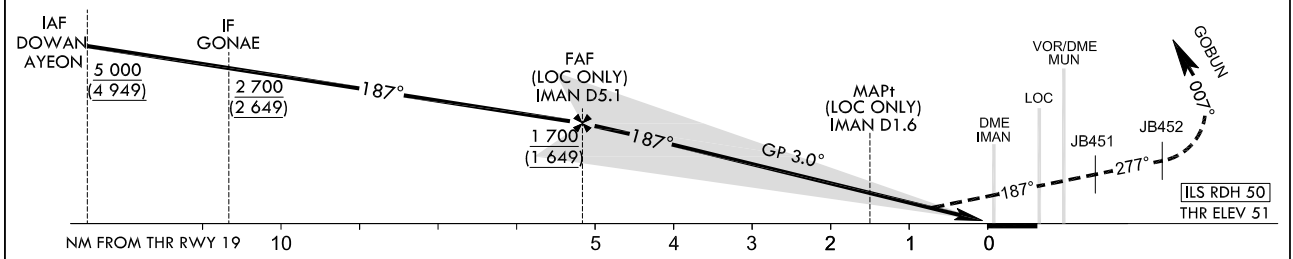
- NOTE**
1. RNAV 1 operation.
 2. GNSS required.
 3. ATS surveillance service required.
 4. DME required on an ILS/LOC approach.
 5. Cross GONAE at 220 kt IAS or less.
 6. ACFT shall remain within MUN D20 while in Holding Pattern.

RECOMMENDED PROFILE(LOC ONLY)	DME IMAN	5	4	3	2	1.7
Final Approach Gradient 5.31%, 323 ft/NM	ALT(HGT)	1 660 (1 609)	1 338 (1 287)	1 015 (964)	692 (641)	590 (539)

MISSED APPROACH

Climb to 5 000 ft on track of 187° to JB451, RIGHT turn on track of 277° to JB452, Then RIGHT turn on track of 007° to GOBUN.
* Missed approach turns are limited to maximum of 230 kt IAS.

TRANSITION ALT 14 000
TRANSITION LVL FL 140



* Timing Not authorized for defining MAPt.
* Circling Not authorized.

Change : Amended ILS plan view symbol.

MUAN/Muan Intl(RKJB)
ILS or LOC Z RWY 19

AERONAUTICAL DATA TABULATION

ILS/LOC Approach to RWY 19 from AYEON or DOWAN	
Fix/point	Coordinates
AYEON(IAF)	35°09'10.2"N 126°12'32.1"E
DOWAN(IAF)	35°09'16.1"N 126°33'16.0"E
GONAE(IF)	35°09'13.6"N 126°22'54.0"E
D5.1 IMAN(FAP) BRG 187.14°/5.12 NM IMAN	35°05'12.3"N 126°22'55.7"E
D1.6 IMAN(MAP† LOC ONLY) BRG 187.14°/1.60 NM IMAN	35°01'40.5"N 126°22'57.2"E
THR RWY19	35°00'14.49"N 126°22'57.82"E
IMAN DME	35°00'04.3"N 126°22'53.3"E
IMAN LOC	34°58'35.0"N 126°22'58.5"E
MUN VOR/DME	34°58'12.7"N 126°23'00.0"E
JB451	34°53'13.8"N 126°23'01.0"E
JB452	34°53'10.9"N 126°14'17.1"E
GOBUN	35°07'46.6"N 126°14'09.0"E

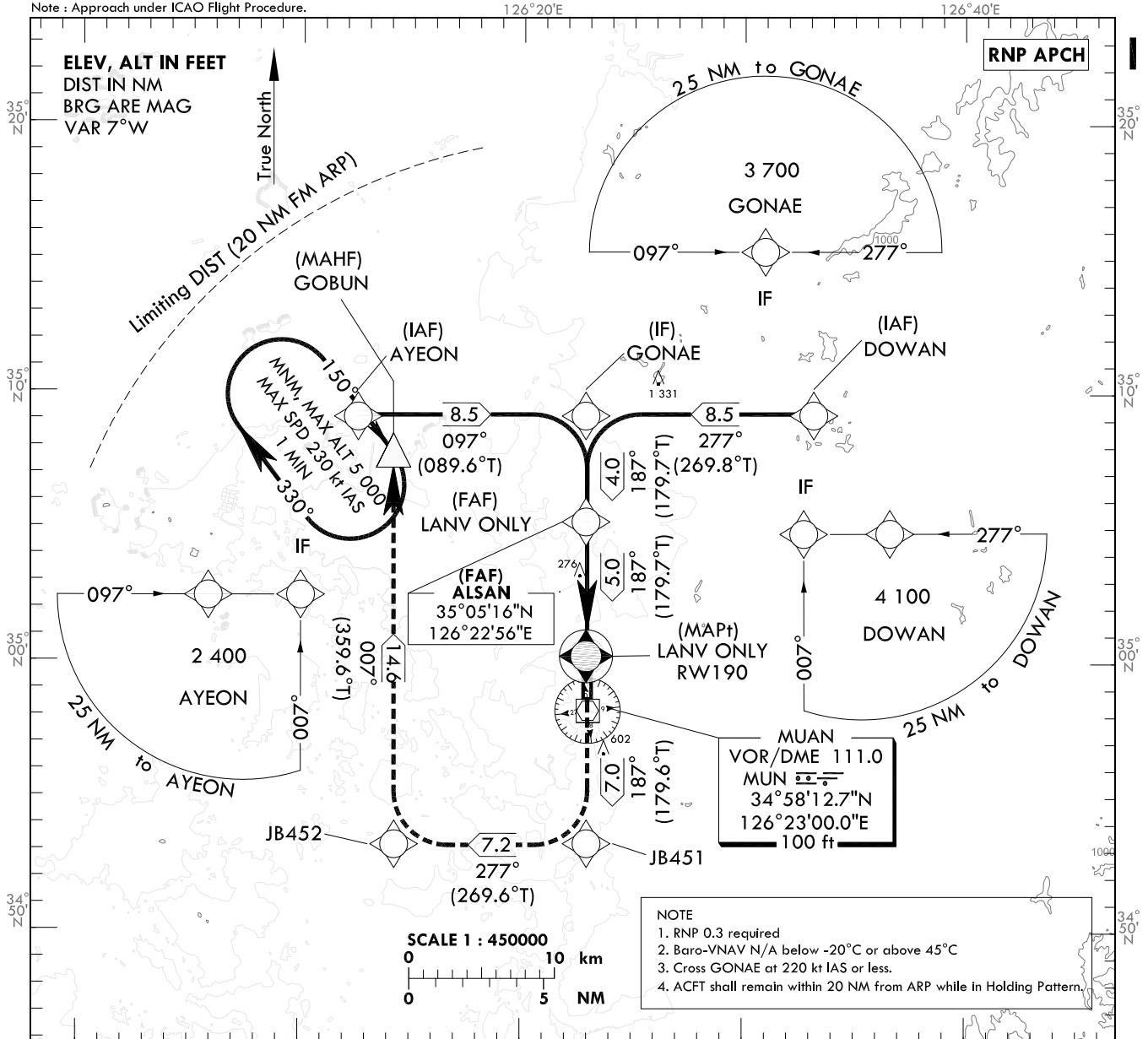
**INSTRUMENT
APPROACH
CHART - ICAO**

AERODROME ELEV 51 ft
HEIGHTS RELATED TO
THR RWY 19 - ELEV 51 ft

GWANGJU APP	120.475	130.0
	228.9	265.5
MUAN TWR	118.25	118.85

MUAN/Muan Intl(RKJB)
RNP RWY 19

Note : Approach under ICAO Flight Procedure.

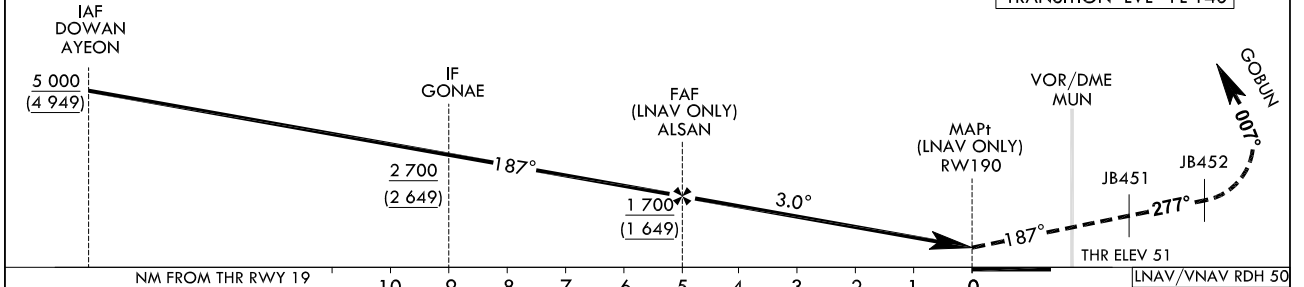


MISSED APPROACH

Climb to 5 000 ft on track of 187° to JB451, RIGHT turn on track of 277° to JB452, Then RIGHT turn on track of 007° to GOBUN.

* Missed approach turns are limited to maximum of 230 kt IAS.

TRANSITION ALT 14 000
TRANSITION LVL FL 140



CATEGORY		DA(H)/MDA(H)	A	B	C	D	Knots						
STA	LNNAV/VNAV	FULL	460 (409)	1 200 m			Rate of descent	V/V fpm	319	478	637	797	957
		ALS INOP	1 900 m										
	LNNAV	FULL	590 (539)	1 700 m									
		ALS INOP	2 400 m										

* Timing Not authorized for defining MAPt.
* Circling Not authorized.

Change : Amended procedure name(RNAV(GNSS) → RNP).

AERONAUTICAL DATA TABULATION

Instrument Approach Procedure Coding Tables

RNP RWY 19 - via DOWAN to GONAE(IF)

Serial Number	Path Descriptor	Waypoint Identifier	Fly-over	Course/Track °M(°T)	Distance (NM)	Turn direction	Altitude (ft)	Speed (kt)	Coordinates	VPA/RDH	Navigation specification	Remarks
001	IF	DOWAN	-	-	-	-	+5 000	-	35°09'16.1"N 126°33'16.0"E	-	RNP APCH	IAF
002	TF	GONAE	-	277(269.8)	8.5	-	+2 700	-220	35°09'13.6"N 126°22'54.0"E	-	RNP APCH	IF

RNP RWY 19 - via AYEON to GONAE(IF)

Serial Number	Path Descriptor	Waypoint Identifier	Fly-over	Course/Track °M(°T)	Distance (NM)	Turn direction	Altitude (ft)	Speed (kt)	Coordinates	VPA/RDH	Navigation specification	Remarks
001	IF	AYEON	-	-	-	-	+5 000	-	35°09'10.2"N 126°12'32.1"E	-	RNP APCH	IAF
002	TF	GONAE	-	097(089.6)	8.5	-	+2 700	-220	35°09'13.6"N 126°22'54.0"E	-	RNP APCH	IF

RNP RWY 19 - via GONAE(IF) to GOBUN(MAHF)

Serial Number	Path Descriptor	Waypoint Identifier	Fly-over	Course/Track °M(°T)	Distance (NM)	Turn direction	Altitude (ft)	Speed (kt)	Coordinates	VPA/RDH	Navigation specification	Remarks
002	TF	GONAE	-	-	-	-	+2 700	-220	35°09'13.6"N 126°22'54.0"E	-	RNP APCH	IF
003	TF	ALSAN	-	187(179.7)	4.0	-	+1 700	-	35°05'15.9"N 126°22'55.7"E	-	RNP APCH	FAF
004	TF	RW190	Y	187(179.7)	5.0	-	+590	-	35°00'14.49"N 126°22'57.82"E	-3.00/50	RNP APCH	MAPT
005	TF	JB451	-	187(179.6)	7.0	-	-	-230	34°53'13.8"N 126°23'01.0"E	-	RNP APCH	-
006	TF	JB452	-	277(269.6)	7.2	-	-	-230	34°53'10.9"N 126°14'17.1"E	-	RNP APCH	-
007	TF	GOBUN	Y	007(359.6)	14.6	-	-	-230	35°07'46.6"N 126°14'09.0"E	-	RNP APCH	-
008	HM	GOBUN	Y	150(142.8)	-	R	@5 000	-230	35°07'46.6"N 126°14'09.0"E	-	RNP APCH	1 min (Outbound timing)

Change : Amended procedure name(RNAV(GNSS) → RNP).

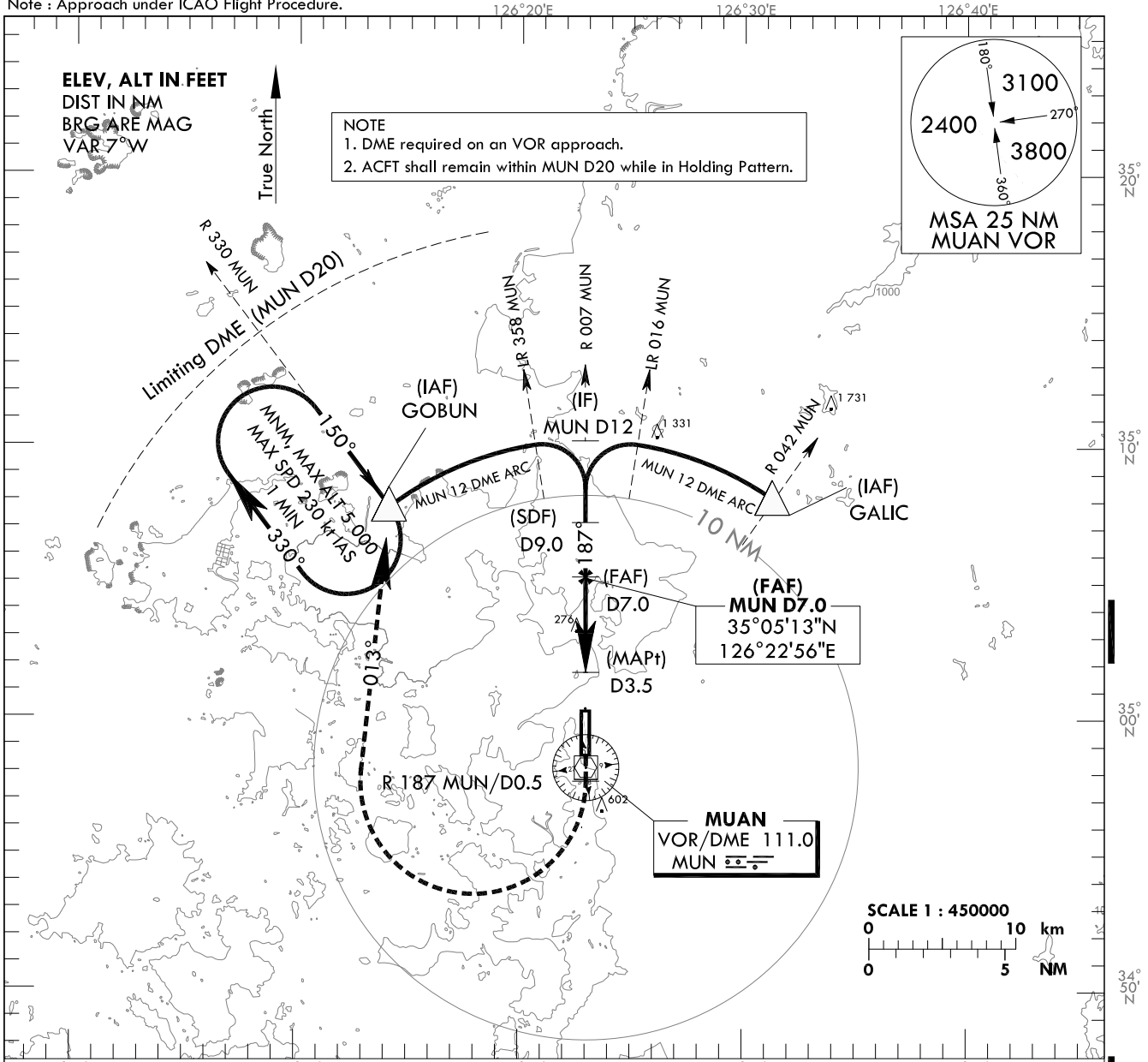
**INSTRUMENT
APPROACH
CHART - ICAO**

AERODROME ELEV 51 ft
HEIGHTS RELATED TO
THR RWY 19 - ELEV 51 ft

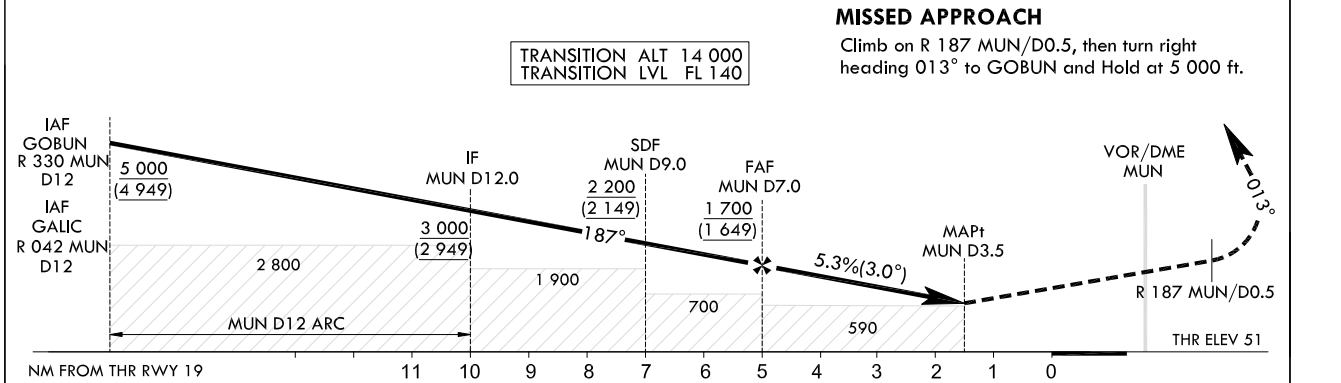
GWANGJU APP	120.475	130.0
	228.9	265.5
MUAN TWR	118.25	118.85

MUAN/Muan Intl(RKJB)
VOR RWY 19

Note : Approach under ICAO Flight Procedure.



RECOMMENDED PROFILE		DME MUN	6	5	4	3.6
Final Approach Gradient 5.32%, 323 ft/NM		ALT(HGT)	1 379 (1 328)	1 058 (1 007)	736 (685)	590 (539)



CATEGORY	MDA/(MDH)	A	B	C	D	Rate of descent					
						V/V fpm	60	90	120	150	180
STA	FULL	590 (539)	2 100 m				322	483	644	804	965
	ALS INOP		2 800 m				* Circling Not authorized. * Timing Not authorized for defining the MAPt.				

Change : Amended coordinate format.

MUAN/Muan Intl(RKJB)
VOR RWY 19

AERONAUTICAL DATA TABULATION

VOR Approach to RWY 19 from GOBUN or GALIC		
Fix/point		Coordinates
GOBUN(IAF)	R 330 MUN /12.00 NM MUN	35°07'46.6"N 126°14'09.0"E
GALIC(IAF)	R 042 MUN /12.00 NM MUN	35°08'04.8"N 126°31'20.7"E
D12 MUN(IF)	BRG 187.12°/12.00 NM MUN	35°10'13.8"N 126°22'53.6"E
D9 MUN(SDF)	BRG 187.12°/9.00 NM MUN	35°07'13.5"N 126°22'55.2"E
D7 MUN(FAF)	BRG 187.12°/7.00 NM MUN	35°05'13.4"N 126°22'56.3"E
D3.5 MUN(MAPt)	BRG 187.12°/3.50 NM MUN	35°01'43.0"N 126°22'58.2"E
THR RWY19		35°00'14.49"N 126°22'57.82"E
MUN VOR/DME		34°58'12.7"N 126°23'00.0"E
D0.5 MUN	BRG 187.12°/0.50 NM MUN	34°57'42.7"N 126°23'00.2"E
GOBUN	BRG 013.43°/12.00 NM MUN	35°07'46.6"N 126°14'09.0"E

Change : Amended coordinate format.