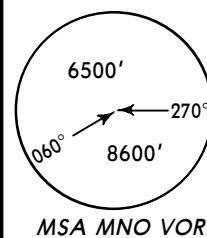
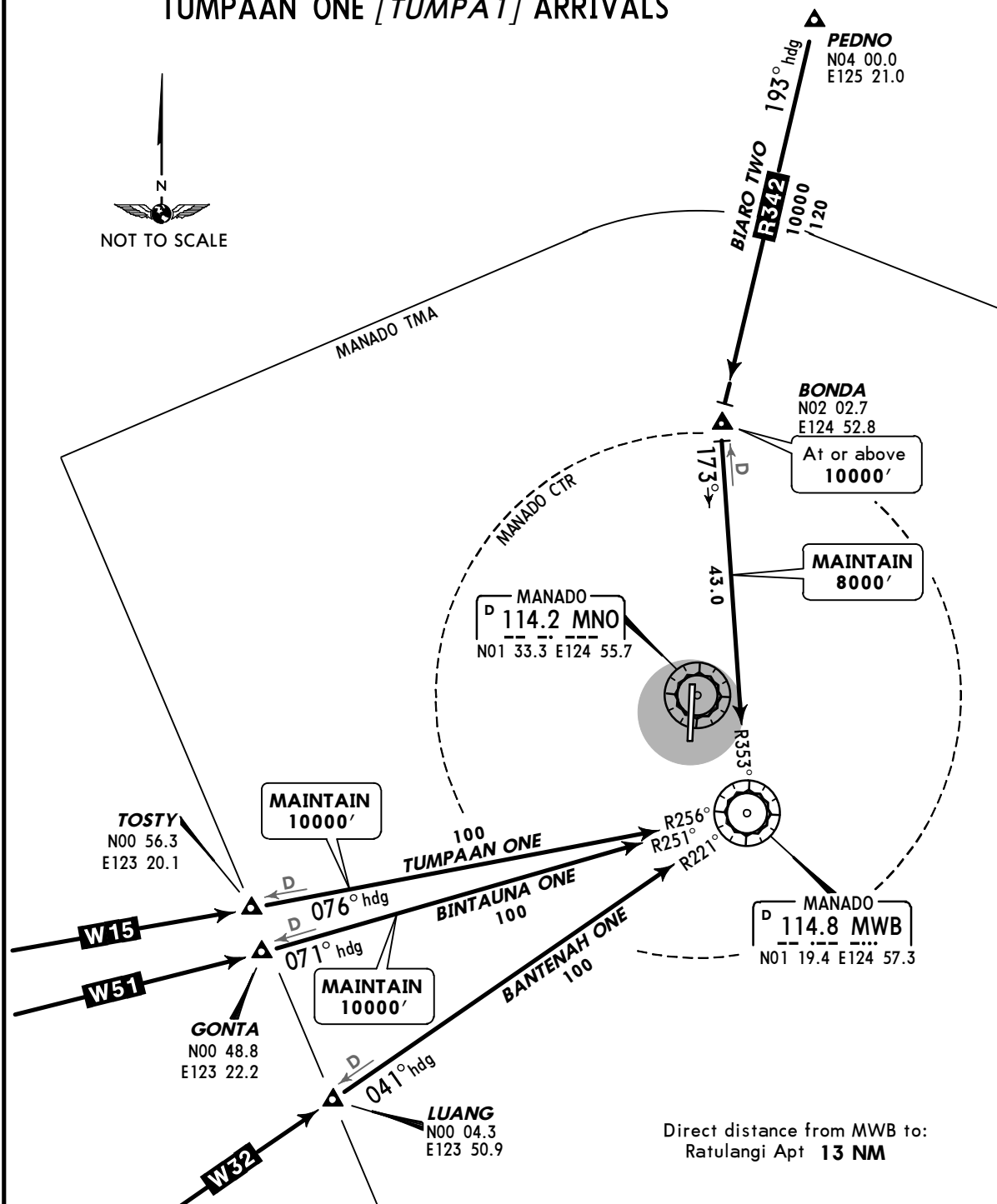


\*ATIS  
126.4Apt Elev  
270'

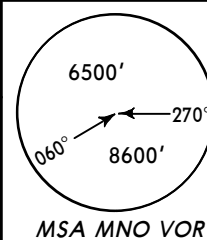
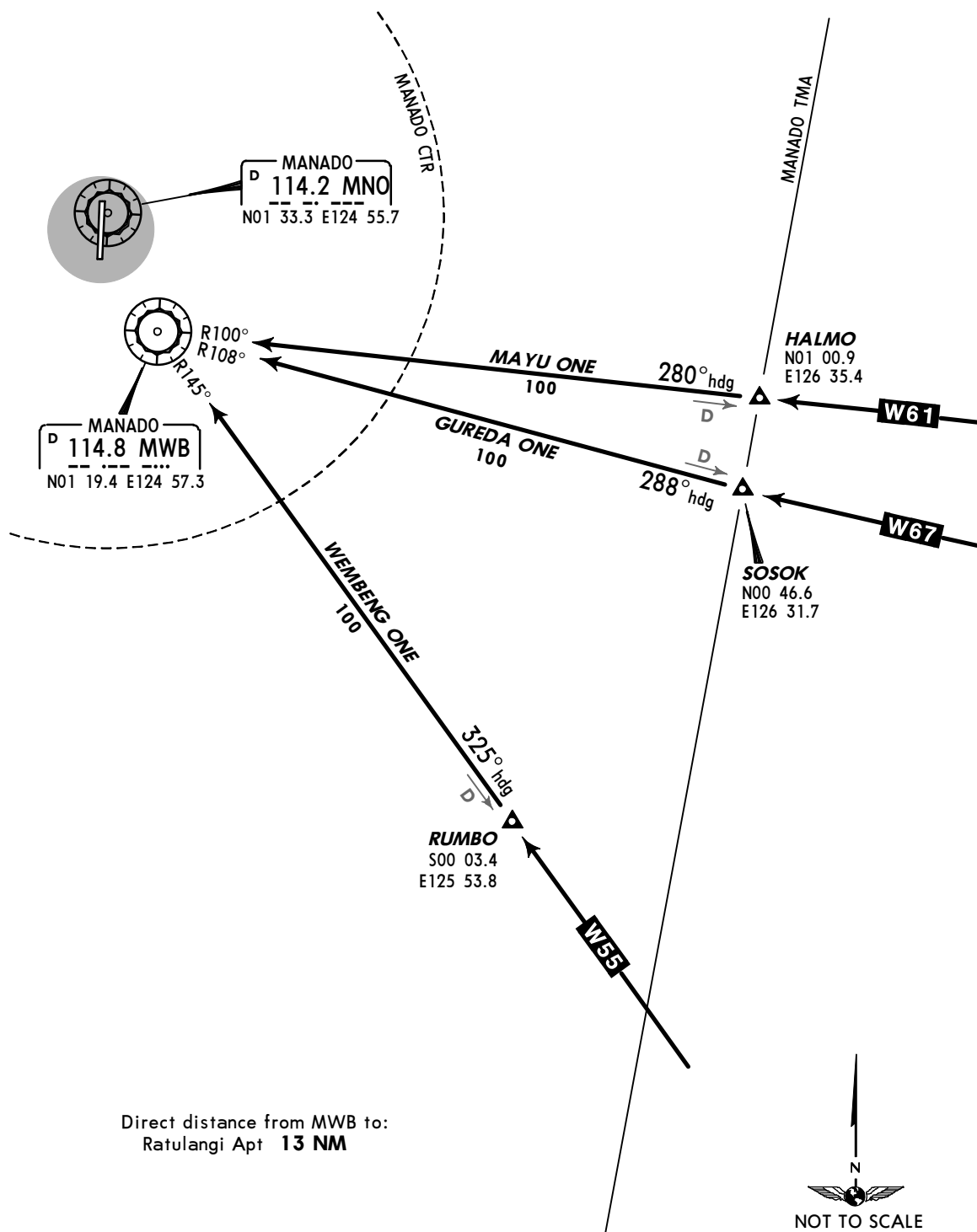
Alt Set: hPa Trans level: FL 130 Trans alt: 11000'

BANTENAH ONE [BANTE1],  
BIARO TWO [BIARO2],  
BINTAUNA ONE [BINTA1],  
TUMPAAN ONE [TUMPA1] ARRIVALS

STAR	ROUTING
BANTENAH ONE	Arriving aircraft from the SOUTHWEST (W-32) over LUANG proceed to MWB on heading 041°.
BIARO TWO	Arriving aircraft from the NORTHEAST BOUND after PEDNO heading 193° until BONDA, and then proceed to MWB via MWB R-353. <b>MAINTAIN</b>
BINTAUNA ONE	Arriving aircraft from the WEST (W-51) over GONTA proceed to MWB on heading 071°.
TUMPAAN ONE	Arriving aircraft from the WEST (W-15) over TOSTY proceed to MWB on heading 076°.

\*ATIS  
126.4Apt Elev  
270'

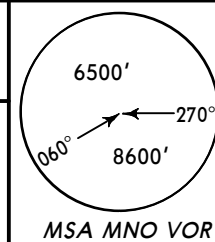
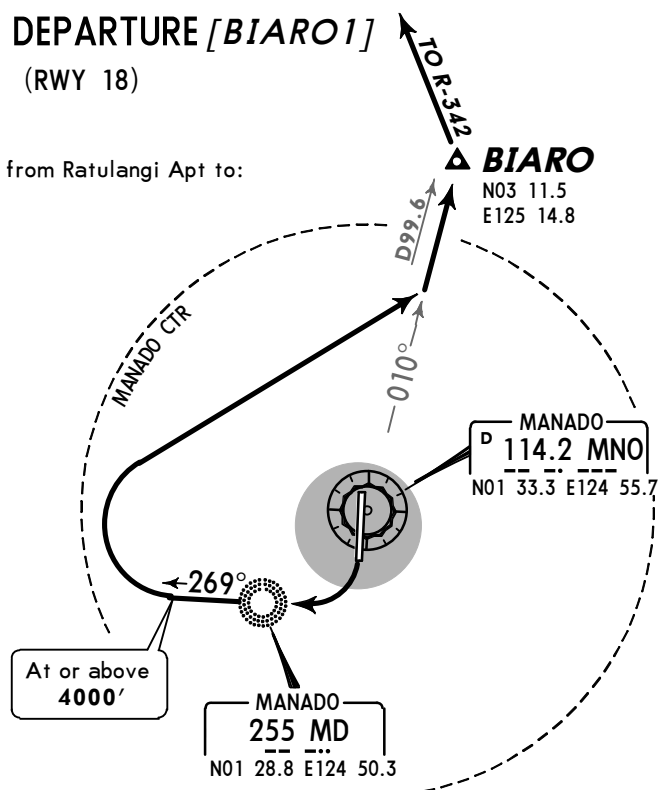
Alt Set: hPa Trans level: FL 130 Trans alt: 11000'

GUREDA ONE [GURED1],  
MAYU ONE [MAYU1],  
WEMBENG ONE [WEMBE1] ARRIVALSDirect distance from MWB to:  
Ratulangi Apt 13 NM

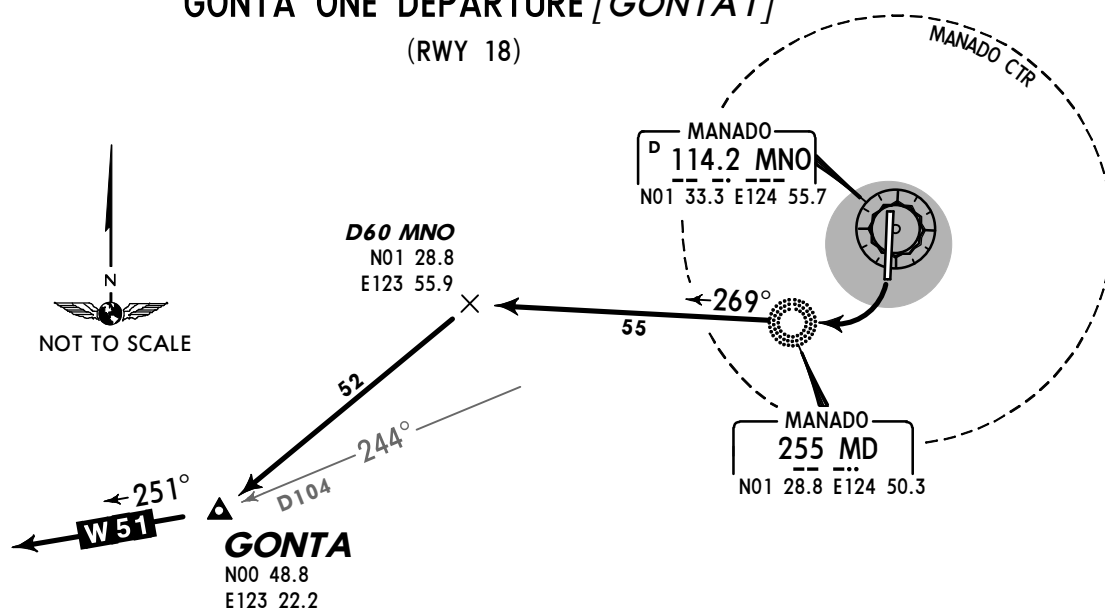
STAR	ROUTING
GUREDA ONE	Arriving aircraft from the EAST (W-67) over SOSOK proceed to MWB on heading 288°.
MAYU ONE	Arriving aircraft from the EAST (W-61) over HALMO proceed to MWB on heading 280°.
WEMBENG ONE	Arriving aircraft from the SOUTHEAST (W-55) over RUMBO proceed to MWB on heading 325°.

Apt Elev  
270'

Trans level: FL130 Trans alt: 11000'

**BIARO ONE DEPARTURE [BIARO1]**  
(RWY 18)Direct distance from Ratulangi Apt to:  
MD NDB 7 NM**INITIAL CLIMB**

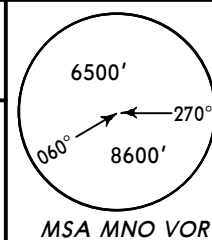
Immediate RIGHT turn to MD NDB, MAINTAIN 269° bearing from MD NDB to at or above 4000', turn RIGHT to intercept MNO R-010. Proceed to BIARO, join airway R-342.

**GONTA ONE DEPARTURE [GONTA1]**  
(RWY 18)Direct distance from Ratulangi Apt to:  
MD NDB 7 NM**INITIAL CLIMB**

Immediate RIGHT turn to MD NDB, climb on 269° bearing from MD NDB until D60 MNO. Proceed to GONTA, join airway W-51.

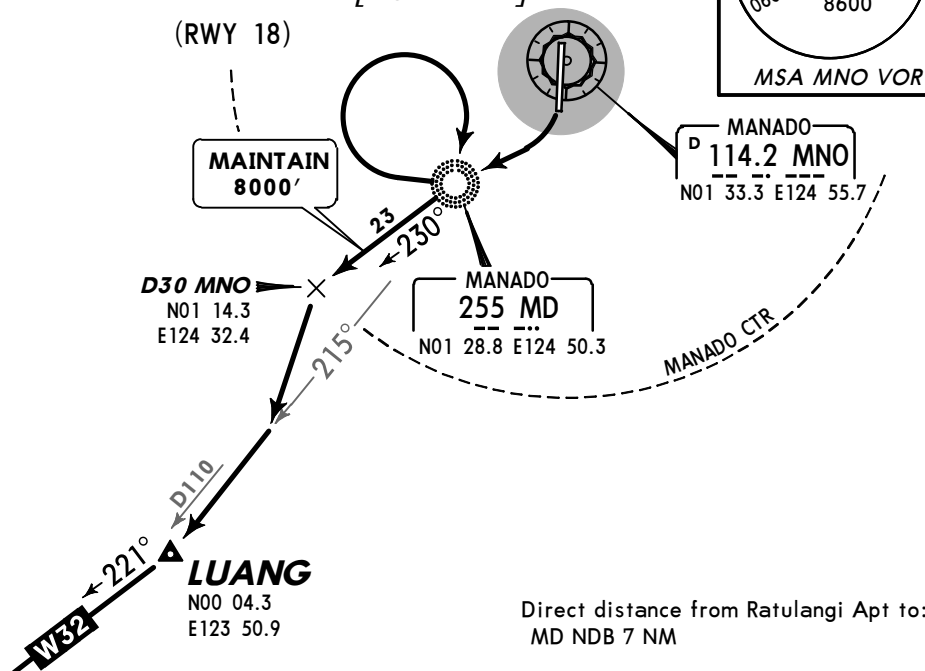
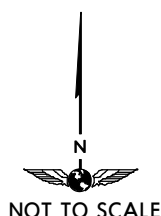
Apt Elev  
270'

Trans level: FL130 Trans alt: 11000'



## LUANG ONE DEPARTURE [LUANG1]

(RWY 18)

Direct distance from Ratulangi Apt to:  
MD NDB 7 NM

## INITIAL CLIMB

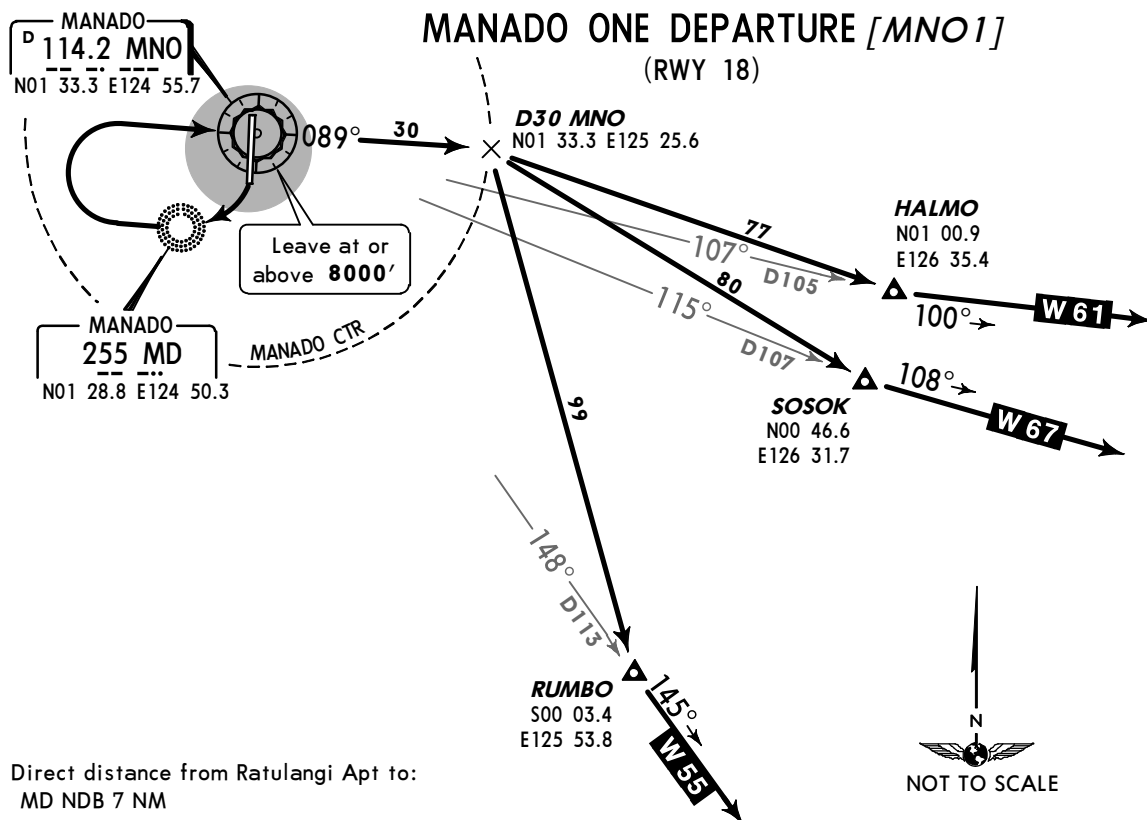
## ALTITUDE

Turn RIGHT to MD NDB, climb overhead and leave MD NDB on 230° bearing from MD NDB until D30 MNO. Turn LEFT to join airway W-32.

MAINTAIN 8000' until D30 MNO

## MANADO ONE DEPARTURE [MNO1]

(RWY 18)

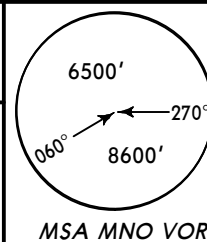
Direct distance from Ratulangi Apt to:  
MD NDB 7 NM

## INITIAL CLIMB

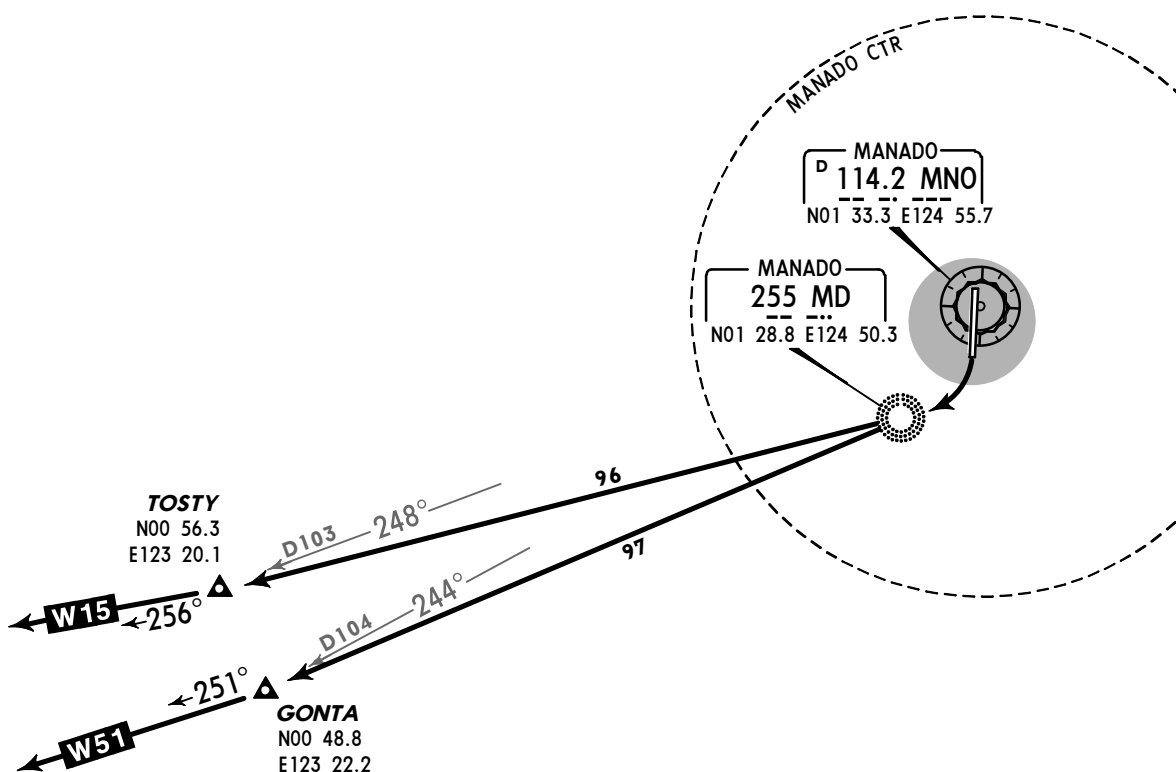
Immediate RIGHT turn to MD NDB, then proceed to MNO VOR and leave MNO VOR on MNO R-089 until D30 MNO. Proceed to HALMO to join airway W-61, or SOSOK to join airway W-67, or RUMBO to join airway W-55.

Apt Elev  
270'

Trans level: FL 130 Trans alt: 11000'



# MIKE DELTA ONE DEPARTURE [MD1] (RWY 18)



Direct distance from Ratulangi Apt to:  
MD 7 NM

## INITIAL CLIMB

Immediate RIGHT turn to MD. Proceed to TOSTY to join airway W-15 or to GONTA to join airway W-51.

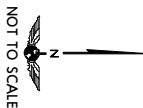
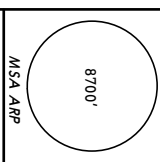
WAMM/MDC  
RATULANGI

Apv Elev  
270'

Trans level: FL130 Trans alt: 11000'

1. Authorization required.  
2. GNSS required.

3. Departure requires RNP less than 1.0.  
4. Pilot shall inform ATC when on-board equipment does not meet the requirements of RNAV (RNP-AR).  
Pilot can then expect the conventional SID.



INITIAL CLIMB

Climb on course 181° to MM600, then on track 186° to MM601, then climbing RIGHT turn to MM602.

SID ROUTING

**ALPON ONE ALPHA**  
At MM602 climbing RIGHT turn to MM608, then on track 259° to MM613, then on track 259° to MM614, then climbing LEFT turn to MM615, then on track 236° to MM616, then on track 227° to ALPON.

**CATUR ONE ALPHA**  
At MM602 climbing RIGHT turn to MM608, then climbing RIGHT turn to MM609, then track 285° to MM610, then climbing RIGHT turn to MM611, then on track 017° to MM612, then track 013° to BONDA, then track 013° to CATUR.

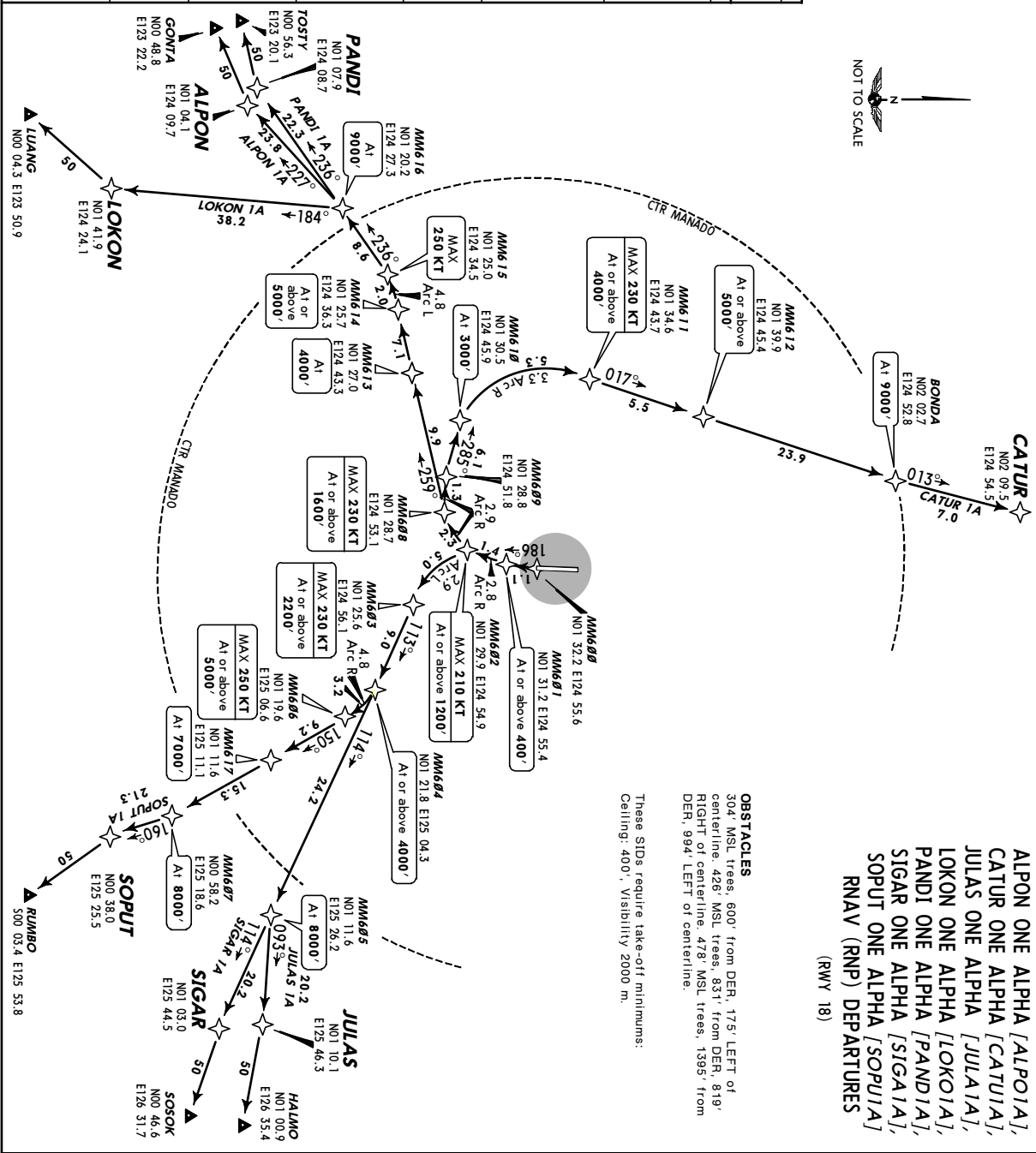
**JULAS ONE ALPHA**  
At MM602 climbing LEFT turn to MM603, then on track 113° to MM604, then on track 114° to MM605, then track 093° to JULAS.

**LOKON ONE ALPHA**  
At MM602 climbing RIGHT turn to MM608, then on track 259° to MM613, then on track 259° to MM614, then climbing LEFT turn to MM615, then on track 236° to MM616, then on track 184° to LOKON.

**PANDI ONE ALPHA**  
At MM602 climbing RIGHT turn to MM608, then on track 259° to MM613, then on track 259° to MM614, then climbing LEFT turn to MM615, then on track 236° to MM616, then on track 236° to PANDI.

**SIGAR ONE ALPHA**  
At MM602 climbing LEFT turn to MM603, then on track 113° to MM604, then on track 114° to MM605, then track 114° to SIGAR.

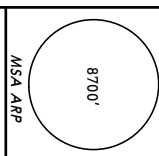
**SOPUT ONE ALPHA**  
At MM602 climbing LEFT turn to MM603, then on track 113° to MM604, then climbing RIGHT turn to MM606, then on track 150° to MM607, then on track 160° to SOPUT.



# WAMM/MDC RATULANGI

Apr Elev 270'  
Trans level: FL130 Trans alt: 11000'  
1. Authorization required.  
2. GNSS required.

3. Departure requires RNP less than 1.0.  
4. Pilot shall inform ATC when on-board equipment does not meet the requirements of RNAV (RNP-AR).  
Pilot can then expect the conventional SID.



## INITIAL CLIMB

Climb on track 001° to MM501, then climbing LEFT turn to MM502.

## SID ROUTING

**ALPON ONE BRAVO**  
At MM502 on track 274° to MM503, then LEFT turn to MM504, then on track 237° to MM505, then on track 229° to MM707, then on track 228° to ALPON.

**CATUR ONE BRAVO**  
At MM502 RIGHT turn to MM507, then on track 025° to MM713, then on track 039° to MM714, then on track 350° to CATUR.

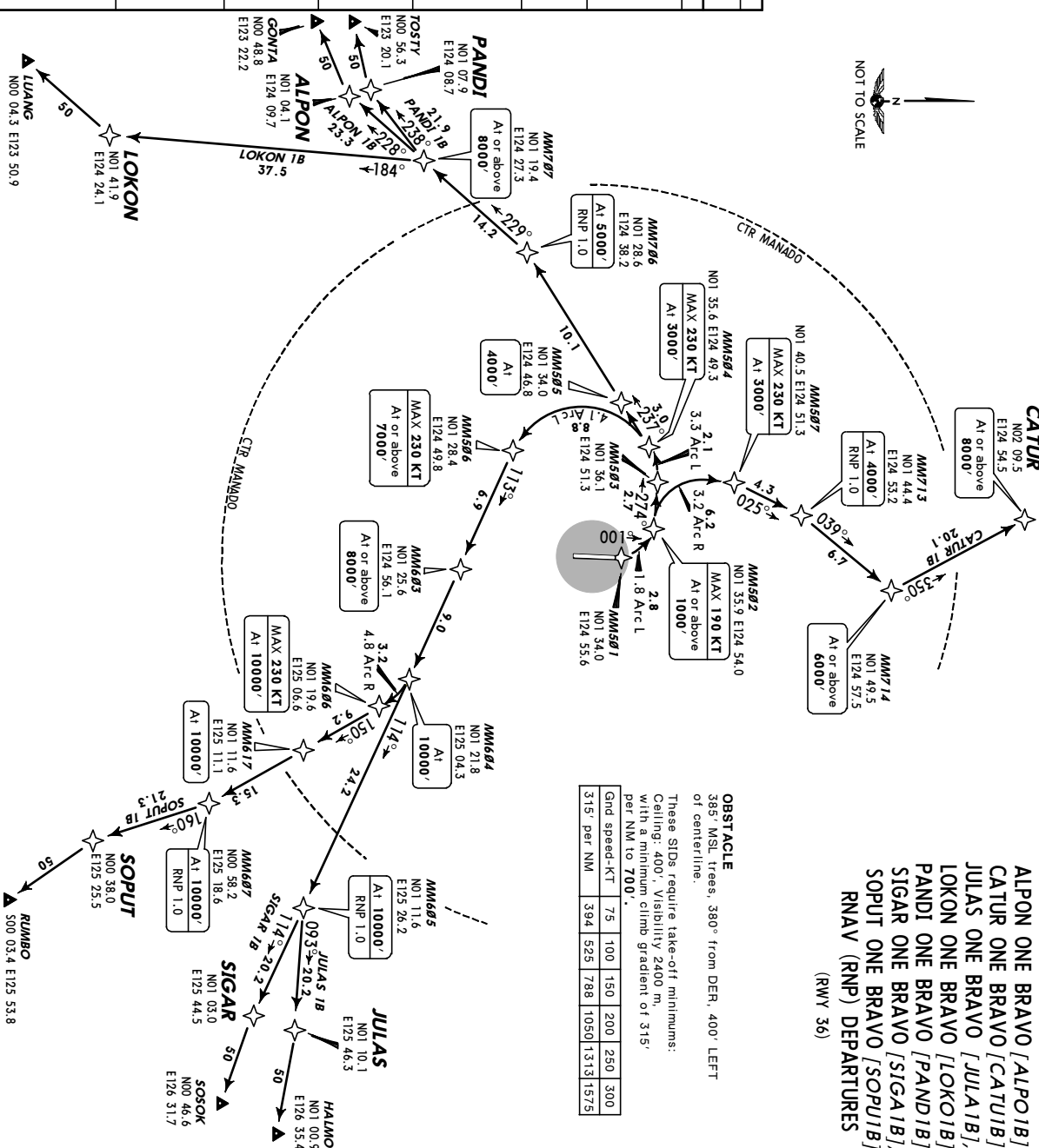
**JULAS ONE BRAVO**  
At MM502 on track 274° to MM503, then LEFT turn to MM504, then on track 113° to MM603, then on track 113° to MM604, then on track 114° to JULAS.

**LOKON ONE BRAVO**  
At MM502 on track 274° to MM503, then LEFT turn to MM504, then on track 237° to MM706, then on track 229° to MM707, then on track 184° to LOKON.

**PANDI ONE BRAVO**  
At MM502 on track 274° to MM503, then LEFT turn to MM504, then on track 237° to MM706, then on track 229° to MM707, then on track 238° to PANDI.

**SIGAR ONE BRAVO**  
At MM502 on track 274° to MM503, then LEFT turn to MM504, then on track 113° to MM603, then on track 113° to MM604, then on track 114° to SIGAR.

**SOPUT ONE BRAVO**  
At MM502 on track 274° to MM503, then LEFT turn to MM504, then on track 113° to MM603, then on track 113° to MM604, then RIGHT turn to MM606, then on track 150° to MM617, then on track 150° to MM607, then track 160° to SOPUT.

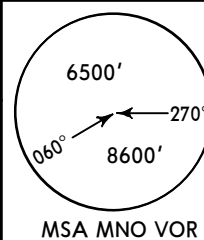


CHANGES: New procedures at this airport.

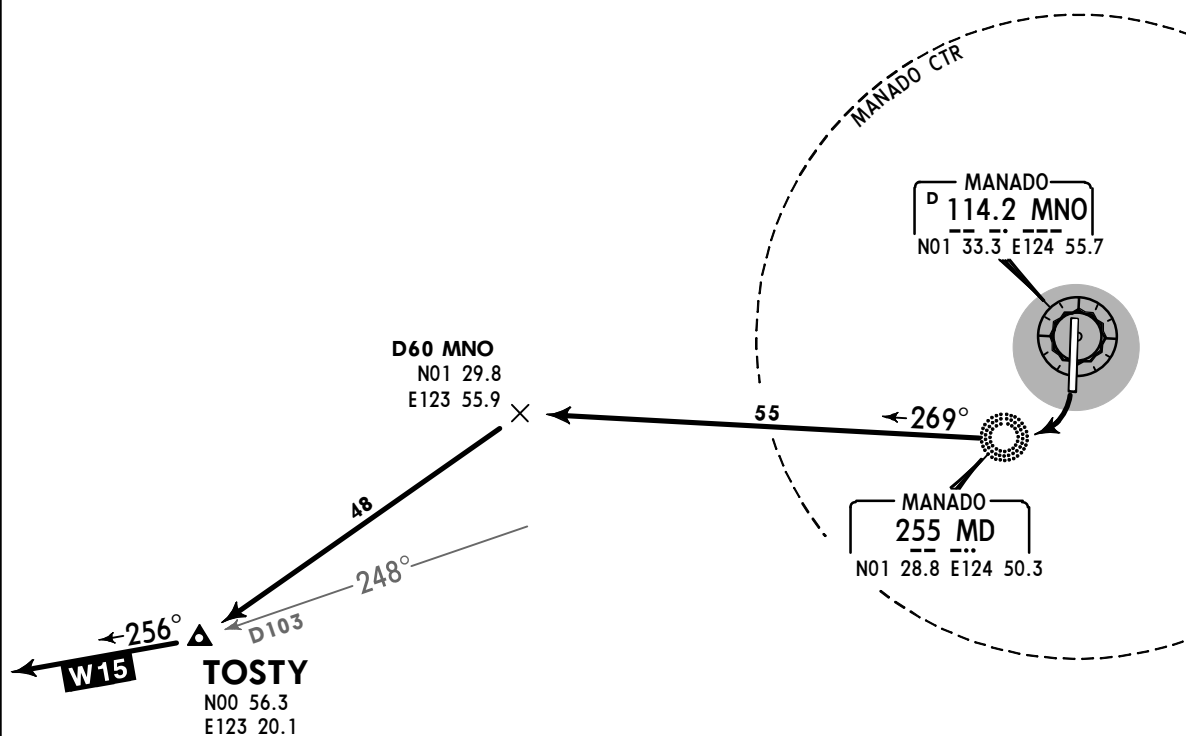
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Apt Elev  
270'

Trans level: FL 130 Trans alt: 11000'



**TOSTY ONE DEPARTURE [TOSTY 1]**  
(RWY 18)



Direct distance from Ratulangi Apt to:  
MD 7 NM

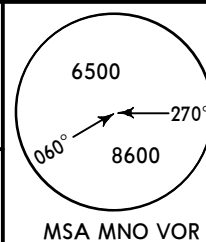
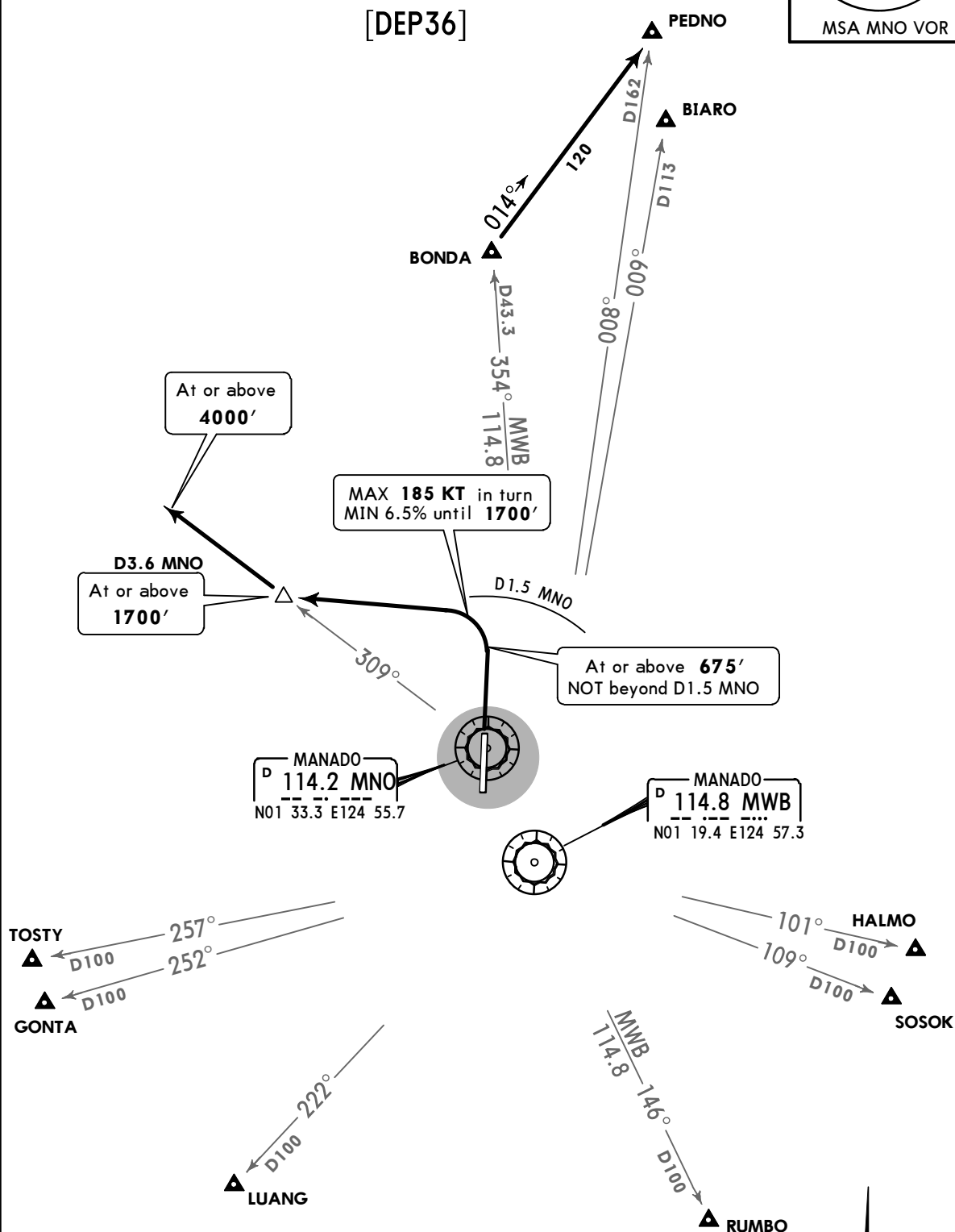
**INITIAL CLIMB**

Immediate RIGHT turn to MD, climb on 269° bearing from MD until D60 MNO. Proceed to TOSTY to join airway W-15.



Apt Elev  
270'

Trans level: FL 130 Trans alt: 11000'  
The increased climb gradient of 6.5% until 1700' is required to avoid hills of 1227' NORTHEAST of the aerodrome and overfly high terrain NORTHWEST of the aerodrome (1404') with an adequate margin.

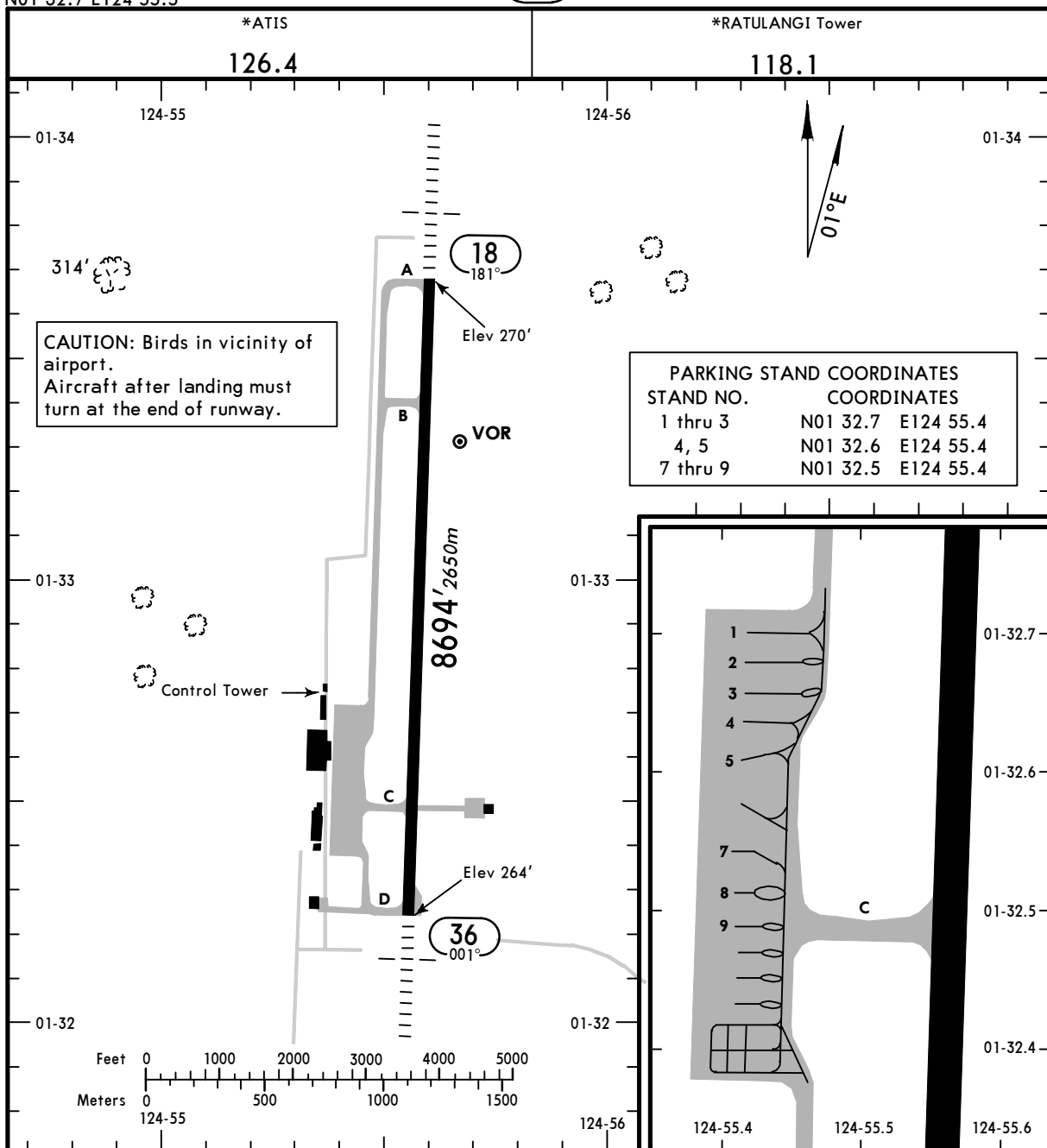
TAKE OFF PROCEDURE RWY 36  
[DEP36]

This SID requires a minimum climb gradient of 6.5% (395' per NM) to 1700'.

Gnd speed-KT	75	100	150	200	250	300
6.5% V/V(fpm)	494	658	987	1317	1646	1975

## INITIAL CLIMB

Climb straight ahead to 675', not beyond D1.5 MNO, intercept MNO R-309. At 4000' or above continue climb, proceed to BIARO, GONTA, HALMO, LUANG, RUMBO, SOSOK, TOSTY or as instructed by ATC.



## ADDITIONAL RUNWAY INFORMATION

RWY		USABLE LENGTHS			
		LANDING BEYOND		TAKE-OFF	WIDTH
		Threshold	Glide Slope		
18	RL HIALS REIL PAPI				148'
36					45m

## TAKE-OFF

AIR CARRIER (JAA)		AIR CARRIER (FAR 121)	
LVP must be in Force			
<b>All Rwys</b>	<b>All Rwys</b>	<b>All Rwys</b>	
RCLM (Day only)	RCLM (Day only)	Adequate Vis Ref	
or RL	or RL		
A		2	
B	250m	Eng	400m
C		3 & 4	
D	300m	Eng	

STRAIGHT-IN RWY		A	B	C	D
18	ILS	<b>470' (200')</b>	<b>470' (200')</b>	<b>470' (200')</b>	<b>470' (200')</b>
	<i>FULL/Limited</i>	<b>800m</b>	<b>900m</b>	<b>1100m</b>	<b>1200m</b>
	<i>ALS out</i>	1200m	1200m	1200m	1200m
	LOC	<b>NA</b>	<b>NA</b>	<b>NA</b>	<b>NA</b>
36	ILS	<b>542' (278')</b>	<b>552' (288')</b>	<b>565' (301')</b>	<b>580' (316')</b>
	<i>FULL/Limited</i>	<b>900m</b>	<b>900m</b>	<b>1100m</b>	<b>1200m</b>
	<i>ALS out</i>	1300m	1400m	1400m	1400m
	① LOC	<b>690' (426')</b>	<b>690' (426')</b>	<b>690' (426')</b>	<b>690' (426')</b>
		<b>1500m</b>	<b>1500m</b>	<b>1600m</b>	<b>1600m</b>
	<i>ALS out</i>	1500m	1500m	2000m	2000m
	LOC	<b>690' (426')</b>	<b>690' (426')</b>	<b>690' (426')</b>	<b>690' (426')</b>
	<i>ALS out</i>	<b>1800m</b>	<b>1800m</b>	<b>2000m</b>	<b>2000m</b>
		2200m	2200m	2400m	2400m

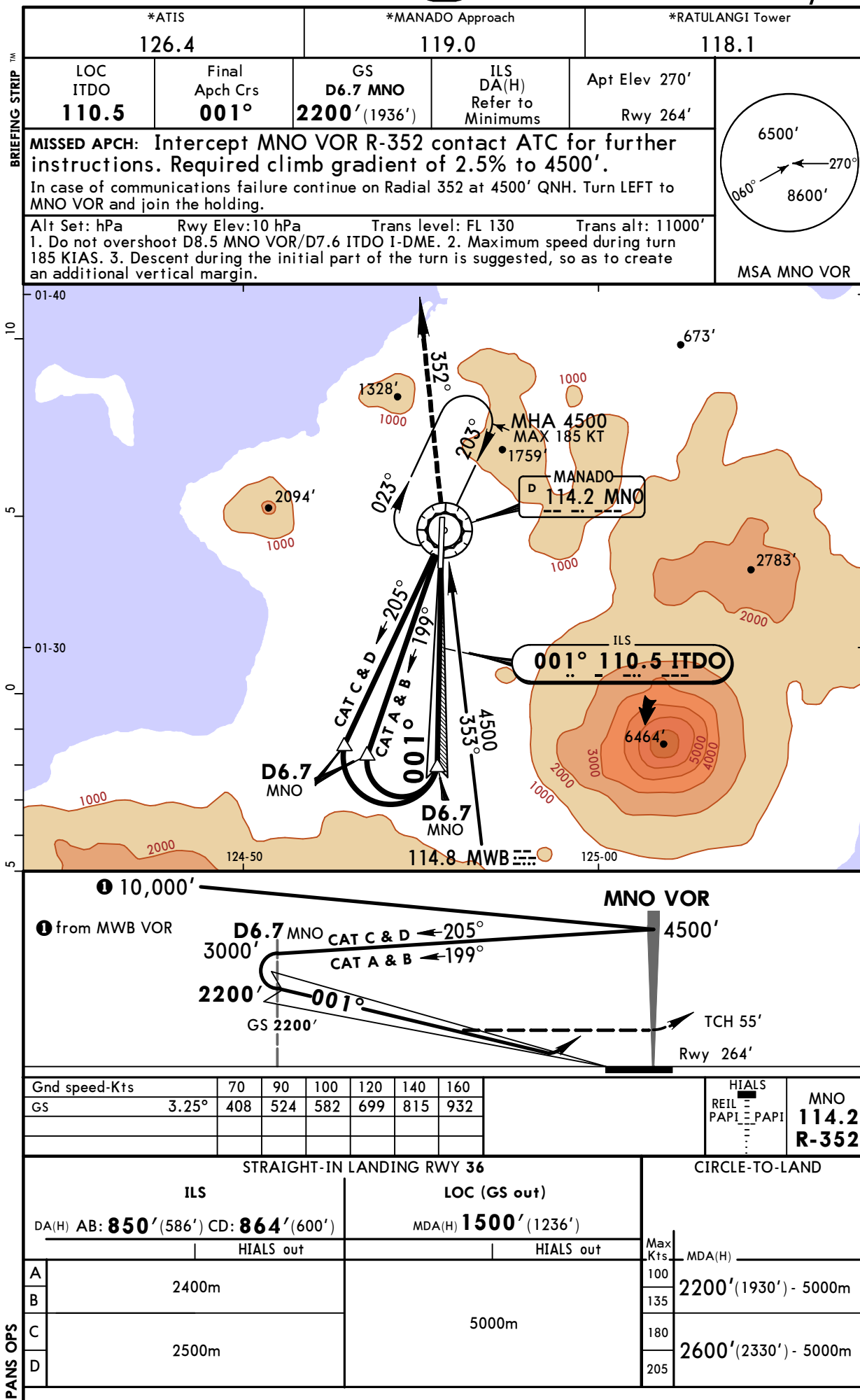
① Continuous Descent Final Approach.

CIRCLE-TO-LAND	100 KT	135 KT	180 KT	205 KT
After NDB 36	<b>980' (716')</b> <b>V2000m</b>	<b>980' (716')</b> <b>V2000m</b>	<b>980' (716')</b> <b>V3200m</b>	<b>980' (716')</b> <b>V3600m</b>
After all other approaches	<b>NA</b>	<b>NA</b>	<b>NA</b>	<b>NA</b>

**TAKE-OFF**

	LVP must be in Force RCLM (Day only) or RL	RCLM (Day only) or RL	NIL (Day Only)
A	250m	400m	500m
B			
C			
D	300m		

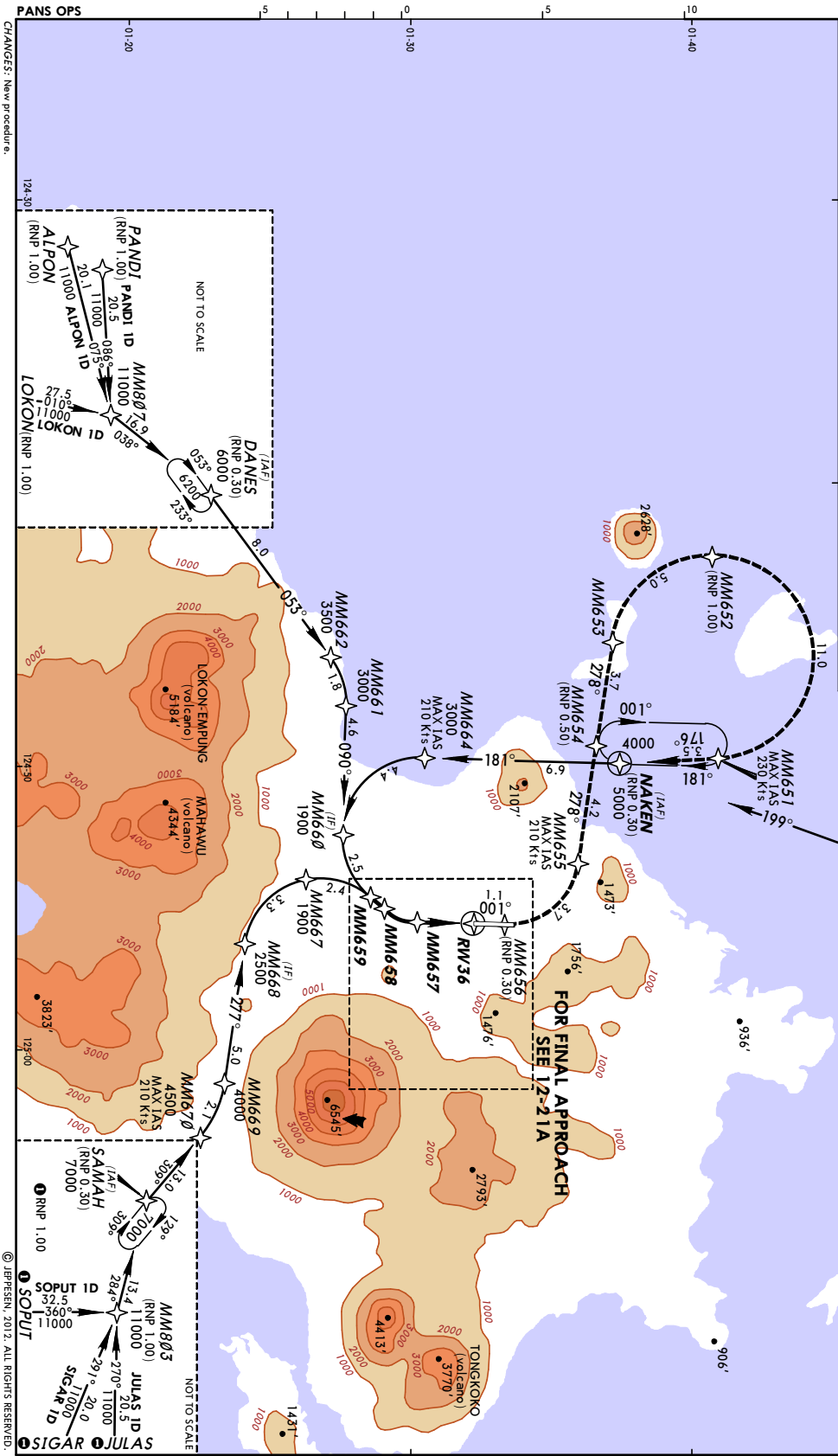








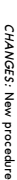
The map illustrates the transition from the Bonin Sea to the Umalu Sea. The Bonin Sea is labeled with a depth of 11000. The Umalu Sea is labeled with a depth of 9000. A star marks the Umalu Sea (RNP 0.30). A box labeled 'TRANSITIONS' is shown. A scale bar indicates 01:50.





MANADO, INDONESIA  
RNAV (RNP) Rwy 36

RNAV (RNP) Rwy 36

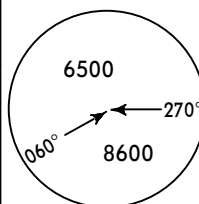


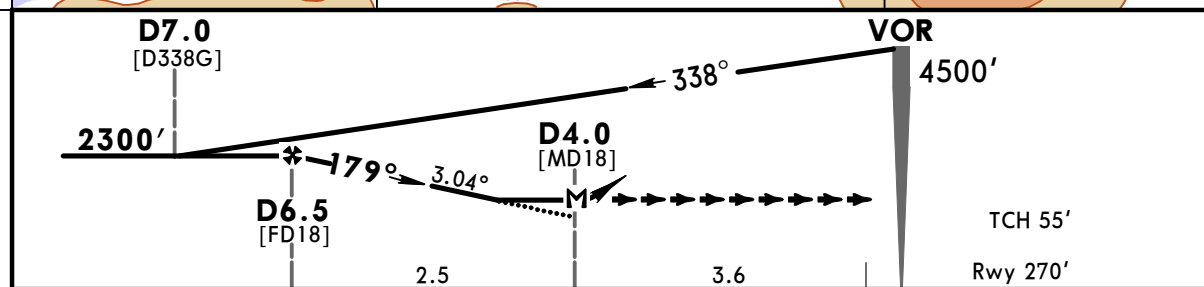
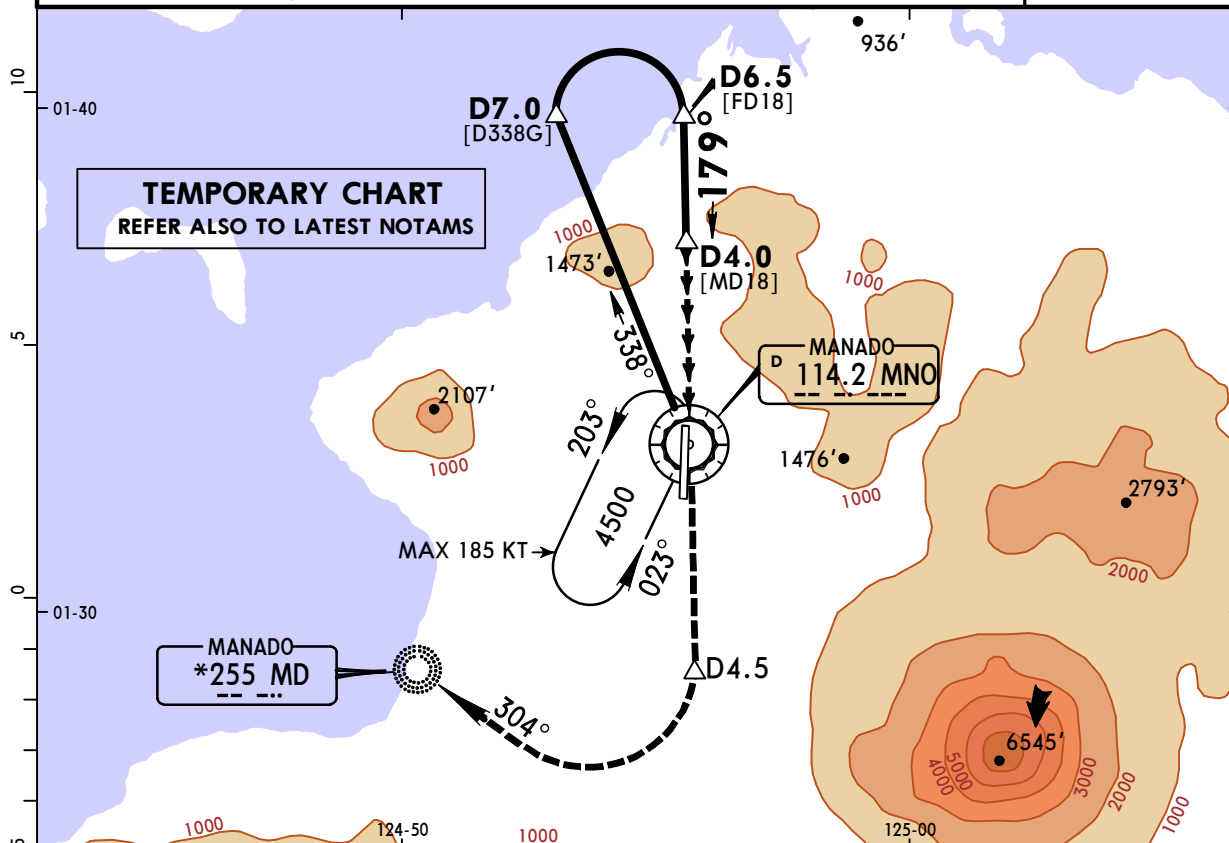
WAMM/MDC  
RATULANGI

JEPPESSEN  
21 APR 17  
Eff 27 Apr 13-1

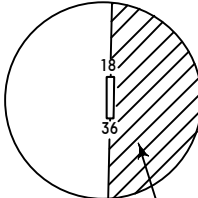
MANADO, INDONESIA  
CAT C & D  
VOR DME Rwy 18

BRIEFING STRIP™

*ATIS 126.4		*MANADO Approach 119.0		*RATULANGI Tower 118.1	
VOR MNO 114.2	Final Apch Crs 179°	Minimum Alt D6.5 2300' (2030')	MDA(H) 1500' (1230')	Apt Elev 270' Rwy 270'	  MSA MNO VOR
<b>MISSED APCH:</b> Over MNO VOR climb to 4500', at D4.5 MNO turn RIGHT track 304° proceed to MD NDB and contact ATC for further instructions. In case of communications failure, continue on track 304° at 4500' QNH. Turn RIGHT to MNO VOR and join the holding.					
Alt Set:hPa		Rwy Elev:10 hPa	Trans level: FL 130	Trans alt: 11000'	



Gnd speed-Kts	70	90	100	120	140	160	HIALS		MNO 114.2		4500'	D4.5 MNO	
Descent Angle 3.04°	376	484	538	645	753	861	REIL PAPI PAPI						
MAP at D4.0													

INS OPS		STRAIGHT-IN LANDING RWY 18		CIRCLE-TO-LAND		 <p>No Circling at the East of Aerodrome</p>
		MDA(H) <b>1500'</b> (1230')		Max Kts.	MDA(H) _____	
		A	NOT APPLICABLE	A	NOT APPLICABLE	
		B		B		
		C	5000m	180	<b>1830'</b> (1560')-5000m	
		D		205	<b>2590'</b> (2320')-5000m	

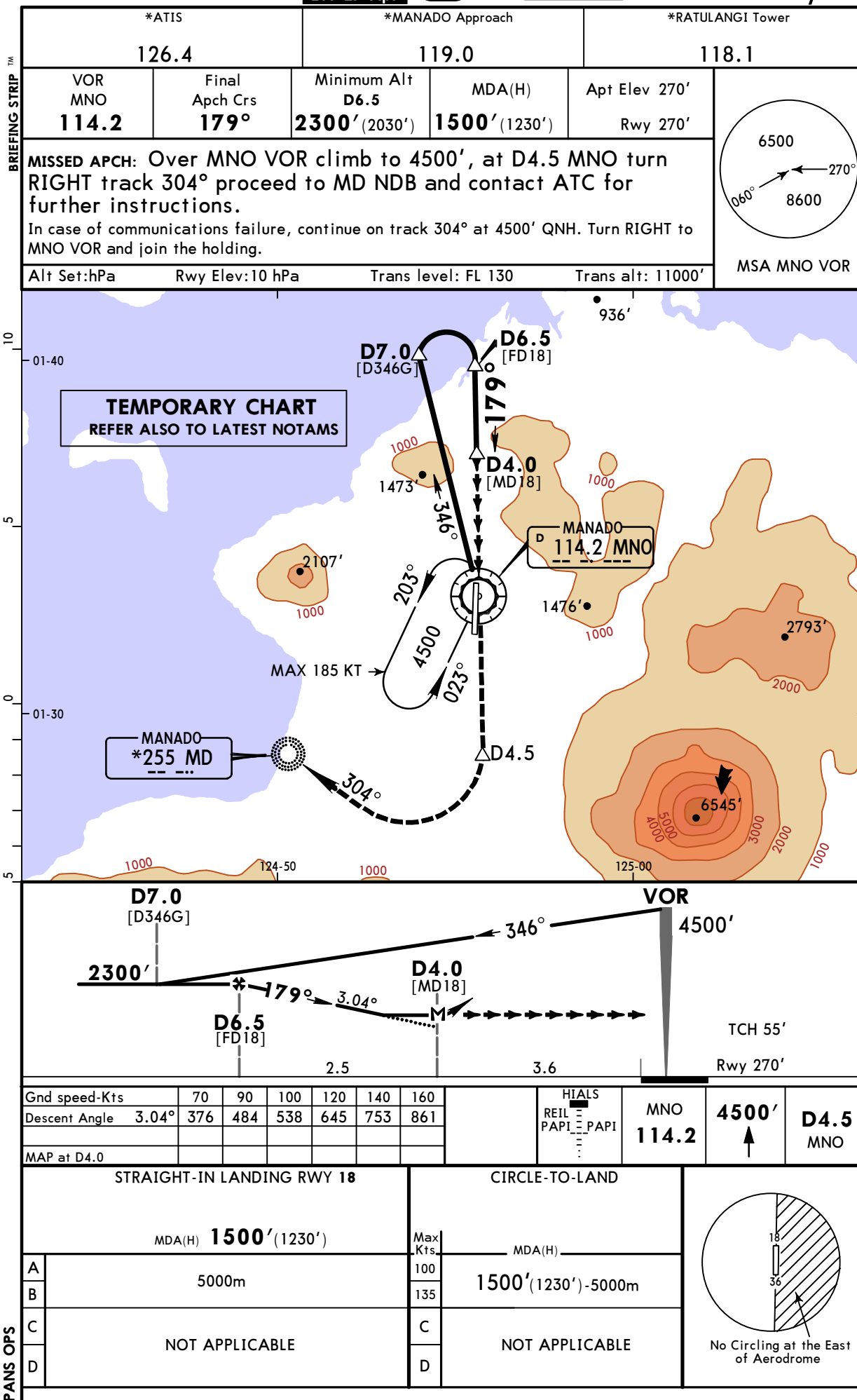
CHANGES: New temporary procedure.

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WAMM/MDC  
RATULANGI

JEPPESSEN  
21 APR 17  
Eff 27 Apr 13-2

MANADO, INDONESIA  
CAT A & B  
VOR DME Rwy 18



CHANGES: New temporary procedure.

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