



MANADO (INDONESIA)

SAM RATULANGI AIRPORT (WAMM/MDC)

MAY 2017



MANADO is located at North Sulawesi and Airport location
about 7 NM North East of the city of **MANADO**

CLIMATE/ WEATHER

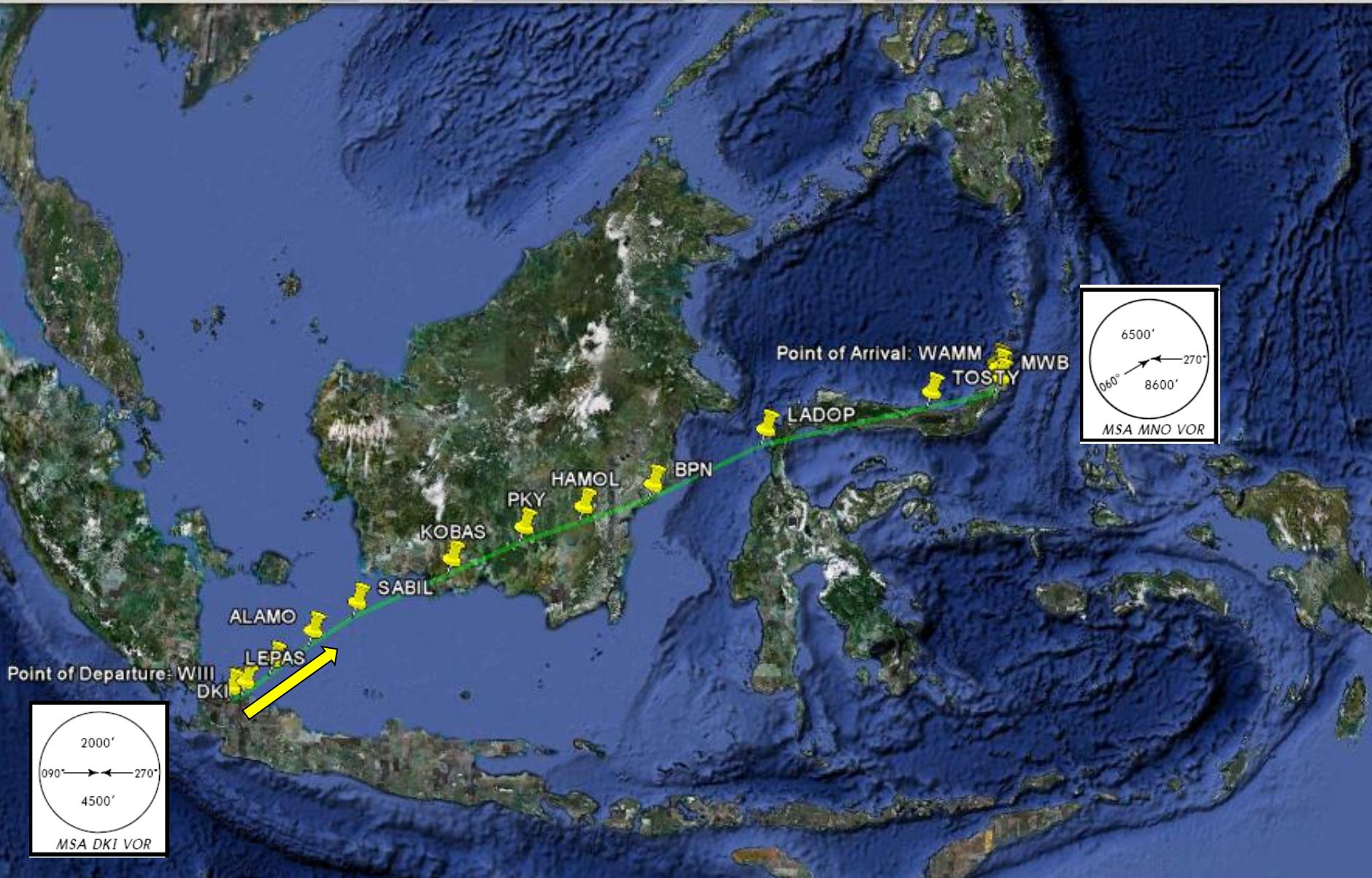
Manado features a tropical rainforest climate under Koppen climate classification. The city roughly 28500 mm of rain annually. Manado has a noticeably wetter season That spans from November through June and a drier season that cover the remaining four months. However Manado does have a true dry season where monthly precipitation figure fall below 60 mm. As with many other cities with this climate, average temperatures remain constant throughout the year, with average high temperatures at around 30^o Celsius and average low temperature at around 24^o Celsius .



Enroute: WIII To WAAA (CGK-UPG), R01: 815 NM

Enroute: WAAA To WAMM (UPG-MDC), R01: 530 NM

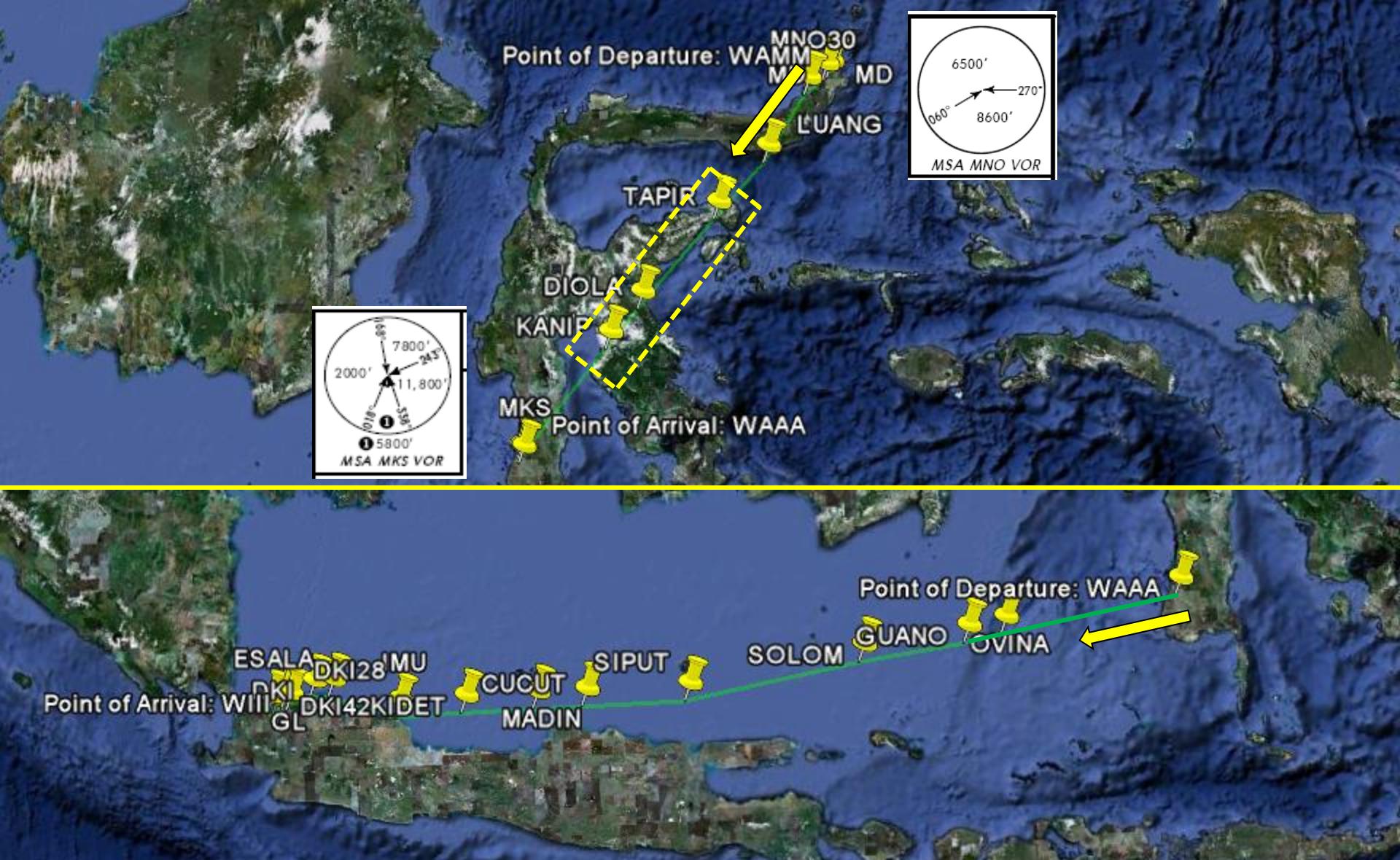
Loc MORA: KANIP 13600 ft, DICLA 12200 ft, TAPIR 13700 ft



Enroute: WIII To WAMM (CGK-MDC), R01: 1234 NM
Loc MORA: TOSTY 12400 ft



OVERVIEW OF AIRPORT



Enroute: WAMM To WAAA (MDC-UPG), R01: 526 NM

Enroute: WAAA To WIIII (UPG-CGK), R01: 815 NM

Loc MORA: TAPIR 10000 ft, DIOLA 13700 ft, KANIP 12200 ft



OVERVIEW OF AIRPORT



No	AD	Loc ID		Type OF ACFT			TT	Dist NM	GH
1	U. PANDANG	WAAA	UPG		B738	B737	219	524	R. Gapura
2	BALIKPAPAN	WALL	BPN		B738	B737	250	523	R. Gapura
3	GOROMTALO	WAMG	GTO		B738	B737	246	150	X, R

RUNWAY/ AIRPORT SAM RATULANGI

ARP Coordinates and Site at AD

: 01 32 44 S, 124 55 30 E

Operation Hours

: 23.00 – 13.00

Time Conversion

: UTC + 8

Magnetic Variation

: 0.22⁰ E (2015)

AD Elevation

: 270 ft

Dimension

: 2650 X 45 m

Runway Designation

: RWY 18/ 36

Surface

: Asphalt Concrete

Pavement Strength

: 80 FCWT

Visual Approach Slope Indicator Systems

: PAPI

Rescue and Firefighting Services CAT

:CAT VII

NAVIGATION AIDS

VOR/ DME	:	114.2 MHz/ CH-89X	“MNO”
VOR/ DME	:	114.8 MHz/ CH-95X	“MWB”
NDB	:	255 KHz	“MD”
NDB	:	290 KHz	“PN”
ILS/ LLZ	:	111.1 MHz	“IMNO” (RWY 18)
GP	:	331.7 MHz	
ILS/ LLZ	:	110.5 MHz	“ITDO” (RWY 36)
GP	:	329.6 MHz	

TWR	:	118.1 MHz	“Ratulangi Tower”
ATIS	:	126.4 MHz	
APP	:	119.0 MHz	“Manado app”
FFS	:	8918, 11309, 6554, KHz	“Manado Info”

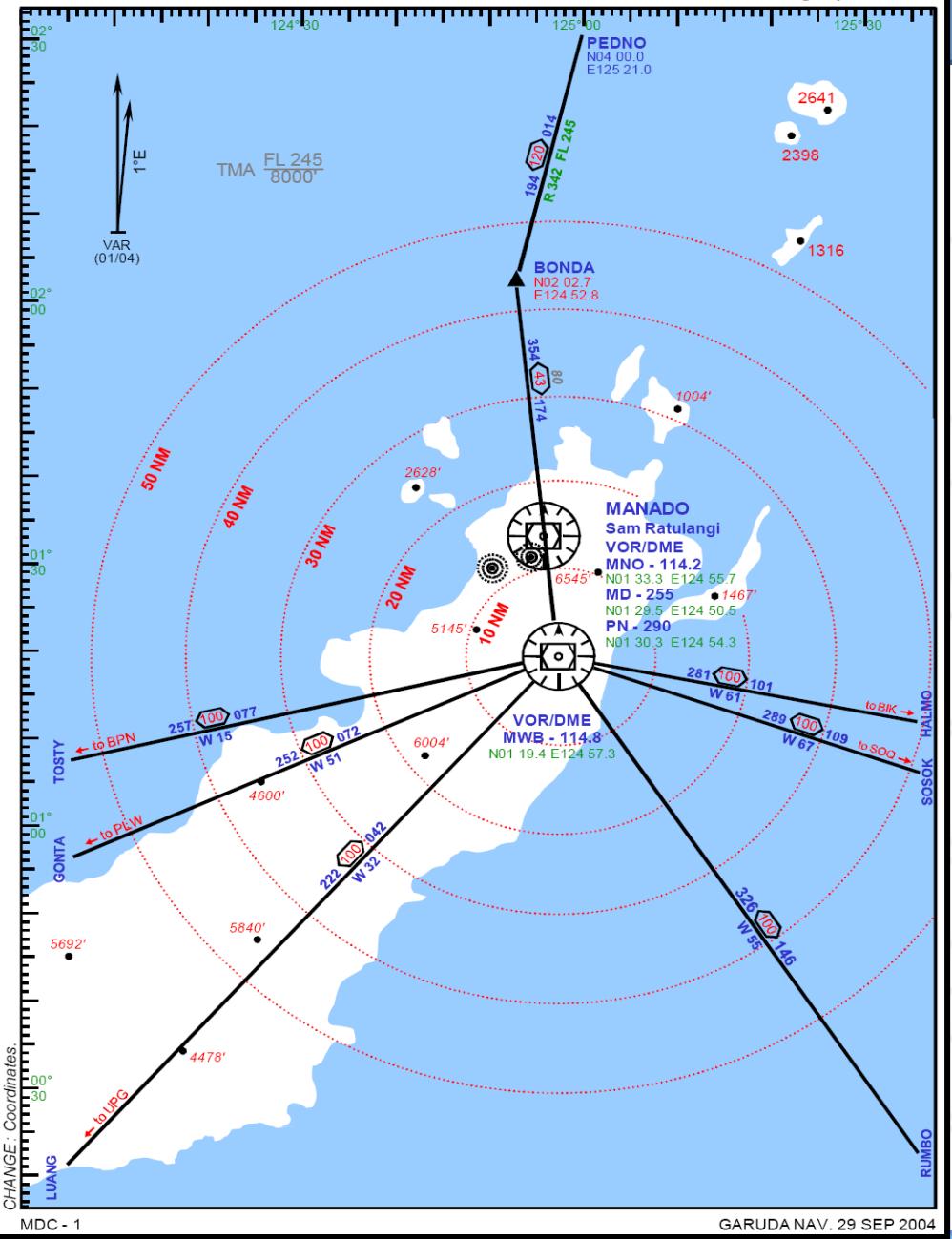
ADDITIONAL INFORMATION/ REMAR

- AFCT after landing must turn at the end of runway.
- AFCT bound for Manado must have health book IVC.
- Caution for flock birds in vicinity of airfield.
- Extended/ advanced hours on request.

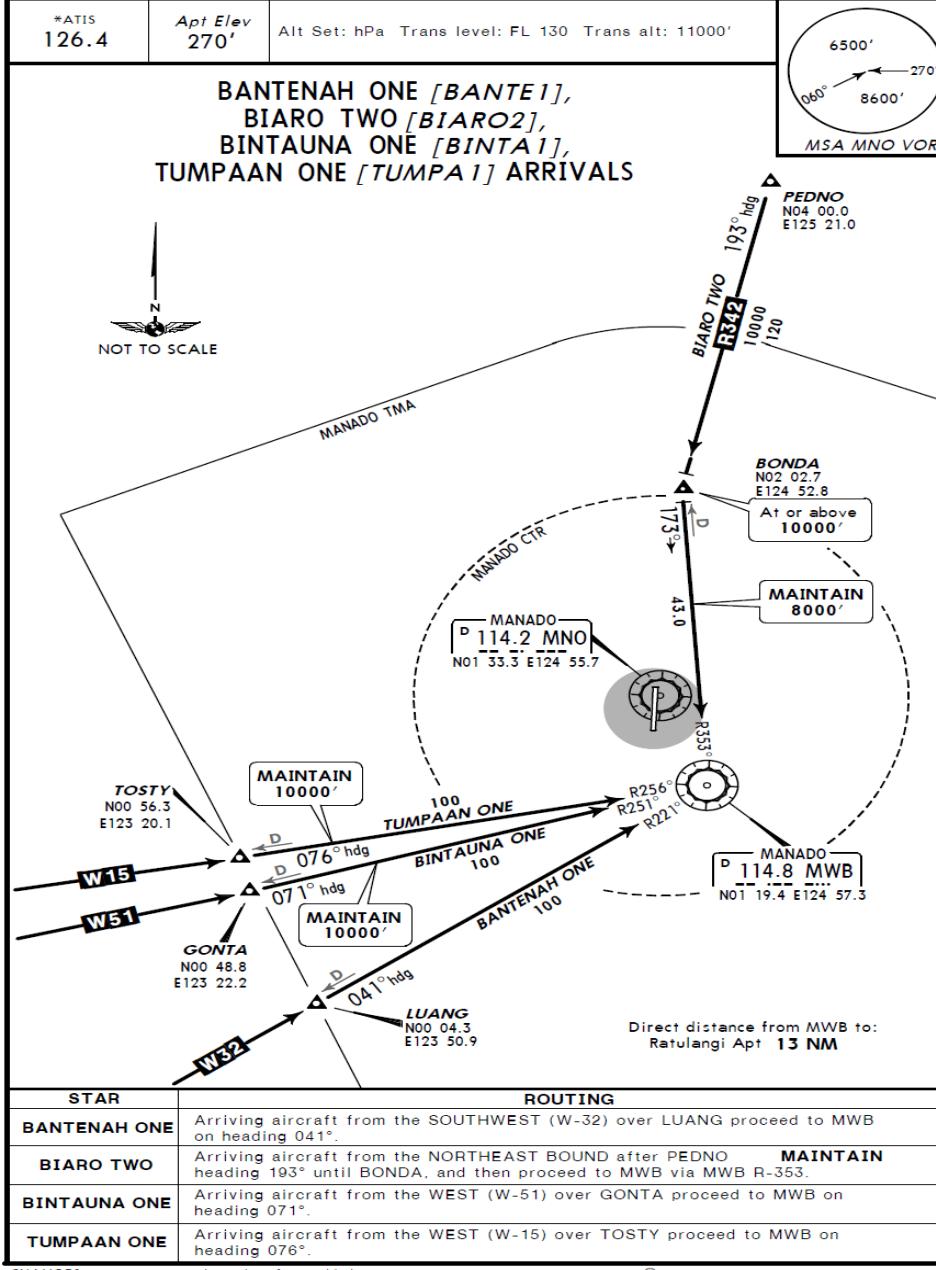
TERMINAL AREA CHART

s. Level : FL 130
. Alt : 11000 QNH

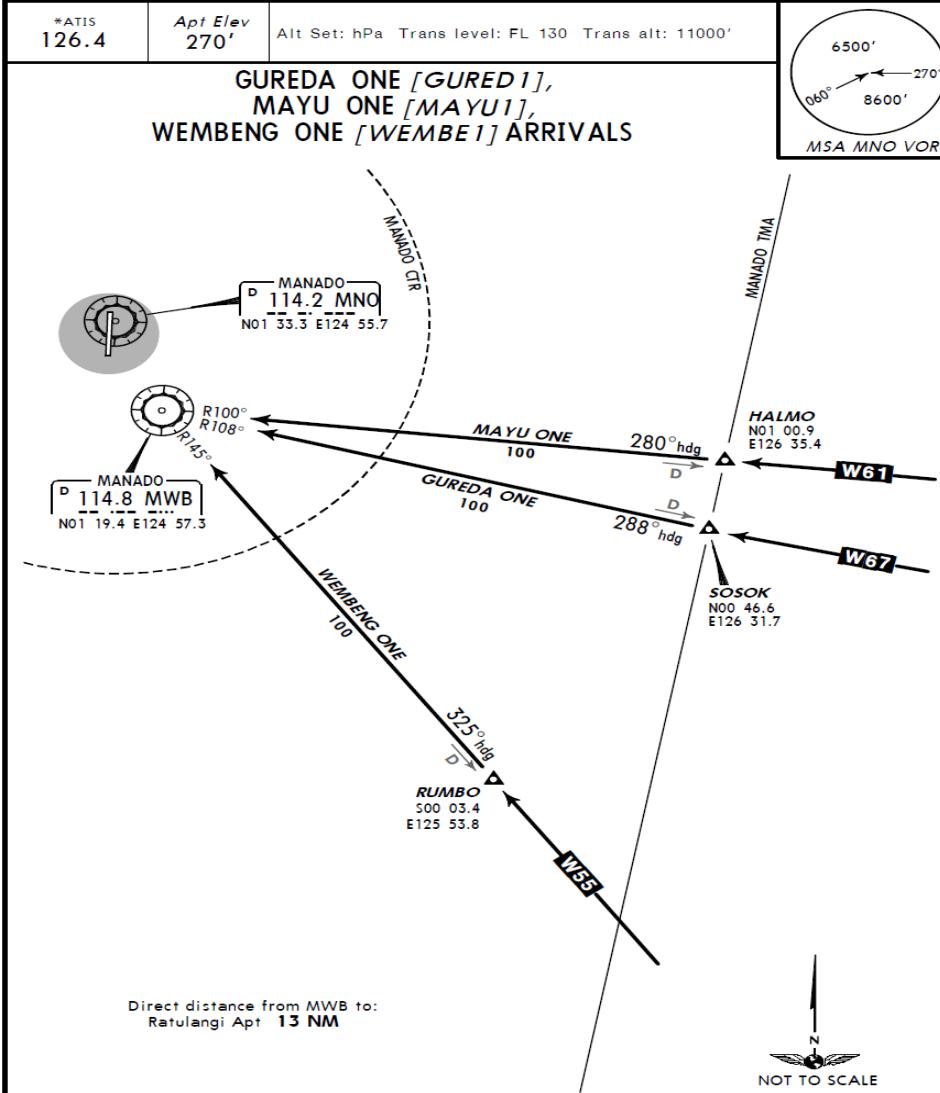
MANADO, INDONESIA
Sam Ratulangi Apt / WAMM



TERMINAL AREA CHART



STAR

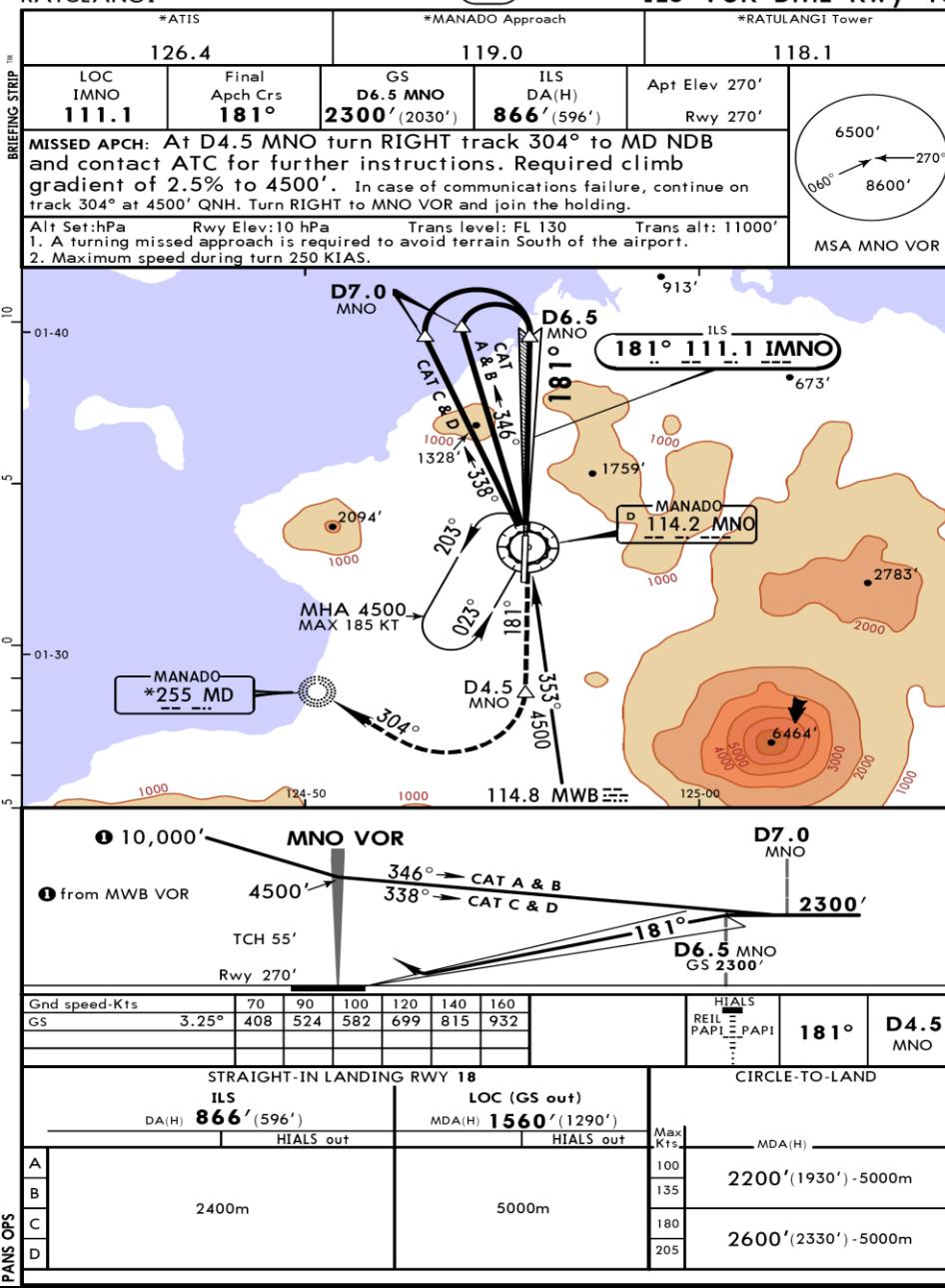


STAR	ROUTING
GUREDA ONE	Arriving aircraft from the EAST (W-67) over SOSOK proceed to MWB on heading 288°.
MAYU ONE	Arriving aircraft from the EAST (W-61) over HALMO proceed to MWB on heading 280°.
WEMBENG ONE	Arriving aircraft from the SOUTHEAST (W-55) over RUMBO proceed to MWB on heading 325°.

CHANGES: Bearings, procedure identifiers added.

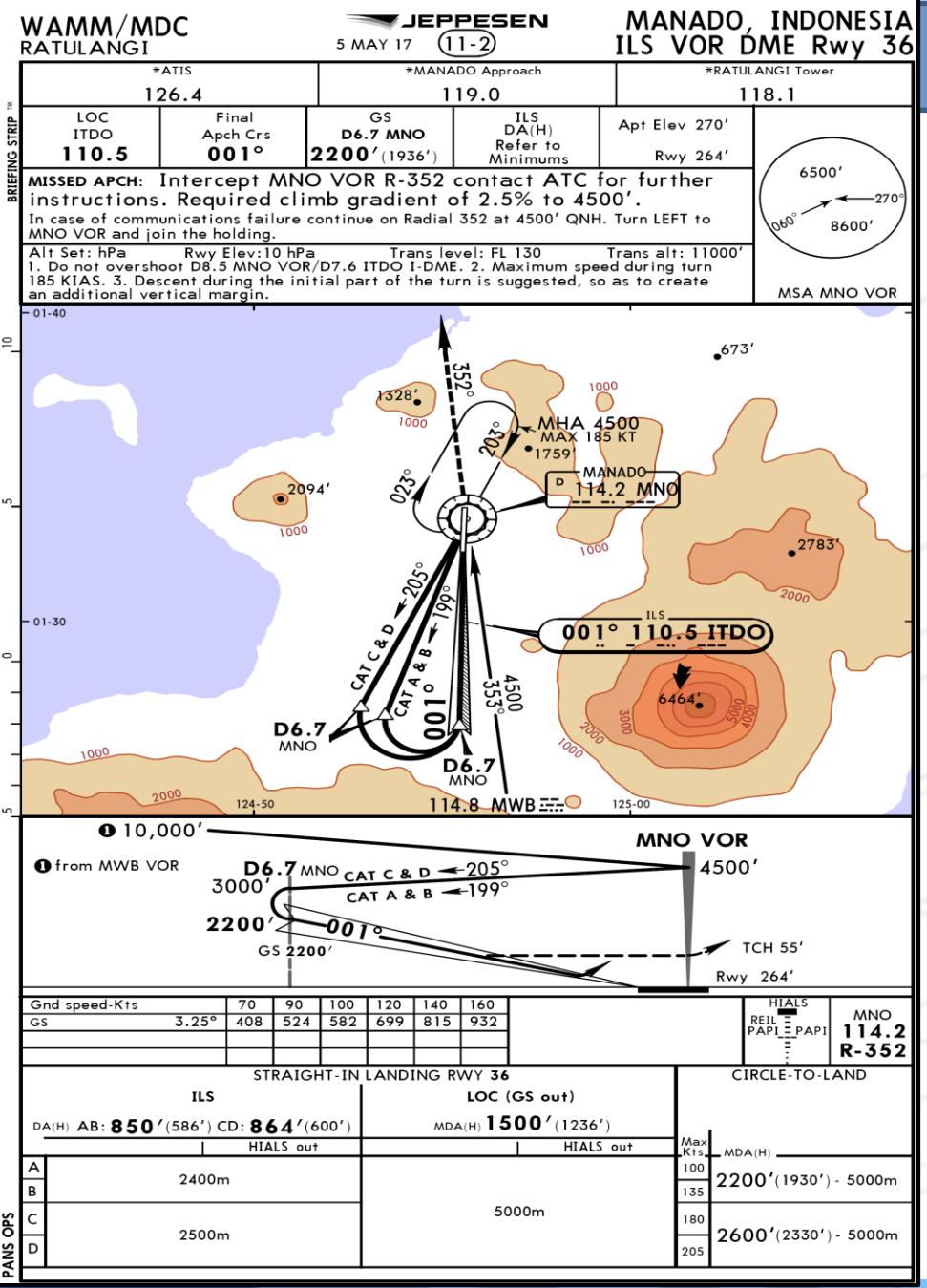
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STAR

WAMM/MDC
RATULANGIJEPPESEN
5 MAY 17 11-1MANADO, INDONESIA
ILS VOR DME Rwy 18

ILS VOR DME RWY 18

MISSED APPROACH; At D4.5 MNO turn RIGHT track 304° to MD NDB and contact ATC for further instructions. Required climb gradient of 2.5% to 4500 ft.



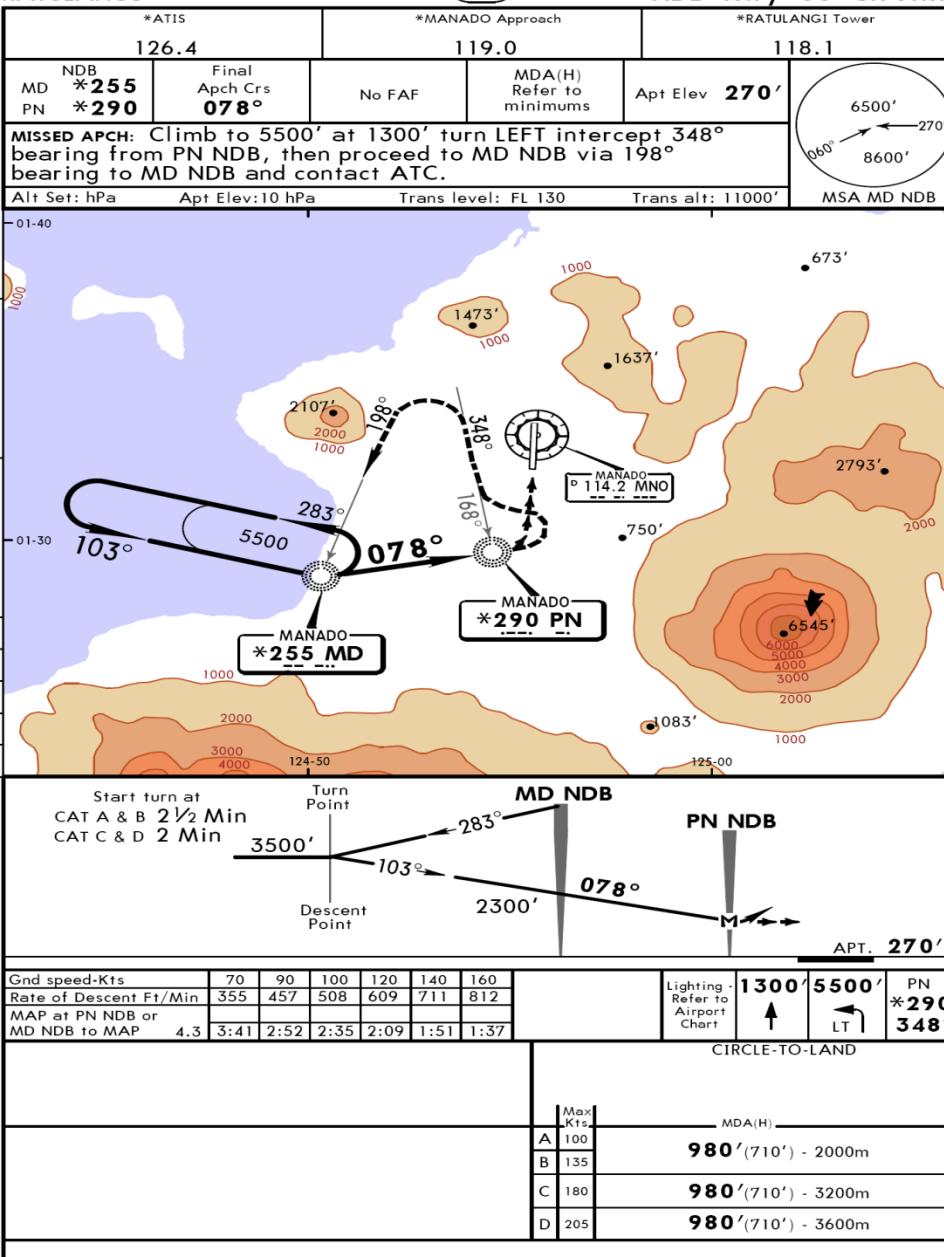
ILS VOR DME RWY 36

MISSED APPROACH : Intercept MNO VOR R-352 contact ATC for further instructions. Required climb gradient of 2.5% to 4500 ft.

WAMM/MDC
RATULANGI

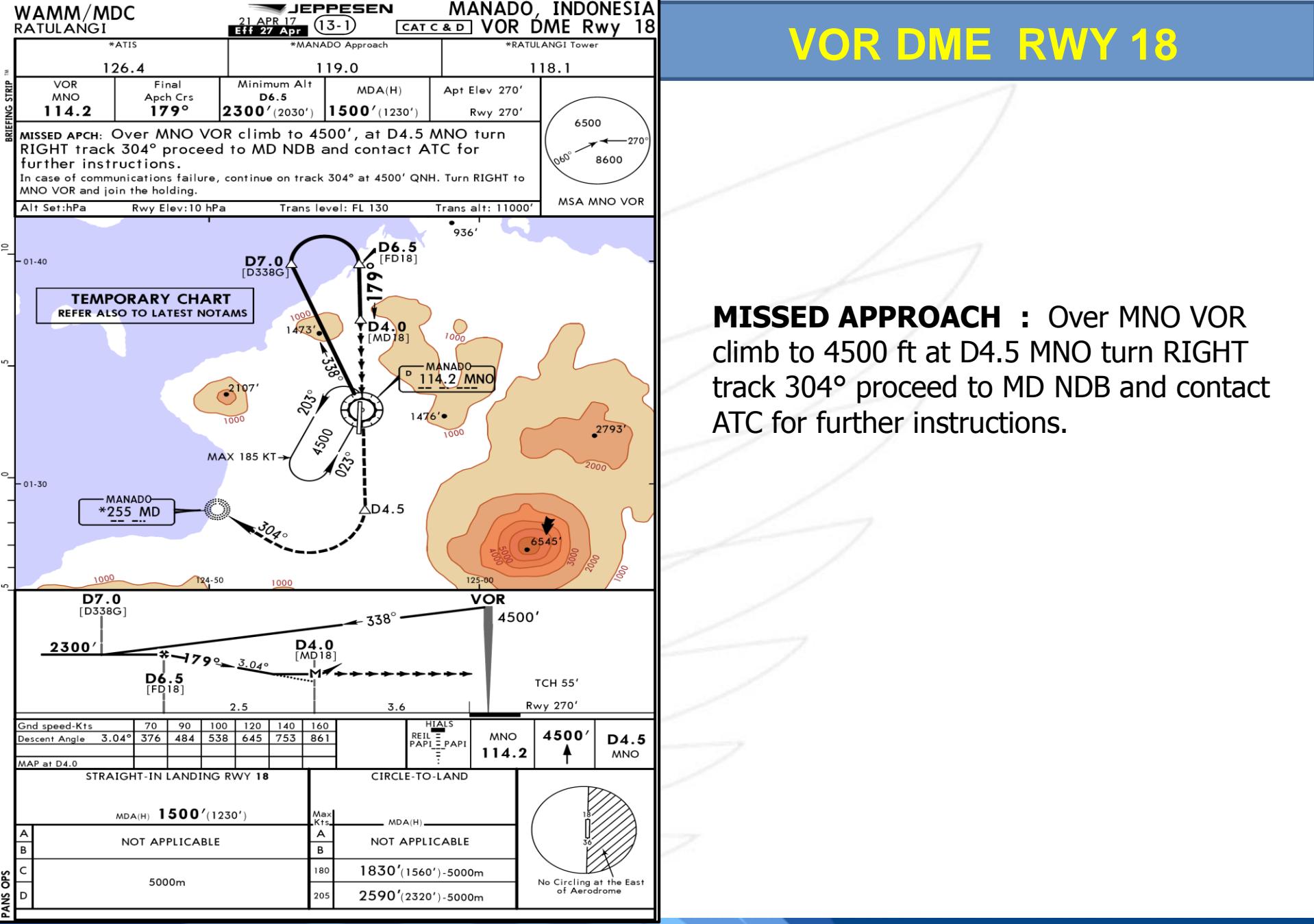
JEPPESEN
22 APR 16 (16-1)

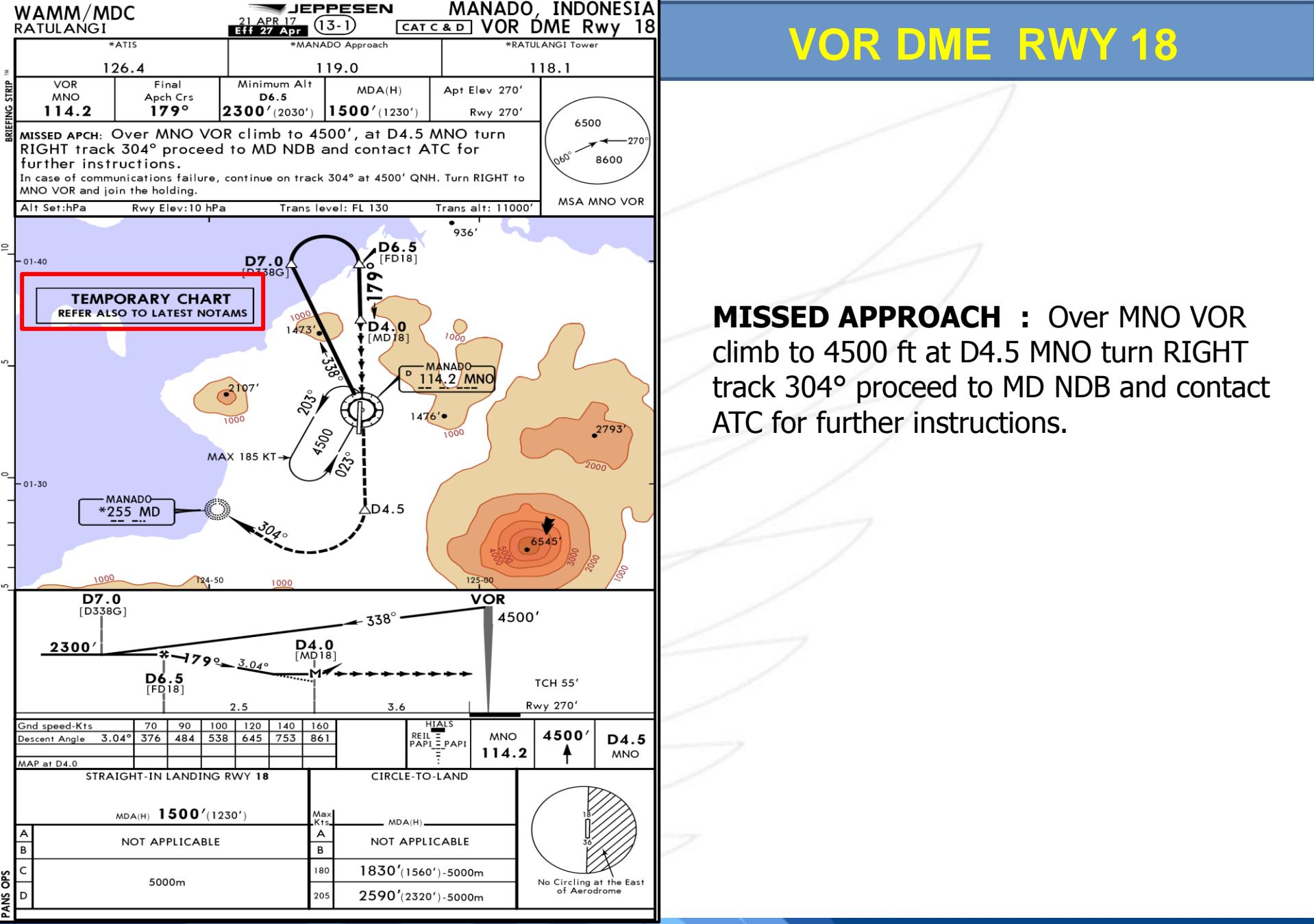
MANADO, INDONESIA
NDB Rwy 36 Circling

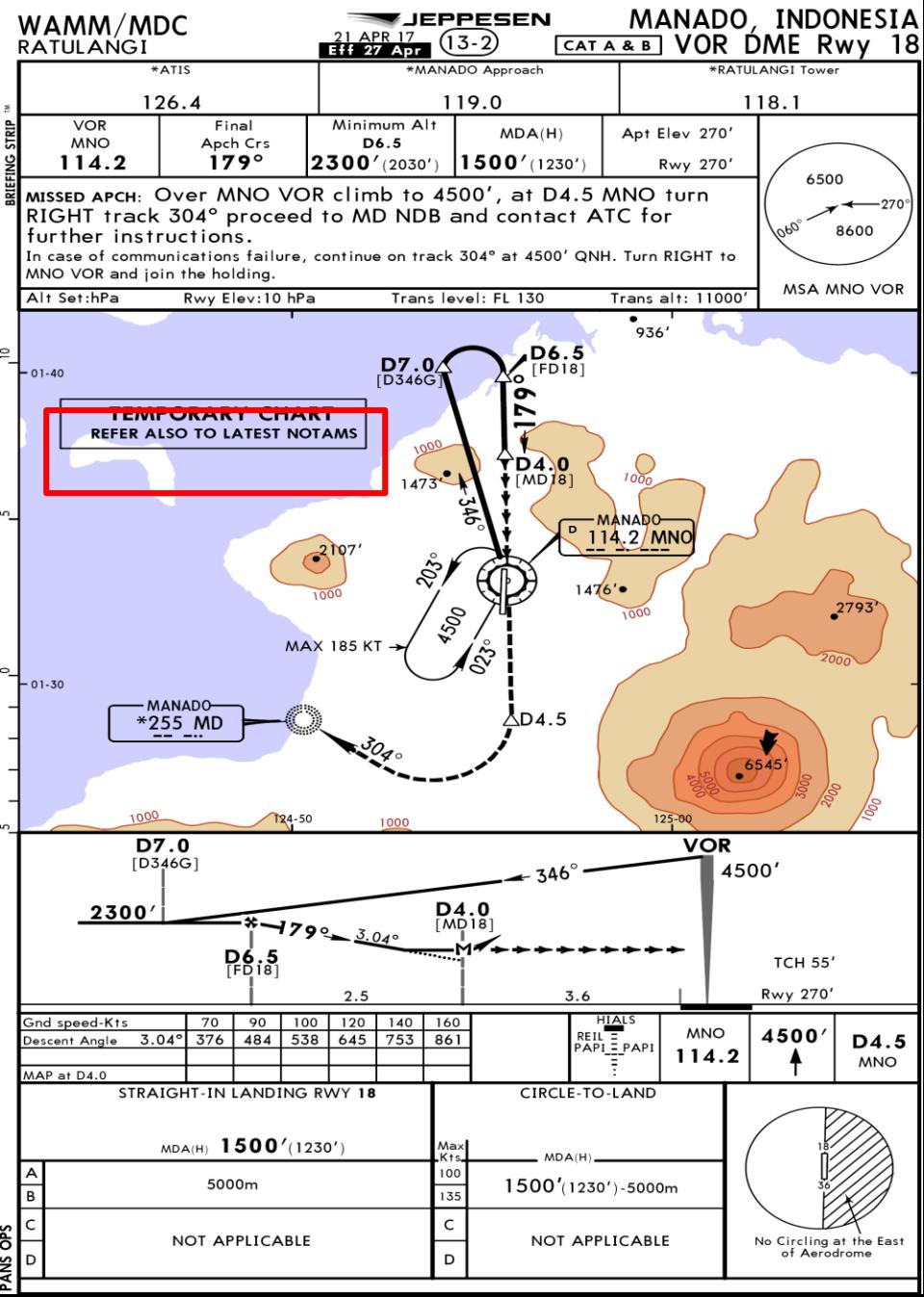


ILS VOR DME RWY 36

MISSED APPROACH : Climb to 1300 ft, then turn LEFT intercept 348° bearing outbound from PN NDB. Climb to 5500 ft, then proceed via 198° to MD NDB and contact ATC.







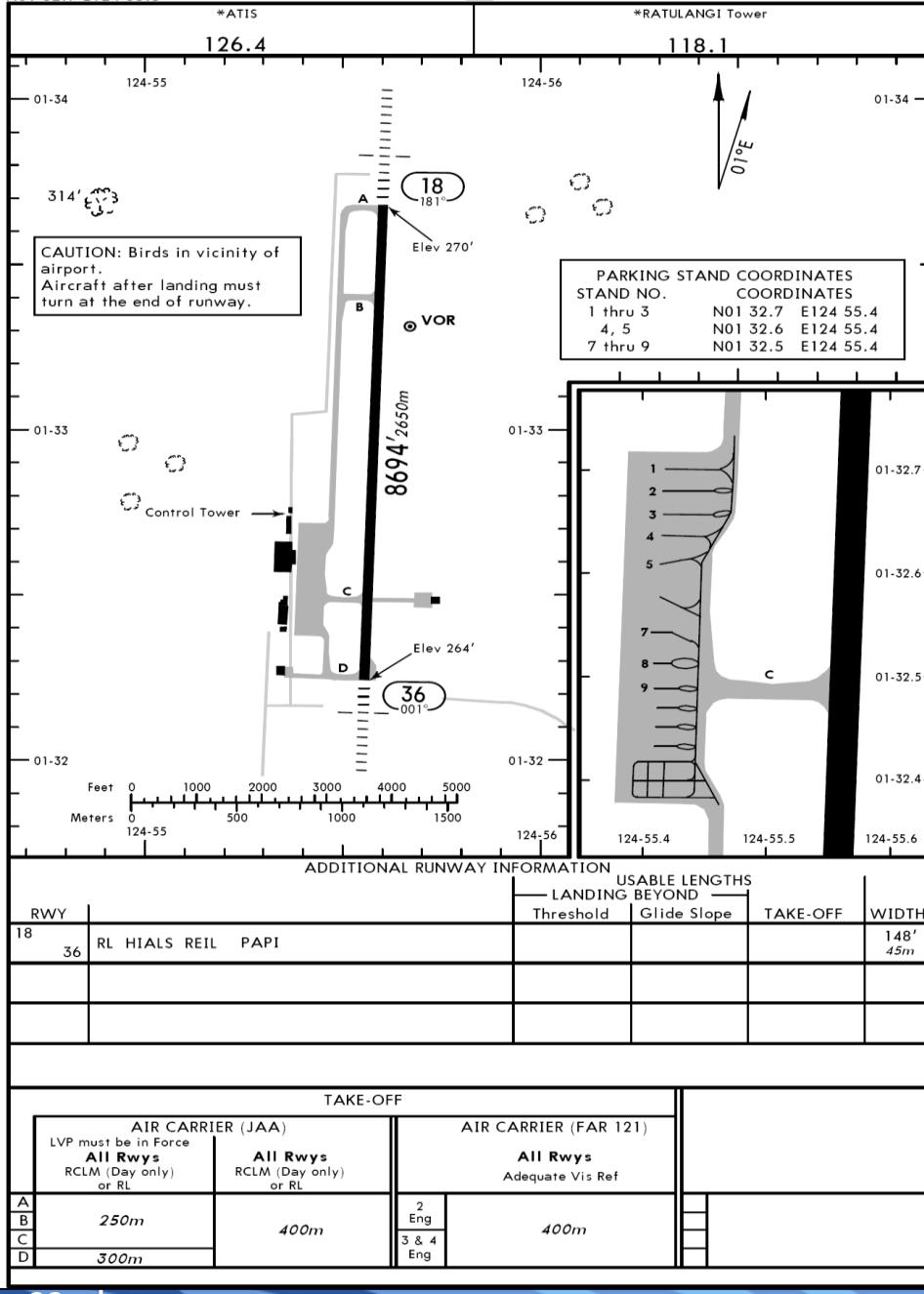
VOR DME RWY 18

MISSED APPROACH : Over MNO VOR climb to 4500 ft at D4.5 MNO turn RIGHT track 304° proceed to MD NDB and contact ATC for further instructions.

WAMM/MDC
Apt Elev 270'
N01 32.7 E124 55.5

JEPPESSEN
3 JAN 14 (10-9)

MANADO, INDONESIA
RATULANGI



LANDING CHART

RNAV (RNP) RWY 18

WAMM/MDC 26 SEP 14
RATULANGI

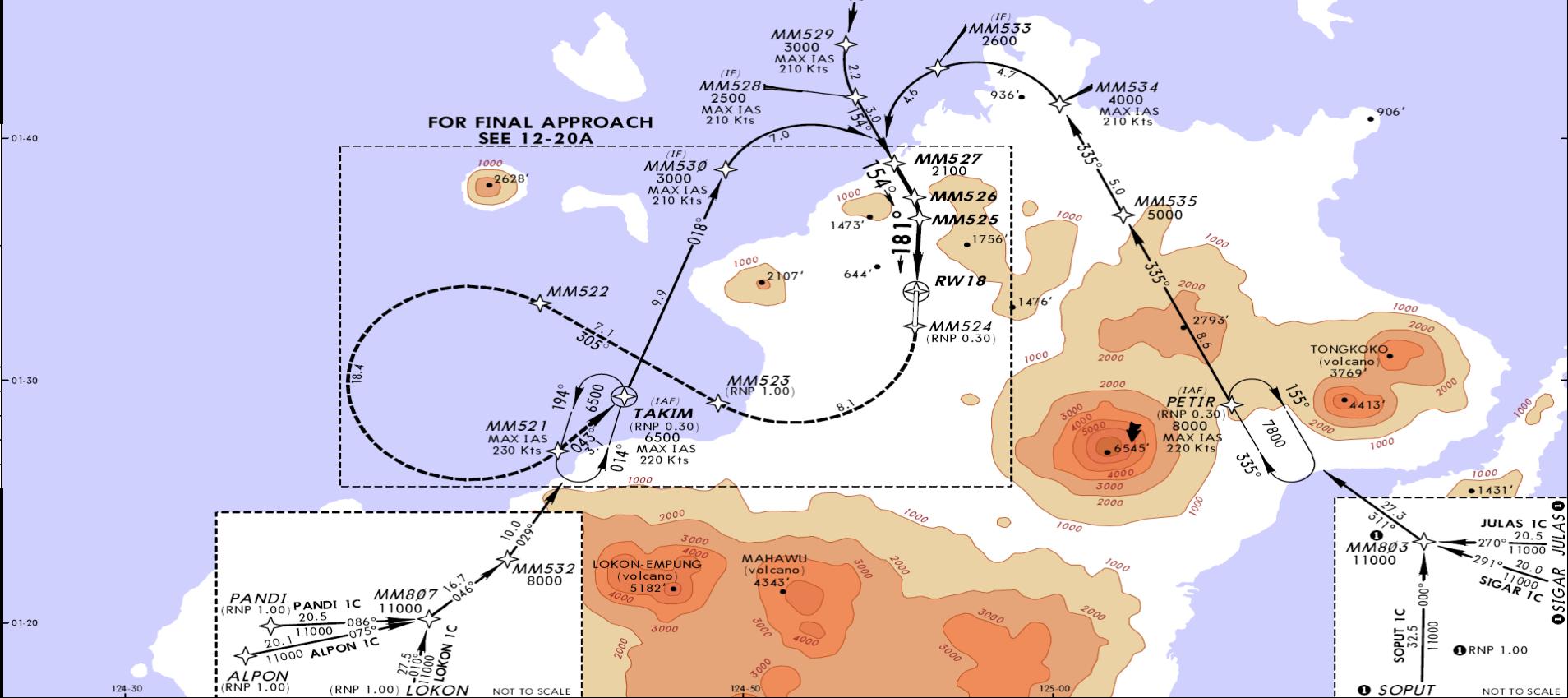
JEPPESSEN MANADO, INDONESIA
(12-20) RNAV (RNP) Rwy 18

*ATIS		*MANADO Approach		*RATULANGI Tower	
126.4		119.0		118.1	
RNAV	Final Apch Crs 181°	Minimum Alt MM527 2100' (1830')	RNP 0.15 DA(H) 813' (543')	Apt Elev 270' Rwy 18 270'	8700' MSA WAMM ARP

MISSIED APCH: Climb to 6500' on track 181° to MM524 and climbing RIGHT turn to MM523, and on track 305° to MM522, and climbing LEFT turn to MM521, and on track 043° to TAKIM and hold.

Alt Set: hPa Rwy Elev: 10hPa Trans level: FL 130 Trans alt: 11000'
1. AUTHORIZATION REQUIRED. 2. DUAL GNSS AND IRU REQUIRED. 3. RF REQUIRED.
4. For uncompensated Baro-VNAV systems, procedure not authorized below 15°C (59°F) or above 38°C (100°F). 5. Missed approach transition to missed approach RNP for lateral guidance must not be initiated prior to the along track position of DA(H).

TRANSITIONS



RNAV (RNP) RWY 18

WAMM/MDC
RATULANGI

JEPPESEN
26 SEP 14 (12-20A)

MANADO, INDONESIA
RNAV (RNP) Rwy 18

*ATIS		*MANADO Approach			*RATULANGI Tower	
126.4		119.0			118.1	
RNAV	Final Apch Crs 181°	Minimum Alt MM527 2100' (1830')	RNP 0.15 DA(H) 813' (543')	Apt Elev 270' Rwy 18 270'	01-38	01-37
MISSING APCH: Climb to 6500' on track 181° to MM524 and climbing RIGHT turn to MM523, and on track 305° to MM522, and climbing LEFT turn to MM521, and on track 043° to TAKIM and hold.						
Alt Set: hPa Rwy Elev: 10hPa Trans level: FL 130 Trans alt: 11000' 1. AUTHORIZATION REQUIRED. 2. DUAL GNSS AND IRU REQUIRED. 3. RF REQUIRED. 4. For uncompensated Baro-VNAV systems, procedure not authorized below 15°C (59°F) or above 38°C (100°F). 5. Missed approach transition to missed approach RNP for lateral guidance must not be initiated prior to the along track position of DA(H).						

01-36

01-35

01-34

124-50 124-51 124-52 124-53

MISSED APCH FIX

18.4

MM522

7.1 305°

MM523 (RNP 1.00)

19.4 014°

MM521 (RNP 0.30) MAX IAS 230 Kts

6.500 043° 6500 MAX IAS 220 Kts

TAKIM (RNP 0.30) 6500 MAX IAS 220 Kts

18.4 014° 6.500 043° 6500 MAX IAS 220 Kts

MM523 (RNP 1.00)

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RNAV (RNP) RWY 36

WAMM/MDC
RATULANGI

7 DEC 12

Eff 13 Dec

JEPPESSEN MANADO, INDONESIA
(12-21)
RNAV (RNP) Rwy 36

*ATIS	*MANADO Approach		*RATULANGI Tower	
126.4	Final Apch Crs 001°	Minimum Alt MM659 1600' (1336')	RNP 0.30 DA(H) 667' (403')	Apt Elev 270' Rwy 36 264'

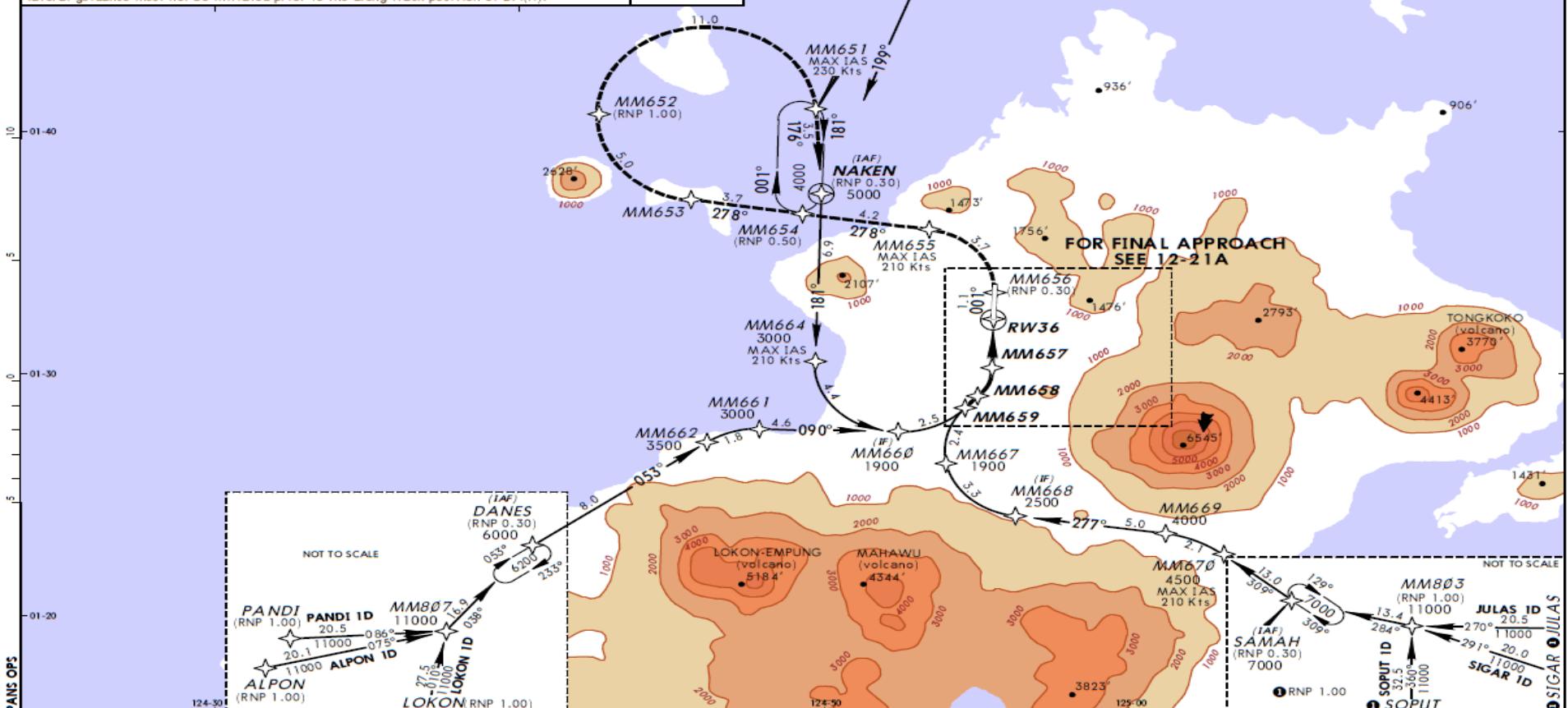
BRIEFING STRIP *

MISSED APCH: Climb to 5000' on track 001° to MM656 and climbing LEFT turn to MM655, and on track 278° to MM654, and on track 278° to MM653, and RIGHT turn to MM652, and RIGHT turn to MM651, and on track 176° to NAKEN and hold.

Alt Set: hPa Rwy Elev: 10hPa Trans Level: FL 130 Trans alt: 11000'
1. AUTHORIZATION REQUIRED. 2. DUAL GNSS AND IRU REQUIRED. 3. RF REQUIRED.
 4. For uncompensated Baro-VNAV systems, procedure not authorized below 15°C (59°F) or above 38°C (100°F). 5. Missed approach transition to missed approach RNP for lateral guidance must not be initiated prior to the along track position of DA(H).

BONDA 11000

TRANSITIONS



CHANGES: New procedure.

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RNAV (RNP) RWY 36

WAMM/MDC
RATULANGI

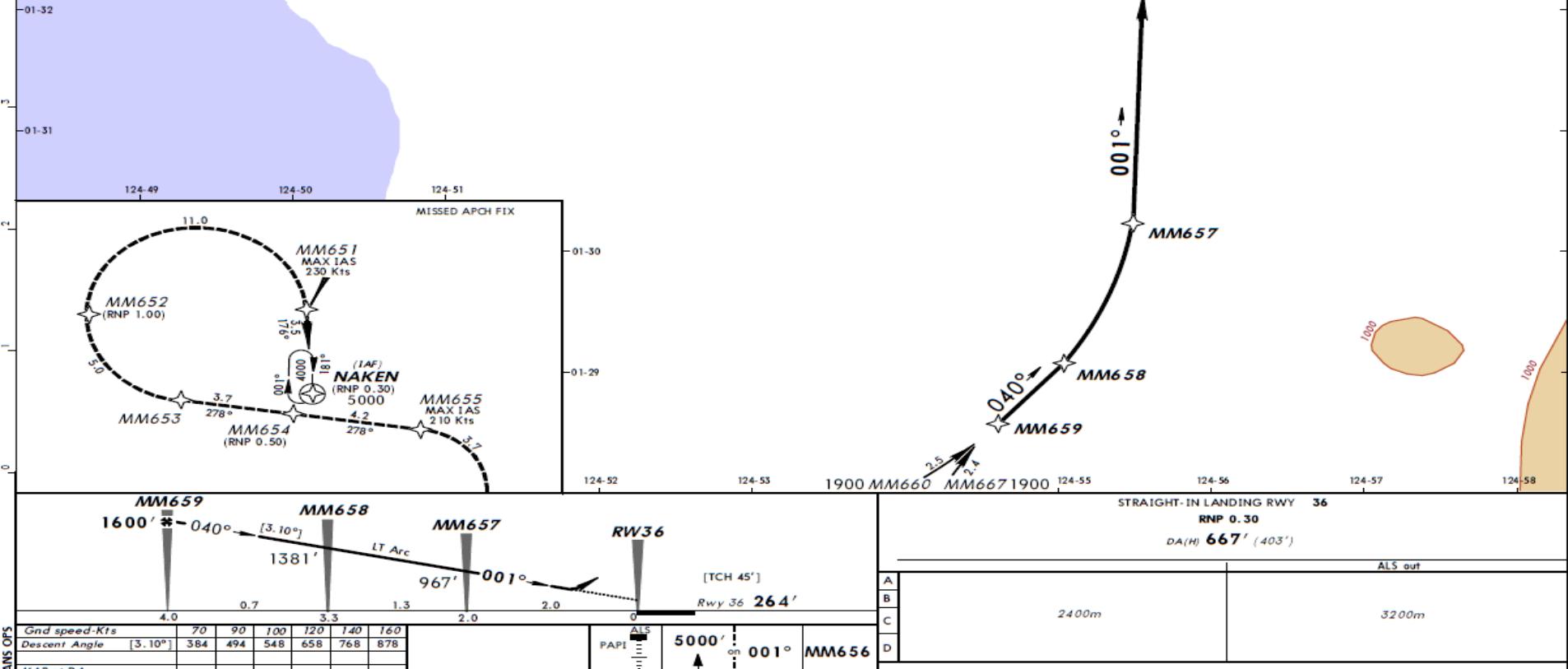
7 DEC 12
EFF 13 Dec
12-21A

MANADO, INDONESIA
RNAV (RNP) Rwy 36

BRIEFING STRIP™

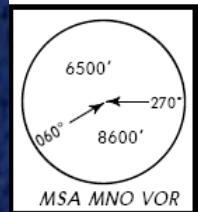
MISSED APCH: Climb to 5000' on track 001° to MM656 and climbing LEFT turn to MM655, and on track 278° to MM654, and on track 278° to MM653, and RIGHT turn to MM652, and RIGHT turn to MM651, and on track 176° to NAKEN and hold.

Alt Set: hPa Rwy Elev: 10hPa Trans level: FL 130 Trans alt: 11000'
1. AUTHORIZATION REQUIRED. 2. DUAL GNSS AND IRU REQUIRED. 3. RF REQUIRED.
 4. For uncompensated Baro-VNAV systems, procedure not authorized below 15°C (59°F) or above 38°C (100°F). 5. Missed approach transition to missed approach RNP for lateral guidance must not be initiated prior to the along track position of DA(H).



CHANGES: New procedure.

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Point of Departure: WAMM MD

TOSTY

LADOP

BPN

HAMOL

PKY

KOBAS

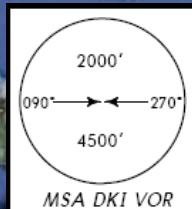
SABIL

ALAMO

LEPAS

ESALA PW190

Point of Arrival: WIII



Enroute: WAMM To WIII (MDC-CGK), R01: 1204 NM

WAMM/MDC
RATULANGI

JEPPESEN
16 JAN 15 10-3

MANADO, INDONESIA

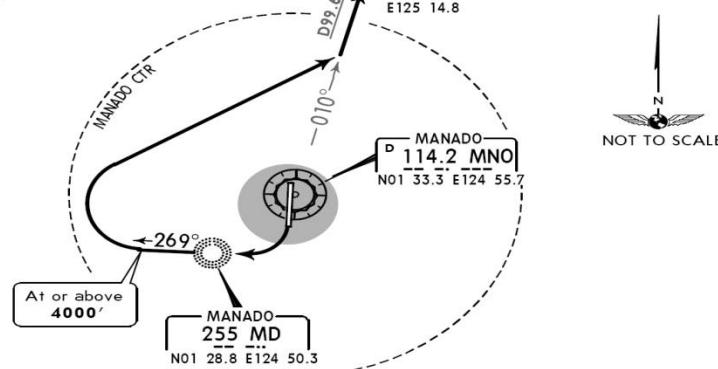
SID

Apt Elev
270'

Trans level: FL130 Trans alt: 11000'

BIARO ONE DEPARTURE [BIARO 1] (RWY 18)

Direct distance from Ratulangi Apt to:
MD NDB 7 NM

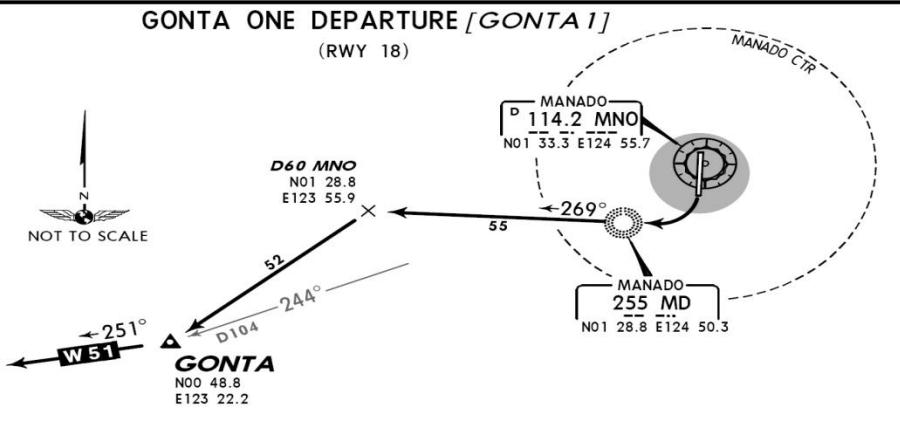


SID BIARO ONE DEPARTURE

SID

GONTA ONE DEPARTURE [GONTA 1] (RWY 18)

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

WAMM/MDC
RATULANGI

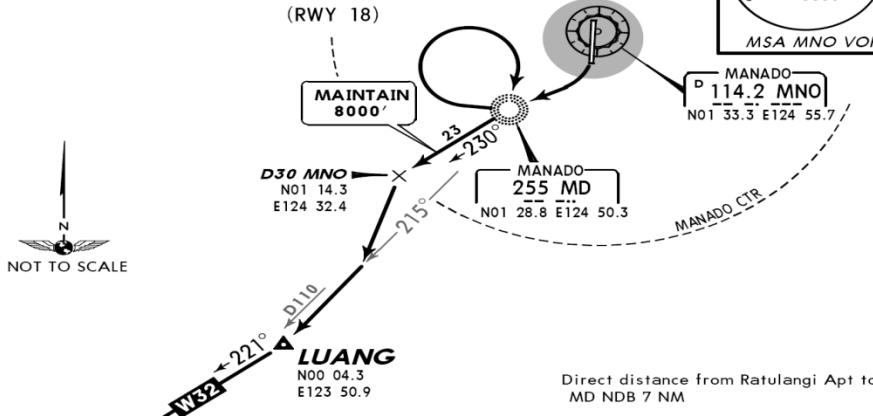
JEPPESEN
16 JAN 15 (10-3A)

MANADO, INDONESIA
SID

Apt Elev
270'
Trans level: FL130
Trans alt: 11000'

SID

LUANG ONE DEPARTURE [LUANG 1]
(RWY 18)



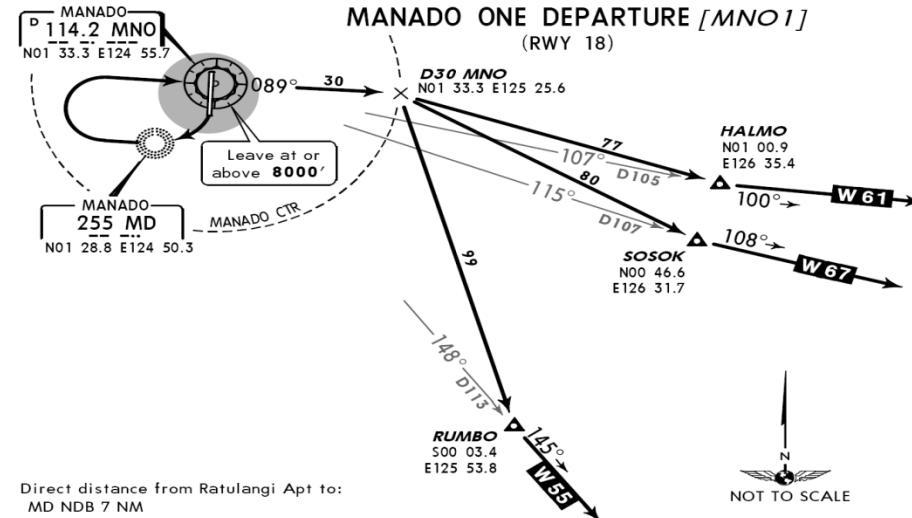
INITIAL CLIMB

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 [MNO 1]
(RWY 18)



INITIAL CLIMB

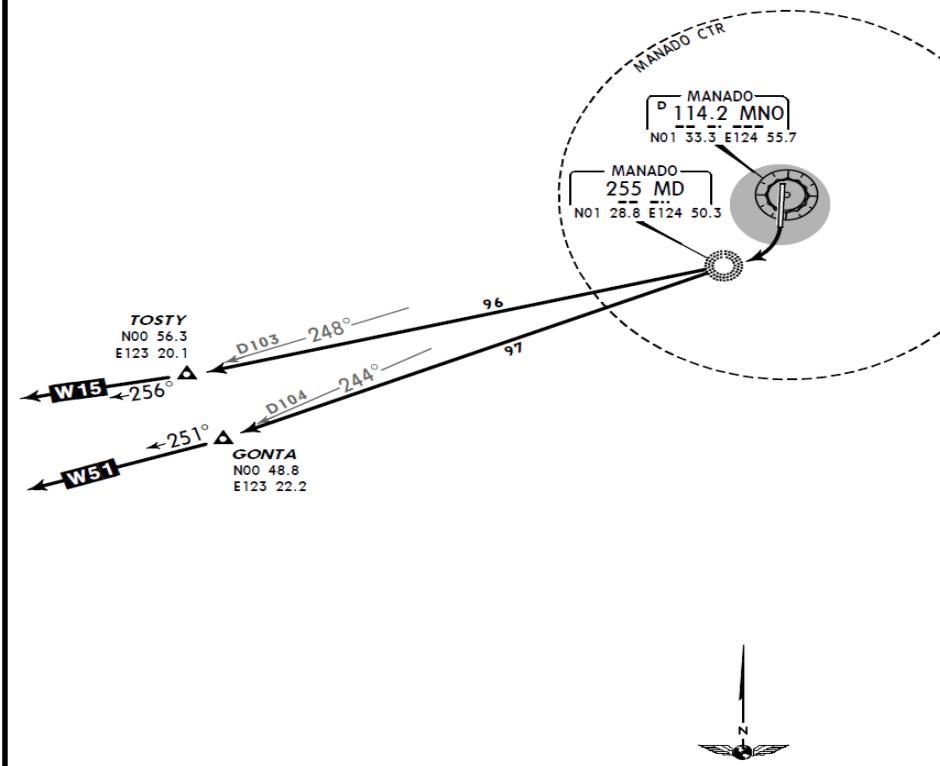
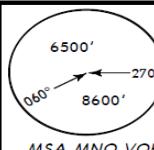
Immediate RIGHT turn to MD NDB, then proceed to MNO VOR and leave MNO VOR on MNO R-089 until D30 MNO. Proceed to HALMO to join airway W-61, or SOSOK to join airway W-67, or RUMBO to join airway W-55.

LUANG ONE DEPARTURE

MANADO ONE DEPARTURE

Apt Elev
270'

Trans level: FL 130 Trans alt: 11000'

MIKE DELTA ONE DEPARTURE [MD 1]
(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.

CHANGES: Procedure bearings, formations, procedure identifier added.

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S I D

MIKE DELTA ONE DEPARTURE

STANDARD INSTRUMENT DEPARTURE (RNAV SID)

WAMM/MDC
RATULANG I

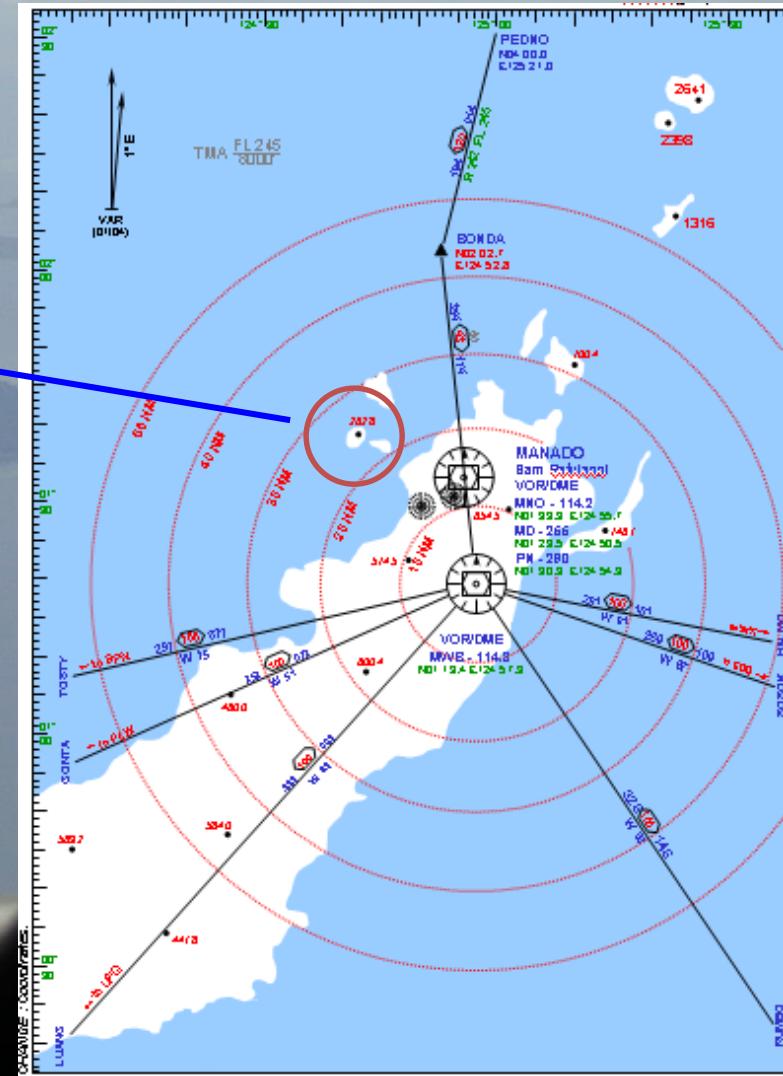
JEPPESEN MANADO, INDONESIA
7 DEC 12 10-3C Eff 13 Dec RNAV SID

CHANGES: New procedures at this airport.

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2628 FT

Manado Tua Mountain





Bunaken Island



Manado City

Proceed to MD NDB
2020 2021 2022 2023 2024

AERODROME

Overhead MD NDB and proceed to PN NDB

RWY. 18

RWY. 36

Leaving PN NDB, commencing left turn

1473 FT

1818 FT

1476 FT

RWY. 36



Follow Strobe₂Lights₀ Track : 1



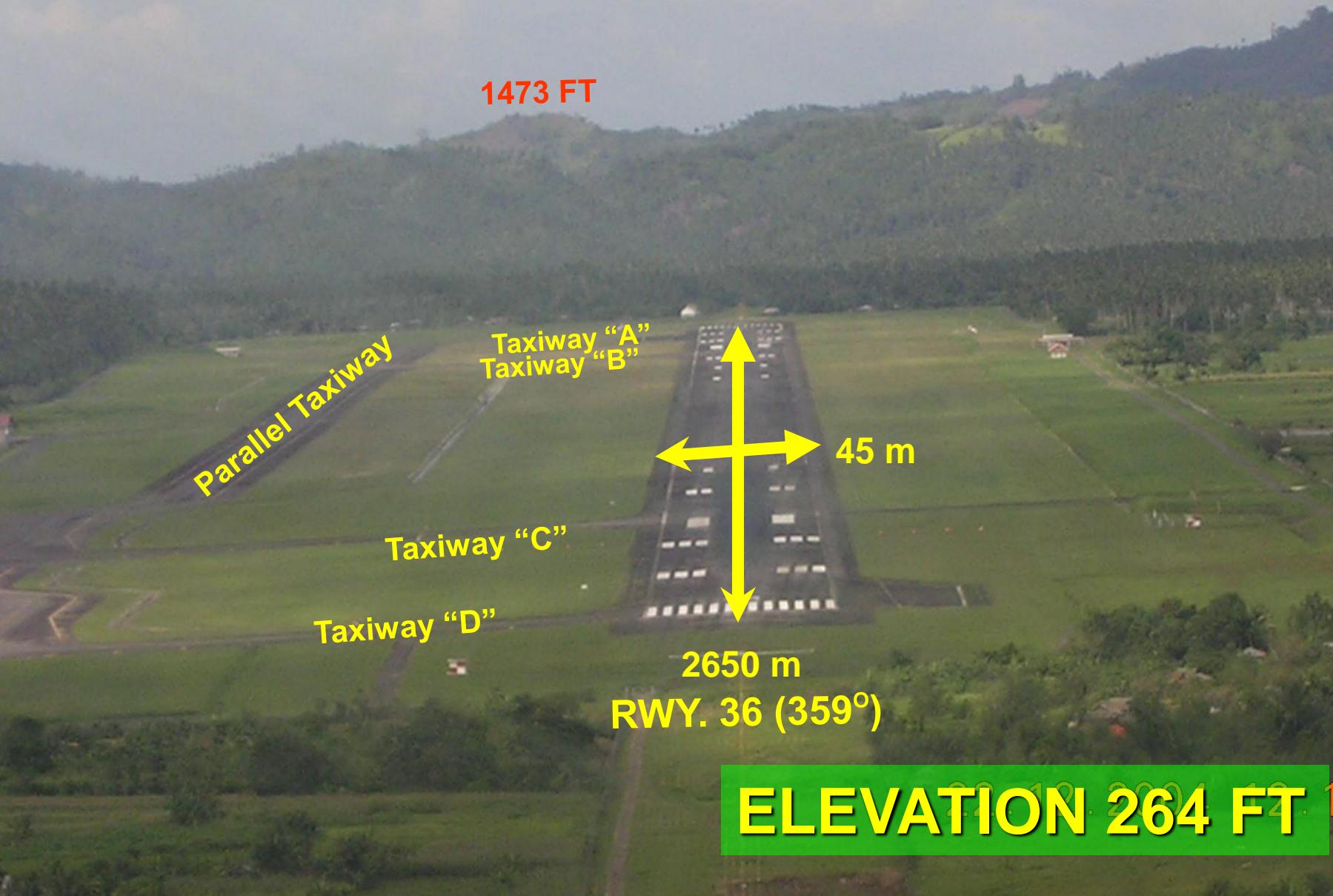
RWY 36



SAM RATULANGI AIRPORT

Taxiway "C"

PCN 72 F/C/X/T ASPHALT CONCRETE : 1



Ratulangi Tower 118.1

APRON

SAM RATULANGI AIRPORT







COMMUNICATION FAILURE

If radio failure precludes, the airplane shall comply with the radio communication failure procedure described herein or miscellaneous book.

The airplane when forming part of the aerodrome traffic at a controlled aerodrome shall keep a watch for such instructions as may be issued by visual signals.

A. Complete Radio Failure

- If in Visual Meteorological Condition (VMC) : → Squawk 7600
 - continue to fly in visual meteorological conditions.
 - land at the nearest suitable aerodrome.
 - report its arrival by the most expeditious means to the appropriate ATC unit.
- If in Instrument Meteorological Conditions (IMC) or when weather conditions are such that it does not appear feasible to complete the flight in accordance with appropriate procedure : → Squawk 7600.
 - Proceed according to the current flight plan to the appropriate designated navigation aid serving destination aerodrome and when required to ensure compliance with next following paragraph, hold over this aid until commencement of descent.
 - Commence descent from the navigation aid specified in flight plan or as close as possible to, the expected approach time last received and acknowledge , or if no expected approach time has been received and acknowledge, at or as close as possible to the estimated time of arrival resulting from the current flight plan.

COMMUNICATION FAILURE

- Complete applicable STAR followed by a normal instrument approach procedure as specified for the designated navigational aid, and land, if possible within 30 minutes after the estimated time of arrival specified or the last acknowledge expected approach time, whichever is later.

If the clearance for the levels covers only part of the route, the aircraft is expected to maintain the last assigned and acknowledged cruising level(s) to the point(s) specified in the clearance level(s) in the current flight plan. The provision of air traffic control service to other flights operating in the airspace concerned will be based on the assumption that aircraft experiencing radio failure will comply with the above name rules.

B. Receiver Failure

When two-way communication is not possible due to receiver failure at the aircraft station, report shall be transmitted preceded by the phrase “transmitting blind due to receiver failure”, at the scheduled positions or times, and on the frequency in use. After blind transmitting of a report, the complete message shall be repeated, and the time of next intended transmission shall be advised.

**HAVE A NICE FLIGHT
TO
MANADO**

