

**FEDERAL AVIATION ADMINISTRATION
FLIGHT STANDARDS SERVICE
RNAV (GPS) STANDARD INSTRUMENT APPROACH PROCEDURE
TITLE 14 CFR PART 97.33**

Bearings, headings, courses, tracks and radials are magnetic. Elevations and altitudes are in feet, MSL, except HAT, HAA, TCH, and RA. Altitudes are minimum altitudes unless otherwise indicated.
Ceilings are in feet above airport elevation. Distances are in nautical miles unless otherwise indicated, except visibilities which are in statute miles or feet RVR.

<u>AIRPORT</u> ROCHESTER INTL	<u>AIRPORT ID</u> KRST	<u>PROCEDURE NAME</u> RNAV (GPS) RWY 31	<u>ORIGINAL/AMENDMENT</u> 2A	<u>CITY</u>	<u>STATE</u> MN
<u>AIRPORT ELEVATION</u> 1317	<u>TDZE</u> 1304	<u>SUPERSEDED</u> RNAV (GPS) RWY 31	<u>ORIGINAL/AMENDMENT</u> 2	<u>DATED</u> 01/03/2019	<u>MAG VAR</u> 1E
<u>FACILITY</u> RNAV	<u>COORDINATES OF FACILITIES</u>	<u>ACTUAL EFFECTIVE DATE</u>	<u>REQUIRED EFFECTIVE DATE</u> ROUTINE	<u>CANCEL/SUSPEND</u>	<u>EPOCH YEAR</u> 2005

TERMINAL ROUTES

<u>FROM</u>	<u>FIX TYPE</u>	<u>TO</u>	<u>FIX TYPE</u>	<u>LEG TYPE</u>	<u>FO/FB</u>	<u>RNP</u>	<u>COURSE</u>	<u>DISTANCE</u>	<u>ALTITUDE</u>
DLANY	IAF	ZUTEL		TF	FB	1.00	247.14	10.34	2900
GABDE	IAF	ZUTEL		TF	FB	1.00	001.97	7.95	2900
EMORE	IAF	ZUTEL		TF	FB	1.00	311.35	6.59	2900
ZUTEL	IF	MINGO		TF	FB	1.00	311.27	6.55	2800
MINGO	FAF	JEDUG/2.33 NM TO RW31		TF	FB	0.30	311.20	2.19	
JEDUG/2.33 NM TO RW31		RW31	MAP	TF	FO	0.30	311.20	2.33	
RW31	MAP	1504 MSL		CA			311.20		
1504 MSL		CORDY		DF	FO	1.00			3000

MISSED APPROACH

MAP:

LPV: DA
LNAV/VNAV: DA
LNAV: RW31

MISSED APPROACH INSTRUCTIONS:

CLIMB TO 3000 DIRECT CORDY AND HOLD.

ALTERNATE MISSED APPROACH INSTRUCTIONS:



PROFILE:

1. PT SIDE OF COURSE OUTBOUND FT WITHIN MILES OF (IAF)

2. PROFILE STARTS AT ZUTEL

3. FAC: 311.20 FAF: MINGO DIST FAF TO MAP: 4.52 DIST FAF TO THLD: 4.52

4. MIN ALT: ZUTEL 2900, MINGO 2800, JEDUG/2.33 NM TO RW31 2100*

5. DIST TO THLD FROM OM: MM: IM: 150 HAT: 200 HAT: 0.45 GS ANT:

6. MIN GP INCPT: 2800 GP ALT AT FAF : MINGO 2800 OM: MM: IM:

7. GP ANGLE: 3.00 34:1: IS CLEAR 20:1: IS CLEAR TCH: 56.1

8. MSA FROM: RW31 3900

PBN REQUIREMENTS NOTE:

RNP APCH.

NOTES:

CHART NOTE: FOR UNCOMPENSATED BARO-VNAV SYSTEMS, LNAV/VNAV NA BELOW -20°C OR ABOVE 54°C.
CHART NOTE: FOR INOPERATIVE ALS, INCREASE LNAV/VNAV ALL CATS VISIBILITY TO RVR 4500, INCREASE LNAV CAT C/D VISIBILITY TO RVR 5500.

ADDITIONAL FLIGHT DATA:

CHART: ASR.
CHART CIRCLING ICON.
CHART VDP AT 1.01 NM TO RW31*
*LNAV ONLY
WAAS CHANNEL #49028
REFERENCE PATH ID: W31A
CHART FAS OBST: 1373 ANT 435447N/09222902W.
1512 AAO 435036N/0922521W.
HOLD SE, RT, 332.78 INBOUND
LTP HAE: 367.5 M

MINIMUMS:

TAKEOFF: SEE FAA FORM 8260-15A FOR THIS AIRPORT

ALTERNATE: NA ☐ STANDARD

CATEGORY:	A			B			C			D			E		
FINAL TYPE	DA/MDA	VIS	HAT/HAA	DA/MDA	VIS	HAT/HAA	DA/MDA	VIS	HAT/HAA	DA/MDA	VIS	HAT/HAA	DA/MDA	VIS	HAT/HAA
LPV DA	1504	1800	200	1504	1800	200	1504	1800	200	1504	1800	200			
LNAV/VNAV DA	1554	2400	250	1554	2400	250	1554	2400	250	1554	2400	250			
LNAV MDA	1640	2400	336	1640	2400	336	1640	3500	336	1640	3500	336			
CIRCLING	1720	1	403	1780	1	463	1900	1 1/2	583	1900	2	583			



CHANGES - REASONS

- 1: CHART PLANVIEW: REMOVED NOTE " PROCEDURE NA FOR ARRIVALS AT EMORE ON V24 EASTBOUND." - LNR DECOMMISSION/ VOR MON.
2: CHART PLANVIEW: REMOVED NOTE " PROCEDURE NA FOR ARRIVALS AT GABDE ON V398-411 SOUTHEAST BOUND." - FUTURE DECOMMISSION OF UKN VOR.
3: CHART PLANVIEW: REMOVED NOTE " PROCEDURE NA FOR ARRIVALS AT DLANY ON V82-170 EASTBOUND AND V218 SOUTHEAST BOUND." - FUTURE DECOMMISSION OF UKN VOR.

COORDINATED WITH:

A4A ☒ ALPA ☒ AOPA ☒ APA ☒ HAI ☐ NBAA ☒ OTHER: ZMP, PNM FSS, RST ATCT, STATE AERO

FLIGHT CHECKED BY

PROCESSED IAW AIRCRAFT OPERATIONS GROUP (AJW-33) MEMO, OCTOBER 3, 2018, SUBJECT:
FLIGHT INSPECTION REVIEW NOT REQUIRED

OFFICE

DATE

Digitally signed by

DEVELOPED BY

DONALD H. LANIER (MICAH HILLEY)

Digitally signed by

DONALD H LANIER

DONALD H LANIER

Oct 31, 2019

OFFICE

AJV-A431

DATE

08/14/2019

APPROVED BY

GEORGE DAVIS

Digitally signed by

DONALD H LANIER

Oct 31, 2019

OFFICE

AJV-A430

DATE

TITLE
MANAGER

Oct 31, 2019



FAS DATA BLOCK INFORMATION

<u>DATA FIELD</u>	<u>DATA</u>
OPERATION TYPE	0
SBAS SERVICE PROVIDER IDENTIFIER	0
AIRPORT IDENTIFIER	KRST
RUNWAY	RW31
APPROACH PERFORMANCE DESIGNATOR	0
ROUTE INDICATOR	
REFERENCE PATH DATA SELECTOR	0
REFERENCE PATH IDENTIFIER (APPROACH ID)	W31A
LTP/FTP LATITUDE	435412.6945N
LTP/FTP LONGITUDE	0922912.1470W
LTP/FTP ELLIPSOIDAL HEIGHT	+03675
FPAP LATITUDE	435512.5400N
FPAP LONGITUDE	0923043.6600W
THRESHOLD CROSSING HEIGHT (TCH)	00056.1
TCH UNITS SELECTOR (METERS OR FEET USED)	F
GLIDEPATH ANGLE (GPA)	03.00
COURSE WIDTH AT THRESHOLD	106.75
LENGTH OFFSET	0000
HORIZONTAL ALERT LIMIT (HAL)	40.0
VERTICAL ALERT LIMIT (VAL)	35.0
CRC REMAINDER	C179B077

ADDITIONAL PATH POINT RECORD INFORMATION

ICAO CODE	K3
LTP ORTHOMETRIC HEIGHT	+03975
FPAP ORTHOMETRIC HEIGHT	+03975



FEDERAL AVIATION ADMINISTRATION
FLIGHT STANDARDS SERVICE
STANDARD INSTRUMENT APPROACH PROCEDURE DATA RECORD

AIRPORT	AIRPORT ID	PROCEDURE NAME	AMDT NO.	CITY	STATE	AIRPORT ELEVATION	FACILITY
ROCHESTER INTL	KRST	RNAV (GPS) RWY 31	2A		MN	1317	RNAV

PART A: OBSTRUCTION DATA SEGMENTS

INITIAL

FROM DLANY TO ZUTEL

<u>RNP</u>	<u>DISTANCE</u>	<u>PAT</u>	<u>MAP</u>	<u>HAT</u>			<u>HMAS</u>					
	10.34											
<u>OBSTRUCTION</u>	<u>COORDINATES</u>		<u>ELEV MSL</u>	<u>HORZ</u>	<u>VERT</u>	<u>AC</u>	<u>ROC</u>	<u>OCS</u>	<u>CG</u>	<u>CGTA</u>	<u>ADJUSTMENTS</u>	<u>MIN ALT</u>
1.AAO	434912.00N/0921815.00W		1565	164	98	4E	1000					2600
2.TERRAIN	434912.00N/0921815.00W		1365 (1400)								AS1500	2900

COMPUTATIONS

ALT KIAS KTAS HAA VKTW TR BA DTA COURSE CHANGE DVEB VEB OCS RF CENTER FIX/DISTANCE

SEGMENT REMARKS:

INITIAL

FROM GABDE TO ZUTEL

<u>RNP</u>	<u>DISTANCE</u>	<u>PAT</u>	<u>MAP</u>	<u>HAT</u>			<u>HMAS</u>					
	7.95											
<u>OBSTRUCTION</u>	<u>COORDINATES</u>		<u>ELEV MSL</u>	<u>HORZ</u>	<u>VERT</u>	<u>AC</u>	<u>ROC</u>	<u>OCS</u>	<u>CG</u>	<u>CGTA</u>	<u>ADJUSTMENTS</u>	<u>MIN ALT</u>
3.TWR (27-020458)	433933.59N/0921758.84W		1680	500	50	5D	1000					2700
4.TERRAIN	434118.00N/0921809.00W		1398 (1400)								AS1500	2900

COMPUTATIONS

ALT KIAS KTAS HAA VKTW TR BA DTA COURSE CHANGE DVEB VEB OCS RF CENTER FIX/DISTANCE

SEGMENT REMARKS:



INITIAL

FROM

EMORE

TO

ZUTEL

RNP	DISTANCE	PAT	MAP	HAT	HMAS							
	6.59											
OBSTRUCTION	COORDINATES		ELEV MSL	HORZ	VERT	AC	ROC	OCS	CG	CGTA	ADJUSTMENTS	MIN ALT
5.AAO	434312.00N/0921415.00W		1559	164	98	4E	1000					2600
6.TERRAIN	434312.00N/0921415.00W		1359 (1400)								AS1500	2900

COMPUTATIONS

ALT

KIAS

KTAS

HAA

VKTW

TR

BA

DTA

COURSE CHANGE

DVEB

VEB OCS

RF CENTER FIX/DISTANCE

SEGMENT REMARKS:

INTERMEDIATE

FROM

ZUTEL

TO

MINGO

RNP	DISTANCE	PAT	MAP	HAT	HMAS							
	6.55											
OBSTRUCTION	COORDINATES		ELEV MSL	HORZ	VERT	AC	ROC	OCS	CG	CGTA	ADJUSTMENTS	MIN ALT
7.AAO	434603.00N/0922136.00W		1569	164	98	4E	500				AC66 AT665	2800
8.TERRAIN	434603.00N/0922136.00W		1369 (1400)								AS1000	2400

COMPUTATIONS

ALT

KIAS

KTAS

HAA

VKTW

TR

BA

DTA

COURSE CHANGE

DVEB

VEB OCS

RF CENTER FIX/DISTANCE

SEGMENT REMARKS:



FINAL: LPV

FROM

MINGO

TO

RW31

RNP	DISTANCE	PAT	MAP	HAT			HMAS					
	4.52		DA		200							
OBSTRUCTION	COORDINATES		ELEV MSL	HORZ	VERT	AC	ROC	OCS	CG	CGTA	ADJUSTMENTS	MIN ALT
								ASC				1504

COMPUTATIONS

ALT

KIAS

KTAS

HAA

VKTW

TR

BA

DTA

COURSE CHANGE

DVEB

VEB OCS

RF CENTER FIX/DISTANCE

SEGMENT REMARKS:

FINAL: LNAV/VNAV

FROM

MINGO

TO

RW31

RNP	DISTANCE	PAT	MAP	HAT			HMAS					
	4.52		DA		250							
OBSTRUCTION	COORDINATES		ELEV MSL	HORZ	VERT	AC	ROC	OCS	CG	CGTA	ADJUSTMENTS	MIN ALT
9.ANTENNA (27-055919)	435447.07N/0922902.32W		1373	20	3	1A		22.44:1				1554

COMPUTATIONS

ALT

KIAS

KTAS

HAA

VKTW

TR

BA

DTA

COURSE CHANGE

DVEB

VEB OCS

RF CENTER FIX/DISTANCE

SEGMENT REMARKS:



FINAL: LNAV

FROM

MINGO

TO

JEDUG/2.33 NM TO RW31

RNP	DISTANCE	PAT	MAP	HAT			HMAS					
	2.19											
OBSTRUCTION	COORDINATES		ELEV MSL	HORZ	VERT	AC	ROC	OCS	CG	CGTA	ADJUSTMENTS	MIN ALT
10.AAO	435224.00N/0922518.00W		1500	50	20	2C	250				DG350	2100

COMPUTATIONS

ALT	KIAS	KTAS	HAA	VKTW	TR	BA	DTA	COURSE CHANGE	DVEB	VEB OCS	RF CENTER FIX/DISTANCE
-----	------	------	-----	------	----	----	-----	---------------	------	---------	------------------------

SEGMENT REMARKS:

FINAL: LNAV STEPDOWN

FROM

JEDUG/2.33 NM TO RW31

TO

RW31

<u>RNP</u>	<u>DISTANCE</u> 2.33	<u>PAT</u>	<u>MAP</u> RW31	<u>HAT</u> 336			<u>HMAS</u>					
<u>OBSTRUCTION</u>	<u>COORDINATES</u>		<u>ELEV MSL</u>	<u>HORZ</u>	<u>VERT</u>	<u>AC</u>	<u>ROC</u>	<u>OCS</u>	<u>CG</u>	<u>CGTA</u>	<u>ADJUSTMENTS</u>	<u>MIN ALT</u>
9.ANT (27-055919)	435447.07N/0922902.32W		1373	20	3	1A	250					1640

COMPUTATIONS

ALT	KIAS	KTAS	HAA	VKTW	TR	BA	DTA	COURSE CHANGE	DVEB	VEB OCS	RF CENTER FIX/DISTANCE
-----	------	------	-----	------	----	----	-----	---------------	------	---------	------------------------

SEGMENT REMARKS:



HMAS
1336

RF CENTER FIX/DISTANCE

HMAS
1423

RF CENTER FIX/DISTANCE

QUALITY
19
CHECKED

MISSED APPROACH : LNAV

FROM

RW31

TO

CORDY

RNP	DISTANCE	PAT	MAP	HAT			HMAS 1540					
OBSTRUCTION	COORDINATES		ELEV MSL	HORZ	VERT	AC	ROC	OCS	CG	CGTA	ADJUSTMENTS	MIN ALT
								ASC				3000
11.TWR (27-001292)	440550.00N/0924752.90W		1678	50	20	2C	1000					2700
12.TERRAIN	440012.00N/0924327.00W		1346 (1300)								AS1500	2800

COMPUTATIONS

ALT

KIAS

KTAS

HAA

VKTW

TR

BA

DTA

COURSE CHANGE

DVEB

VEB OCS

RF CENTER FIX/DISTANCE

SEGMENT REMARKS:

CIRCLING

☐ ALL CATS

☒ CAT A

☒ CAT B

☒ CAT C

☒ CAT D

☐ CAT E

☐ NOT AUTHORIZED

OBSTRUCTION	COORDINATES	RADIUS	HAA	ELEV MSL	HORZ	VERT	AC	ROC	OCS	ADJUSTMENTS	MIN ALT
CATEGORY A											
13.TANK (27-026583)	435513.81N/0922844.33W	1.31	403	1419	20	3	1A	300			1720
CATEGORY B											
14.TANK (27-001544)	435211.00N/0922953.00W	1.85	463	1428	50	20	2C	300		HAA	1780
CATEGORY C											
15.TWR (27-000694)	435050.87N/0922935.63W	2.91	583	1538	250	50	4D	300		AC50	1900
CATEGORY D											
15.TWR (27-000694)	435050.87N/0922935.63W	3.81	583	1538	250	50	4D	300		AC50	1900

CIRCLING REMARKS:



MSA

CENTER

RW31

RADIUS

25

SECTOR	OBSTRUCTION	COORDINATES	BEARING	DISTANCE	ELEV MSL	HORZ	VERT	AC	ROC	OCS	ADJUSTMENTS	MIN ALT
360-360	TWR (19-020063)	432832.00N/0924230.00W	200	27.4	2828	500	50	5D	1000			3900

MSA REMARKS:

NOTES/EXPLANATIONS FROM PROCEDURE SEGMENTS:

TAA NOT USED DUE TO AIR TRAFFIC RESTRICTIONS.



PART B: SUPPLEMENTAL DATA

COMMUNICATIONS WITH

RST TOWER, ZMP ARTCC, RST APP CON

<u>WX SERVICE</u> ASOS	<u>LOCATION</u> KRST	<u>HRS OPERATION</u> 24	<u>ALTIMETER SOURCE</u> KRST	<u>DISTANCE</u> 0	<u>SERVICE-A</u> Y	<u>ADJUSTMENTS</u> 0
<u>BACK-UP WX SERVICE</u>	<u>LOCATION</u>	<u>HRS OPERATION</u>	<u>ALTIMETER SOURCE</u>	<u>DISTANCE</u>	<u>SERVICE-A</u>	<u>ADJUSTMENTS</u>

WX REMARKS:

BACKUP ALTIMETER NOT REQUIRED, AIRPORT HAS REDUNDANT ALTIMETER SOURCES.

<u>PRIMARY NAVAID</u>	<u>MONITOR POINT</u>	<u>HRS OPERATION</u>	<u>CAT</u>
-----------------------	----------------------	----------------------	------------

<u>APPROACH AND RUNWAY LIGHTING SYSTEM</u>	<u>RUNWAY MARKINGS</u>	<u>RUNWAY VISUAL RANGE</u>
RW02 - MIRL (PCL), REIL, VASI-4L	NPI-G	
RW20 - MIRL (PCL), REIL, PAPI-4L	NPI-G	
RW13 - TDZ, MALSR (PCL), HIRL (PCL), C/LINE, PAPI-4L	PIR-G	APPROACH
RW31 - TDZ, MALSR (PCL), HIRL (PCL), C/LINE, PAPI-4L	PIR-G	APPROACH

<u>GLIDESLOPE ANGLE</u> 3.00	<u>ELEV RWY THRESHOLD</u> 1304.1	<u>TCH</u> 56.1	<u>ELEV GS ANTENNA</u>	<u>DISTANCE FROM RWY</u>	<u>VGSI ANGLE</u> 3.00	<u>TCH</u> 54.9
---------------------------------	-------------------------------------	--------------------	------------------------	--------------------------	---------------------------	--------------------

FINAL APPROACH COURSE AIMING

RUNWAY THRESHOLD	<input checked="" type="checkbox"/>	FT FROM THRESHOLD	DISPLACED THRESHOLD DISTANCE
ON CENTERLINE	<input checked="" type="checkbox"/>	FT FROM CENTERLINE	

CRITICAL TEMPERATURES

<u>CRITICAL LOW</u> -20C	<u>CRITICAL HIGH</u> +54C	<u>ACT</u> -27.66C	<u>APT ISA</u> -21C
-----------------------------	------------------------------	-----------------------	------------------------

CRITICAL TEMPERATURE REMARKS:

AVERAGE COLD TEMPERATURE DERIVED FROM 5-YEAR HISTORY (2013-2107). CRITICAL LOW TEMPERATURE BASED ON ACT. DESCENT RATE (FPM): STANDARD TEMP 971 HIGH TEMP 1134.

"VISUAL PORTION OF FINAL" PENETRATIONS

HELICOPTER 'VISUAL PORTION OF FINAL' PENETRATIONS



and/or

5280-FT "PROCEED VFR" SEGMENT LEVEL SURFACE AREA PENETRATIONS

PART C: GENERAL REMARKS:

PRECIPITOUS TERRAIN EVALUATION COMPLETED.

BACK-UP ALTIMETER NOT REQUIRED, REDUNDANT WEATHER SOURCES AVAILABLE AT AIRPORT.

ORDER 8260.3 CHAPTER 2 APPLIED TO 1512 AAO 435036N/0922521W.

ORDER 8260.3, VOLUME 1, CHAPTER 2, NEW CIRCLING CRITERIA APPLIED.



<u>AIRPORT</u> ROCHESTER INTL	<u>AIRPORT ID</u> KRST	<u>PROCEDURE NAME</u> RNAV (GPS) RWY 31	<u>AMDT NO.</u> 2A	<u>CITY</u>	<u>STATE</u> MN	<u>AIRPORT ELEVATION</u> 1317	<u>FACILITY</u> RNAV
PART D: AIRSPACE							
DOCKET #							
ALL DISTANCES TO 1/100NM; ELEVATION TO NEAREST 100 FEET; COORDINATES TO 1/100 SECOND; DEG TO 1/100 DEGREE							
DISTANCE FROM	THLD	TO 1000FT POINT	2.95				
WIDTH OF	FINAL	SEGMENT AT 1000FT POINT	1.20				
TRUE COURSE OF	FINAL	SEGMENT CONTAINING 1000FT POINT	312.20				
HIGH TERRAIN IN	FINAL	SEGMENT CONTAINING 1000FT POINT	1310				
DISTANCE FROM	THLD	TO 1500FT POINT	10.01				
WIDTH OF	INTERMEDIATE	SEGMENT AT 1500FT POINT	4.00				
TRUE COURSE OF	INTERMEDIATE	SEGMENT CONTAINING 1500FT POINT	312.20				
HIGH TERRAIN IN	INTERMEDIATE	SEGMENT CONTAINING 1500FT POINT	1369				
THRESHOLD COORDINATES (IF STR-IN)	435412.69N/0922912.15W						
ARP COORDINATES	435429.80N/0923000.10W						
RUNWAY APCH END AND DIST FURTHEST FROM ARP	RUNWAY 13 DISTANCE 0.88 NM						
FAF COORDINATES	435110.57N/0922434.16W						
FIX NAME COORDINATES							
REMARKS							

QUALITY
19
CHECKED

FAA Form 8260-9 / (11/16) Supersedes Previous Edition

Electronic Version

Page 10 of 11

<u>AIRPORT</u> ROCHESTER INTL	<u>AIRPORT ID</u> KRST	<u>PROCEDURE NAME</u> RNAV (GPS) RWY 31	<u>AMDT NO.</u> 2A	<u>CITY</u>	<u>STATE</u> MN	<u>AIRPORT ELEVATION</u> 1317	<u>FACILITY</u> RNAV
PART E: PREPARED BY							
<u>NAME</u> DONALD H. LANIER (MICAH HILLEY)			<u>OFFICE</u> AJV-A431	<u>DATE</u> 08/14/2019	<u>TITLE</u> AERONAUTICAL INFORMATION SPECIALIST		

QUALITY
19
CHECKED

FAA Form 8260-9 / (11/16) Supersedes Previous Edition

Electronic Version

Page 11 of 11