AERONAUTICAL CHARTING FORUM
Charting Group
Meeting 15-02 – October 28 - 29, 2015

RECOMMENDATION DOCUMENT

FAA Control # ACF-CG RD 15-02-297

Subject: Charting of HILPT Maximum Holding Altitude

Background/Discussion:

The instrument approach procedure Holding Pattern In Lieu Of Procedure Turn (HILPT) is designed to facilitate alignment with the final approach course. The descent gradient from the HILPT altitude to the Final Approach Fix (FAF) altitude is limited by TERPS criteria to permit aircraft deceleration and configuration for the final approach. Due to a combination of this descent gradient requirement and the surrounding terrain, it may be necessary to employ a smaller than desired holding pattern template to define the HILPT protected airspace. Use of this smaller template may require the designation of a maximum holding altitude on the 8260-2 Form. This becomes the maximum altitude the aircraft is permitted to enter the HILPT unless ATC can ensure obstacle clearance by keeping the aircraft at or the minimum vectoring altitude (MVA) or the minimum IFR altitude (MIA) until the aircraft is established on a segment of the published procedure.

Figure 1 shows the RNAV (GPS) Rwy 20 approach at Alamosa, CO (KALS). The HILPT altitude is 10,800' MSL. Figure 2 shows the FAA 8260-2 Form for JADGU. The maximum holding altitude shown at JADGU is 12,000' MSL. Figure 2 depicts the protected airspace for the HILPT at JADGU based on the P10 pattern. Use of this pattern is required to allow the HILPT protected airspace to remain clear of the terrain to the east of Alamosa. A larger holding pattern would permit holding above 12,000' MSL. However, because of the terrain to the east, the use of a larger holding pattern template is not possible at this location.

Figure 4 shows an overlay of the MIA altitudes in the vicinity of ALS. At most airports, ATC can bring the aircraft to the HILPT at or above the MVA or MIA and below any maximum holding altitude published on the 8260-2 Form. However, at Alamosa the MIAs east of the holding pattern protected airspace are at or above 16000' until just prior to JADGU. It is nearly impossible for ATC to clear an aircraft direct-to JADGU from the east at the 16000' MIA, and then descend the aircraft to cross JADGU at or below 12,000' as required by the holding pattern's maximum altitude prior to clearing it for the approach. This would require a descent of 4000 feet in little over 2 miles.

It is important to note that the airspace above the JADGU holding pattern's protected airspace area that ends at 12,000' MSL and the airspace below the overlying MIA has not been assessed for obstacle clearance as required by 14 CFR part 97. Aircraft operating within this 4,000' zone have no assurance of obstacle clearance if holding in the JADGU holding pattern or executing the HILPT between 12,001' MSL and the MIA.

During the discussion of ACF CG agenda item 15-01-294, it was clearly apparent that air traffic controllers do not have ready access to the 8260-2 Forms indicating maximum holding altitude,

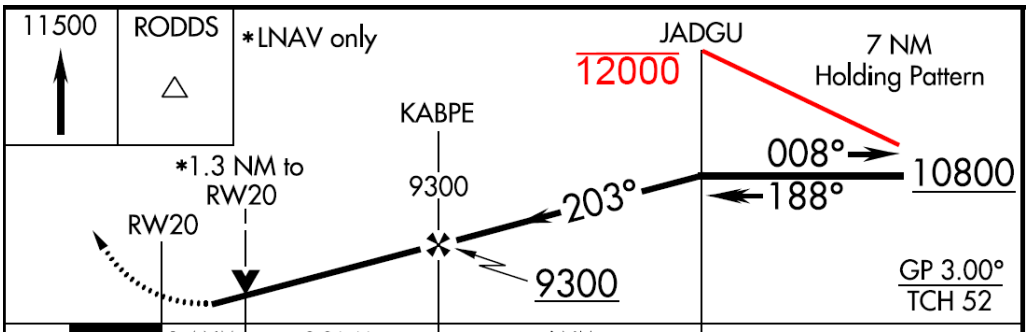
and therefore, are unlikely to be aware of the requirement for the aircraft to enter the HILPT at or below the maximum holding altitude when that altitude is below the applicable MVA or MIA

This similar situation exists with procedures turns. Figure 5 shows the VOR/DME – B approach to Dillon, MT (KDLN). The maximum altitude at the IAF (WAKUX) is 10,000' MSL for entry into the procedure turn. Limiting the maximum altitude at WAKUX permits the use of the TERPS procedure turn protected airspace template specified for use with altitudes 10,000' MSL and below. If the larger template for above 10,000' MSL were used, then the procedure turn altitude would need to be raised, which in turn would result in a higher altitude at the FAF.

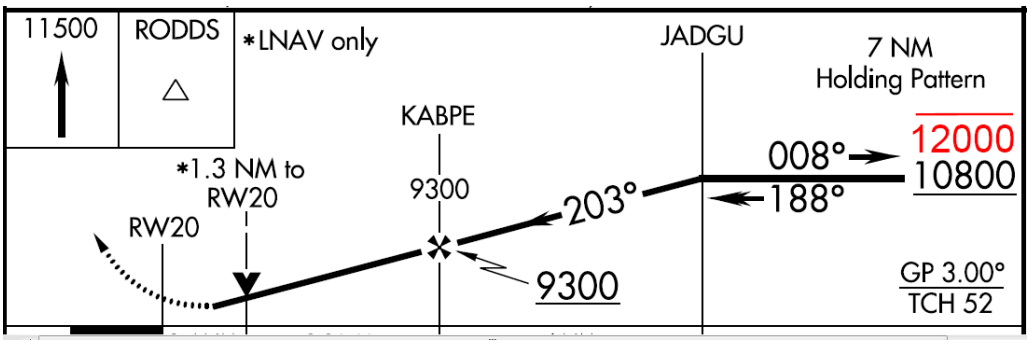
Recommendations:

NBAA proposes that the same charting requirement applicable to a procedure turn when the 10,000' and below template is used, which is to chart a maximum "at or below" altitude at the IAF, be applied to a HILPT when a maximum holding altitude is specified on the 8260-2 Form. If this maximum holding altitude is specified for ATC-purposes, then this maximum altitude need not be published on the procedure chart.

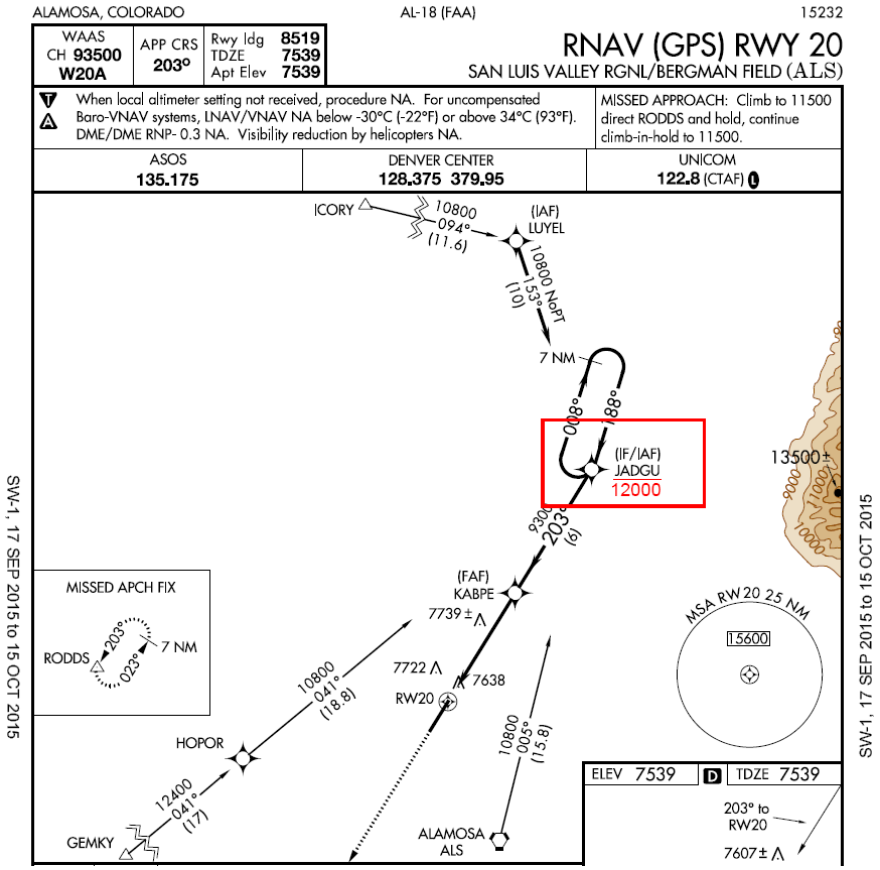
Using the Alamosa RNAV (GPS) Rwy 20 approach example, JADGU would have an "at or below" 12,000' MSL altitude limit depicted in the profile view, as shown below:



Alternatively, a window, "at or below" and "at or above" altitude can be charted in the profile view. We invite the assistance of the ACF to determine the preferred method:



In addition to charting the "at or below" altitude in the profile view, the altitude should also be depicted in the approach plan view, as shown below:



NBAA recommends that guidance be furnished in the Aeronautical Information Manual (AIM) to explain to pilots the purpose of maximum altitude charted for an HILPT entry. Further, we recommend that the Air Traffic Organization (ATO) take action to explain to controllers in the 7110.65 Air Traffic Order the purpose and limitations of the maximum HILPT altitude and a maximum procedure turn entry altitude charted on instrument approach procedures if such guidance does not currently exist.

Comments:

This recommendation affects:

- FAA Order 8260.3B, U.S. Standard for Terminal Instrument Procedures (TERPS)
- FAA Order 8260.19, Flight Procedures and Airspace
- FAA Order 7110.65, Air Traffic Control
- Aeronautical Information Manual

Submitted by: Richard J. Boll II
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Date: 9/21/2015

Figure 1

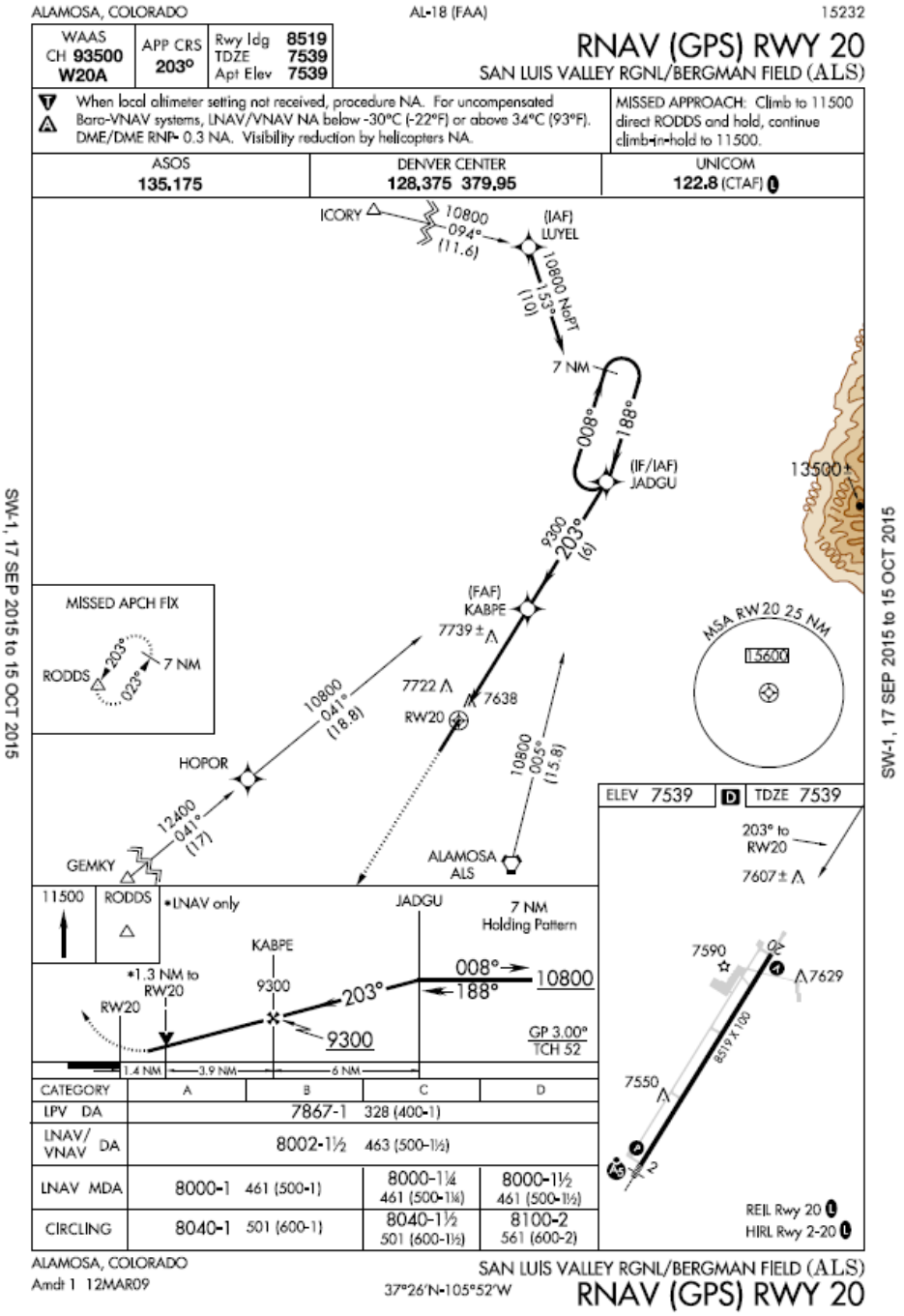

ALAMOSA, COLORADO
AL-18 (FAA)
15232
WAAS CH 93500 W20A
APP CRS 203°
Rwy Idg 8519
TDZE 7539
Apt Elev 7539
RNAV (GPS) RWY 20
SAN LUIS VALLEY RGNL/BERGMAN FIELD (ALS)
When local altimeter setting not received, procedure NA. For uncompensated Baro-VNAV systems, LNAV/VNAV NA below -30°C (-22°F) or above 34°C (93°F). DME/DME RNP- 0.3 NA. Visibility reduction by helicopters NA.
MISSED APPROACH: Climb to 11500 direct RODDS and hold, continue climb-in-hold to 11500.
ASOS 135.175
DENVER CENTER 128.375 379.95
UNICOM 122.8 (CTAF)
ICORY
10800 094° (11.6)
(IAF) LUYEL
10800 153° (10) NoPT
7 NM
008°
188°
(IF/IAF) JADGU
9300 203° (6)
13500+
(FAF) KABPE
7739 ±
7722
7638
RW20
MISSED APCH FIX
RODDS
203°
023°
7 NM
10800 041° (18.8)
HOPOR
12400 041° (17)
GEMKY
10800 005° (15.8)
ALAMOSA ARPT
MSA RW20 25 NM
15600
ELEV 7539
D
TDZE 7539
203° to RW20
7607 ±
11500
RODDS
•LNAV only
JADGU
7 NM Holding Pattern
KABPE
9300
•1.3 NM to RW20
RW20
203°
008°
188°
10800
9300
GP 3.00°
TCH 52
1.4 NM
3.9 NM
6 NM
7590
7629
8519 X 100
7550
CATEGORY A B C D
LPV DA 7867-1 328 (400-1)
LNAV/VNAV DA 8002-1½ 463 (500-1½)
LNAV MDA 8000-1 461 (500-1) 8000-1¼ 461 (500-1¼) 8000-1½ 461 (500-1½)
CIRCLING 8040-1 501 (600-1) 8040-1½ 501 (600-1½) 8100-2 561 (600-2)
REIL Rwy 20
HIRL Rwy 2-20
ALAMOSA, COLORADO
Amdt 1 12MAR09
37°26'N-105°52'W
SAN LUIS VALLEY RGNL/BERGMAN FIELD (ALS)
RNAV (GPS) RWY 20
SW-1, 17 SEP 2015 to 15 OCT 2015
SW-1, 17 SEP 2015 to 15 OCT 2015

Figure 2

RADIO FIX AND HOLDING DATA RECORD

NAME: JADGU **STATE:** CO **COUNTRY:** US

LATITUDE/LONGITUDE: 373619.86N/1054406.75W **TYPE:** WP

AIRSPACE DOCKET: **FIX TYPE OF ACTION:** MODIFY

FIX MAKE-UP FACILITIES:

FAC	NAME	IDENT	TYPE	CLASS	MAG BRG	TRUE BRG	DME	DIST FROM FAC NM	FAC FEET	MRA	MAA
1	KALS R20					031.77	11.31				17500

HOLDING: **HOLDING TYPE OF ACTION:** MODIFY

PATTERNS:

PAT	DIR	IDENT	TYPE	RAD/CRS/BRG	CRS INBOUND	TURN (L OR R)	LEG LENGTH TIME	LEG LENGTH DME	HOLDING ALTITUDES MIN	HOLDING ALTITUDES MAX	TEMPLATES MIN	TEMPLATES MAX
1	N		WP	007.85	187.85	R		7	10800	12000	10	10
2	NW		WP	334.85	154.85	R		7	10500	12000	10	10

CONTROLLING OBSTRUCTIONS:

PAT	AIRSPEED	OBSTRUCTION	COORDINATES	ELEVATION	ACCURACY CODE
1	230	AAO	375236.00N/1053500.00W	10689	4E
2	230	AAO	374721.00N/1054048.00W	7907	4E

REMARKS:
HOLDING LIMITED TO ESTABLISHED PATTERN.
PAT 1 CONTROLLING OBSTACLE IN 11808FT INTO SECONDARY. PRIMARY EQUIVELANT HEIGHT 9705FT.
PRECIPITOUS TERRAIN EVALUATION COMPLETED: PAT 1, 2 NO ADJUSTMENT.

FIX USE:

USE TYPE	USE TITLE	FAC	PAT	AIRPORT IDENT	CITY	STATE
IAP				KALS	ALAMOSA	CO (US)
	SAN LUIS VALLEY RGNL/BERGMAN FIELD - RNAV (GPS) RWY 20 (PAT 1), RNAV (GPS) RWY 02 (PAT 2)					

REQUIRED CHARTING: IAP

COMPULSORY REPORTING POINT: NO

RECORD REVISION NUMBER: 1 **DATE OF REVISION:** 03/12/2009

REASON FOR REVISION:
ADDED HOLDING PAT 2.
DECREASED AIR/GROUND COMM FROM 10700 TO 10500.
ADDED PRECIPITOUS TERRAIN REMARK.
CHANGED PAT 1 CRS INBOUND FROM 184.85 TO 187.85.
DME DISTANCE INCREASED FROM 11.29 TO 11.31.
FIX MOVED 150' EAST.
INCREASED PAT 1 HOLDING ALTITUDE FROM 10700 TO 10800.

DEVELOPED BY: **DATE:** 07/03/2008 **OFFICE:** AVN-130 **NAME:** JIMMY HUGHES

APPROVED BY: **DATE:** 11/24/2008 **OFFICE:** AVN-130 **NAME:** RICK WEBB

SIGNATURE:

DISTRIBUTION:
NFDC
FPO: WST
ARTCC: ZDV
ATC FACILITY:
OTHER:

Figure 3

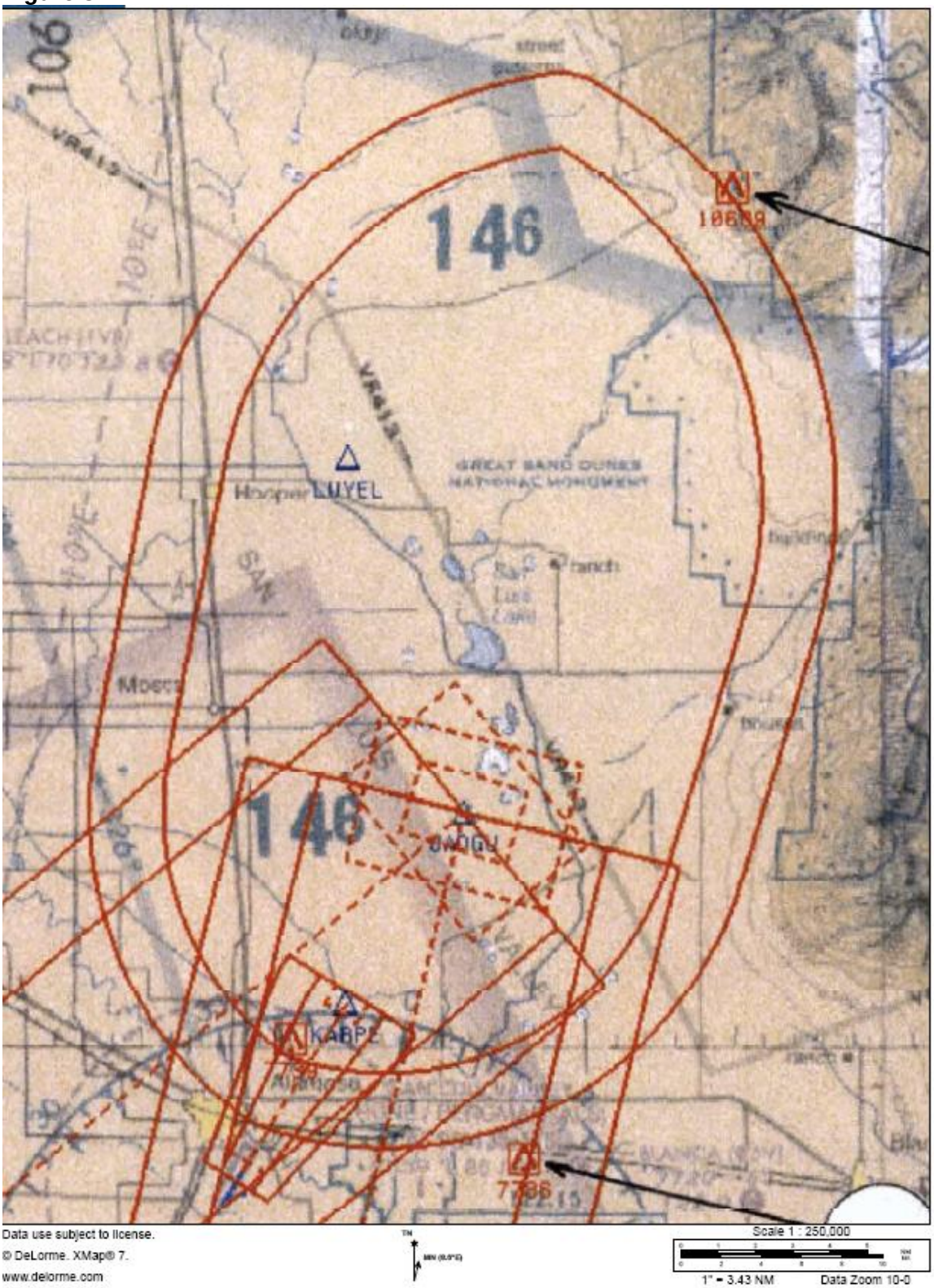

146
LUYEL
GREAT SAND DUNES
146
Data use subject to license.
© DeLorme. XMap® 7.
www.delorme.com
Scale 1 : 250,000
1" = 3.43 NM
Data Zoom 10-0

Figure 4

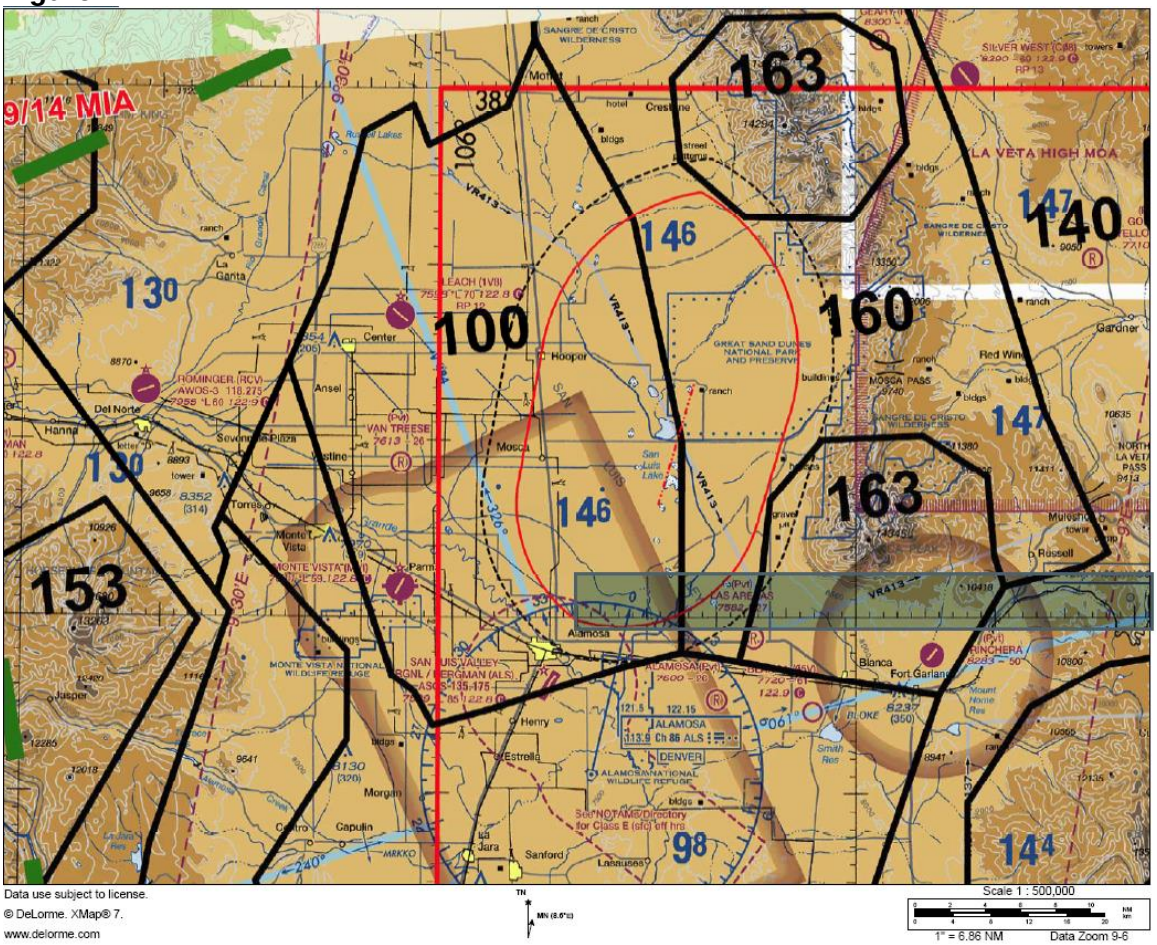
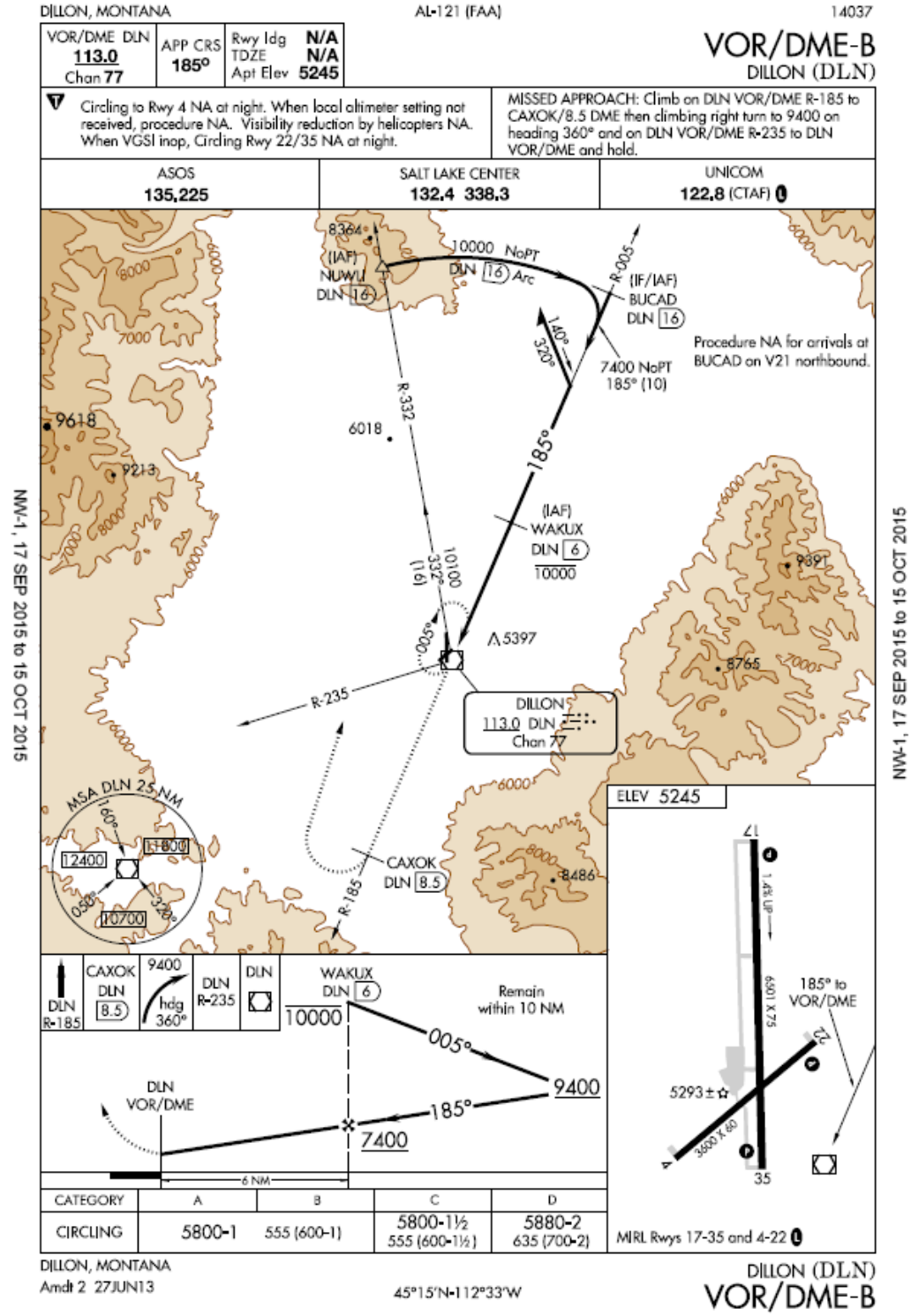

9/14 MIA
163
146
130
100
160
140
147
153
98
144
LA VETA HIGH MOA
ALAMOSA
DENVER
Data use subject to license.
© DeLorme. XMap® 7.
www.delorme.com
Scale 1 : 500,000
1" = 6.86 NM
Data Zoom 9-6

Figure 5


DILLON, MONTANA
AL-121 (FAA)
14037
VOR/DME DLN 113.0 Chan 77
APP CRS 185°
Rwy Idg N/A
TDZE N/A
Apt Elev 5245
VOR/DME-B
DILLON (DLN)
Circling to Rwy 4 NA at night. When local altimeter setting not received, procedure NA. Visibility reduction by helicopters NA. When VGSI inop, Circling Rwy 22/35 NA at night.
MISSED APPROACH: Climb on DLN VOR/DME R-185 to CAXOK/8.5 DME then climbing right turn to 9400 on heading 360° and on DLN VOR/DME R-235 to DLN VOR/DME and hold.
ASOS 135.225
SALT LAKE CENTER 132.4 338.3
UNICOM 122.8 (CTAF)
10000 NoPT
DLN 16 Arc
(IF/IAF) BUCAD DLN 16
R-005
140°
320°
7400 NoPT 185° (10)
Procedure NA for arrivals at BUCAD on V21 northbound.
(IAF) NUWLI DLN 16
R-332
185°
(IAF) WAKUX DLN 6 10000
10100 332° (16)
R-005
5397
R-235
DILLON 113.0 DLN Chan 77
MSA DLN 25 NM
160°
12400
11800
050°
320°
10700
CAXOK DLN 8.5
R-185
ELEV 5245
DLN R-185
CAXOK DLN 8.5
9400 hdg 360°
DLN R-235
DLN
WAKUX DLN 6
10000
Remain within 10 NM
005°
9400
185°
7400
DLN VOR/DME
6 NM
185° to VOR/DME
5293 ± ☆
6501 X 75
3600 X 60
17
35
CATEGORY A B C D
CIRCLING 5800-1 555 (600-1) 5800-1½ 555 (600-1½) 5880-2 635 (700-2)
MIRL Rwys 17-35 and 4-22
DILLON, MONTANA
Amdt 2 27JUN13
45°15'N-112°33'W
DILLON (DLN)
VOR/DME-B
NW-1, 17 SEP 2015 to 15 OCT 2015
NW-1, 17 SEP 2015 to 15 OCT 2015

MEETING 15-02

Rich Boll, NBAA, briefed the new recommendation. Rich recommends that where a maximum holding altitude has been established for a hold-in-lieu of procedure turn (HILPT) holding pattern, it should be depicted on the approach chart so that both pilots and ATC are aware of the restriction. Rich emphasized that ATC does not readily have access to FAA 8260-2 forms (on which the maximum altitude would be documented) so they may not be aware that a maximum holding altitude applies. Rich stated that it is unknown how large the issue is, however he showed, as part of his presentation, several examples where maximum holding altitudes apply to a HILPT and they are not published on the chart. He stated that this is not likely a problem at larger fields, but may be an issue at smaller airports.

Rune Duke, AOPA, stated his support for charting these altitudes, agreeing that pilots need to know this information.

Michael Stromberg, Air Wisconsin, asked how a pilot would get the 8260-2 forms to look up this information. Rick Mayhew, AJV-533, stated that some but not all 8260-2 forms are available online. Valerie Watson, AJV-553, stating that if it is decided that the maximum holding altitude needs to be charted, it would have to be documented on the on the 8260 series procedure source form, not merely the 8260-2 holding pattern form.

Tom Schneider, AFS-420, stated that FAA Order 8260.19 would need to be revised to specify any maximum holding altitudes that require charting. If/when the decision is made to chart this information, Tom will take an action IOU to make necessary changes.

Rich commented that if there are any changes to the charts to include maximum holding altitudes, there would also have to be an education piece for the AIM.

Discussion shifted as to where such maximum holding pattern altitude should appear on the chart, the profile view or planview, or both, and how it should be depicted in the profile. There was consensus that it should be depicted in both the planview and profile. Valerie agreed to create concept charts for the next ACF with various depiction options.

STATUS: OPEN

ACTION: Valerie Watson, AJV-553, to draft prototype charts for next ACF.

MEETING 16-01

Valerie Watson, FAA/AJV-553, briefed the issue and showed chart prototypes with various ways of depicting the Maximum Holding Altitude on a Hold-in-Lieu holding pattern. The prototype depiction that gained a consensus of approval depicted the word “HOLD” preceding the block altitude (with over and underbars to indicate max and min altitudes) as a leadered note in the planview (See Slide #4), but it was recommended that both the minimum and maximum altitudes be placed in both the planview and the profile.

Ted Thompson, Jeppesen, asked how the maximum holding altitude would be documented on procedure source. Ted emphasized that he prefers to see it documented on the FAA Form 8260-3 (procedure source) form rather than only on the 8260-2 (holding pattern source) form

where it resides currently. Valerie agreed with Ted that if this is to be charted consistently and correctly, it should reside on the procedure source document. Tom Schneider, FAA/AFS-420, agreed that the altitude will need to be documented on the applicable 8260-series Form and will take action to revise the guidance.

Tony Lawson, FAA/AJV-5441, commented that criteria will need to be written so that the procedure design specialist knows when to apply the maximum holding altitude for charting.

Tom Schneider, FAA/AFS-420, stated that he would draft language for FAA Order 8260.19H to support documentation of the maximum holding altitude.

Valerie stated that she will look at the IACC specifications and, if a modification is required, will draft the change to support the agreed-upon charting when specified on the procedure source document.

STATUS: OPEN

ACTION: Valerie Watson, FAA/AJV-553, to review IACC Specifications and, if a modification is required, will draft the change to support charting.

ACTION: Tom Schneider, FAA/AFS-420, to draft new language for FAA Order 8260.19 to support documentation HILPT maximum holding altitude.

MEETING 16-02

Valerie Watson, FAA/AJV-553, reviewed the topic. Valerie showed the audience the prototype chart and stated that the charting specification (IACC Requirement Document 771) has been signed and is in place. Tom Schneider, FAA/AFS-420, showed the new language that has been added to draft FAA Order 8260.19H. Tom also showed the audience a sample FAA Form 8260.3 showing how the maximum holding altitude is documented on the procedure source.

STATUS: OPEN

ACTION: John Bordy, FAA/AFS-420, to report on the status of the new guidance to be published in FAA Order 8260.19H.

MEETING 17-01

Meeting was cancelled.

MEETING 17-02

Valerie Watson, FAA/AJV-553 reviewed the topic. Valerie showed the audience the prototype chart and reported that the charting specification is in place. John Bordy, FAA/AFS-420, reported that the new guidance was published in FAA Order 8260.19H. There were no further actions required and it was agreed that the topic could be closed.

STATUS: CLOSED