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:

![Diagram 1](image1.png)

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:

![Diagram 2](image2.png)

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

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Date: 9/21/2015
Figure 1
Figure 2

RADIO FIX AND HOLDING DATA RECORD

| NAME: | JADGU | STATE: CO | COUNTRY: US |
| LATITUDE-LONGITUDE: | 373619.80N/105460.75W | TYPE: FP |

**AIRSPACE DOCKET:**

| FIX TYPE OF ACTION | MODIFY |

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**HOLDING TYPE OF ACTION:** MODIFY

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**REMARKS:**

HOLDING LIMITED TO ESTABLISHED PATTERN
PAT1 CONTROLLING OBSTACLE IN 11509FT INTO SECONDARY PRIMARY EQUIVELANT HEIGHT 9705FT.
PRECIPITOUS TERRAIN EVALUATION COMPLETED: PAT 1, 2 NO ADJUSTMENT.

**FIX USE:**

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**REQUIRED CHARTING:** LAP

**COMPULSORY REPORTING POINT:** NO

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

**REASON FOR REVISION:**

ADDED HOLDING PAT 2.
ADDED PRECIPITOUS TERRAIN REMARK.
CHANGED PAT 1 CRS INBOUND FROM 184.85 TO 167.85.
DME DISTANCE INCREASED FROM 11.29 TO 11.31.
FIN MOVES 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:**

- NDOC
- PPO: WST
- ARTCC: ZDV
- ATC FACILITY: OTHER
Figure 5
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.

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**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.

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**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