AERONAUTICAL CHARTING FORUM
Instrument Procedures Group
Meeting 12-01 – April 24, 2012
HISTORY RECORD

FAA Control # 12-01-301

Subject: Publishing a Vertical Descent Angle (VDA) with 34:1 Surface Penetrations in the Visual Segment (*Also includes Issue 13-01-309 - LP Procedure Cancelled Because of VDA Not Being Charted).*

Background/Discussion: FAA policy is to publish VDAs on all nonprecision approaches. Some of these approaches have obstacles that penetrate the 34:1 surface. AIM paragraph 5-4-5i, makes it clear that the VDA is for information only, is strictly advisory in nature, and there is no implicit additional obstacle protection below the MDA. However, Flight Inspection Services believes use of a VDA in these situations presents a potential hazard to safe flight. Currently, the only specific indication on the approach chart that the 34:1 surface is not clear in the visual segment below the MDA is the absence of shading in the visual segment on the profile view; however, this depiction is only used on RNAV procedures.

A recent user complaint by Southwest Airlines brought this issue to the attention of Flight Inspection Services. They complained of unexpected GPWS alerts on the RNAV RWY 36 at Birmingham, AL (KBHM). A flight inspection aircraft (Challenger) investigated the complaint by flying multiple approaches and determined that GPWS warnings are received (you cross only 200' over a house on 2 mile final) if the published 3.0° VDA is flown. GPWS warnings could be avoided if a dive and drive to the MDA profile is flown, followed by a visual descent, or by intercepting a higher 3.4° glidepath from the FAF altitude.

Ironically, VDAs were added to procedures to reduce the cases of controlled flight into terrain (CFIT) by providing a means for stabilized descents. However, blind application of VDAs has resulted in misleading information that makes it look like once the aircraft is established on the published VDA it has a clear path to the runway. This is especially compelling with the increased use of RNAV avionics and glidepath guidance (albeit advisory in nature) provided for the pilot on the primary flight display.

Recommendations: Suggestions on how to fix the issue are changes to criteria that do one or more of the following:

1. Do not publish a VDA when there is a penetration of the 34:1 surface.
2. Continue to publish the 3.0° VDA, but add a warning to the approach plate.
3. Publish a VDA that clears all obstacles by a safe amount up to 3.5°, without changing the FAF (fix) location or altitude.
4. Change the FAF (fix) altitude and/or location to increase the VDA an amount required to safely clear all the obstacles to the threshold.
5. Move the non-precision missed approach point to a location prior to the threshold and don't provide data for a VDA or threshold crossing height.

Comments: This recommendation affects FAA Orders 8260.3, 8260.19, and the AIM.

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Date: April 4, 2012

INITIAL DISCUSSION - MEETING 12-01: Tom Schneider, AFS-420, presented this new issue on behalf of the Flight Inspection Services, AJW-331. Tom agreed to put the issue before the ACF-IPG for preliminary discussion until a representative of Flight Inspection can attend the October meeting. The issue arose when Southwest Airlines complained of receiving GPWS alerts while flying a published vertical descent angle (VDA) on approach to Birmingham, AL. Flight Inspection validated the complaint, also receiving GPWS alerts. Although the IAP has a VDA, the 34:1 surface is not clear as indicated by the lack of the "stipple" on the profile view. John Collins, GA Pilot, also expressed concern when VDAs and VDPs are published when 34:1 and 20:1 visual surface penetrations exist. He has forwarded a similar issue to the Charting Group recommending that a cautionary note be published when this condition exists - see ACF Charting Group issue 12-01-252. A copy of John's briefing slides is included here (). Ted Thompson, Jeppesen, provided an explanation of the history of how VNAV angles came to be added to Jeppesen charts, along with the “DA in lieu of MDA” profile note which Jeppesen charts as a ‘value added’. Both of these enhancements were based on ATA/Airline requests to Jeppesen in order to support industry use of vertically-guided, stabilized descents in the final approach segment. Mike Frank, AFS-52, asked whether Jeppesen charted VDAs from the 8260 forms. Ted replied yes, and if one was not provided, Jeppesen would compute the angle. Brad Rush, AJV-3B, interjected that the angle was computed from FAF altitude to TCH, not the runway. John Collins, GA Pilot, stated that it is impossible to fly a stabilized approach to the runway when there is terrain penetrating the VDA. Tom emphasized that VDAs are for information only, advisory in nature, and are not protected for use below the MDA (Editor's Note: See AIM paragraph 5-4-5i). Rich Boll, NBAA, noted that FAA provides an indication of a clear 34:1 on RNAV IAPs, but nothing for conventional IAPs. Tom expects that Bill Geiser, AJW-331, or a member of his staff will attend the next ACF to elaborate on his recommendations and asked all attendees be prepared for further discussion and offer recommended solutions at the next meeting. ACTION: All Participants.

MEETING 12-02: Bill Geiser, AJW-334, who was unable to be present at the last meeting provided a slide presentation on the issue; a copy of which is included here (). The presentation recapped the flight inspection history of the RNAV (GPS) RWY 36 IAP at Birmingham, AL (KBHM) as a result of Southwest Airlines concerns. The flight inspection results confirm that the procedure is designed correctly and that "on path, on course" is safe. The problem is that pilots are not maintaining responsibility for descending below MDA. Pilots are following the published advisory VDA as a glide slope to the threshold. The 34:1 obstacle surface is not clear resulting in GPWS alerts. There are no standard flight inspection guidelines for checking a VDA or the visual segments. Therefore, as a result of this analysis, whenever a procedure form indicates the 34:1 is not clear, flight inspection will fly all approaches one dot below the VDA for a 'reasonable' obstacle clearance check. If the flight inspection pilot has to destabilize the approach or receives a GPWS warning, he/she will annotate the procedure that the VDA and TCH should not be charted or databased. Bill Geiser's recommendations include: 1) Revise FAA Order 8260.19 guidance to accommodate flight inspection results; i.e., raise the angle or do not publish a VDA, 2) Issue a SAFO and beef up other pilot educational material, and 3) revise industry coding policy. Tom Schneider, AFS-420, briefed that the following has been included in Change 3 to 8260.19, under paragraph 8-57u(1). The change is currently in FAA internal coordination - changes are shown in red text:

> *For straight-in aligned nonprecision SIAPs (except for procedures that already have a GS/GP angle established for the vertically guided procedure on the same chart and surveillance (ASR) approach procedures), enter the descent angle for the appropriate fix in the final approach segment, and the appropriate TCH:* ***NIXON to RW15: 3.26/55.*** *Where straight-in minimums are not authorized due to an excessive descent angle, enter the straight-in descent angle (may exceed maximum when compliant with circling descent angle). Where the VDA values are not coincident with published VGSI values, see paragraph 8-55n. Only one angle and TCH will be published on the chart. Do not*

publish a VDA (or TCH) when Flight Inspection has requested that one not be established due to an obstacle that would require an aircraft to deviate from its vertical flight path prior to reaching the TCH.

Rick Dunham, AFS-420, added that a policy memorandum has been issued to preclude continuous waiver requests pending publication in Order 8260.19. John Collins, GA Pilot, asked why the 34:1 is used vice a 20:1. Kevin Allen, US Airways, responded that 34:1 is the standard obstacle surface for a 3 degree angle. Gary McMullin, SWA, added that his organization prefers higher angles, but without eliminating CAT D aircraft operations. Tom stated that if the angle is increased, then it will require increasing the FAF altitude. Marc Gittleman, ALPA, asked why a fly-off from the FAF at the existing altitude couldn't be used to create a higher descent angle. Ted Thompson, Jeppesen, commented that the use of vertical descent angles in databases has been around for decades and gained momentum after the Winsor Locks, CT (KBDL) accident. The original purpose of the VDA/VNAV angle was to facilitate a stabilized descent down **to** the MDA – **not below** MDA while simultaneously designed to clear minimum altitudes at step-down fixes. There was never any intent to clear 34:1 surface obstacles below the MDA. Ted emphasized that if VDAs are removed wherever a 34:1 penetration occurs, it will result in the loss of stabilized descent for thousands of approaches. Tom Schneider, AFS-420, also noted that if VDAs are removed from charts as recommended by Flight Inspection, a descent angle may be included in the database, even if not specified on the associates FAA 8260-series form. If the fly-off suggestion is desired, it will have to be addressed by the US-IFPP. Ted emphasized that pilot education is the key to understanding the purpose of VDAs. Rick Dunham, AFS-420 commented that the FAA has expanded the explanation and use of VDAs in the proposed change to the IPH, which is currently in coordination. FAA will also look into expanding up the AIM language. Val Watson, AJV-3B, agreed that pilot education is the key to a solution and suggested that perhaps an annotation to existing VDAs in the chart profile to show "**3.00 to MDA**" might add emphasis. John Collins, GA Pilot, stated that he had accomplished an informal survey of non-precision approaches in North and South Carolina; 10-15% had the "stipple", 10-15% had a VDP, and the other 80% had nothing. Gary McMullin, SWA, added that we need to be careful about removing descent angles, as if the angle is removed, the procedure will be removed from the database. Increasing the angle is helpful provided the increase does not exclude certain Category aircraft. The better option is to re-design the procedure. Tom wrapped up the discussion saying the issue will be referred to the US-IFPP. In the interim, AFS-420 will track the IPH change and recommend better AIM language.
ACTION: AFS-420 (US-IFPP).

MEETING 13-01: Tom Schneider, AFS-420, briefed that the issue was presented to the US-IFPP at the January 2013 meeting. Volunteers have been identified for a work group that will be led by John Bordy, AFS-420, to study the issue. the first meeting will likely occur in May. Tom added there is nothing much to report thus far. FAA Order 8260.19 has been revised to allow Flight Inspection to direct AeroNav Products to remove the VDA from a procedure when deemed necessary. When directed, AeroNav Products will add a chart note "VDA NA". Ted Thompson stated that Jeppesen has accommodated coding a 0 (zero) degree angle in these instances; however, that does not preclude other agencies from computing and coding an angle. Ted recommended that AIRNC 424 personnel be invited to the meeting. John Collins, GA Pilot, asked whether the meeting was open to the public. Tom said he did not know, but would check. If open to the public, the following requested to participate:

John Collins, GA Pilot	johncollins@carolina.rr.com
Ted Thompson, Jeppesen	ted.thompson@jeppesen.com
Lee Smith, Capitol Airspace	lee.smith@capitolairspace.com
Lev Prichard, Allied Pilots Assn	lhp4@swbell.net
Neal Covington, Aero Nav Data	neal@aeronavdata.com

AFS-420 will continue to co-work this issue and Issue 13-01-309 (see below), through the US-IFPP and update the next ACF. ACTION: AFS-420 (US-IFPP).

Editor's Note: *At this meeting, John Collins, GA Pilot, presented the following related new issue, which expresses concern over the loss of LP minimums when the VDA is not authorized. The forum recommended that the new issue be addressed concurrently with issue 12-01-301. John agreed provided the retention of LP minimums when a VDA is not charted is an added requirement for resolution of issue 12-01-301. AFS-420 agreed to ensure the US-IFPP will respond to both issues under 12-01-301. The full text of the initial discussion may be viewed on the ACF-IPG web site under the History of Closed Issues, Issue # 13-01-309.*

AERONAUTICAL CHARTING FORUM
Instrument Procedures Group
April 24, 2013

RECOMMENDATION DOCUMENT

FAA Control # 13-01-309

Subject: LP Procedure Cancelled Because of VDA Not Being Charted

Background/Discussion: *Wally Roberts, consultant for NBAA, copied me on a conversation/inquiry dealing with the reasoning behind why an update to the RNAV (GPS) RWY 9 approach at Washington County, PA (KAFJ) had cancelled the LP procedure.*

Wally wrote:

> *I note that LP minimums are being deleted (as noted on the FAA Form 8260-9) but no reason is given.*
>
> *Could you please provide us the reason for the removal of LP? Also, why is the procedure presently 'NOTAMed' NA?*
>
> ***FDC 2/2272*** *- FI/T IAP WASHINGTON COUNTY, WASHINGTON, PA.*
> *RNAV (GPS) RWY 9, AMDT 1...*
> *PROCEDURE NA. WIE UNTIL UFN. CREATED: 07 DEC 16:16 2012*

The AeroNav Products response was:

> *Control Number 16280 has been assigned to this issue for tracking purposes.*
> *This concern has been closed with the following response:*
>
> ***The LP minimums were removed from amendment 1A (to be published on March 7). Amendment 1B (to be published on April 4) was done to correct an error on 1A.***
>
> ***The 8260-9 is used to give future developers the reason the LP minimum were removed and the reason was on the back of the -9 two lines above. The reason should have been place together with LP minimums deleted.***
>
> ***The procedure was NOTAM'd NA per Flight Inspection, but we will reinstate the procedure, per new guidance.***

Wally presented a follow up question:

Attached is the back of the 8260-9. Could you point me to the reason for the deletion of LP? I cannot find it.

The following response was received:

This is the reason, but it has more to do with coding. Once we remove the VDA, the coding has to be changed 3.00 degrees to 0.00 degrees thus negating the LP minimums and the FAS DATA. If we kept the 3.00 degrees in coding it would override what we are trying to prevent. We are trying to prevent the aircraft flying from FAF to THLD, like an LPV /ILS, when it should be flying from FAF to MDA like an LNAV.

We had a test case go thru flight inspection to see if we could keep LP minimums, but it did not work. I hope this answers your question.

PART C - REMARKS:
PRECIPITOUS TERRAIN EVALUATION COMPLETED.

TERPS PARAGRAPH 289 APPLIED TO 1639 AAO
400801N/0802457W

BLOCK 3: ALTIMETER SETTING
SOURCE: KAFJ/KHLG
DISTANCE: 16.54
HRS REMOTE: 24
ADJUSTMENT: 39.54

AWOS-3 AND ASOS ON SERVICE A

RWY 09 VGSI DATA: 4.00/77

WAVVO TO RW09: 3.00 / 50

FLIGHT INSPECTION RESULTS DO NOT WARRANT A VDA

TAA NOT USED, ATC REQUEST

LP MINIMUMS DELETED

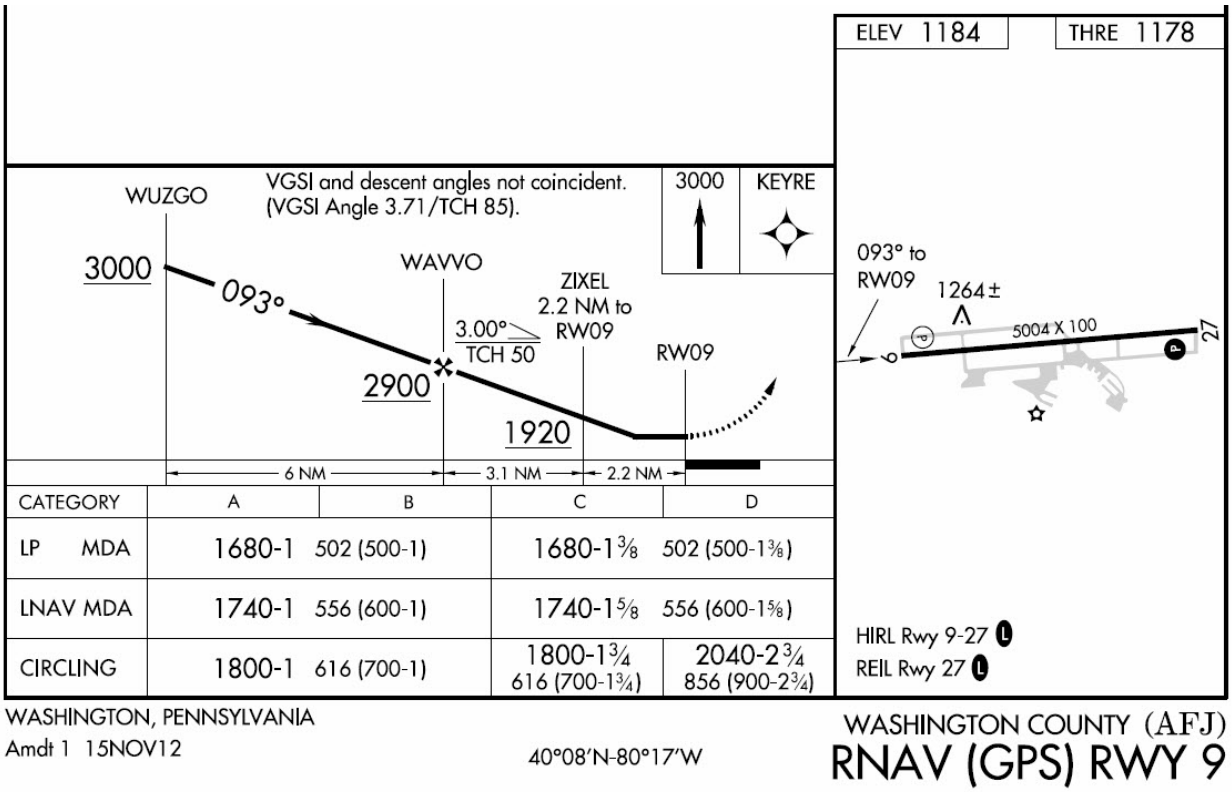
PRESSURE PATTERNS ARE THE SAME
KAFJ (1184 MSL)
KHLG (1195 MSL)

RASS ADJUSTMENT ROUNDED TO 40 AND ADDED AS NOTE

NO ADDITIONAL AIRSPACE REQUIRED.
RASS PRESSURE PATTERNS SAME
KAFJ 1183.90, KHLG 1194.70
RA = 39.56.

LPV AND LNAV/VNAV NOT DEVELOPED DUE TO GQS PENETRATIONS.

ORDER 8260.3, VOLUME 1, VISUAL PORTION OF FINAL PENETRATIONS:
20:1



I called the Quality Advisor involved in the discussion to make sure I understood what was going on. He confirmed that the LP could not be published because it could not be coded with a VDA of 0 (zero). He indicated that the 0 was required to prevent advisory vertical guidance on the procedure.

I have several issues with this. The purpose for LP procedures is to provide a lower MDA than permitted by the LNAV where the smaller OCS footprint allows. It is only used when a vertically guided procedure isn't appropriate for the runway. Although a Constant Angle Non Precision Approach (CANPA) may be desirable, it is not always available as an option on all NPA procedures. The advisory glidepath provided by some manufacturers' GPS units is only permitted to be used during the descent to the MDA and not below it. It is my understanding that regardless whether a VDA is published or not, advisory vertical guidance may be provided, in that if the 8260 doesn't provide the data for the advisory glidepath, the manufacturer may calculate one. Therefore, setting the VDA to 0 in the database doesn't necessarily eliminate the advisory glidepath from the database. Because of the coding issue described by the Quality Advisor, the LP procedure is eliminated. It is ironic that the unintended consequence is that the LNAV will end up with an advisory glidepath, but if it is coded in the database it will not generate advisory guidance, at least in the Garmin units. This is because, the LP procedure in the Garmin units don't support advisory vertical guidance under any circumstance whenever LP is the highest service level coded for the approach, regardless if the integrity at the time of the approach supports LP or LNAV. My understanding of the ACF issue dealing with VDA was only to affect whether or not the VDA would appear on the chart and there was to be a note added to the effect "Descent Angle NA". This situation ends up being a 'catch 22', if the runway doesn't qualify for vertical guidance, and flight testing indicates that CANPA is not an option, it doesn't qualify for LP, and when a LP is coded it doesn't have advisory vertical guidance, but if only a LNAV is coded, it does have advisory vertical guidance.

Recommendations: *The database coding of LP procedures should be permitted even when the VDA is not charted. Being able to fly a procedure with CANPA should not be a requirement for a NPA.*

Comments: *This recommendation affects FAA Order 8260.19.*

Note 1: From the 12-02 ACF/IPG Minutes, the related issue is:12-01-301 Publishing a Vertical Descent Angle (VDA) with 34:1 Surface Penetrations in the Visual Segment. This issue may be considered as a continuation of 12-01-301.

Note 2: Quote from the 12-02 ACF/CG Meeting Minutes re: 12-01-252 Warning Note on Vertical Descent Angle (VDA) Procedures: "Bill Hammett's recommendation, that when Flight Inspection deems prudent, the VDA will not be published (on the source document and thus on the chart – databasing remains unresolved), received general acceptance."

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Date: *February 20, 2013*

MEETING 13-02: Tom Schneider, AFS-420, briefed the following update as provided by John Bordy, the AFS-420 conventional TERPS criteria specialist: "This issue was discussed at length during the US-IFPP meeting in June. The US-IFPP determined that AFS-420 will lead a working group (tentative members were identified during the US-IFPP meeting) to develop a recommended position for the US-IFPP to consider. It was also agreed that non-US-IFPP member participation would be included in the working group as requested at AFC-IPG meeting 13-01. AFS-420 intends to convene a meeting of the working group prior to the next meeting of the US-IFPP." Rich Boll, NBAA, requested he be included as a meeting participant.

Lev Prichard, APA, briefed that he had decided to research examples where the problems exist and emphasized that it is not strictly a commercial operational problem. He briefed from a PowerPoint presentation, which included a CFIT history slide that showed where aircraft accidents occurred relative to runways. Lev used the San Diego (KSAN) LOC RWY 27 IAP to demonstrate the benefits of vertical guidance. Lev compared the FAA and Jeppesen approach plates, with emphasis on the advisory altitudes on the Jeppesen chart. Lev said the point is that APA supports all vertical guidance to MDA, with advisory use below MDA; however, NOTAMs not allowing straight-in procedures at night effectively cancel all vertical guidance. A synopsis of Lev's presentation and briefing slides are included here .

From the GA perspective, Lev discussed the Fayetteville (FYV) RNAV RWY 34 which illustrated several issues. This approach has LPV minimums, has a VDP so the 20:1 visual surface is clear, but no 'stipple' indicating the 34:1 is not clear, and has a VDA. However, if you fly into the airport with a Garmin equipped aircraft, you will note the box is stripped of vertical descent programming because of Garmin programming methodology. Therefore, even though the chart shows LPV and LNAV minimums, you have no vertical guidance. But, if you look at the plate, you would think you also have vertical guidance since it has both a VDA and VDP. This is the unintended consequence of when this box was certified; some systems may have the guidance while others do not. Lev recommended charting everything and letting pilots/operators sort it out to their specifics. John Collins, GA Pilot, stated that a pilot can't always tell from a charted NPA whether vertical guidance is available. Discussion ensued about steep glide paths, and that advisory vertical guidance is advisory everywhere.

Rich Boll, NBAA, referred back to the KSAN LOC RWY 27 approach. The Jeppesen version profile has the ball note: "only authorized operators may use VNAV/DA/H in lieu of MDA/H". Rich asked

how the VGSI could be inop and the FAA still allow an operator to treat a MDA as a DA/H under OpSpec C073. Rich stated he is raising this issue due to the note, and he is seeing it on a lot of approaches, where straight-in/circling is N/A at night but the ball note is still on the chart. Tom asked John Moore if he could determine the Jeppesen source for these notes. John said he did not know, but there had been internal discussions on the matter and he would check with Ted Thompson. Group discussion indicated that this was due to criteria at Part 139 airports only, and also is unique to Jeppesen charts, not FAA charts. Tom stated that since this subject is off topic from the agenda item, it would be put in the minutes as a discussion item, but will not be tracked by ACF. Rich concurred since NBAA concern deals with Part 135 operators.

Much later in the Forum John Collins raised concern that no updates or discussion was provided relating to Recommendation 13-01-309, which was combined with this item at the last meeting. Tom assured the group that this item will not be closed till both 12-01-301 and 13-01-309 are resolved. John asked that issue 13-01-309 be specifically updated in the next update to this issue. AFS-420 will continue to work these two issues through the US-IFPP.
ACTION: AFS-420 (US-IFPP).

> ***Editor's Note:*** *The following response was provided by Ted Thompson, in response to John Moore's inquiry regarding the use of the ball note in the profile of Jeppesen approach charts: "In essence, the origins of the Jeppesen-added notes are based on HBAT 99-08 and related requests from several ATA (now A4A)-member airlines when VNAV was introduced. The criteria originally cited in HBAT 99-08 were eventually replaced with amended criteria contained in OpSpec C073. The criteria were mainly unchanged with the exception that they now only apply at 14 CFR, Part 139 Airports. Jeppesen charting specs address the removal of the notes for charts at non-Part 139 Airports."*

MEETING 14-01: Tom Schneider, AFS-420, briefed that the working group has had several meetings and brought Flight Inspection onboard. The slide shows the results of the VDA Working Group meeting and the US-IFPP recommendations. The first slide shows design criteria in Order 8260.3 & policy in Order 8260.19. () Joshua Fenwick, Aero Nav Data, inquired if a flight inspection failed, would a redesign to increase the descent angle occur? Tom said that would be one option. John Collins, GA Pilot, inquired about the 0 degree angle in VDA. There was discussion on one manufacturer who had coding issues with using the zero, and this has been fixed. Brad Rush, AJV-3, added that this only affects approximately 120 procedures (out of well over 10,000) in the US NAS. A discussion followed with previous points restated from other meetings: i.e. VDA advisory only; ARINC 424 coding; data base suppliers coding "0" for the angle; publishing note "VDA N/A below MDA"; TPP changes; pilot guidance in AIM and IPH; coded value; etc. It was recommended these coding issues be brought up in the scheduled Database Manufacturers Forum scheduled for Thursday afternoon (5-1-2014).

Status: AFS-420 will continue to work this agenda item through the US-IFPP. Item Open [AFS-420 (US-IFPP)].
