

GOVERNMENT/INDUSTRY AERONAUTICAL CHARTING FORUM
Instrument Procedures Group
May 1, 2007
HISTORY RECORD

FAA Control # 07-01-269

Subject: Diverse Vector Areas (DVAs)

Background/Discussion: There are disconnects between DVA information provided to pilots in the AIM, information provided to air traffic managers in FAAO 7210.3U, "Facility Operation and Maintenance," and information provided to controllers in FAAO 7110.65R, "Air Traffic Control". Based on NBAA's research into this area, we find that very few civil DVAs exist. Further, it appears none exist with a climb gradient specified where obstacles penetrate the TERPs Initial Climb Area (ICA) and beyond. Thus, departure vectors on takeoff and below the MVA serve to negate the safety product intended by Obstacle Departure procedures (ODPs) and climb gradient takeoff minimums published by Flight Standards under Part 97. Further, NBAA believes that the Air Traffic Organization has neither the tools nor the TERPs expertise to locate and evaluate obstacles below the MVA that penetrate the departure 40:1 surface, particularly in the ICA.

AIM paragraph 5-2-7 c. 2 states:

*"ATC may assume responsibility for obstacle clearance by vectoring the aircraft prior to reaching the minimum vectoring altitude by using a Diverse Vector Area (DVA). The DVA has been assessed for departures which do not follow a specific ground track. ATC may also vector an aircraft off a previously assigned DP. **In all cases, the 200 FPNM climb gradient is assumed and obstacle clearance is not provided by ATC until the controller begins to provide navigational guidance in the form of radar vectors.**"*
(emphasis NBAA's)

Order 7110.65 states:

"5-6-3. VECTORS BELOW MINIMUM ALTITUDE

Except in en route automated environments in areas where more than 3 miles separation minima is required, you may vector a departing IFR aircraft, or one executing a missed approach, within 40 miles of the antenna and before it reaches the minimum altitude for IFR operations if separation from prominent obstructions shown on the radar scope is applied in accordance with the following:

a. If the flight path is 3 miles or more from the obstruction and the aircraft is climbing to an altitude at least 1,000 feet above the obstruction, vector the aircraft to maintain at least 3 miles separation from the obstruction until the aircraft reports leaving an altitude above the obstruction.

b. If the flight path is less than 3 miles from the obstruction, and the aircraft is climbing to an altitude at least 1,000 feet above the obstruction, vector the aircraft to increase lateral separation from the obstruction until the 3 mile minimum is achieved or until the aircraft reports leaving an altitude above the obstruction.

c. At those locations where diverse vector areas (DVA) have been established, terminal radar facilities may vector aircraft below the MVA/MIA within those areas and along those routes described in facility directives.” (7110.65R, Para 5-6-3)

Order 7210.3.U, paragraph 3-9-5 states:

“ESTABLISHING DIVERSE VECTOR AREA/S (DVA)

A DVA area may be established at the request of the air traffic manager and developed jointly with the Technical Operations Service Area Director and the appropriate Service Area Director for any airport within the facility’s area of jurisdiction. When established, reduced separation from obstacles as provided for in TERPS diverse departure criteria will be used to radar vector departing IFR aircraft below the MVA/MIA. When a DVA is established, the air traffic manager shall prepare a facility directive describing:

a. Procedures for radar vectoring IFR departures within 3 miles of obstacles including:

1. Outbound vectoring sectors involving one or more areas.

2. Where required, specific radar routes, depicted on the radar scope, along which positive course guidance is provided to aircraft below the MVA/MIA.

3. Free vectoring areas, in which random vectoring may be accomplished below the MVA/MIA, described in any manner identifiable on the radar scope.

b. No IFR aircraft climbing within a DVA shall be assigned an altitude restriction below the MVA/MIA. Obstacle avoiding vectors may be discontinued when the aircraft reaches the MVA/MIA or leaves the ROC altitude, rounded up to the next 100-foot increment.

c. Headings shall not be assigned beyond those authorized for the DVA prior to reaching the prescribed altitude.

d. If a particular sector or route within a DVA depends on the use of a climb gradient in excess of 200 feet per mile: (emphasis NBAA’s)

1. Unless the procedure is published, this information shall be transmitted to the pilot before departure.

2. Pilot concurrence is required.

e. DVAs should not be developed that require increased climb gradients unless there is no other suitable means to avoid obstacles except in situations where high volumes of high performance aircraft routinely make accelerated climbs.

f. Ensure that an air traffic controller is familiar with all the provisions of the facility directive before vectoring aircraft in accordance with DVA criteria.” (Order 7210.3.U, Para 3-9-5)

NBAA believes that neither pilots nor controllers are familiar with the DVA provisions of Order 7210.3U. Note that the language provides both design and operational guidelines,

but no reference to appropriate obstacle clearance tools or criteria. In any case, obstacle clearance assessments of this fidelity and importance are the responsibility of Flight Standards and the National Flight Procedures Group (NFBPG), not the Air Traffic Organization.

The information provided to pilots in AIM 5-2-7 c. 2 is incorrect, misleading, and has serious departure obstacle-clearance collision risk implications.

Recommendations: Flight Standards must take action to assure that pilots are given the best and safest guidance to assure obstacle clearance on departure when ATC provides radar vectored departures at airports in controlled airspace. A long-term goal might be for AFS, in partnership with ATO, to provide an effective DVA program, with obstacle assessments to include all headings that a particular TRACON or center might provide from the DER to MVA or MIA. In the near term, the AIM must be revised (NBAA strongly suggests via GENOT before the next AIM cycle) that pilots must, at a minimum, use any climb gradient associated with the Part 97 minimums for a runway end during departure radar vector climbs. Pilots should also be advised that headings assigned at Class G airspace airports are not intended to supersede any published ODP and, may in fact, result in controlled flight into terrain. Finally, the AIM reference to DVAs must be significantly revised so that pilots are provided the correct information, including the lack of DVAs at most civil airports. Pilots must be advised that, where a Part 97 climb gradient is associated with a given runway end (and usually associated with an ODP) that it is quite unlikely that a DVA for that runway, if any, makes the area 40:1 clear.

Finally, at controlled airports with TRACON services and runway ends that are not 40:1-clear, there should be consideration of a requirement to provide Vectored-SIDs, with their own minimums and climb gradients, which would assure not only a complete obstacle assessment by the NFBPG, but also common safety information for both pilots and controllers. Some locations already have such SIDs where departure vectors are provided.

Comments: This recommendation affects The AIM, the 7110.65R, the 7210.3U, and the Instrument Procedures Handbook.

Submitted by: Steve Bergner

Organization: National Business Aviation Association

Phone: 202-783-9000

FAX: 202-331-8364

E-mail: Bergners@granitelp.com

Date: April 5, 2007

Initial Discussion Meeting 07-01: New Issue presented by Rich Boll, NBAA, expressing concern over disconnects between DVA information provided to pilots in the AIM, information provided to air traffic managers in FAAO 7210.3U, *Facility Operation and Maintenance*, and information provided to controllers in FAAO 7110.65R, *Air Traffic Control*. Rich used an example of ST Paul Downtown, MN (KSTP) where controllers frequently give initial radar vectors and assigned altitudes that are contrary to the ODP for runways 14/32. Additionally, the runway 32 climb gradient is not provided when the vector clearance is issued. Wally Roberts, NBAA, stated that NBAA conducted an informal survey of the ATO Service Areas and found that there are less than 10 DVAs in the entire country. NBAA questions how a pilot is to know whether a DVA exists and what the dimensions are

(approved initial headings)? Wally also stated that if there is a climb gradient associated with the published ODP, it must be issued with an unpublished radar vector (DVA) departure. Paul Ewing, AJR-37 (AMTI) stated that if NBAA suspects that DVA criteria are being violated, they should report it to Air Traffic. There was a discussion on when pilots should fly the published and when not to. Also under discussion was when pilots should make the turn to an assigned ATC departure heading. Bill Hammett, AFS-420 (ISI), used the textual ODP for runway 35 at Manchester, NH (KMHT) as an example that has been under discussion in the New England Region. The ODP states to "...climb runway heading to 1200 before proceeding westbound..." Controllers frequently issue "...left turn to XXX, cleared for takeoff". Does the pilot turn at 400' AGL or climb to 1200 before taking the turn? Unfortunately, there was no Terminal Service Unit representation at the meeting to participate in the discussion. Tom Schneider, AFS-420, as Chair of the ACF-IPG, took an IOU to send the agenda item and initial discussion to the Terminal Safety and Operations Support Office, AJT-2 requesting a response and participation in future meetings.

ACTION: Chair, ACF-IPG and AJT-2.

Meeting 07-02: Tom Schneider, AFS-420, briefed that the issue and an extract from the ACF-IPG minutes were forwarded to the ATO Terminal Safety and Operations Support Office (AJE-2) on June 20th requesting they respond directly to NBAA with an info copy to the ACF-IPG Chair. No response has been received to date. Pam Coopwood, AJT-2300, stated that nothing has been done to respond to the letter. Rich Boll, NBAA, stated that this issue needs to be elevated within Air Traffic. There is increasing pilot concern regarding obstruction clearance when issued a heading and/or initial altitude that contradicts the published ODP - he provided several "real-world" examples. Pam responded that controllers know the area they provide service in. Rich questioned whether Air Traffic has the tools and expertise to locate and evaluate obstacles below the MVA. Bill Hammett, AFS-420 (ISI), stated that when a DVA is established, the AT facility cannot do it alone; it must be accomplished jointly with the Flight Procedures Office (FAA Order 7210.3, paragraph 3-9-5). This will ensure TERPS expertise in evaluating the 40:1 departure obstacle identification surface. Paul Ewing, AJR-37 (AMTI), stated that just because a departure vector is issued it does not mean that a DVA has not been established. Rich added that the language in the AIM leads pilots to believe when they receive a vector on departure, a DVA has been established. He believes pilots should know what locations have DVAs established and perhaps this information could be included as a chart note; e.g. "DVA assessed." Tom Schneider, AFS-420, stated that information regarding DVAs could possibly be included with other information relating to ODPs and documented on FAA Form 8260-15A. This would drive NACO and Jeppesen to chart the information. Tom will consider this during the re-write of Order 8260.46. Pam or Tim Swope, AJR-5000 (JVS), will ensure the Terminal Service Unit addresses air traffic facility awareness of DVA policy and report at the next meeting. **ACTION:** AFS-420, AJR-5000 (JVS), and AJT-2300.

MEETING 08-01: Bill Hammett, AFS-420 (ISI) briefed that at the last meeting, Pam Coopwood, AJT-2300, stated the FAA's new System Operations Planning and Procedures Group, AJR-5000, would address this issue. However, as noted during discussion of issue 02-01-241, the new group was not formed; therefore, on January 28, 2008, the issue and related correspondence were forwarded to the ATO Terminal Service Unit (Gary Norek, AJT-23), for action. It appears nothing has been done within Air Traffic since the last meeting to address the issue. Tom Schneider, AFS-420, briefed that AFS-420 is currently revising FAA Order 8260.46, *Departure Procedure (DP) Program*. DVA documentation

requirements have been included in the draft 8260.46D. A charting change IACC Requirements Document (RD) has also been prepared and forwarded to the IACC Member Points of Contact (MPOC) for consideration. Rich Boll, NBAA, asked if DVAs would routinely be established when a diverse departure analysis was conducted. Tom responded no; the requirement for DVA establishment is up to the air traffic facility. Dan Diggins, AJT-22 stated that his new organization would be addressing this issue. He believes there are two specifics involved, criteria for DVA development and policy for DVA establishment. From reviewing the past history, it appears from the minutes that many terminal facilities are issuing radar vectors to departures believing they have a DVA established. Others are using radar vectors for departures whether they have a DVA established or not. Rich Boll, NBAA, briefed that informal research by his organization in the Western Service Area indicates there are only approximately 10 DVAs established. Kevin Comstock, ALPA, asked whether there is a list of locations with DVAs established. Brad Rush, AJW-321, responded that a NFPO query through the ATO Service Area FPOs indicated they have no record of any DVAs being established. Rich added that NBAA pilots, at some locations, have experienced ATC issuing a heading to fly on takeoff concurrent with their ATC clearance and then asking pilots to verify that it meets obstacle clearance requirements. (**Editor's note:** *There is a provision for this request in Order 7110.65, paragraph 4-3-2-c-3. Provisions for vectoring below the MVA are specified in 7110.65, paragraph 5-6-3.*) Tom said this would be an issue for ATPAC as it involves controller procedures. Richard Kagehiro, AJE-32, indicated that is acceptable for controllers to issue an initial heading to be flown after departure; however, it may not necessarily be considered a "radar vector" prior to the controller saying "radar contact". Kevin added that it appears any ATC interpretation that pilots have the responsibility for terrain and obstacle avoidance when given a heading to maintain along with their take-off clearance is inconsistent with the intent of Order 7110.65 paragraph 4-3-2-c-3 and Example, and appears to contradict Part 91.123, which requires pilots to follow ATC instructions. In addition, 7110.65, paragraph 5-6-3 a through c, should be re-written. Currently it appears to read that ATC can vector below MVA as long as the vector avoids obstructions shown on the radar scope. Anywhere there is an ODP but no DVA, there is no assurance that all relevant obstructions are on the radar scope. Dan confirmed that once a controller defines a specific track across the ground; e.g., issues an initial departure heading, ATC is responsible for terrain/obstacle clearance. The supporting rationale is that ATC took away a pilot's ability to laterally maneuver their aircraft either using an approved ODP or visually avoiding terrain/obstacles in a specific direction until proceeding on course (as listed in AIM paragraph 5-2-8). There was further discussion indicating that perhaps Air Traffic should publish guidance that controllers cease issuing diverse vectors at airports where a published ODP exists unless a DVA has been formally established under current directives. Dan agreed to take action to ensure proper guidance is provided controllers. Bill added that the guidance must apply to both the Terminal and En Route specialties as ARTCCs are increasingly assuming more terminal type control duties due to part-time terminal facilities. The discussion was lengthy and yielded several IOUs: Brad and Dan will jointly research the number of valid DVAs. The NBAA list will be used to help in this effort. [**Note:** *Jeff Struyk, NGA, requested a copy of the validated list when completed.*] Dan and Richard Kagehiro, AJE-31, will jointly develop controller guidance. Tom will continue to track DVA documentation and charting. The following IOUs were assigned: 1) Brad and Dan will jointly determine the number of valid DVAs; 2) Dan and Richard will jointly ensure controller guidance is developed for radar vectoring departures at airports where an ODP is established; and, 3) Tom will continue to track DVA documentation and charting during the re-write of Order 8260.46.

ACTION: AJW-321, AJT-22, AJE-31, and AFS-420.
