R U DOWN WITH VDP'S?

Visual descent points are one of those IFR subtleties that separate the hacks from the pros. (Don't worry. It's easy to go pro.)

by Neil Singer

Pop quiz: What are the three conditions required to descend below MDA or DA? If you answered, "Ability to make a normal descent and landing, flight vis at or above published vis, and runway environment in sight", you get a B+.

If you answered, "Aren't there four conditions?" then go to the head of the class. The fourth is unknown to the vast majority of pilots: The airplane must have reached or passed the visual descent point (VDP), if published.

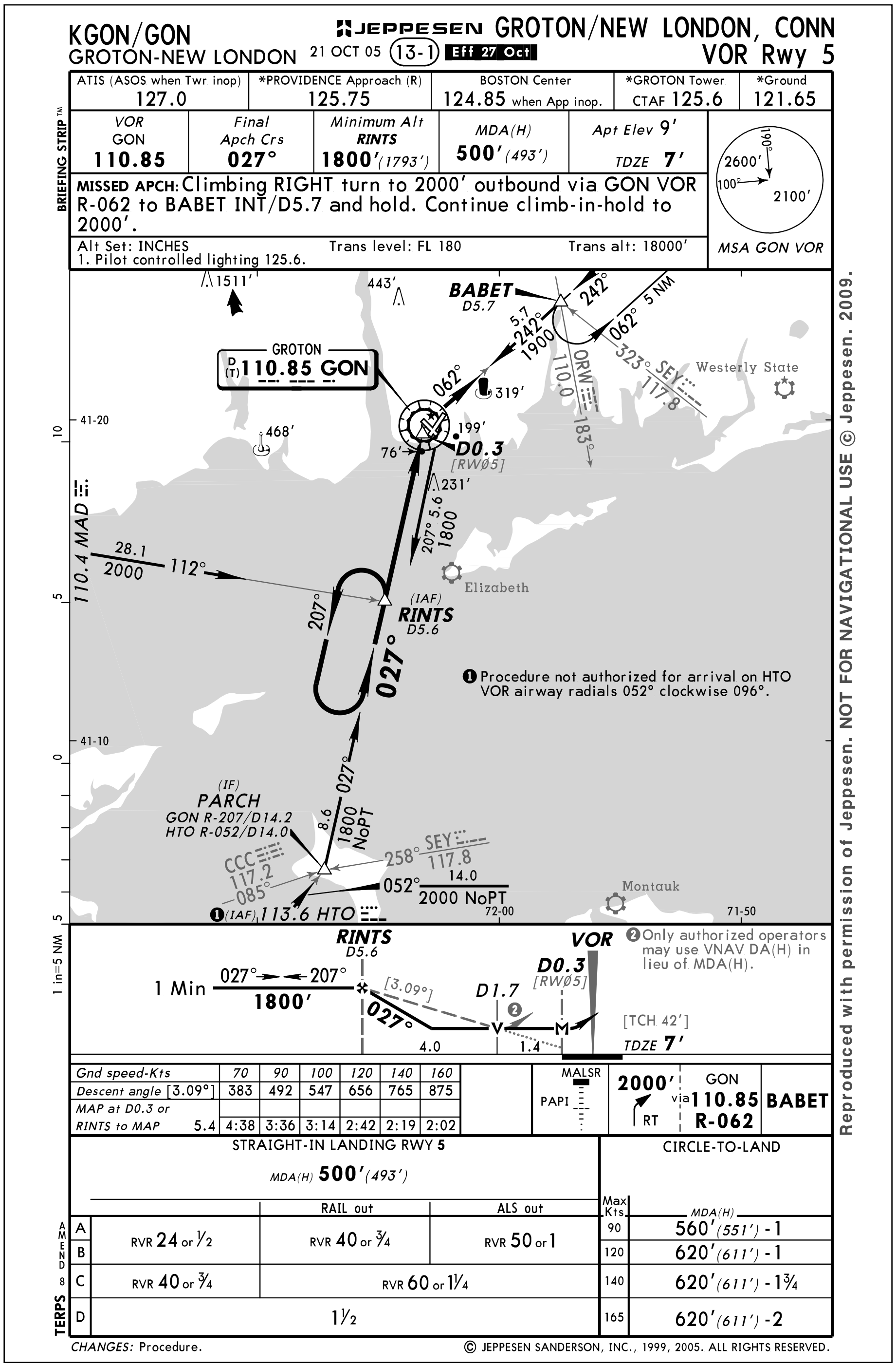
Why Bother with the V?

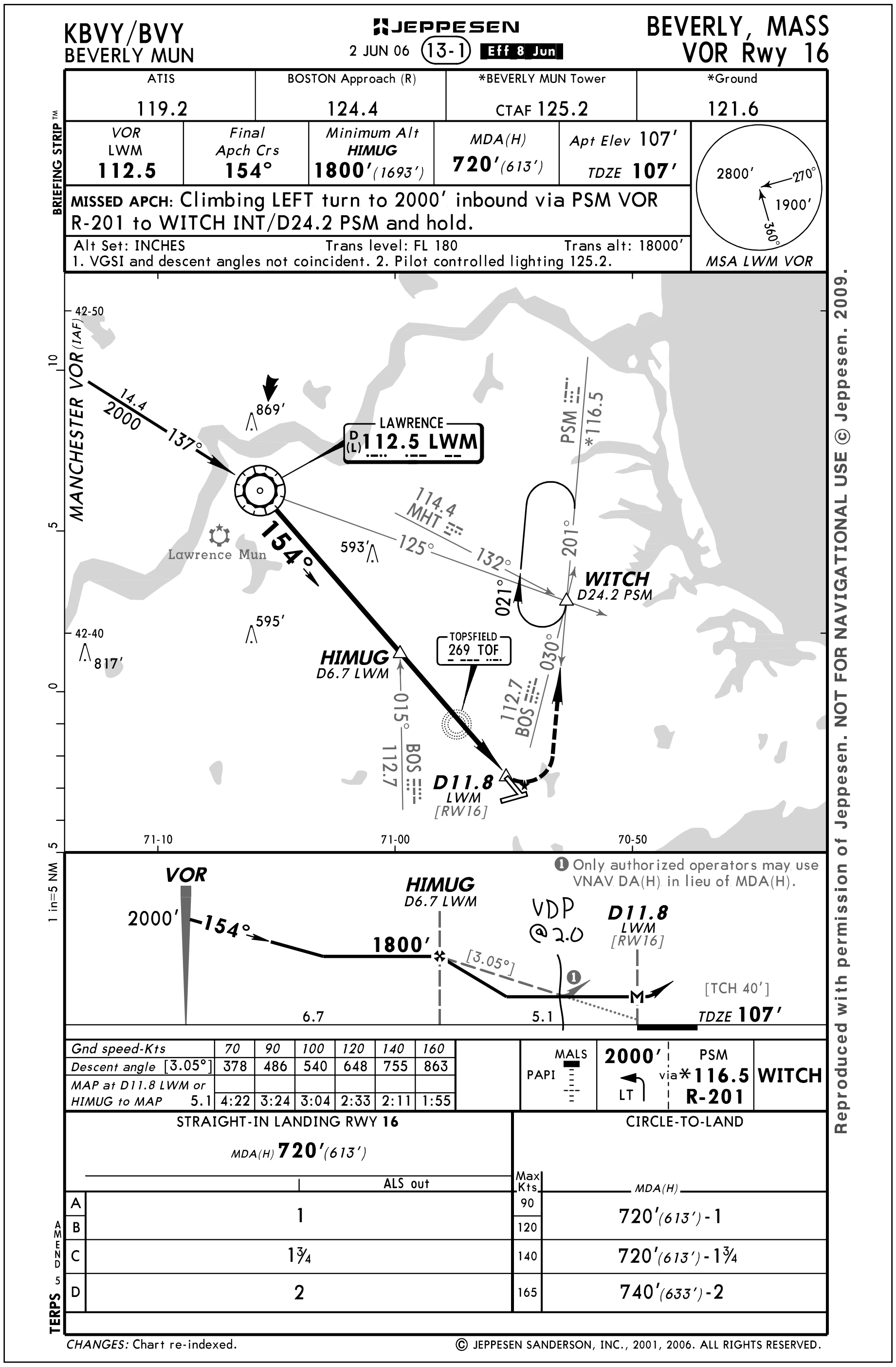
I can hear the head scratching from many of you now. VDPs are one of those little IFR tidbits that slip from the awareness of many pilots. VDPs aren't frequently used (and become less important every day with vertical guidance courtesy of WAAS), yet they can still be a bacon saver and are worthy of a minute's review.

Only found on non-precision approaches where some means of along-track-distance determination exists (DME or GPS), a VDP is displayed by a "V" on the profile view. It represents the point in space where an aircraft at MDA would intersect a three-degree descent path to the runway and where most VASIs/PAPIs would show white and red.

The purpose of a VDP is to ensure that a pilot does not leave MDA too early and compromise terrain clearance. In low visibility, particularly on "black hole" approaches where the area under the final approach course and surrounding the airport is not lit, there can be a powerful illusion of being too high. On a non-precision approach, the terrain clearance at MDA can be as little as 250 feet. Starting down for the runway too early has intimately acquainted more than one aircraft with the terrain short of the runway.

The AIM states that a "pilot should not descend below the MDA prior to reaching the VDP and acquiring the necessary visual reference." Additionally, leaving MDA significantly after the VDP may not be wise. Every bit of distance traveled at MDA beyond the VDP will cause the descent angle to the runway to steepen. Depending on the length of the runway, the flight characteristics





Above: *Once you calculate the VDP, it will be the same for that approach whenever you fly it. Go ahead and write it directly on the chart.*

of the airplane and exactly how far past the VDP the pilot has traveled, it may be impossible to make a safe descent to a straight-in landing (unless you're flying a Wilga or approaching a really long runway).

Many turbine operators flying aircraft unforgiving of steep descents to the runway use the VDP as the actual missed approach point. If the runway is not in sight at the VDP, the missed is initiated by beginning a climb while continuing to track the final approach course. Once the official MAP is reached, the appropriate missed approach procedure can commence.

This represents a two-fold increase in safety: The temptation to perform a screaming 1500 FPM descent to the runway is eliminated, and much better terrain clearance is provided on the missed.

Figure Your Own VDP

Not all approaches have a published VDP, but it's easy to calculate one on the fly. A standard three-degree path will descend 300 feet per mile. Divide the MDA in feet above touchdown by 300. The resulting number is the distance from the runway threshold to where the VDP is located. With an IFR GPS and a MAP at the threshold itself, we can usually read this number right off the unit. If we're using DME, we'll have to convert it to a DME number based on how far the DME source is from the threshold. If the MAP is before the threshold, we have to subtract that distance from the calculated VDP to get the real point from which we should descend.

As an example, we'll compute VDP for the VOR Rwy 16 approach to Beverly, Mass. The MDA of 720 feet is listed as 613 above touchdown. Divided by 300, we get 2.0 miles from the threshold to the VDP. If we don't have GPS distance to the threshold, we can see that the threshold is at 11.8 DME on the approach. So we know that our VDP will be at 9.8 DME. Writing this directly on the profile view of the approach plate is highly recommended.

You can twist this number a bit for long runways. Suppose your destination is a former military field that's been retired to civilian air service. It sports a 9000-foot runway but only a non-precision approach. You calculate the VDP at two miles from the threshold, but you feel comfortable landing in the last 3000 feet. So, your early VDP is at two miles, but you know you can go an extra mile before clearly getting the runway and descending, and still have a reasonable approach angle to the last third of the runway.

Published VDPs are not in GPS databases, even VDPs shown on a GPS approach plate, so don't go looking for them in your GPS flight plan.

THE QUIZ

1. **If you choose to fly to the LNAV/VNAV minimums for an RNAV (GPS) approach that lists both LNAV and LNAV/VNAV minimums, you must:**
   - a. Cross the FAF and descend as quickly as possible to the MDA, level off and proceed to the MAP.
   - b. Follow the glideslope/glidepath to the DA and then either land or immediately start your missed approach.
   - c. Follow the glideslope/glidepath to the DA and then level off and proceed to the MAP.
   - d. Usually b, but in some cases c is acceptable.

2. **For straight-in approaches (such as a VOR Rwy 18 approach), the minimums section shows you the height above touchdown zone. For approaches with only circling minimum (such as a VOR-A approach) the minimums are height above airport. What about circling minimums published on straight-in approaches?**
   - a. They show height above airport.
   - b. They show height above the touchdown for the straight-in.
   - c. They show average height above all available runways.
   - d. No figure is published.

3. **How many aircraft approach categories does TERPS recognize? (Bonus points if you can know which ones helicopters use.)**
   - a. Four categories: A, B, C and D
   - b. Five categories: A, B, C, D and E
   - c. Five categories: A, B, C, D and Copter
   - d. Six categories: A, B, C, D, E and Copter

Answers on page 23

You'll always need to be watching for a specific number on the GPS or DME. But considering the significant safety improvement VDPs add to non-precision approaches, it's well worth the extra trouble to watch for them.

Neil Singer scribbles on his approach plates as a mentor pilot in the northeast.

FLYING LONG-RANGE IFR

continued from page 9

assumes 14 GPH for the remainder of the flight. Unless I'm headed to Aspen, I need to plan for flying approaches and misses down low and at a higher fuel burn. I often wonder how many pilots deceive themselves that they are "IFR legal" based on this false view of reality.

An increase of six gallons per hour means I'll burn 2.5 additional gallons more than the fuel computer shows during cruise flight. I either have to "bank" an extra three gallons by being more efficient over the first three hours of the flight, or plan to fly the low-altitude segment at an economic flight configuration.

Stacking the Deck

It's an indisputable fact that our risk goes up as fuel quantity goes down. So, naturally, the instrument approach happens when you have the least fuel. As you're getting vectors to final, even with your MAP fuel target intact, you can still be thinking about ways to mitigate that risk if a cloud unexpectedly meets you at the runway threshold.

I've learned that the controllers will usually give me a custom missed-approach instruction if I ask. The conversation goes like this: "If I miss this approach, I'm going to Fredrick's ILS. Any chance for a missed-approach vector?" Often they'll say, "Climb and maintain 3000 and fly heading of 360 on the missed," which points me right at my alternate's IAF, instead of making me head out toward the hold first.

When selecting that alternate, it should be something with an ILS, or an LPV if you're so equipped. If you should find yourself in the nightmare scenario, with time and ideas running short, busting minimums might be your last shot at saving your skin and tin. Of all your minimums-busting alternatives, these two give you the best accuracy between DA and the runway threshold.

But also pay attention to those METAR timestamps if you have datalink weather. If you're going to be driving around in low IFR with only 20 gallons in your tanks, you need accurate data. Heading to your alternate airport with a stale METAR might be the start of the accident chain.

If fuel is really tight, you can crawl to your alternate. A general rule is that piston airplanes are at their most fuel efficient somewhere around their best glide speed. While you may not need to go that slow, rather than roaring over to your alternate at flank speed, save fuel, and buy yourself options by dawdling to your alternate at your best-economy configuration. I know, this goes against every fiber in your body that's saying, "Get on the ground," but it's truly a better deal.

An Equal-Opportunity Trap

Most of us read accident reports and say, "I'll never do that." We might never buzz our neighbor's house or take off with a control lock in place, but the vagaries of aviating don't allow us to say we'll never be in that United crew's situation (see sidebar, page 7). They took off with "no problem" TAFs, and then ATC threw a knuckleball and WX came with the curve. Unexpected holds happen, forecasters make mistakes, airports get closed due to blown tires ... and then the most normal of flights becomes a situation.

And when situations happen, you don't want to add the stress of wishing you could get back those four gallons you squandered in the first two hours of the flight.

Rob McGovern squeezes utility out of his Bonanza up and down the East Coast