INSTRUMENT READINGS™

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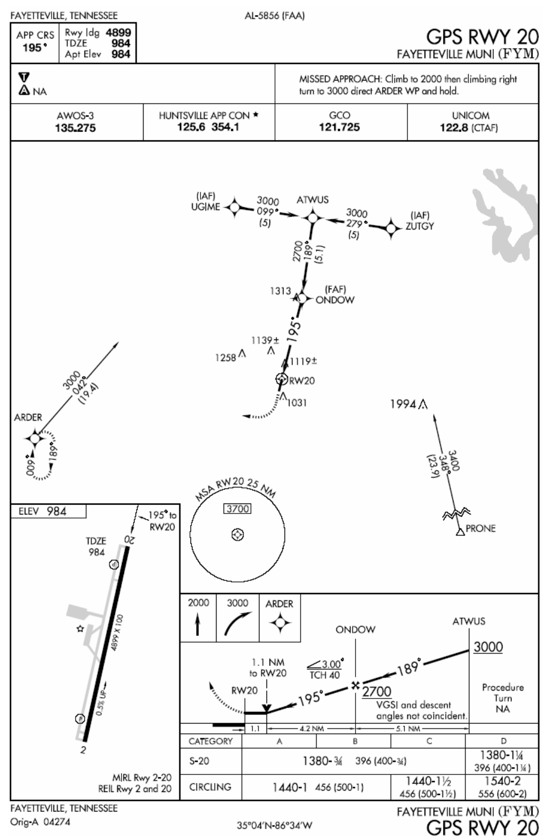
VISUAL DESCENT POINTS (VDPs)

There you are, on a dark and stormy night, flying the GPS RWY 20 approach into Fayetteville, TN (KFYM). AWOS reports 500 ft and 1½ mile. Passing the FAWP (ONDOW), you descend at 750 fpm, reaching MDA 2.5 nm from the MAWP. The only airport lighting is REILs and MIRLs, and the runway 20 PAPI is NOTAMed out of service. You see nothing at first, and you begin to prepare for the missed approach. Then at 1.5 miles, you see the REILs, then the threshold lights. You are at MDA and have the required visual sightings, so should you begin your descent to landing now?

There is no regulation that says you cannot begin your descent at that point. However, you really need to consider whether it is safe to do so. Closer examination of the approach chart profile view shows a bold black **V** 1.1 nm from the MAWP. This symbol represents a Visual Descent Point. Let's examine what one is, how we use it, and what it does for us.



Rather than invent new words to describe a VDP, I refer you to Section 5-4-5 of the AIM, from which I have extracted the following:

"The VDP is a defined point on the final approach course of a nonprecision straight-in approach procedure from which normal descent from the MDA to the runway touchdown point may be commenced, provided visual reference required by 14 CFR Section 91.175(c)(3) is established.

The pilot should not descend below the MDA prior to reaching the VDP and acquiring the necessary visual reference."

So now we are told what the VDP is and that it marks a point from which a normal descent can be made. But we have not learned its importance. Reading further in the AIM:

"Visual descent points (VDPs) provide pilots with a reference for the optimal location to begin descent

from the MDA, based on the designed vertical descent angle (VDA) for the approach procedure, assuming required visual references are available. Approaches without VDPs have not been assessed for terrain clearance below the MDA, and may not provide a clear vertical path to the runway at the normally expected descent angle. Therefore, pilots must be especially vigilant when descending below the MDA at locations without VDPs."

Now we have learned the real value of a VDP: obstacle protection during descent below MDA. But the AIM statement that "Approaches without VDPs have not been assessed for terrain clearance below the MDA…" does not seem quite right. Current TERPS criteria require that all runway ends where there are nonprecision approaches be assessed for obstacles that would intrude into a normal descent profile. In some cases, this assessment will result in a runway being declared NA at night. In other cases, the visibility minimum will be increased. If proper criteria are satisfied, then a VDP must be published. Under current criteria, absence of a VDP on an RNAV approach or one using DME means that there are obstacles on the descent that require your awareness and close attention. However, a great many procedures were developed prior to VDPs and the current TERPS criteria, and on these procedures you have no idea what lurks below MDA.

So what's a pilot to do? First, read AIM 5-4-5 some more:

"Use of visual glide slope indicator (VGSI) systems can aid the pilot in determining if the aircraft is in a position to make the descent from the MDA. However, when the visibility is close to minimums, the VGSI may not be visible at the start descent point for a "normal" glide path, due to its location down the runway."

Following up on the reference to VGSIs, we find this in Section 2-1-2 of the AIM:

"The VASI is a system of lights so arranged to provide visual descent guidance information during the approach to a runway. These lights are visible from 3-5 miles during the day and up to 20 miles or more at night. The visual glide path of the VASI provides safe obstruction clearance within plus or minus 10 degrees of the extended runway centerline and to 4 NM from the runway threshold. Descent, using the VASI, should not be initiated until the aircraft is visually aligned with the runway. Lateral course guidance is provided by the runway or runway lights."

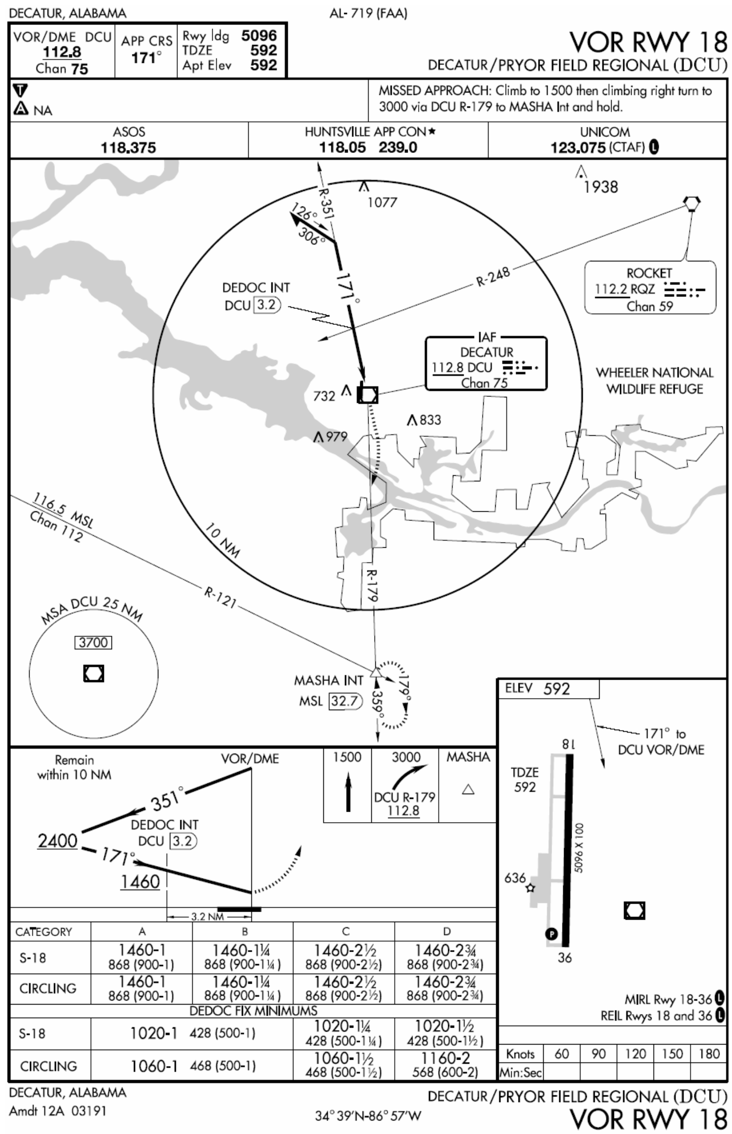
This tells us that a VASI (and the same is true for a PAPI) provides obstacle protection out to four nm from the runway. So if there is no VDP, unless you are willing to descend through unknown obstacles, you should track the VGSI glide slope down. On a 4-light PAPI, I like to keep just one red.

Notice that the minimum visibility for the approach (Categories A-C) is ¾ mile, but the VDP is located 1.1 mile from the runway threshold. Under conditions of minimum visibility, you may not be able to acquire the required visual references at the VDP, and will be unable to begin descent there. If you see the lights at ¾ mile and

> As an unrelated observation, this approach has a course change at the FAWP. The great majority of GPS approaches use the same course from the Initial or Intermediate Waypoint to the MAWP; in other words, the intermediate segment is aligned with the final segment. Don't get caught by surprise by a course change after being used to flying approaches with aligned segments.

immediately begin descent, you can still make the runway, but it will require abrupt maneuvering and a high descent rate, not the best thing to be doing at night in low visibility.

We have seen that if there is a VDP or a VGSI, we have a way to descend obstacle-free from MDA. Now let's explore the transition to the visual segment of the approach when there is no VDP or VGSI. Consider the VOR RWY 18 approach into Decatur, AL (KDCU). This is an example of an approach with an on-field VOR and no FAF. There is no VDP and no VGSI. Even with DME from the VOR, no distance is shown that directly relates to the landing end of the runway.



CATEGORY	A	B	C	D
S-18	1460-1 868 (900-1)	1460-1¼ 868 (900-1¼)	1460-2½ 868 (900-2½)	1460-2¾ 868 (900-2¾)
CIRCLING	1460-1 868 (900-1)	1460-1¼ 868 (900-1¼)	1460-2½ 868 (900-2½)	1460-2¾ 868 (900-2¾)
DEDOC FIX MINIMUMS				
S-18	1020-1 428 (500-1)		1020-1¼ 428 (500-1¼)	1020-1½ 428 (500-1½)
CIRCLING	1060-1 468 (500-1)		1060-1½ 468 (500-1½)	1160-2 568 (600-2)

Knots	60	90	120	150	180
Min:Sec					

DECATUR, ALABAMA
Amdt 12A 03191
34°39'N-86°57'W
DECATUR/PRYOR FIELD REGIONAL (DCU)
VOR RWY 18

Inbound on this approach, without DME, you really have no accurate knowledge of where you are. (Well, that is not entirely true; you can identify the stepdown fix DEDOC using the crossradial from Rocket VOR.) With sufficient preflight planning, you can construct your own pseudo-VDP based on a RQZ radial or DME from DCU, but first let's see if it makes sense.

Another source of information as to the safety of descent is in Section C of the TPP. If the approach plate for the runway opposite the landing runway does not have a black triangle with a T in it, the presence of which indicates that nonstandard takeoff minima and/or an Obstacle Departure Procedure can be found in Section C, then that runway is safe for diverse departure under standard takeoff minima. Conversely, the landing runway will be safe for descent at a gradient of 200 ft/nm or greater to the threshold. At 90 kts ground speed, that would be 300 fpm or greater. If there is a black triangle with T, then you have to refer to Section C and assess the situation. The KDCU VOR RWY 36 approach plate has the black triangle with T, so we look in Section C and find this:

DECATUR, AL
PRYOR FIELD REGIONAL
TAKE-OFF MINIMUMS: Rwy 18, 300-1 or std. with a min. climb of 380' per NM to 800.

There are no nonstandard takeoff minima or departure procedures for runway 36, and no obstacles are identified, meaning that the north end of the runway (approach end of runway 18) is obstacle free for a standard climb gradient. Therefore, we could construct our own VDP based on a three-degree descent to the landing threshold from MDA. The MDA without identifying DEDOC is 868 feet HAT. A three-degree slope is 318 ft/nm, so we need 2.7 nm. If DEDOC is identified, then the MDA is 428 ft, putting our VDP at 1.3 nm for that case. There is no good reason that I can see not to identify DEDOC, unless you only have one VOR receiver and no DME or GPS, so let's use the lower number. Now you can use many methods to construct the VDP, one is to use the sectional chart. Draw the 351 radial from DCU. Draw a 1.3 nm arc from the runway end and see where that intersects the radial. That is your VDP. Find the RQZ radial to that point or the DME from DCU VOR, and that is how you identify the point from which you can make a normal descent from MDA to the runway, assuming you have the required visual references.

One caution on this IAP. Many pilots tend to fly a standard procedure on this type of approach of two minutes outbound from the VOR, then make the procedure turn. At 90 knots, two minutes will not get you to the stepdown fix unless you have some tailwind. The way you should fly this approach is to identify DEDOC on the outbound leg, then make your procedure turn outside DEDOC, so you can identify it on the way in and descend to the lower MDA. Furthermore, you should fly far enough past DEDOC so that you can complete the PT far enough out to make the 940 ft descent from PT completion altitude to DEDOC minimum altitude. It depends on winds, but a nominal minute and a half past DEDOC should work, for 750 fpm descents.

If there is no VDP or operational VGSI, and you haven't done the kind of thinking through the descent as illustrated above, then the runway under consideration is a poor choice to make an approach to at night or in poor visibility, unless you have good local knowledge. Furthermore, an airport like KDCU or KFYM, is a marginal choice under bad conditions due to having no approach lighting system. These are all factors to be considered in flight planning, both for your primary destination airport and your alternate airport.

Coming Attractions…

Next in *Instrument Readings*: Considerations In Choosing An Alternate Airport.

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