

# STRAIGHT AROUND

**Circling approaches may sound simple, but in marginal weather they can be a handful for even the most experienced pilot.**

By Bill DeBrauwere

Logic would dictate that flying by visual references is easier than flying by instruments. Yet one of the most challenging maneuvers in an IFR pilot's repertoire is the circling approach, a procedure that borrows from both the visual and instrument world.

When you think about it, the circling approach is really an odd amalgamation of VFR and instrument flying. If the weather is IMC, you spend the first part of the approach on the needles. Then you have to switch your attention outside of the cockpit in an attempt to position the airplane for landing without losing sight of the runway.

When the ceilings are high enough to give you some maneuvering room and the visibility is good, this is a manageable challenge. It's when the weather is at or near minimums that a circling approach loses all of its simplistic charm.

## Considerations

While the concept of flying a circling approach may sound easy, the decision to fly one should not be made lightly. Consider these numbers: A cursory look through the NTSB files for 2000 through 2005 alone revealed at least eight fatal accidents in which the decision by the pilot to fly a circling approach played some part in the

*The VOR or GPS-A approach to Wenatchee is aligned with the runway, but an excessive descent rate from the FAF precludes straight-in minimums.*

final outcome. Those are just the fatal ones. More in-depth research would be required to determine how many non-fatal accidents that have occurred on circling approaches, but if the fatal accident statistic is any barometer, it'll probably be a sobering number.

The challenge of flying a circling approach in marginal weather conditions isn't lost on commercial operators. Most Part 121 airlines and many Part 135 operators prohibit circling approaches in IMC conditions, period. In fact, my type rating specifically states that for the jet I fly, circling approaches are approved in VMC only.

Now this is not exactly a case where if it's good for the goose, it's good for the gander. Due to size and speed, an airliner isn't nearly as maneuverable as a Cessna 182, which makes the circling approach that much more challenging. While circling minimums take this

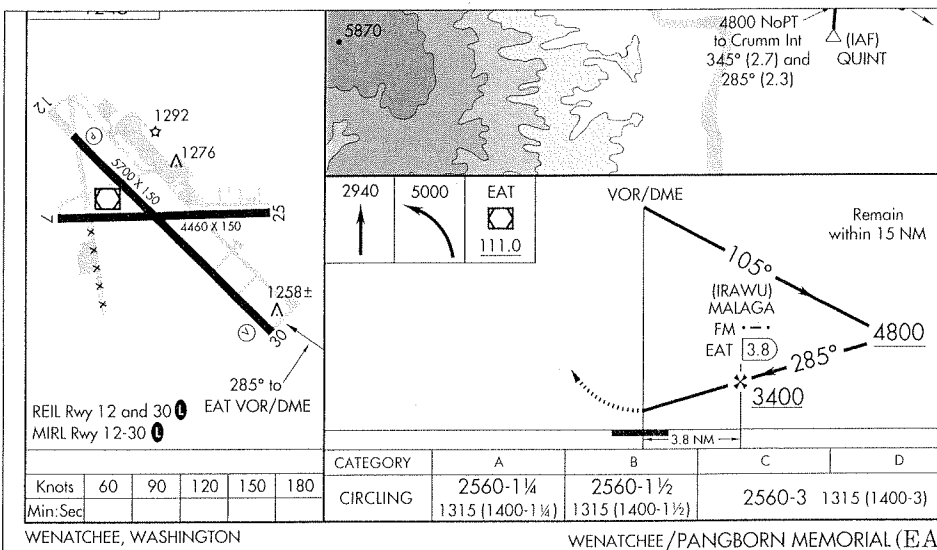
into account by raising ceiling and visibility requirements for larger airplanes, those increases are sometimes marginal. Perhaps not surprisingly, about a third of the fatal accidents involved corporate jets or turboprops, flown by experienced crews.

Still, the fact that commercial operators prohibit their crews from flying circling approaches in IMC conditions should give you a hint that circling approaches require a great deal of respect.

## The Challenge

The common theme to most circling approach mishaps is the dreaded stall/spin. To understand why, we must first dispel the notion that flying a circling approach is similar to flying a traffic pattern. It is not.

In a typical VFR traffic pattern, the airplane is usually clean until midpoint downwind or abeam the touchdown point. On a circling approach, that's likely not going to be the case, as you may already have added flaps and/or dropped the landing gear while on the initial approach. That means higher power settings than you're used to in order to maintain level flight. This leads to the first mistake pilots make — they get too slow. They may not set off the stall horn, but combined with the following common error, the ingredients for an accident are there.

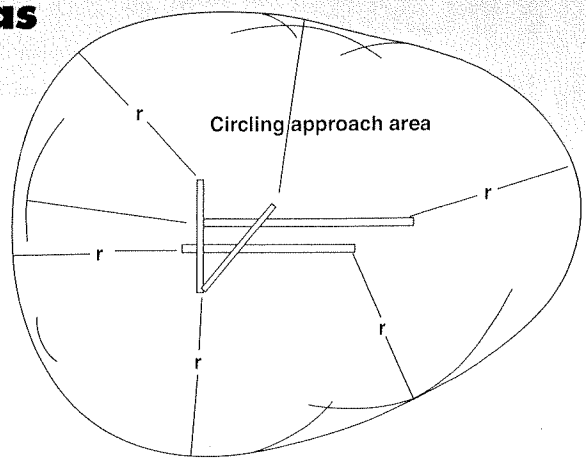


## Circling Approach Protected Areas

Circling approach protected areas are defined by the tangential connection of arcs drawn from each runway end. The distance of the arcs, and therefore the overall protected area, depends on the aircraft approach category. The faster the aircraft, the larger the protected area.

Sometimes, circling may be prohibited in certain areas around the airport and will be noted in the remarks sections.

Approach Category A .....	1.3-mile radius
B .....	1.5-mile radius
C .....	1.7-mile radius
D .....	2.3-mile radius
E .....	4.5-mile radius



Most traffic patterns are taught to put you on about a two mile final. It's a sight picture we are all familiar with, having practiced it countless times during our private pilot training. Circling minimums for light GA airplanes, however, are typically one mile. That changes the sight picture considerably. Low ceilings and reduced visibility force one to fly a much tighter pattern. The tendency, then, is to increase the bank angle when the runway begins to disappear into the rain or mist, or when it looks like the airplane will fly through final. The resultant increased stall speed, combined with the slow airspeed of the airplane, can easily lead to a stall/spin occurrence from which recovery is impossible.

### From The Beginning

With all the challenges a circling approach can bring, there are times when there is not other option. A frequent example for the need to fly a circling approach is when strong winds favor a runway to which a suitable approach is not available.

In other instances, TERPS criteria don't allow for anything else. For an approach to have straight-in minimums, the final approach course can't be offset more than 30 degrees from the runway. Any angle greater than that, and only circling minimums may apply. You'll often see this when the navaid, like a VOR or NDB, is located

away from the airport and not aligned with the runway.

This is usually not an issue with RNAV approaches, since they can be built so the final approach course and runway line up. The only exception here would be terrain, obstacles or airspace that would prohibit a straight-in approach.

Another reason for having circling minimums only is when the approach requires a descent gradient that's greater than 400 feet per NM from the final approach fix, even if the approach course is perfectly aligned with the runway. This is a far less common occurrence and one you'll most likely encounter in mountainous regions. It's important to note that such an approach does not preclude one from landing straight in, as long as the approach and landing are "normal," as per FAR 91.175.

Sometimes, however, a circling approach can make perfect sense. Newport News, Va., (KPHF), for example, only has an ILS to Runways 7 and 25. The GA ramp, on the other hand, is on the west side of Runway 2. In the case of KPHF, the way the two runways intersect easily allows one to fly the ILS 7 to circling minimums and dogleg it to land on Runway 2, saving considerable taxi time and the need to cross a potential active runway.

Approaches that have circling-only minimums are designated with a let-

ter instead of a runway number, such as VOR/DME A. For any particular airport, the naming scheme starts with the letter A and works its way up the alphabet. So if there are two circling-only approaches, one would be designated A and the other B, irrespective of which navaid the approach is based on. For example, you'd never see a VOR A and a NDB A to the same airport.

This lettering scheme is different from the scheme assigned to multiple RNAV approaches to the same runway. Those approaches are identified with letters that start from the back of the alphabet and will also include a runway designator. The RNAV (GPS) Z Rwy 07L at Daytona Beach, Fla., International (KDAB) is such an example.

### Categories

Another consideration to keep in mind is that a circling approach may put your airplane into a higher approach category, which could affect minimums.

A function of the approach category is to provide obstacle clearance based on an airplane's approach speed at maximum certified landing weight. For large airplanes, this is often referred to reference speed or  $V_{ref}$ . For airplanes without a published  $V_{ref}$  — this applies to most light GA — the category is based on  $V_{so} \times 1.3$ .

Almost all piston singles and most light twins fall into Category A, which

'is for airplanes with a 1.3 Vso of less than 91 kts. Put into a simpler way, this is any airplane with a Vso of 69 kts or less. However, if you elect to fly an approach at a faster speed, one greater than 1.3 Vso, you'd have to use the minimums for the higher approach category. While this is usually not a problem with straight-in approaches, it does become a factor in a circling approach where speeds during the maneuvering phase are higher than 1.3 Vso. For light twins and heavy singles, which have a Vso that can bump the 69-kt limit, this is a consideration. It is therefore possible that an airplane can use Category A minimums for straight-in approaches, but must use Category B minimums for circling approaches.

To ensure obstacle clearance, you must remain at the published minimums until you can begin your descent to the runway.

## Going Missed

The circling approach is designed on the premise that you must maintain visual contact with the airport environment. Should you lose sight, you must execute the missed approach.

How this is accomplished will depend on many factors. The book answer is that you must begin a climbing turn towards the runway and continue the turn until you're established on a published portion of the missed approach.

Let's consider these two scenarios, based on an approach to runway 9 with a circle to land on runway 27. In the first scenario, the missed approach instructions are to make a left turn towards the approach's Locator Outer Marker (LOM) and hold. As you are flying a right downwind ready to turn base, you lose sight of the runway. In this case, you'd simply turn towards

the direction of the runway while climbing to the missed approach altitude and proceed to the LOM.

In scenario number two, the missed approach is to fly to a VOR directly east of the airport and hold. You lose sight of the airport as you turn base. This is a little more complicated. Do you turn right, away from the runway, directly to the VOR? Or do you initially make a climbing left turn towards the airport, then turn 180 degrees towards the VOR? That will depend on the terrain around the airport and how familiar you are with it. The safest bet is the latter option, but the first choice might be equally prudent.

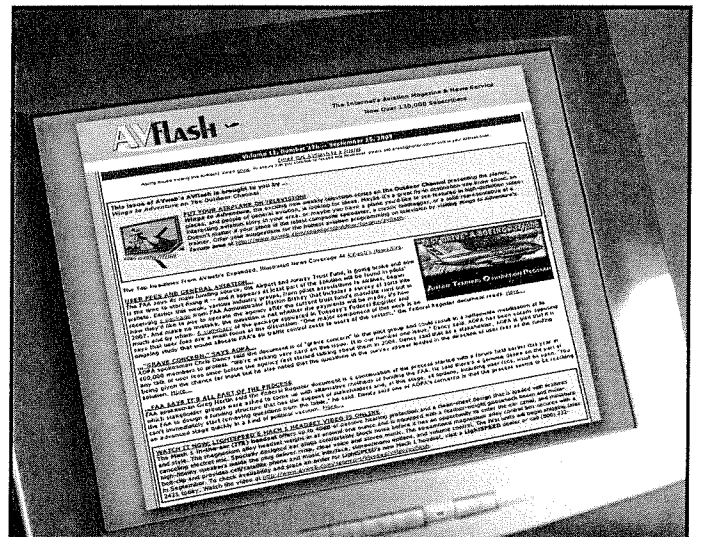
It's these situations that make the circling approach so challenging. Occupying a space between visual and instrument flight, circling approaches offer few clear answers. And that's why they deserve our respect.

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