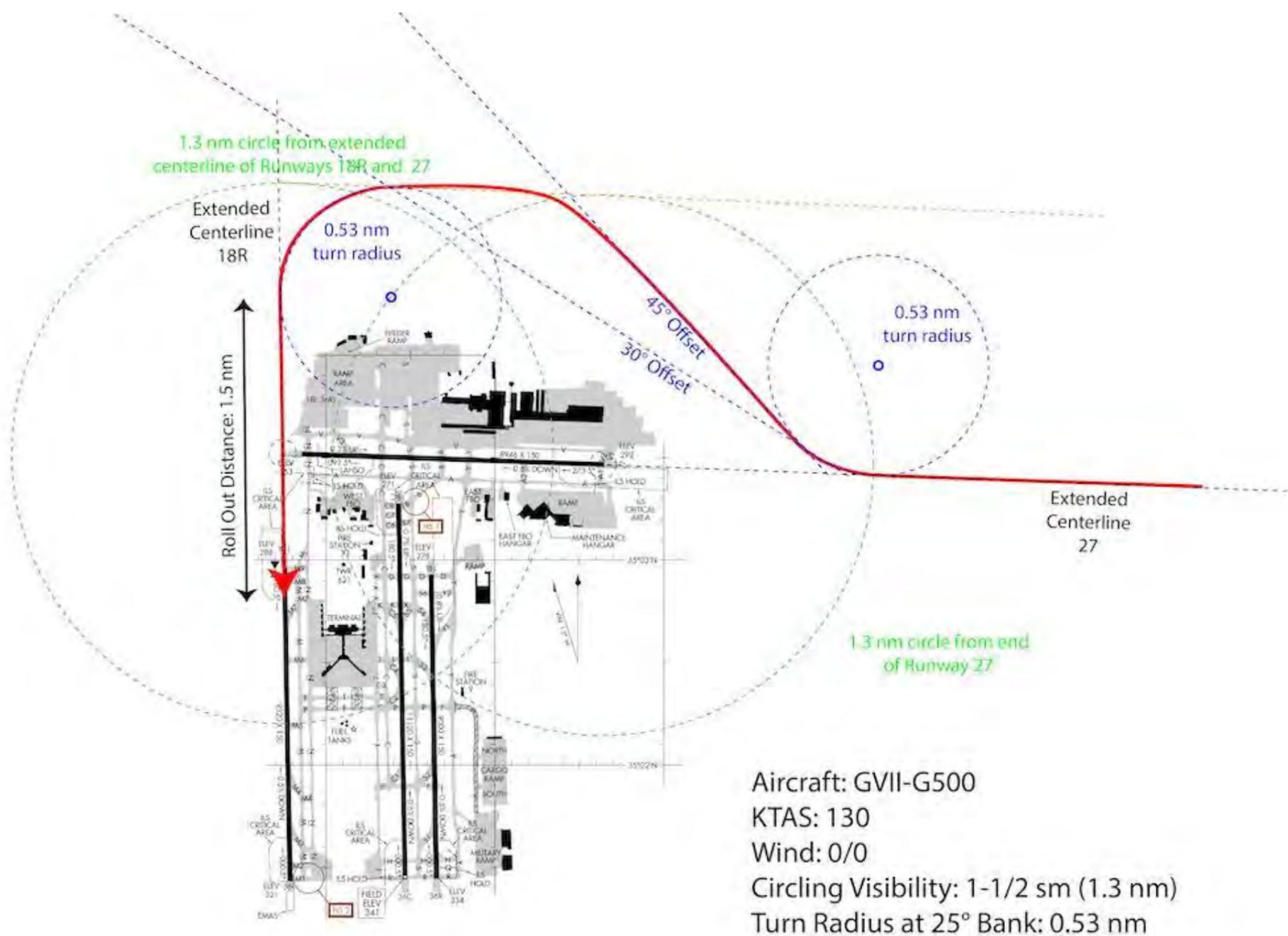


Circling Approaches: Good Riddance! Part 1

James Albright August 03, 2022



Example circling maneuver at Memphis IAP, Tennessee. Author graphic.

I used to think of the circle-to-land maneuver following an instrument approach as a necessary evil. We had a lot of airports to go to, in good weather and bad, but not enough straight-in instrument approaches. The cost of installing an instrument approach left us with few options, so we learned to deal with it.

Dealing with it in the U.S. Air Force meant training and checking in actual aircraft while flying as high as possible (up to traffic pattern altitude) and as wide as possible (up to normal traffic pattern width). I no longer think of circling as a necessary evil. Now I think of it as an unnecessary evil made worse by the way we train and check. Worse to the point of being unsafe. I can hear about half of you cheering me on and

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Before I go any further, let me define “unsafe” for those of you in the business of training and checking in simulators. The FAA, other regulatory authorities and I all agree a safe approach requires the aircraft to be stable no less than 500 ft. above the landing surface. An approach isn’t stable unless the aircraft is wings level, fully configured to land, on speed, on the runway’s extended centerline, and on the specified glide path (usually 3 deg.). Furthermore, you cannot have exceeded 30 deg. of bank on the way to getting there. If you haven’t got all that accomplished by the time you descend below 500 ft. above the landing surface, you are unstable. And unsafe.

Circling Before Simulators Became Clever

Early simulators did a poor job of presenting the airport environment with enough cues to make circling approaches possible, so examiners granted pilots wide latitude. It was almost understood that the turn to the landing runway would be a near-aerobatic maneuver, but so long as we ended up on the runway all was forgiven. As simulators got better, the forgiveness became rarer. Lost on those administering the check was the fact that it is impossible to fly a stable approach off a circling approach at most published visibility minimums. I’ll illustrate that with several examples, but first let me explain how it is that many pilots somehow make it all work out. There are various techniques, but the earliest was with a stopwatch and what many aviators call “the gouge.”

A classic definition of “gouge” is to extort, and I suppose that is apropos here. We pilots would take copious notes after each failed and successful simulator circle and the word spread throughout: when to turn, what offset angle to use, how many seconds to time, and so on. “Do you see the runway?” “Absolutely!” As simulators got better, so did cockpit avionics. So, the gouge has been replaced with wonderful situational awareness (SA) tools, such as airport moving maps and geographically referenced approach charts with accurately placed aircraft symbols.

So, we are learning to improve our SA, which is a good thing. But we are learning the wrong lessons about how to circle. Moreover, we are fostering a false sense of confidence that we will be able to circle in the real world as safely as we do in the simulator. There is no better example than the classic simulator circle exercise: the Memphis International Airport (KMEM), RNAV (GPS) Runway 27, circle to Runway 18R.

The Classic (and Dumb) Simulator Circling Check

In theory, circling north of Memphis is easy because there is a huge ramp that offers visual cues, the approach runway is displaced a half mile from the landing runway, giving you more distance to displace yourself, and there are two other runways leading up to the runway you want to land on. But even with all these advantages, pilots struggle with it until they memorize the gouge or learn creative ways to extend their vision. (More on that later.)

I last accomplished this in a Gulfstream GVII-G500 simulator, a Category C aircraft. A typical approach speed for us at normal weights, no wind, would be 130 KCAS. Our turn radius would be 0.53 nm. The Category C visibility minimum for that approach is 1.5 sm. A statute mile is 15% less than a nautical mile, and that difference is critical. My technique is to turn 45 deg. north once I spot Runway 27 and then turn to base once I have the correct offset. I am fortunate that my aircraft’s avionics help me out with this. In older aircraft, the check airman would light up the ramp to give me the cues I needed.

I was rarely able to do this and roll wings level on final before 500 ft. But the various check airmen almost always ignored stable approach rules, I suppose because they had no choice. I diagrammed the approach and discovered that if flown perfectly, you would roll out 1.5 nm from the touchdown zone. Good job? Almost. A 3-deg. glidepath takes 318 ft./nm, so you would roll out at $(1.5)(318) = 477$ ft., just shy of a stable approach. But that required perfection on your part. How many flight maneuvers require perfection?

Several years ago, in a real aircraft, I was flying into Memphis on a moonless night, just after midnight. The normally busy FedEx arrival traffic was already on the ground, and we had the night sky to ourselves. We were cleared for the ILS Runway 27 and the tower reported the winds at 090/5 kt., which wasn’t optimal. By the time we got to the glideslope, the winds had picked up to 090/15. We told tower, “We can’t land with more than 10 kt. on the tail.” Tower said, “You have the airport to yourselves, circle to the runway of your choice.”

I looked at the right-seat pilot and said, “We’ve never been better prepared to circle, anywhere.” But it wasn’t like the simulator at all; we didn’t see any of the ground references or the approach lights to the other runways. We had to beg the tower to light everything up before we were able to circle.

Of course, this example, and those to follow, are in a jet flying at 130 KCAS. You may have better luck in a slower aircraft, especially in a lower circling category. But I’ve found these results to be typical of Category C, D and E aircraft.

Just as I was learning to distrust the Memphis circling procedure in the simulator, our training vendor discovered a way to make it even worse: John F. Kennedy International Airport (KJFK), New York ILS or LOC Runway 4L, circle to Runway 31R.

Learning to Distrust the Simulator

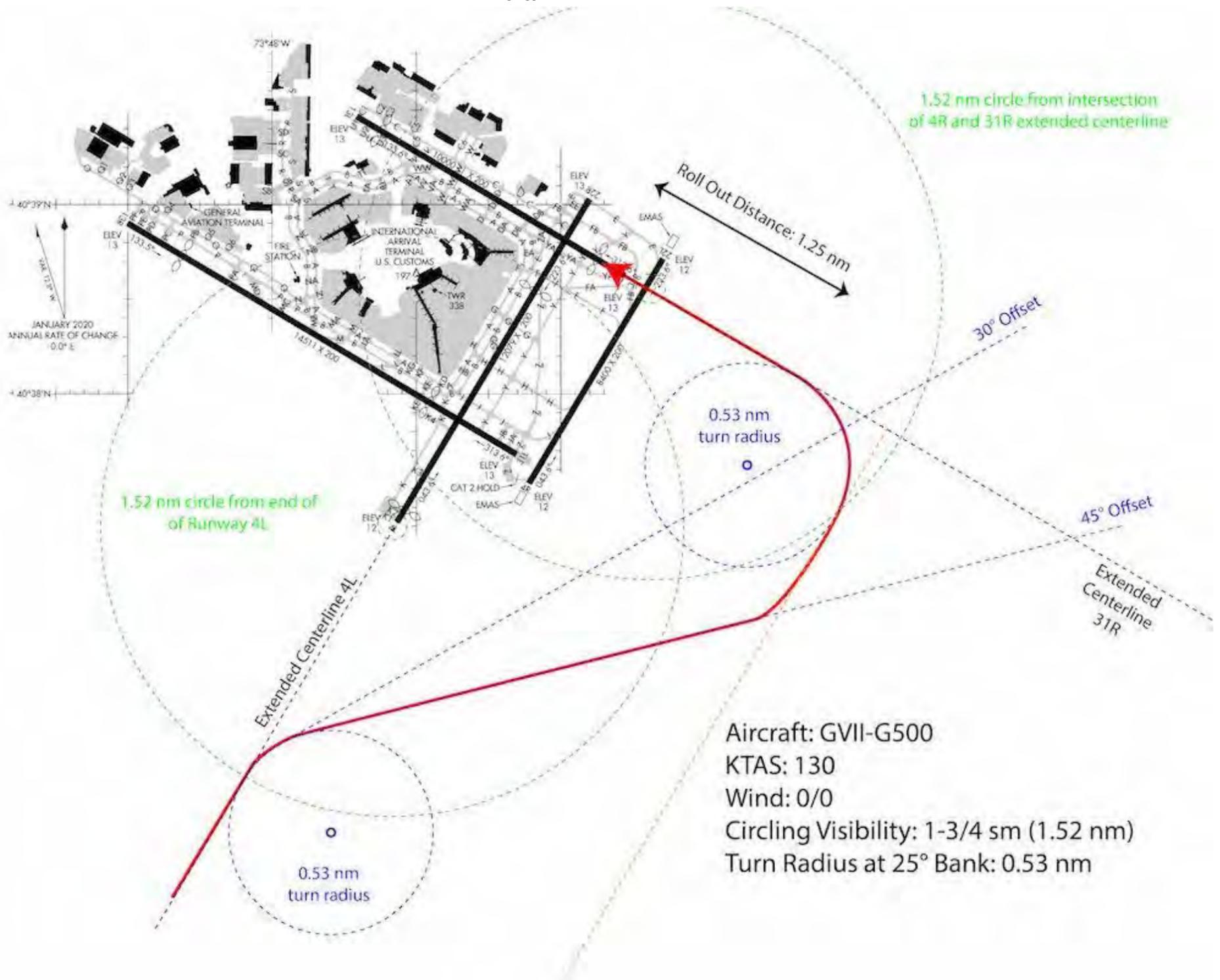


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Example circling maneuver at John F. Kennedy IAP, New York. Author graphic.

The simulator circling at KJFK is just like KMEM, but with smaller margins. While you are given 0.25 sm more visibility, you have less offset to the landing runway and fewer visual cues. You end up rolling out 1.25 nm from the end of the runway and that means you will be at $(1.25)(318) = 398$ ft. Once again, the exercise leaves you unstable at 500 ft.

Most simulator instructors and examiners will grant you a lot of leeway on what constitutes a stable approach during this maneuver. I am usually left to self-critique. “Another unstable approach into Kennedy,” I typically say after landing. “Why don’t you fly a stable approach, then?” I am asked. I admit that my answer is meant to provoke: “I can fly that maneuver at minimums, or I can fly it stable. But I can’t do both.”

Of course, that sparks a heated debate because it is me accusing the examiner of doing something wrong. (I am doing exactly that.) These debates usually end with the examiner saying his or her hands are tied, because the FAA mandates this kind of training and checking of all FAR Part 142 training centers.

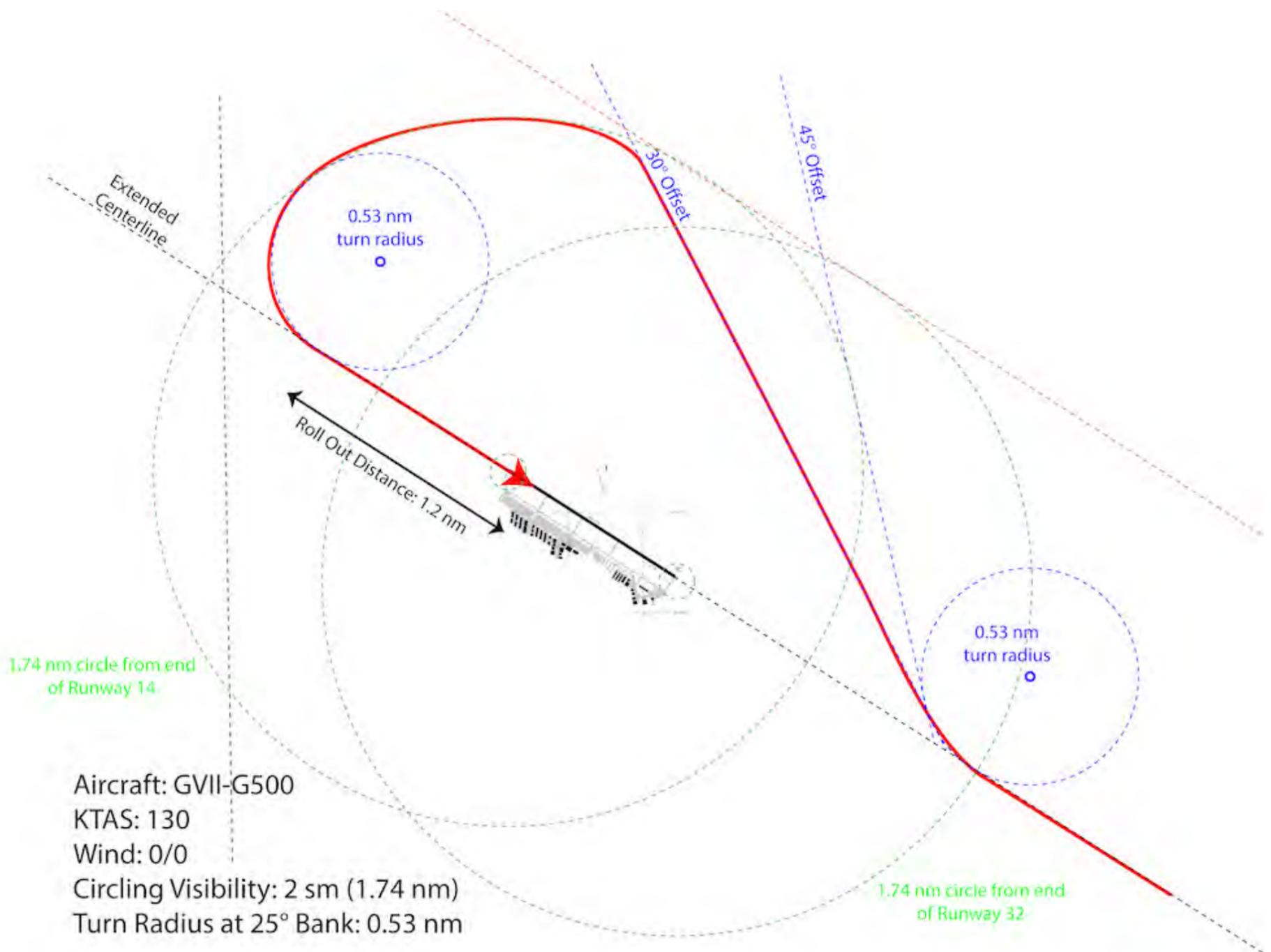
The ‘Part 142’ Excuse

My company long ago recognized the circling problem and raised our minimums to 1,000-ft. ceiling and 3 mi. visibility. But at the simulator we are told we must demonstrate circling at the published visibility minimums. When I ask why, I am told it is a “142 requirement.” But the only mention of circling in Part 142 is that if the training center examiner (TCE) will instruct and check students at minimums, he or she must be evaluated at those minimums. There is nothing about we operators. For that you have to look at the airline transport pilot (ATP) and type rating for airplane airman certification standards (ACS). In the ACS we see only that pilots must “execute a circling approach at night or marginal visibility.” The ACS does not define “marginal visibility.” We are also told that an unacceptable risk is “attempting to land from an unstable approach.”

The next line of defense from these TCEs is that if we learn to circle at published minimums at large international airports, it will be easier in the real world. I think they have that backward.

Circling Approaches: Good Riddance! Part 2

James Albright August 04, 2022



Example circling maneuver at Boire Field, New Hampshire. Author graphic

In Part 1, we discussed the classic simulator circling check and the “Part 142” excuse.

You might think the odds are stacked against us at a major international airport with multiple runways, but they are actually improved. These airports have full approach lighting systems that make keeping sight of the airport easier. Ironically, you will almost never have to circle at one of these airports, since they tend to have precision approaches to each runway. Where things become really hazardous is where you have just one, short runway.

I used to be based at Boire Field (KASH), New Hampshire, where the choices for the single runway were the ILS Runway 14 or the VOR Runway 32. If the ILS was down, our best option was said to be the VOR Runway 32, circle to Runway 14 with 2-sm minimum visibility.

After flying simulated circling approaches with less visibility, I thought this would be easy. It was not: It left us rolling out just 1.2 nm from the touchdown zone. That comes to $(1.2)(318) = 382$ ft. The runway has since been lengthened, but back then it was 5,500 ft. long. We learned that given the choice of circling at minimums and landing someplace else, the someplace else was always a better option.

Creatively Extending Your Vision



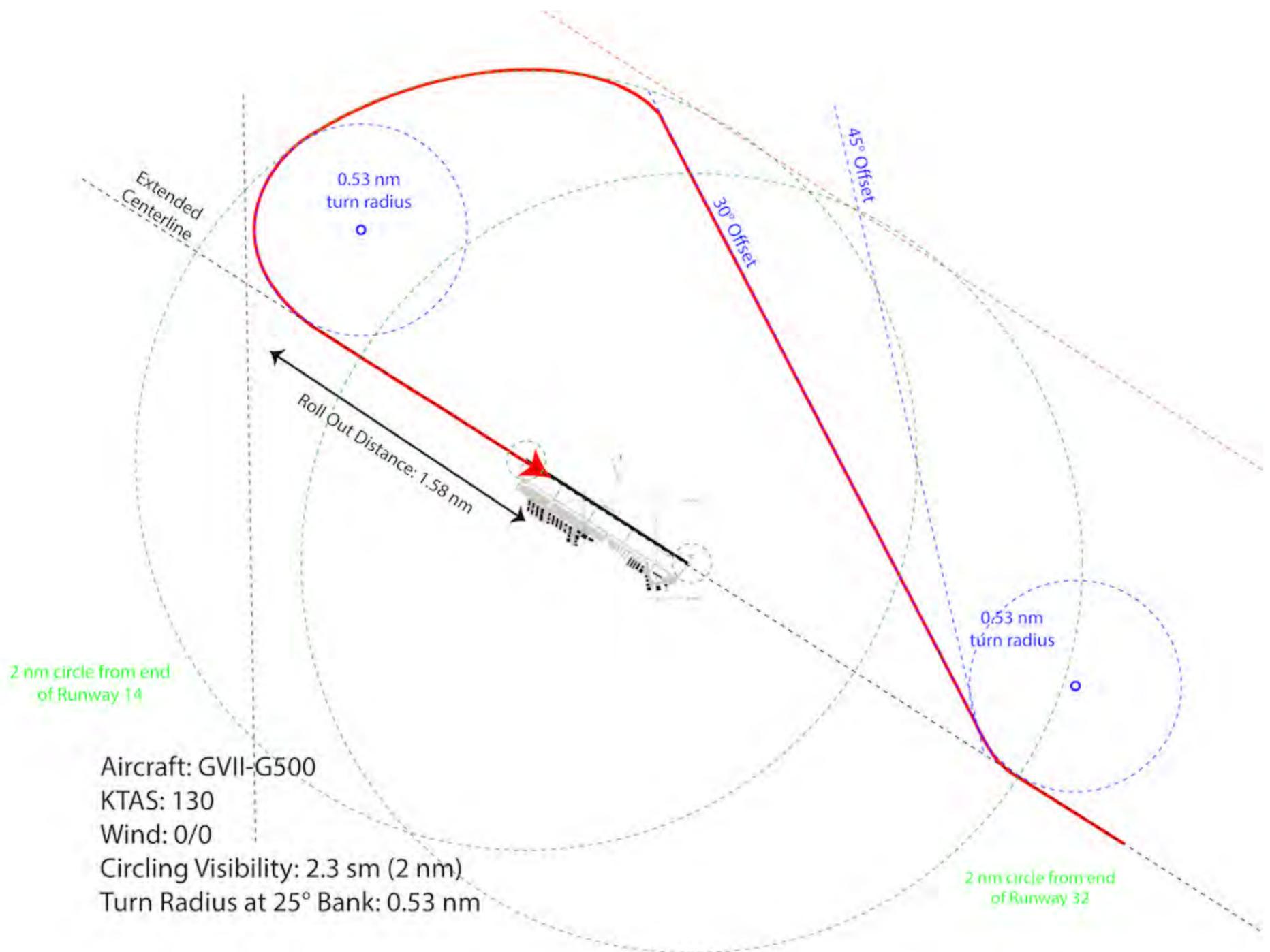
Cheating with modern technology. Credit: James Albright

Is this problem going to get better anytime soon? I doubt it. As disingenuous as the system is, we pilots are even more ingenious at finding ways to “creatively” extend our vision and our success in flying the unflyable.

Many aircraft, like mine, offer very good map displays of the runway environment with the aircraft’s position drawn in real time. We can size the display to draw a 2-nm circle around the aircraft as well as 2-nm “feathers” that depict localizer beams off any runways with an ILS approach. We are encouraged to do this as a way of improving our situational awareness.

I’ve seen more than a few pilots struggle with the KMEM Runway 27 circle to Runway 18R and then be given helpful hints on how to use this technology to improve their odds. We are told to place that circle over the ILS feather to Runway 27. Yes, that keeps you within 2 nm of the airport environment. But 2 nm converts to 2.3 sm and our visibility minimum is 1.5 sm. Somebody is cheating: Either the pilot doesn’t really see the airport, or the examiner has fudged with the visibility. No matter who is fudging, we pilots are taught we can safely circle at our visibility minimums. I contend that we cannot.

Solving the Circling Conundrum

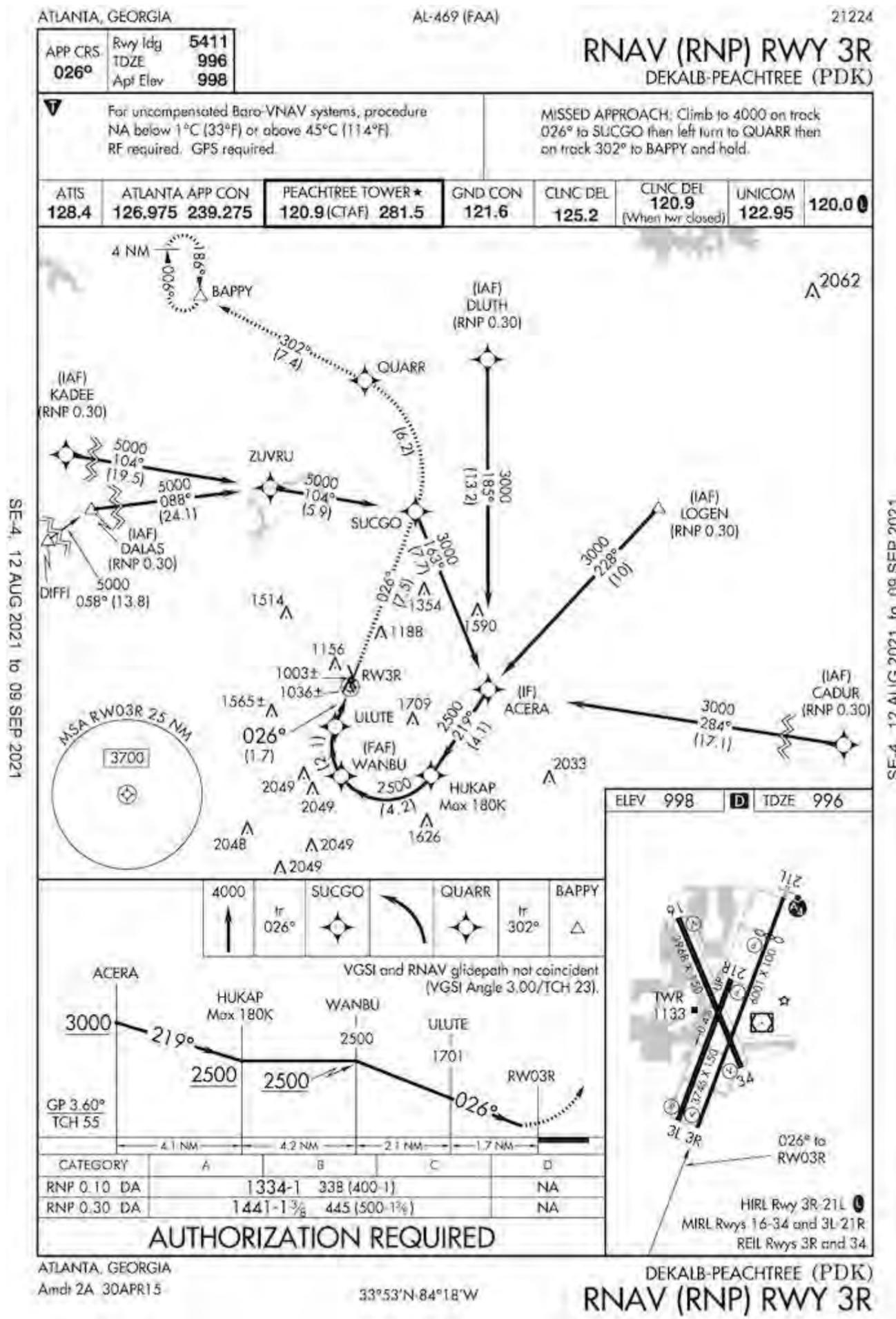


Example circling maneuver with 2-nm (not sm) visibility. Author graphic

I often wonder about the fact that we use statute miles for visibility and nautical miles for everything else. Let's say in our small airport example we insisted on our visibility minimums using the same numerical value, but in nautical miles. Would that extra 15% solve things? Yes, it appears it would. Being able to begin our offset earlier and fly a wider base turn allows us to roll out 1.58 nm from touchdown. That means we will be at $(1.58)(318) = 502$ ft. Again, that requires perfection from imperfect pilots. So this is hardly the solution to what ails us. But there are two better solutions available.

Solution One: Raise the visibility minimums. We are told repeatedly that "Circling is a VFR maneuver." In my flight department, we require at least a 1,000-ft. ceiling and 3 sm visibility for circling. If we don't have that, we look for another place to land.

RNAV Approach At Dekalb-Peachtree



The RNAV (RNP) Runway 3R at Dekalb-Peachtree Airport (KPDK).

Solution Two: Technology. We often fly to Dekalb-Peachtree Airport (KPDK), Georgia, where there are several instrument approaches available for landing on Runway 21L. As of the day I am writing this, we do not have our Letter of Authorization (LOA) to use the only approach available for the opposite runway, the RNAV (RNP) Runway 3R. (We applied more than six months ago.) We are fully trained, and our aircraft is fully capable. The RNAV (RNP) has turned circling, a very unsafe maneuver, into one of the easiest in the book. And easy means safe.

If the dangers of circling are as I've outlined them here, why do they persist? I believe they continue at many airports because they are an easy way of offloading the responsibilities of air traffic control onto the pilot. ATC will continue to use circling approaches if we pilots continue to accept them. We pilots will continue to accept them because our training tells us it is safe to do so. The approach visibility minimums have the FAA's stamp of approval, after all. But keep in mind you can say the same thing about the once-ubiquitous non-directional beacon (NDB) approach.

Most of the airports I use have long ago decommissioned their NDB approaches, and to that I long ago said, "Good riddance!" I think few will argue with the idea that an NDB approach can be deadly. Now that we've slayed that dragon, it is time to aim for the next. I am hoping for the day circling approaches will be as rare as those awful NDB approaches. And on that day, I will once again say, "Good riddance!"

Circling Approaches: Good Riddance! Part 1 <https://aviationweek.com/business-aviation/safety-ops-regulation/circli...>