

# Envelope Extension Maneuvers

by Thomas Daniel



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## Pattern, what pattern?

You are flying along, or perhaps it would be more accurate to say that the autopilot is flying the airplane. Normally, you always file IFR and fly an instrument approach, as it's so much easier and safer.

Your home airfield has a 6,000-foot runway and your personal minima prohibits landings at runways shorter than 4,000 feet, so more often than not you fly an approach procedure with vertical guidance. You file and fly IFR, even in severe clear, and the approach brings you to 200 feet above the threshold. That's where things get dicey, because you have to disconnect the autopilot, flare and touchdown. You know that Cirrus introduced auto-land capabilities in the Vision Jet, although for now that is only for the jet and in emergencies. But there is hope.

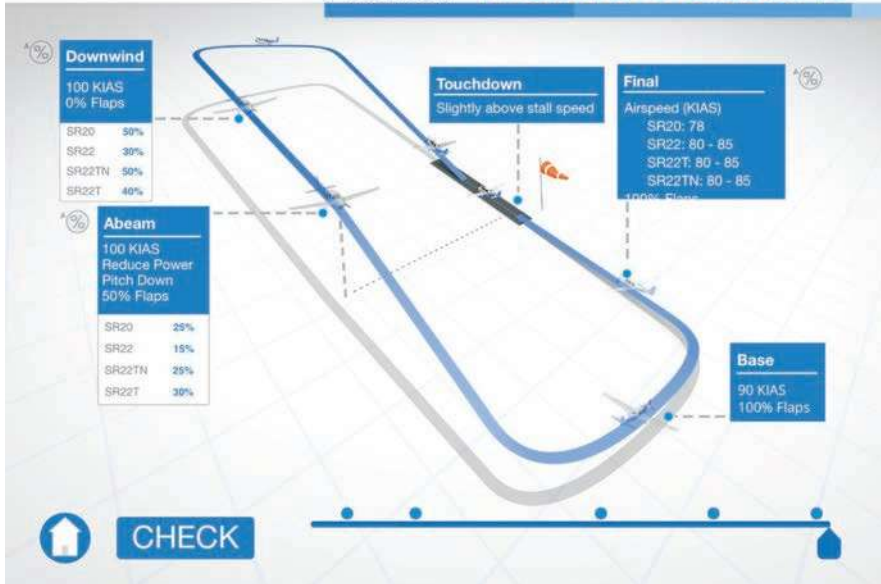
That description is of course an intentional exaggeration, prompted by yet another traffic pattern accident. The pilot became distracted, slowed down, overshoot the final, tightened the turn with the rudder, pulled up for good measure and stalled. There are innumerable variants of the same sad story and each generates vivid and long discussions on internet

forums – how to avoid such things in the future, why a competent pilot killed himself and possibly passengers, how to change the procedures to avoid that happening again and what additional automation we should have in the airplane that could save the day. There are those who know better and want to educate others, those who are scared that something like that could happen to them, those who say more training is required and those who say we've been saying that since Wilbur Wright and it didn't change anything. We must try something else.

## Procedures

This article was prompted by yet another accident and I will further discuss some of these ideas. Starting with procedures ... to its immense credit Cirrus Aircraft published a recommended set of procedures on flying the traffic pattern. If you do not have a copy of the iFOM (Flight Operation Manual), buy it immediately on iBooks. There are two versions, one for Avidyne-equipped airplanes and one for Perspective avionics, although for the purpose of traffic pattern, it does not matter. Still, you want to buy the right one. This is what they have to say about traffic pattern.

## Profile / Traffic Pattern



Let's assume you are flying an SR20, it is pretty simple:

1. On downwind: 50% power, 0% flaps, 100 knots
2. Abeam the numbers: 25% power, 50% flaps, 100 knots
3. On base: 25% power, 100% flaps, 90 knots
4. On final: 78 knots, 100% flaps

This is not a result of somebody's imagination, who on a spur of moment decided that this should be just fine. This is a result

of collective discussions and wisdom of the best instructors in the industry. People who designed these airplanes and flew them before anybody else. This is wholeheartedly embraced by the corps of CSIPs (Cirrus Standardized Instructor Pilot), all of

whom have done thousands and thousands of patterns, often more in a month than an average pilot does in a lifetime.

But of course people still kill themselves, so shouldn't we talk about changing it and inventing better procedures? If 90

knots is not good enough, shouldn't we fly the base at 100 knots? Maybe 110 knots? If rectangular pattern doesn't work, shouldn't we fly an oval pattern?

But ask yourself this question: Do people kill themselves because they fly these procedures or because they do something else? What makes you think that they will now fly your procedure precisely as you prescribed it? A procedure that you proposed based on your infinitely smaller experience in a Cirrus.

## Technology

If the better procedures are not the answer, perhaps its better technology. I'll skip more outlandish ideas such as automatic CAPS deployment and talk about AOA indicators. Not because I am against AOA indicators, they are fine complements to all other instruments, but because so many people claim this is the ultimate solution. You are now flying on base or final, and too slow, the AOA indicator chimes in or you notice the wrong doughnut, so you push the nose down and nicely recover ... another fatal accident avoided. Except that it doesn't work like that. We already have a binary AOA alert, the stall warning, and that didn't prevent people from stalling. If the pilot doesn't hear the stall warning, what makes you think that he will hear or see the warning from the AOA indicator?

The reality is that in actual fatal accidents, the stall happens fast, the wing drops, the airplane gets inverted and the pilot didn't even register that the stall warning went off, not from the audio alert and not from visual indications. These are not the stalls that you practiced for the private pilot license. "OK, let's slow down, pitch down in landing configuration, now bring the nose above the horizon, wait, wait, wait, feel the buffet? Let's recover, we don't want to spin the airplane, do we?" It just doesn't happen like that.

If better procedures and new gizmos are not the answer, what is? More training,

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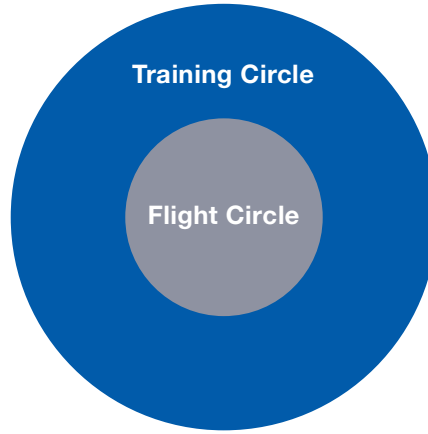
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I hear some say. The typical response is “We’ve been saying that since Wilbur and it doesn’t fix the problem.”

### Not more, but better training

It’s not more training, it is better training ... different training. It is not practicing more stalls, it is how they are practiced. It is not more landings, it is different landings. It is pushing you out of your comfort zone, so that in real life, if you accidentally get close to the edges of that comfort zone, you will know what to do, because you already experienced more than that.

I’ve heard people say, “I will not train to do forward slips – and most certainly not slipping turns – because it is too dangerous. It is easy to enter a spin from a cross-controlled stall, and besides, I would never perform a forward slip in my flying, I would just go around if I found myself too high.”



Here’s a thought: You are flying and training in a small area of the airplane envelope. If you inadvertently ever approach the boundary of that circle or cross it, you’ll find yourself in uncharted territory. If you are there for the first time, it is unlikely that you will be able to figure out what to do. If you are training in a much larger training circle, exploring the edges of the envelope with a qualified instructor onboard, then even if you happen to cross your boundary,

you will know what to do, because you’ve already been there. It actually gets even better. Not only will you know what to do if you are outside, but you will notice that you are at the edge of your flying circle and take a corrective action preventing the airplane from ever getting outside.

### Training maneuvers

Let’s elaborate on that idea and give you a few examples of what you and your instructor could be doing for practice. I’d like to underscore the point that you have to do it with an instructor, not only for safety reasons, but because you want constructive feedback when you make mistakes.

There is no specific order of importance here.

### Stable pattern

Many people think that the adjective stable applies only to the final leg. It applies to

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(continued from page 40) the whole pattern. Give yourself this challenge, assuming there is no other traffic. From downwind, you are allowed to make only three power

***“When on downwind, you should keep glancing toward the runway to know when to start descending and when to start turning base.”***

changes. The first one abeam the numbers, to start descending, the second one on final, to adjust the glidepath and the third one to cut the power off in the flare. You should maintain the prescribed airspeeds (100/90/78) all the time. Bonus points if you can do it with only two power changes.

***Look outside and look in front of you***

When on downwind, you should keep glancing toward the runway to know when to start descending and when to

start turning base. Glancing, not staring. I see so many pilots staring at the runway, which is 45 degrees behind, while initiating the downwind to base turn and base to final turn. In the meantime, the airplane pitches up, the pilot doesn't see it, because, you guessed it, he is looking at the runway instead of the nose of the airplane and is slowing down. Give yourself this challenge. Notice where the wing points before starting the turn to base and execute a 90-degree turn looking only in front of you. Wait for that point to come in front of you and level the wings. You'll be surprised to find yourself perpendicular to the runway. Do exactly the same before turning final – don't crane your neck to spot the runway, wait for runway to show in front of you.

The second half of the challenge is even more important: Aircraft pitch must not change from the time you started descending until you rolled out on final.

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