



Pattern Precision

The FAA, General Aviation Joint Steering Committee (GAJSC), and industry agree that regular, structured, proficiency training is perhaps the most effective means of reducing GA accidents. Because the traffic pattern involves nearly all piloting tasks, it is a logical choice for a proficiency training environment. Commitment to precision and consistency in pattern operations will yield operational safety benefits throughout the flight task spectrum.

Predictable Patterns

How many times have you been on approach where you get behind the aircraft a little or are not set up properly, and wind up landing a little long? Does it matter? Yes, it does. Airport traffic pattern operations are an essential part of every flight. But sometimes we take those routine movements for granted, and we can get a little sloppy.

In addition to helping you execute a safe and stable approach, precise pattern flying makes you sharper in other flight procedures. It can also improve your confidence and reassure your passengers. Let's go back to our example. You may think it doesn't matter if you land long, but what if your runway is compromised and your landing distance is much shorter? What if your aircraft has a problem and you need to carry out a forced landing?

Preparing for Pattern Precision

It all starts with knowing your aircraft, its performance parameters, and the required research

to determine what sort of takeoff and landing performance you will get.

By documenting these numbers and then comparing them with your actual performance, you will be able to create predictable expectations. Don't forget to calculate performance based off of your predicted flying weight.

Here's some rules of thumb to consider when computing your takeoff calculations:

- If you have a fixed pitch prop, add 15% to your calculated takeoff distance for each 1,000 foot increase in density altitude, up to 8,000 feet.
- For constant speed props, add 12% per 1,000 feet of density altitude, up to 6,000 feet.
- *(50/70 Rule)* When planning takeoff from short unobstructed runways, establish a landmark at 50% of your calculated takeoff distance. When reaching that landmark, you should be at 70% of your rotation speed. If not, abort the takeoff and reduce weight or wait for more favorable wind and temperature conditions.
- *(30/70 Rule)* If you must clear obstructions on takeoff, you'll need to have 70% of your rotation speed by the time you've traveled 30% of your available takeoff distance.

It's All Part of the Pattern

Now that we've covered some takeoff tips, let's shift to some pattern practices.

Pattern Entry:

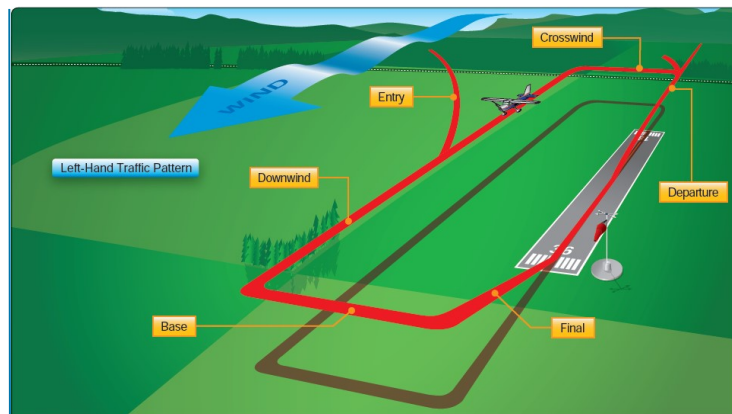
- If you enter on the downwind side, join the downwind leg at a 45-degree angle at pattern altitude (PA).
- If you enter on the upwind side, you generally have two options, both of which require you to yield to established traffic:
 - ⇒ Cross midfield at 500 feet above PA, fly clear of the pattern and descend to PA, then turn to join midfield downwind at a 45-degree angle.
 - ⇒ You can also cross midfield at PA and then turn to join to the downwind leg.

Straight In Approach:

- Be conspicuous – use landing lights and strobes.
- Announce your positions and intentions on the Common Traffic Advisory Frequency (CTAF).
- Be aware of possible no-radio aircraft.
- Don't assert right-of-way if it will result in a collision hazard.
- If there's an unresolved conflict, break off the approach and go around to the non-pattern side of the runway.

Establish Key Positions:

- During descent, maintain pattern altitude on downwind until abeam the approach end of the landing runway. From this key position you'll be in a constant descent to the runway.
- Adjust power to maintain target approach airspeed, flaps to control approach angle, and flight path to compensate for wind.
- Once established on final approach, it's essential that you maintain speed and glide path. You should maintain a glide path that will result in touching down in the first third of any runway. It's helpful to pick a runway stripe and try to land on it every time without adding power. VASI and PAPI approach path indicator lights can help keep you at the right glide path, but practice with and



without them since not all runways have them.

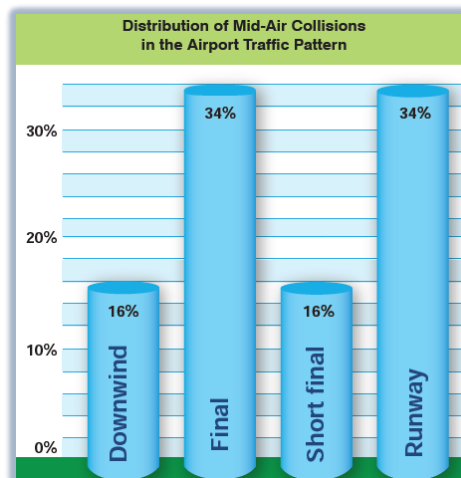
- Once you master hitting your landing target, practicing power-off landings can be excellent preparation for off-airport forced landings.
- Also aim to expand your horizons with more difficult landing strips. Just be sure to ask your flight instructor before operating at any unfamiliar or challenging destinations!

Collision Avoidance

Did you know the majority of mid-air collisions occur at or near non-towered airports in daylight with good visibility? Collisions usually occur below 1,000 feet AGL and with aircraft traveling the

same direction. Although many GA aircraft are now equipped with ADS-B systems that provide additional situational awareness for surrounding traffic, pilots must still look and listen for traffic. Pilots should always strive to be:

- ♦ *Predictable* – fly published patterns and use standard entry/exit procedures
- ♦ *Aware* – look and listen for traffic in the pattern
- ♦ *Proactive* – announce your position and intentions in the pattern



Resources

FAA Airplane Flying Handbook, Chapter 7

<https://bit.ly/2DJ3MLG>