Training Secrets of the Elite 1%

Learn How the Good Guys Make it Look Easy

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Status Quo

Ideally, before practicing any new skill one would acquire the proper understanding of the technique involved, but that's not how most people learn to fly R/C. Many of us received informal instruction from a recreational instructor with little or no pre-flight preparation. (We were happy just to have some help at all.) It's therefore always been assumed that learning at every skill level hinges on a lot of stick-time and pretty good reflexes and eyesight. Since most people are inclined to instruct others the way that they learned, generations of flyers have been brought up reacting to the airplane using the trial and error approach and presuming that crashing is part of the learning process, a.k.a., "paying your dues".

More recently, simulators have helped significantly, but while simulators can help people learn with fewer crashes, student pilots need proper guidance to learn to fly correctly. Otherwise, incorrect practice can lead to learning bad habits that can be difficult to change and impair future success. As many pilots discover when their skills plateau after only a few short years, just because a person can fly, it does not mean that he's flying correctly.

Unless you and your instructor followed a complete pro-active training syllabus when you learned to fly, you're approach to flying is most likely based on "reacting" to the airplane, as it is for 99% of the flyers in the sport. Consequently, most pilots think that, along with stick-time, getting better at making corrections is the main requirement for better flying, so little thought is given to how they fly, or whether they are flying correctly.

As a result, most flyers make 3 to 4 times more control inputs than what the maneuvers require when flown optimally. The problem with that is learning slows dramatically when pilots reach their saturation point from having to make thousands of split-second decisions reacting to whatever the plane happens to be doing. A higher quantity of inputs also increases the likelihood of errors and a different result each time a maneuver is performed. (Expo promises to tame the consequences of making a lot of inputs, but it does not address the cause.) Consequently, like golfers who buy a new set of clubs every year but their scores remain about the same, most pilots end up looking to equipment to improve their flying. Indeed, constant equipment upgrades and radio programming has become the hobby for a lot of people, and in some cases it no longer even occurs to them to think about improving their flying skills. Good equipment and the right setup definitely helps, but nothing has a greater impact on your flying more than your flying technique. Nothing! So, for those who are not content to remain at the same skill level, an entirely new approach is needed.

This article is intended to bring to the forefront the flying approach used by the elite 1% of pilots who "think ahead of the airplane" and therefore control what a plane does rather than reacting to it. If you're worried that your habits are too deeply ingrained to incorporate any new methods, let's be clear that reacting to the airplane is much harder than the approach used by the elite 1%. So most will find it easy to adopt new methods when they prove to get the job done with a lot less effort.

Necessity is the Mother of All

When 1st U.S. R/C Flight School began offering 4-day aerobatic and 5-day solo courses to people of all ages, backgrounds and abilities, the fact that we had less than a week to accomplish all the course goals meant that we had to develop a kind of training far more efficient than the time consuming reactive approach.

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The system of (accelerated) flight training that the school uses today was born out of the familiar adage that if you want to be highly successful at something, study and pattern yourself after those who are already highly successful in that arena. To determine what makes highly successful pilots tick, we chose as the subjects of our study the elite class of flyers "who make everything they do look easy". We're not talking about "hot dogs" that can fly with the tail inches above the ground most of the time without crashing. We're talking about the guys that nail every landing, don't miss a beat when the winds pick up, can fly any type of airplane for the first time like they've been flying it for years, and the best indicator of good technique, they continue to get better year after year.

Positive Reinforcement

Our study revealed distinct reasons why certain people fly far better than their counterparts with similar abilities and stick-time: The best flyers in our sport were able to compartmentalize their flights early on, remembering only the things they did that produced favorable results, and forgetting everything that was unfavorable. In time, they developed proficiency/efficiency. That is, by repeating the favorable actions often enough, significant segments of their flying started becoming routine or automatic. At that point they were able

to detect ways to improve their flying further and added more maneuvers, with each new success motivating them to do even better. Flying is, after all, more fun when doing well and making progress.

In contrast to the best flyers, most pilots do not make or utilize the connection between their actions and the responses of the plane. Instead, most of their actions are responses to what the plane is doing. Their skills tend to plateau while continuing to struggle in certain areas because they remain too busy responding to deviations to learn how they might be prevented in the first place. For many, the hope that practice will make perfect lasts for awhile, but eventually the lack of advancement erodes their desire to improve, and other aspects of the sport become their main interest, such as tinkering with their plane, engine, and radio setups. (Of course, none are aware that this has happened to them.)

Altogether, our study can be summed up in two statements: Proficient pilots don't merely get better making corrections, proficient pilots have learned control techniques that reduce or eliminate the need for a lot of corrections -- thereby freeing them up to think ahead of the airplane. It's also not how many hours one flies that determines whether the maneuvers start becoming automatic, but how that time is spent, a.k.a., practice doesn't make perfect, perfect practice makes perfect.

"Automatic" and "thinking ahead of the airplane" are not rooted in hand-eye-coordination or reflexes. Thus, anyone can become proficient at flying R/C with the right approach and focus on developing routine flight control inputs.

Step I: Get Out of Your Way

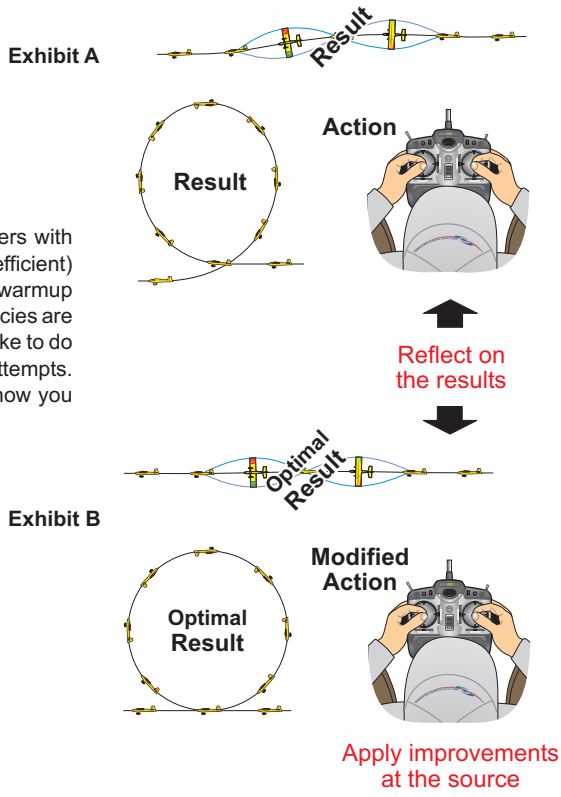
So how does all this apply to your own flying moving forward? First of all, you need to acquire a good understanding of the basic use of the controls before you attempt a new task. Think about it, if you don't have a pretty good idea what to do before you take off, what are the odds that you'll figure it out anytime soon speeding around the sky at 50+ mph? A little planning goes a long way to ensuring a higher level of success right away, and there are several resources available in the sport to help you with that.

Next, in order to join the elite ranks of those who fly and learn with the greatest ease, you'll need to compartmentalize what you're learning into a crawl-walk-run approach. That means you need to minimize the corrections you make. Yes! The fewer corrections you make, the faster you will learn because the plane's tendencies during a maneuver will be much more obvious and therefore stand out in your mind the next time you attempt the maneuver (figure 1).

The decisive quality here is; while reactors are often too busy correcting deviations to think about what's causing them, a proficient pilot keeps things simple at first to make it easier to pinpoint what he needs to do to make significant strides by his 3rd or 4th attempt. (Even if he commits an error, as long as he's consistent, it'll be easy to detect and make the appropriate adjustment.) In other words, it's not about a perfect start, it's how well you finish that counts.

Consistency is therefore the key to advancement. Even a poor result can be quickly improved upon as long as the maneuver is initially performed the same way each time. But when progress is slow or has ceased altogether, it's because the pilot is inputting different commands each time the maneuver is attempted, and thus introducing too many variables to pinpoint precisely how the maneuver should be flown.

Rather than muddying the waters with a lot of corrections, proficient (efficient) pilots uses the first attempt as a warmup to learn what the plane's tendencies are and what actions they should take to do much better in subsequent attempts. I.e., it's not how you start, it's how you finish that counts!



Step II: Pro-active Control

Proficient flight control centers on developing consistent inputs with the airplane following along. Consider that when the initial control inputs are made correctly, the need for additional corrections may not even exist, and that's when a pilot is free to think ahead of the airplane and therefore become a controller of the plane rather than a reactor. Think about it, the airplane does not know the age or experience level of the person at the controls, only what commands it's receiving. So if you want to produce a good result, you need to pay attention to the commands you are sending it.

Example: A reactor will typically enter a loop and start watching for deviations side-to-side and adjusting the size and shape. A proficient (efficient) pilot has learned that entering a loop with the

wings level is paramount to performing a good loop and will most likely eliminate the need for any aileron corrections throughout (figure 2).

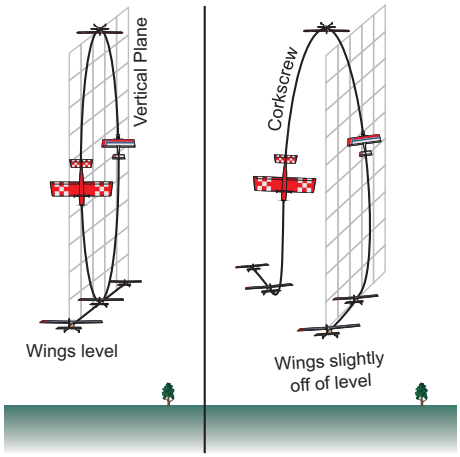
He knows that the size of a loop is predetermined by how much elevator he pulls at the start, and he's learned that trying to slowly finesse the elevator entering the loop produces an inconsistent radius, so his pull is smooth, but deliberate, in order to establish a consistent loop radius right away (figure 3).

He knows that gravity will cause the loop to become tighter or "pinched" as the airplane loses speed approaching the top. By not making constant aileron and elevator adjustments, he noticed early in his loop practice that the pinch typically starts near the 10:00 and 2:00 positions, which told him that he needs to reduce his elevator input between 10:00 and 2:00 to keep his loops round (figure 4). The severity of the pinch also told him how much elevator to take out, e.g., tiny pinch = tiny elevator reduction, etc..

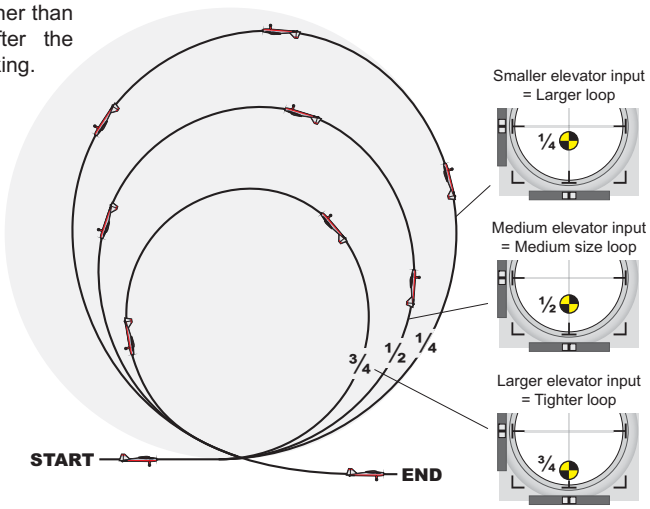
Altogether, he's able to routinely perform round loops by pulling a fixed amount of elevator at the start (the amount determined by how large he wants the loop to be), reducing the elevator input between 10:00 and 2:00 (predetermined by the tendencies of his plane), and then returning the elevator to its original position to match the back side radius to the front side.

Those who struggle to fly round loops make the mistake of "hunting" or releasing too much elevator and thus create a "segmented" radius or flat spot on top of the loop. This occurs for the same reason people over-control at every skill level; they want to see their inputs doing something. However, when performed correctly, a loop remains round without any visible signs of when the elevator adjustments were made. On the other hand, those who try to manage the elevator strictly by watching the airplane have to see a deviation before they start correcting, and then it's too late.

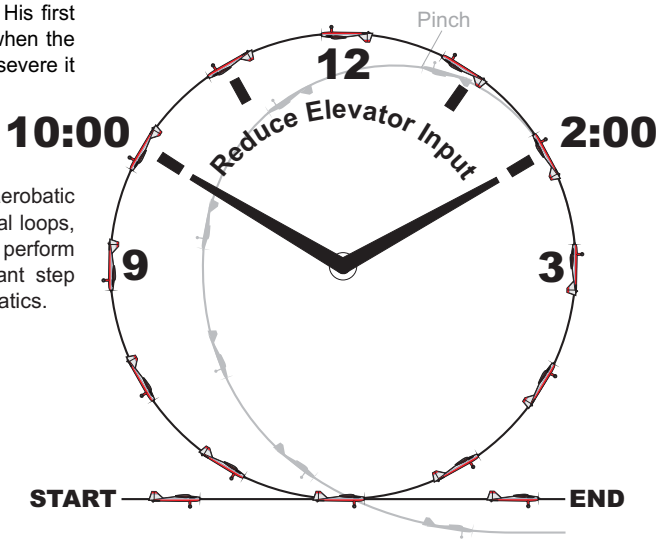
Rather than putting the emphasis on getting better at correcting deviations, elite pilots strive to fundamentally execute the maneuver well enough to eliminate the need for unnecessary corrections. Entering a loop with the wings level is a prime example.

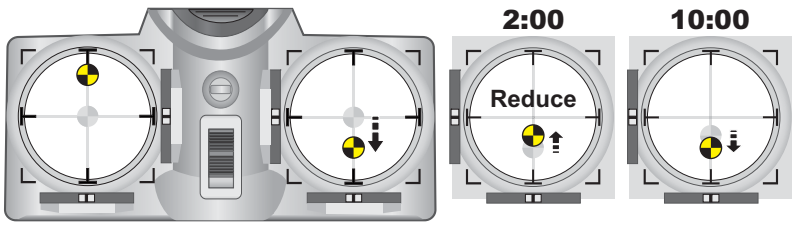


Proficient pilots predetermine the size of their maneuvers by the size of the inputs they apply. To change the results, look to change your inputs rather than waiting to correct after the results are not to your liking.



A proficient pilot already knows how to perform a loop. His first try is just to determine when the "pinch" occurs and how severe it is so he knows how much elevator to take out over the top of his next loop. Considering how many aerobatic maneuvers contain partial loops, the ability to consistently perform nice loops is a significant step toward mastering aerobatics.





Reactors are also prone to varying their bank angle throughout their turns, and since the amount of elevator required to keep a turn level changes with bank angle, they end up having to adjust the elevator throughout as well. When variables such as different planes, setups, wind, etc., are introduced into the reactors' busy turn technique, consistency becomes a hard thing to nail down (often manifesting erratic landings).

Proficient pilots take a pro-active approach to turns: A controller knows that his aileron input sets the bank angle that determines the size of the turn, so his objective is to pinpoint the aileron input that results in the bank/turn that he's comfortable with. He then pinpoints the exact amount of elevator that keeps his standard turn level without needing additional adjustments. After repeating the favorable inputs a few times, he's able to consistently perform level turns without even thinking.

When a situation calls for a wider or tighter turn than standard, a controller does not change the pattern or rhythm of his inputs, rather, he simply changes the size of the inputs he starts the turn with (figure 5).

Thanks to this foundation, when a controller flies a new airplane for the first time, he intuitively knows immediately after takeoff whether to use more or less aileron during the first turn based on whether the ailerons seem more or less responsive than what he's used to. Thus, he still achieves his standard turn despite the different control response. If his first turn with a new airplane climbs or descends, instead of trying to react faster to altitude changes for the remainder of the flight, he simply changes the amount of elevator that he inputs at the start of the next turn and he's rewarded with a level turn on only his second try. Now all that remains is deciding what maneuver to try next (figure 6).

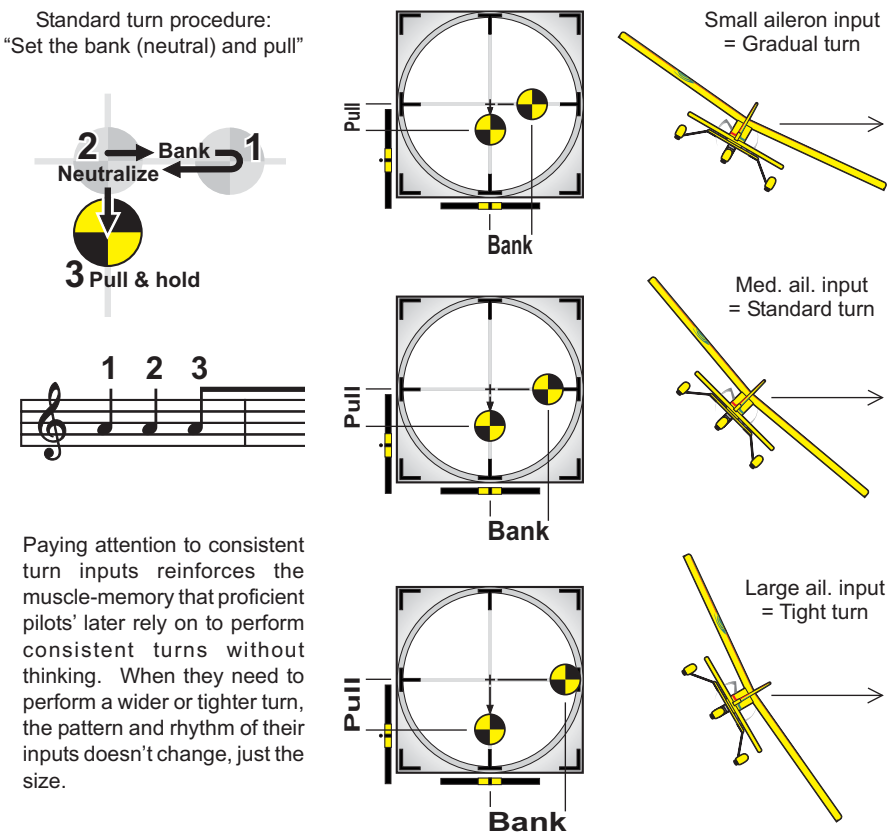


Exhibit A: Climbing start to the turn.

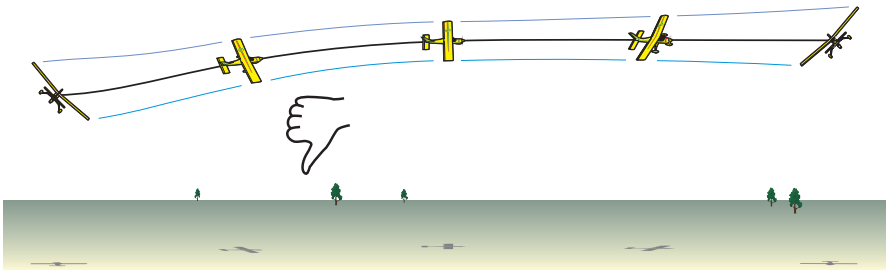
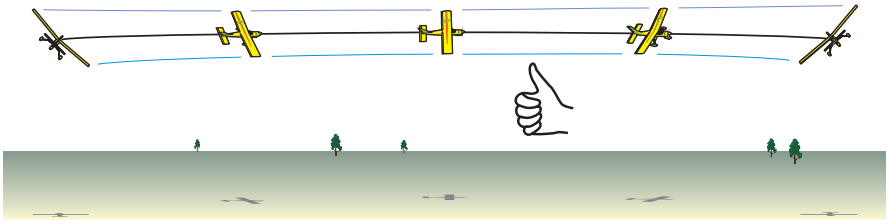


Exhibit B: When a elite flyer experiences a climbing turn, rather than trying to react faster to altitude changes during subsequent turns, he repeats the same aileron input (and bank) but inputs less elevator to start with, and from that point he's able to achieve level turns with little or no further adjustments.



Summary

Controllers are both knowledgeable and efficient, executing each maneuver using predictable commands with the airplane following along. When a deviation is encountered, they take that opportunity to determine why it occurred, and from that point forward they are able to anticipate the appropriate input(s) to prevent that deviation from happening before it happens, a.k.a., they are ahead of the airplane. Of course, reacting has its place, and by first identifying how to correctly and efficiently fly the maneuvers, we are setting the stage to begin picking up on those final touches to perform all our maneuvers nearly perfect. Now go make it happen.