

Parallel Positioning: The Foundation that Great Aerobatic Flying is Built Upon

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 Illustrations by Dave Scott



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Introduction

If you've ever watched proficient aerobatic pilots fly (you can tell their ability to perform a wide variety of maneuvers one after another rather than individual stunts), you may have noted the absence of visible corrections or realignments between their maneuvers, often referred to as being "smooth" and "the good guys make it look easy."

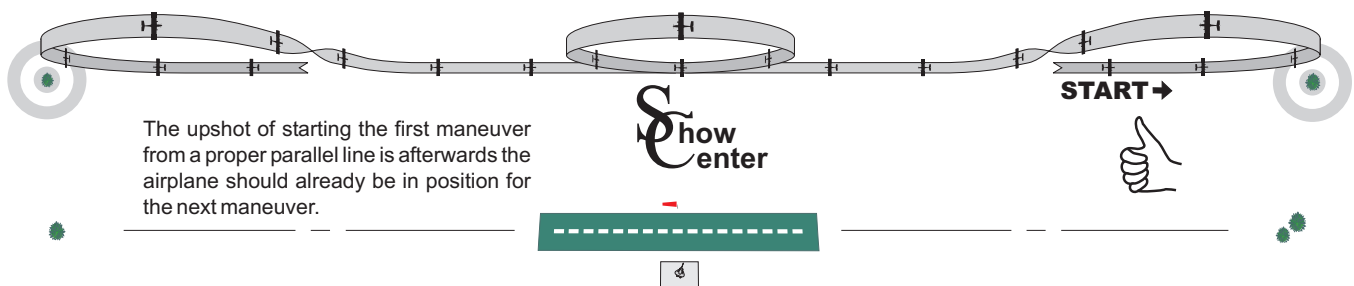
The main reason for their smooth consistent flying is so simple that it's often overlooked. That is, the tendency of most pilots is to enter a maneuver and then make constant corrections to try to come out on a decent heading. Proficient flyers, on the other hand, understand that starting each maneuver from a well positioned (not too close, not too distant) parallel line with the runway is the most influential factor leading to finishing it parallel, and thus in good position for the next maneuver often without needing to make corrections (figure 1).

Furthermore, by consistently performing their center and turnaround maneuvers along the same parallel line, the nuances common to each quickly become familiar (like watching the same movie scene over and over). Therefore, in no time they are able to identify and implement the refinements that enable them to achieve a level of consistency and precision that most in the sport only dream about.

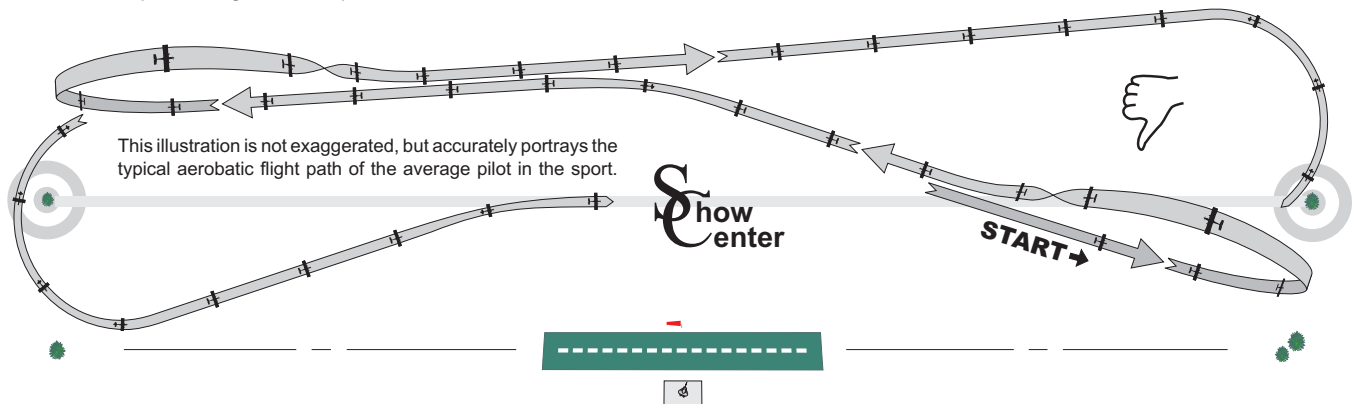
Due to the compound effect that a deviation can have on the remainder of a maneuver and all that follows, those who fail to maintain consistent positioning often remain too busy making corrections to pick up on how they might be prevented in the first place. Consider that even the same deviation in the same maneuver can look quite different when viewed from different perspectives -- thus making it much more difficult to identify the deviations that are common to a given situation when the positioning

continually varies. Poor positioning, and the resulting constant corrections and lack of consistency, is therefore one of the main reasons why many flyers' skills plateau short of being able to fly precision aerobatics or perform more than one maneuver per pass.

Equally important, proficient pilots know the importance of entering the maneuvers with the wings perfectly level to avoid veering off to one side or



Forcing a maneuver from an improper line causes pilots to spend considerable time realigning before another maneuver can be attempted. Consequently, fighting to realign the airplane after maneuvers is more likely the result of needing to improve the positioning of the setups than the maneuvers themselves!



the other and thereby getting incorrect feedback about how the maneuver should be flown. I.e., if a person doesn't enter his maneuvers with the wings level, the characteristics of his plane and the techniques he uses won't matter much because his ability to accurately assess cause-and-effect will be greatly impaired!

Thus, more than anything else, consistent positioning and wings level entries are crucial to aerobatic success and continued advancement. In fact, many of the problems that pilots experience learning aerobatics, for which people come up with all kinds of ideas about how to fix, would quickly be solved or plain disappear if they concentrated more on flying consistent parallel lines with the runway. Ultimately, making consistent parallel

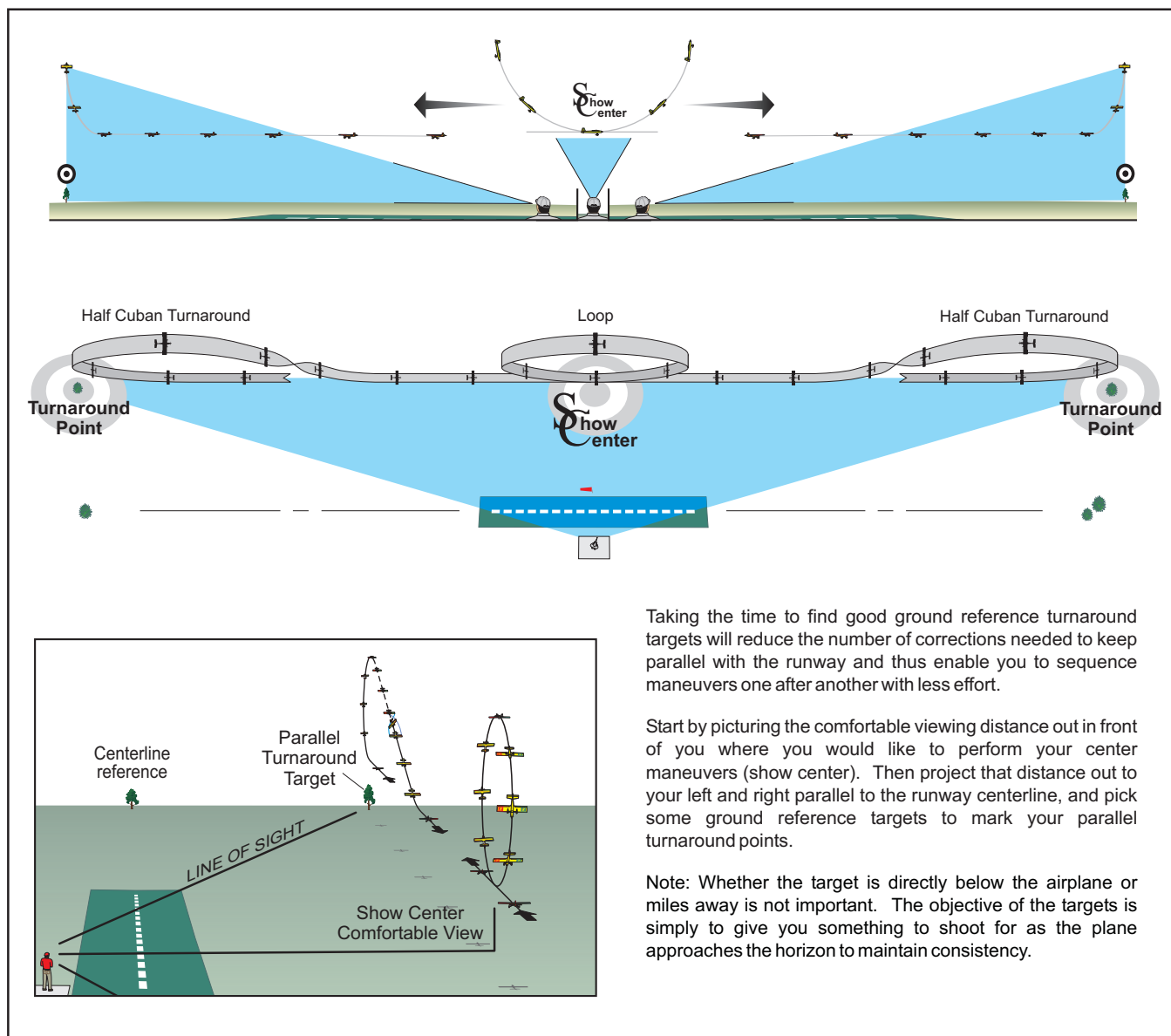
lines your #1 priority will enable you to more often think ahead of the airplane, fly a continuous aerobatic sequence far more easily, and more quickly identify when the deviations in the maneuvers typically occur and subsequently what to do about them, just like a pro.

Step 1: Choosing Ground Targets

Proficient pilots use ground reference "targets" to help maintain consistent parallel lines with the runway. So, you would be wise to walk out to the center of the runway before your next flight and survey your surroundings to find some good parallel targets (figure 2):

Start by picturing the comfortable viewing distance out in front of you where you would prefer to perform your

center maneuvers (a.k.a., show center). Then, project that distance out to your left and right parallel to the runway centerline and pick some ground reference "targets" to mark the areas where you'll perform your turnaround maneuvers, e.g., Immelmans, Cubans, etc.. Note that the turnaround ground references do not have to be directly below the airplane. The targets are simply points to shoot for (something, rather than nothing) as the plane approaches the horizon to maintain consistency. Then, if it turns out that you regularly don't like where the airplane is heading after your turnaround maneuvers, i.e., it's consistently too close or too far way, simply adjust your turnaround target versus meddling with the maneuvers themselves.



Taking the time to find good ground reference turnaround targets will reduce the number of corrections needed to keep parallel with the runway and thus enable you to sequence maneuvers one after another with less effort.

Start by picturing the comfortable viewing distance out in front of you where you would like to perform your center maneuvers (show center). Then project that distance out to your left and right parallel to the runway centerline, and pick some ground reference targets to mark your parallel turnaround points.

Note: Whether the target is directly below the airplane or miles away is not important. The objective of the targets is simply to give you something to shoot for as the plane approaches the horizon to maintain consistency.

Step 2: Projecting Flight Paths and Object-as-a-Whole

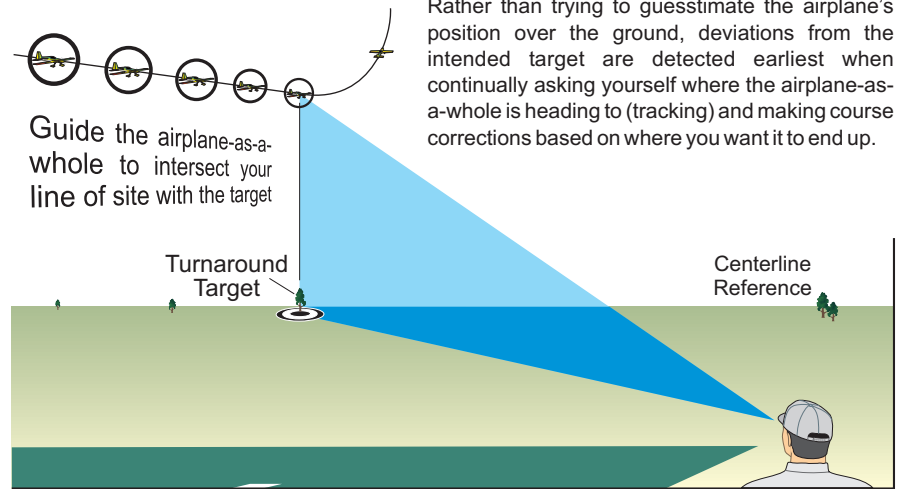
In order to detect deviations away from the intended target early before they require more significant corrections, you must continually ask yourself, "Where is the airplane heading to?" That is, rather than trying to guesstimate the airplane's location over the ground using hit-or-miss depth perception, you need to "project" where the airplane is heading (tracking) and make your course corrections based on where you want it to end up.

Furthermore, you need to focus on where the airplane-as-a-whole is heading irrespective of the wind or where the plane is pointing (figure 3). People debate every year about how to use the controls (esp. rudder) to correct crosswind drift between the maneuvers. But the fundamental mistake pilots make is that they get caught up with where the fuselage is pointing versus where the airplane-as-a-whole is actually tracking. If they just focused on guided the airplane-as-a-whole to their intended target, versus pointing it, they would seldom have to correct for wind drift in the first place.

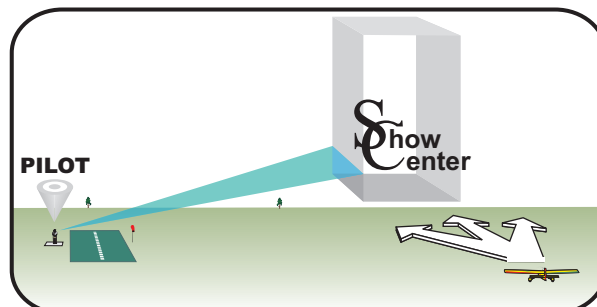
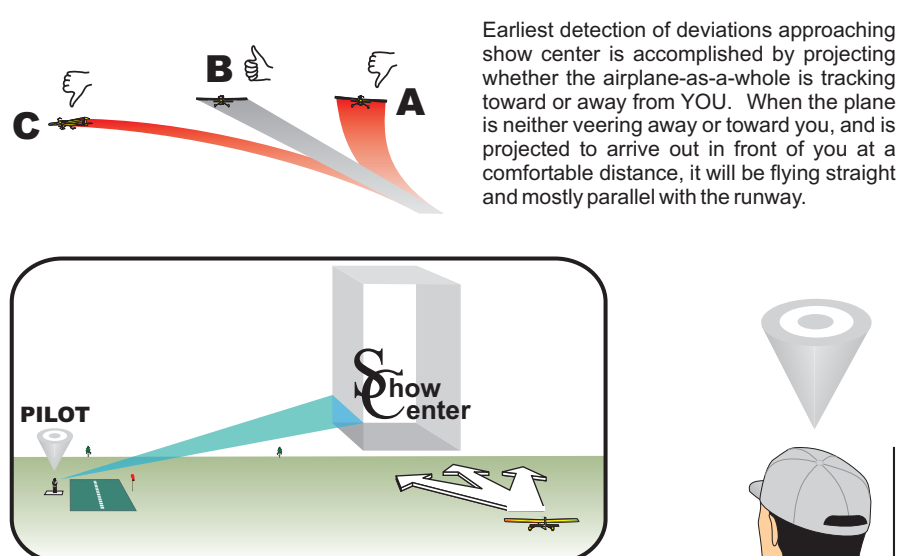
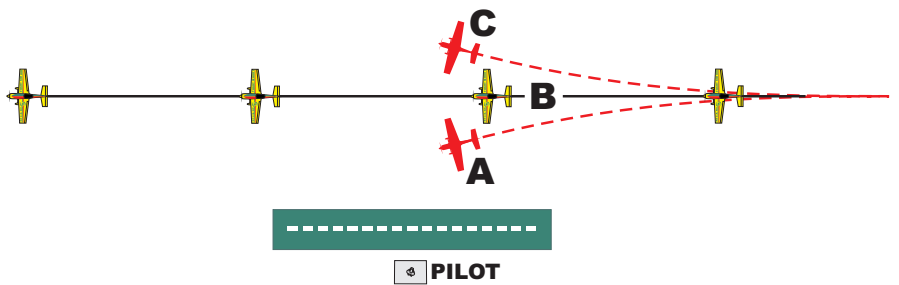
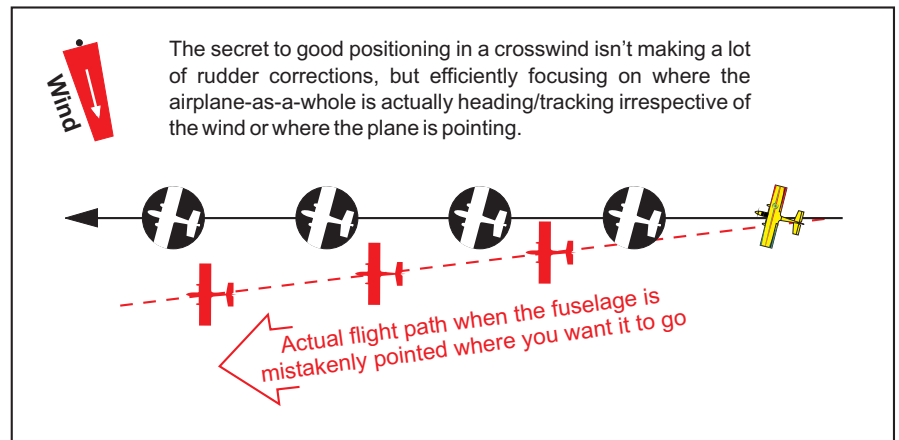
Ultimately, the technique of projecting where the airplane-as-a-whole is heading is the solution to detecting and therefore correcting deviations when they are so small that people watching won't even know that you're making corrections, a.k.a., "the good guys make it look easy" and prompting onlookers to comment "that sure is a nice flying airplane!"

Step 3: You as the Reference

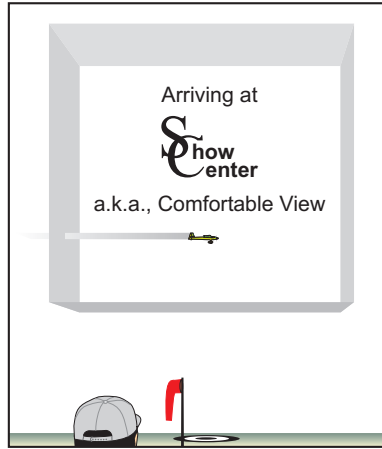
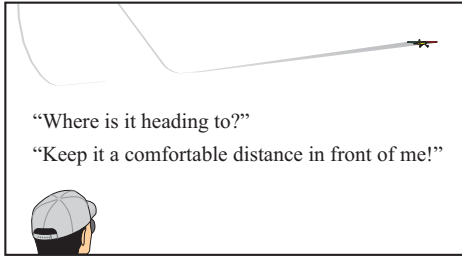
After completing each turnaround maneuver, the quickest and easiest way to detect deviations approaching show center is to project where the airplane-as-a-whole is heading in reference to YOURSELF. If you observe the airplane veering in toward you, push it away. If it's veering away from you, pull it in. When neither a deviation in or away from you is detected, and the airplane is projected to pass out in front of you at a comfortable distance, the plane will be flying generally parallel with the runway (figure 4). Put another way, considering that "show center" is the comfortable distance in front of you



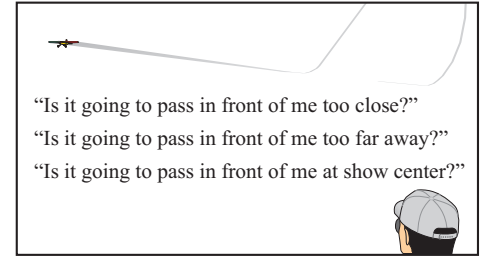
Rather than trying to guesstimate the airplane's position over the ground, deviations from the intended target are detected earliest when continually asking yourself where the airplane-as-a-whole is heading to (tracking) and making course corrections based on where you want it to end up.



Projecting where the plane will be in a few seconds is the quickest way to detect deviations approaching show center before they become otherwise obvious. Thus, begin asking where the airplane heading to immediately after completing the turnaround.



Note that your choice of show center was based on a comfortable viewing distance out in front of you. Thus, that is your center target. I.e., Guide the plane to arrive at the same point or distance out in front of YOU on every pass.



where you would like to perform your center maneuvers, that distance is effectively your center target. So, rather than trying to guesstimate the plane's position over the ground as it passes in front of you, aim to have the airplane always pass in front the same distance from YOURSELF (figure 5).

This approach will also prove instrumental during the many times when the position of the wings is not clear as the plane passes in front of you. I.e., as a rule, if the airplane-as-a-whole is flying in a straight line, the

wings must be level. Therefore, the solution to entering the maneuvers with the wings level when they're not visible is to aim to establish a straight line instead.

Conclusion

A person can fly a perfect aerobatic maneuver, but if it is forced from an improper line, the time spent realigning afterward often negates the chance to try a second consecutive maneuver. The payoff for starting each maneuver from a well positioned parallel line is that you're more likely to finish it in

good position to perform the next maneuver with a lot less effort. Even if the airplane gets blown or you make a mistake during the maneuver, the corrections afterward will be minimal as long as it was started from an optimal parallel line. Thus, while it is often assumed that a person advancing into aerobatics will need to learn advanced procedures to fly well, a basic foundation of parallel lines to the runway is truly the key to effective practice and aerobatic proficiency at every skill level.