

Text & Illustrations by Dave Scott

# Fix Bad Flight Habits

Maximize proficiency with how you hold your transmitter

Dave Scott (left) is the owner/operator of 1st U.S. R/C Flight School and helped thousands of pilots earn their RC wings. Here, he shows a student how keeping two fingers on the control stick naturally enables him to more precisely control his inputs.



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**D**rivers naturally put both hands on the steering wheel whenever a situation demands greater control and driving accuracy. Pilots who use both their thumbs and index fingers on the control sticks are similarly able to more precisely control their inputs, and thus their flying.

While individual opinions vary regarding the "best" transmitter handling techniques, it's safe to say that few people have objectively compared them all. Rather, most pilots simply continue to use (and promote) whichever techniques they've become accustomed to. However, if you could compare all the different transmitter handling techniques, you would quickly discover that certain methods promote greater consistency and therefore faster learning.

Like the example of using two fingers on the sticks, the following transmitter handling techniques are those that have proved during 1st U.S. R/C Flight School's week-long primary solo and aerobatic courses to universally produce the best results in the shortest amount of time. Note that the techniques presented here apply specifically to "precision" flying, e.g., takeoff, procedure turns, precision aerobatics, landing, etc. 3D stunt flying involves entirely different approaches to transmitter handling, not to mention flying techniques and equipment setups.

While some of these techniques will no doubt feel strange at first, if you did not start out this way, know that most pilots find them relatively easy to adopt when they prove to help get the job done with not less effort.

#### CAUSE AND EFFECT

Additionally, most people learn to fly RC on the side of a recreational flier/instructor, usually with very little pre-flight preparation. As a result, most pilots are conditioned to "react" to what the airplane does (as opposed to having a plan and proactively controlling the plane). Consequently, most pilots think that getting better at making corrections, fast reflexes, and large amounts of stick time are the keys to better flying, and little thought is given to how they fly or whether they are flying correctly. As a result, most fliers make one to four times more control inputs than what the maneuvers require when flown optimally. The problem with that is that learning slows dramatically when pilots reach their saturation point from trying to make thousands of additional split-second decisions during their flights. A higher quantity of inputs also increases

the likelihood of errors and a different result each time a maneuver is performed. These issues tend to be further magnified for pilots who fly with only their thumbs on top of the control sticks because of the unsupported thumb's natural tendency to jerk or snap the controls (especially when the pilot is anxious or excited, e.g., flying a new and/or expensive model, flying in windy conditions, landing, etc.).

Furthermore, reactive thumbs-only fliers' skills often plateau because they remain too busy responding to deviations to learn how they might be prevented in the first place. Their lack of consistency prevents them from making the correlation between their inputs and the responses of the plane needed to cement a solid foundation on which to build.

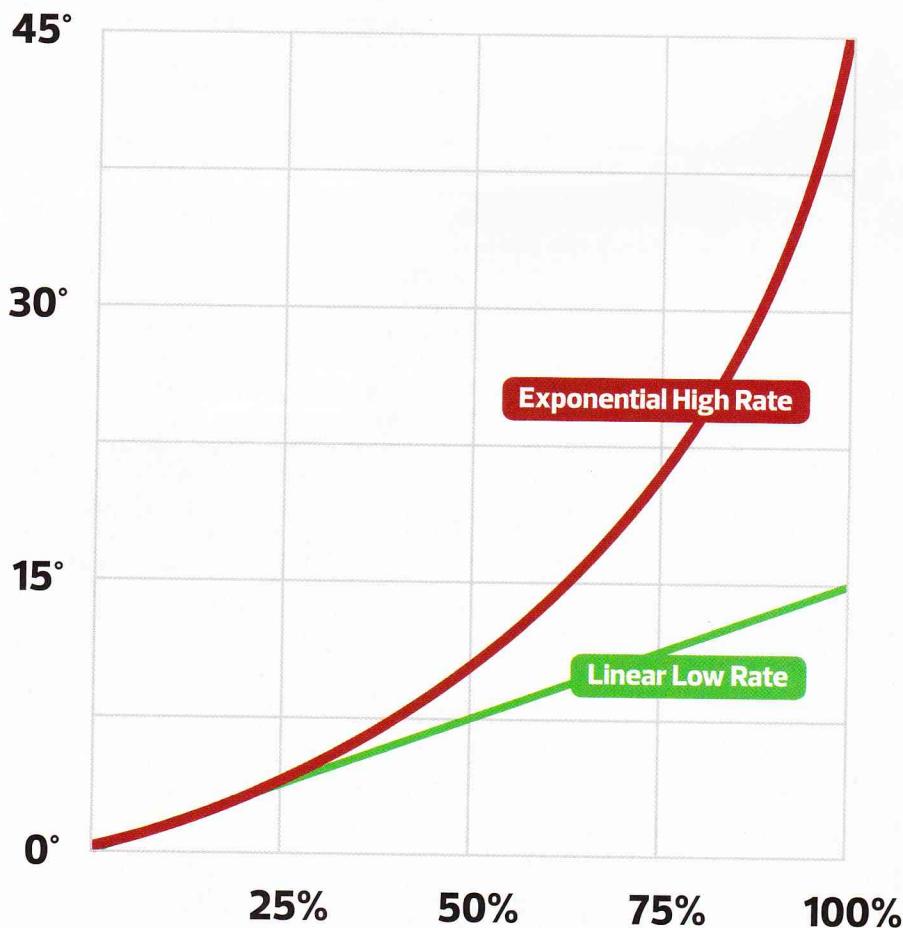
Like the golfer who can't keep his head down during his swing but fantasizes that a new set of clubs will improve his game, many pilots end up looking to equipment to try to improve their flying. They will often employ large amounts of radio exponential (expo) in an attempt to dampen

the consequences of making too many inputs and jerking the sticks.

#### THE EXPONENTIAL TRADEOFF

While it's true that large amounts of expo have the potential to make flying smoother, this doesn't address poor technique and some predictability and therefore, consistency is sacrificed. For example, anyone who has ever driven an older car with slop/play in the steering knows how much harder you have to work just to try to keep the car going straight. That's because the lag in the steering response makes it more difficult to correct small deviations, prompting the operator to make larger corrections that often result in getting more response than needed.

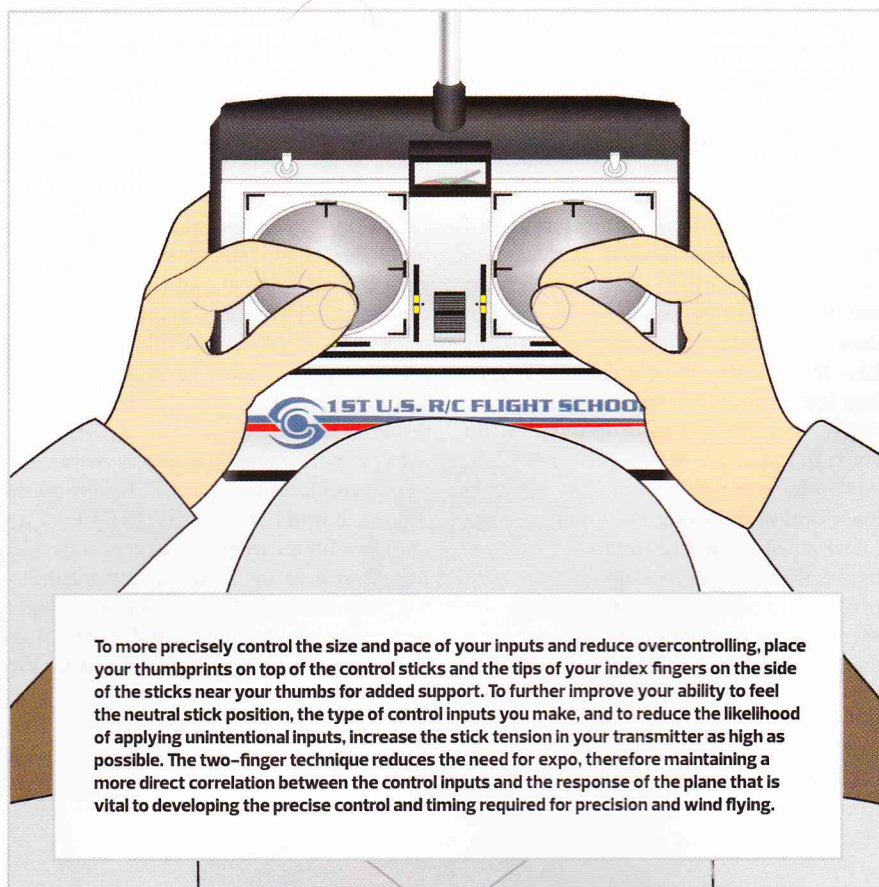
Pilots who attempt to mask poor technique with large amounts of expo run into the same problems as the operator of an old car with an irregular control response. In addition to sacrificing a direct correlation between control inputs and flight response and thus predictability, the sluggish control response enables deviations to



Significant expo, e.g., 30–50%, is required to make an airplane controllable on high 3D rates. On normal rates, less expo, e.g., 5–15%, results in a more predictable linear response that's better suited to consistent precision flying. The tradeoff for maintaining a precise correlation between the control inputs and the response of the plane with less expo is the pilot must be able to accurately control the size and pace of his inputs.



## Fix Bad Flight Habits



become larger before the corrections take effect, thereby prompting larger correction inputs that increase the potential for over-controlling and needing additional corrections. Of course, there are pilots who can fly with precision despite using lots of expo, but it takes extraordinary amounts of practice to do so.

Flying with less expo, on the other hand, is more comparable to driving a newer car with tighter steering. It's easier to keep the car going precisely where you want because the steering wheel corresponds directly to the response of the car and thus your inputs have an immediate effect on

correcting deviations while they are still minute. Furthermore, the direct correlation between the steering wheel and the response of the car is more predictable and thus enables driving to become routine and eventually automatic.

In short, pilots flying with less expo experience a more direct correlation between their intentions/inputs and the response of the airplane, aka, an "honest" flying airplane that enables them to fly with greater precision and consistency. Although good equipment and a reasonable amount of expo are certainly helpful, nothing works as effectively as flying an honest airplane

and applying the proper control inputs in the first place!

### TWO-FINGER ADVANTAGE

More than 1,500 pilots of all skill levels have attended 1st U.S. R/C Flight School. During that time, a comprehensive system of accelerated flight training has been developed and resulted in a 99% solo success rate and more than 3/4 of the aerobatic students returning for more advanced training. However, even if everything else remained the same, the flight school would not be here today if it wasn't for the two-finger technique in which pilots place the tips of their index fingers on the side of the control sticks to help steady their thumbs

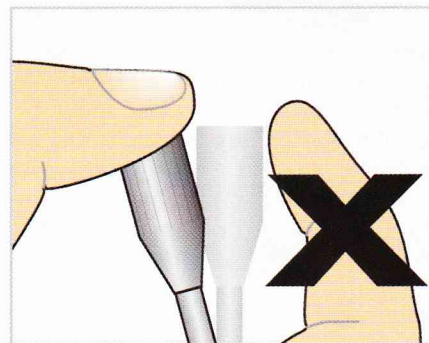
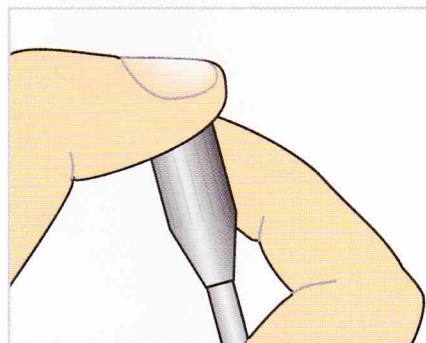
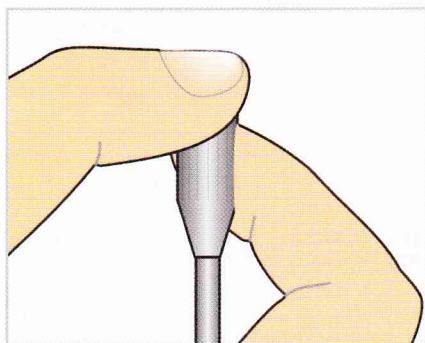
### YOUR ABILITY TO PRECISELY MANAGE THE SIZE AND PACE OF YOUR CONTROL INPUTS WITH TWO FINGERS ON THE STICKS REDUCES THE NEED FOR LOTS OF EXPO.

positioned on the tops of the sticks.

In the same way that two hands on a steering wheel improves control, supporting your thumb and the stick with your index finger will naturally enable you to apply smoother inputs, resulting in greater consistency and less over-controlling, especially in pressure situations.

Most importantly, your ability to precisely manage the size and pace of your control inputs with two fingers on the sticks reduces the need for lots of expo. Consequently, you'll be able to maintain the direct correlation between your control inputs and the response of the plane that is so vital to developing the precise inputs and timing required for precision flying.

Furthermore, pilots using the two-finger technique enjoy the additional confidence



Keeping both your thumb and index finger on the stick will help you to feel more connected to the plane. Guard against taking one or both fingers off of the sticks, which will lead to jerking or jabbing the controls and thus making it impossible to fly with consistency or precision.



## Fix Bad Flight Habits

that comes from feeling more connected to the airplane. Rather than the airplane just responding to inputs, there's the sense that it's responding in ways that more closely match your exact inputs and intentions.

### TURN EXAMPLE

A typical reactive pilot's approach to turning is to enter the turn applying aileron and elevator and then start to adjust the bank angle and elevator in response to seeing the turn becoming too wide or tight, climb or

without even thinking. And when a situation calls for a wider or tighter turn than standard, he simply changes the size of the inputs that he initiates the turn with.

Thanks to this foundation, when a proactive two-finger pilot flies a new airplane for the first time, he can sense immediately after takeoff whether to use more or less aileron during the first turn. This is based on whether the ailerons seem more or less responsive than what he's used to. Thus, he's still able to achieve his efficient

Some people initially find it difficult to use the two-finger technique because they go about it backward. They first place their thumb and index finger on the sticks, but then find it difficult to grip the transmitter. Instead, you should first get a comfortable grip on the transmitter, then place your thumbs on top of the sticks. Next, without any tension in your fingers or hands, bring the tips of your index fingers to the side of the sticks near your thumbs while allowing the remaining fingers to natu-

rally come to rest in the positions that are comfortable. Most importantly, always keep your thumb prints on top of the sticks, versus "pinching" the sticks, to maintain a better feel for where the sticks are positioned. Note that those who pinch the sticks are more prone to using either their thumb or index finger (one or the other) to jerk the stick. The objective is to control the inputs with the thumb on top of the stick and use the index finger on the side merely for support.

### ENHANCING FEEDBACK

Increasing the stick tension in your radio as high as possible will significantly help to minimize over-controlling and improve consistency by improving your feel for the types of control inputs you apply. Furthermore, increasing spring tension reduces the likelihood of accidentally applying unintended inputs along with your intended inputs. In fact, 1st U.S. R/C Flight School has found these benefits to be so substantial that it installs stiffer after-market springs into

all of its radios.

### STRAPS, TRAYS, OR FREE-HOLD?

Pilots must always guard against developing the bad habit of taking their fingers off of the control sticks, resulting in a tendency to take jabs at the controls and thus making it impossible to fly with consistency or precision. Note that this bad habit tends to be far more common when using a transmitter strap or tray.

While they look cool, when the transmitter is supported by a strap or tray, the

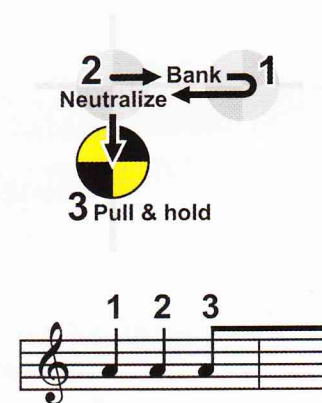
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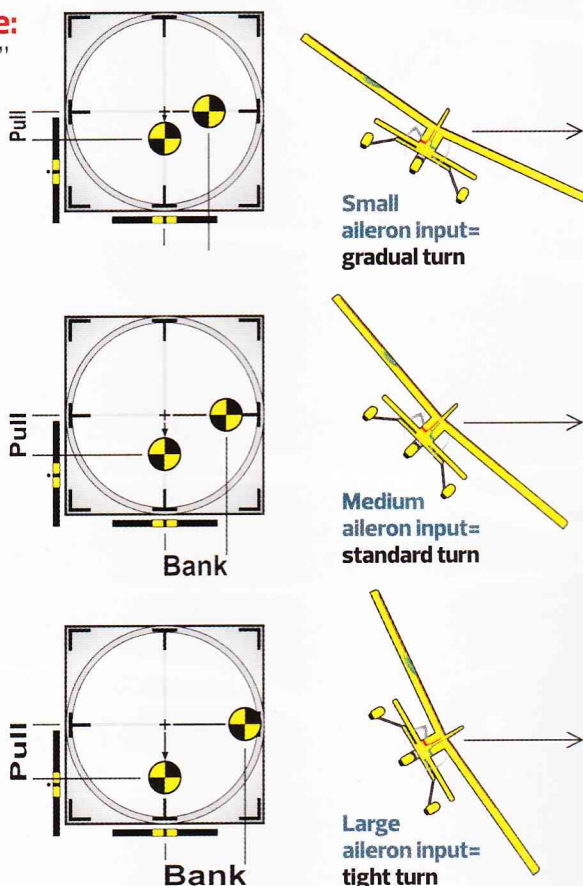
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### Standard turn procedure:

"Set the bank (neutral) and pull"



A proficient two-finger pilot's consistent turn inputs reinforce the muscle-memory that enables him to perform consistent turns without thinking. When a wider or tighter turn is required, rather than relying on adjustments and reflexes, he proactively changes the size of the inputs he initiates the turn with.



descend. When variables such as different planes, setups, wind, etc., are introduced into this already busy turn technique, consistency can be difficult to achieve.

A proficient two-finger pilot, on the other hand, uses his ability to precisely manage his inputs to pinpoint the aileron input that consistently results in the bank/turn that he's comfortable with. He then pinpoints the exact amount of elevator that keeps his standard turn level with little or no additional adjustments needed. After repeating the favorable inputs a few times, he's able to consistently perform level turns

standard turn despite the different control response. Furthermore, 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 and is rewarded with level turns for the remainder of the flight. This efficient process applies to loops, rolls, landings, etc., as well. In other words, not only does using two fingers make good inputs easier to repeat, mistakes are also more consistent and therefore easier to diagnose and achieve a better outcome.