

# Setting up control rates on a Pattern plane

By Neil Allen

I prefer to avoid using dual rates on my planes if I can get away without it. Often on a sport or scale plane they are just a nuisance, as they are sometimes accidentally set on the wrong setting.

When flying Pattern though, you may have to use rates for two maneuvers, the spin and the snap, if you have these in your schedule. Sometimes you are lucky and the normal flight settings do a good spin or snap roll, but this is rare.

Some flyers snap with a snap button. This produces a good snap, but the top flyers generally prefer to do a snap by pushing the sticks into the corners as required. This has the advantage of your hands not leaving the sticks, and also some planes prefer the snap to be entered or exited with a small delay on one of the controls, which cannot be done with a snap button.

I currently fly with just one three position rate switch. The same 3 position stick sits at normal for most of the flight, and is moved to a snap or spin position just for that maneuver. The same result would be achieved if you use no dual rates, but flick separate switches for snap and spin. The same switch when moved to snap or spin position should affect all three controls – aileron, elevator, and rudder. Even cheap radios nowadays usually allow this to happen through the same selector switch. It is a bit of a hassle to flick three separate dual rate switches for all three controls, but it can be done!

## Normal Flight setup

For smooth flying you want to use the smallest possible amount of movement that is just enough to do what you need to do.

### Aileron

Try a rate that does two rolls in three seconds as a starter. Then use full control in all the rolls in your pattern, and see how fast they seem. Adjust if you prefer.

### Elevator

Fly at moderate speed and apply full up for a loop. The plane should do a smallish loop, but not a very tight one. Jason Barker is a top flyer who sold me my e-Motion. He said he kept on reducing the elevator movement to fly the pattern more smoothly, until finally he did not have enough up to hold the nose up for the landing!

### Rudder

Usually you use almost all you can get, to help the stall turn. Normally use 60% expo here.

A tip for the stall turn. You cannot do it with an electric plane without some power on. I pull up for a stall turn at speed. Then I pull the throttle fully closed, and bang it open to

around ¼ or 1/3 throttle to do the stall. Then there is plenty of propwash to kick the plane around smartly.

### Exponential rates

When an aileron servo for example drives an aileron, the servo moves through around 90 degrees and the aileron through perhaps 30 degrees. The result is that the aileron moves more when the servo is in the middle than at the extremes. So at least 10% expo is always needed to correct this. 20 % is usually best as a standard setting to smooth out your flying. It is set so the control movement is greater at the extremes which is often a negative expo value on a radio.

Some pilots get used to flying with higher amounts of expo to get even smoother at the middle, but then the control sensitivity is always varying, which is disturbing.

When using dual rates it is best to increase the expo if you increase the travel, to keep the feel around neutral the same. Ideally if you are coming in to do a snap roll and you select snap rates, the elevator and aileron should feel the same while you fly level towards the position of the snap. This might mean expo increasing from 20% to 60% or whatever is needed.

## Snap Setup

### Aileron

Usually use all you can get, such as 120%

### Rudder

Usually use a lot less than for normal flight, perhaps half that. Do your snaps, and if it spirals or corkscrews too much you have too much rudder.

### Elevator

Use more than for normal flight. Start with 50% more. If you do an inside snap with up elevator, and the plane exits in a climb you had too much up. The same applies to down elevator in an outside snap. So the amount of elevator used to snap sets the exit path.

## Spin setup

This is done by trial and error, as planes vary a lot.

### Elevator

You may need quite a bit more elevator to get a proper stalled spin entry. Note that the judges demand a stall with nose drop before the spin, or else you will get a zero

### Aileron

Use a moderate amount, perhaps the same as normal flight.

### Rudder

This sets the spin rotation speed. Spin too slowly and you get too low to the ground. Spin too fast and it is hard to count the spins and see when to stop them.