

Setting up a Plane for Success Part 2

For what its worth, here are some thoughts on setting up the radio system on a giant scale plane setup for IMAC, 3D and Pattern. I will add that just because what is below are things I do, that that does not mean that they are universal truths.

Mixing:

Pitch Coupling.

Most giant scale planes have Pitch Coupling and therefor, a mix to mix it out is good. This mix would be a rudder to elevator mix. In some cases, the mix is not linear, especially if you have a lot of rudder authority. Due to this, "point mixing", becomes necessary to curve the mix to fit the planes needs.

Roll Coupling.

A few giant scale planes have roll coupling. A mix from rudder to ailerons will sort this out in short order. Generally speaking, this mix is rarely more then 3%, more normally 1 to 2%. It is also very rare that a point mix is needed for this mix.

Down line mixing.

Many planes, when setup for IMAC, 3D and pattern (i.e. not a forward CG) show a tendency to pull to the canopy on down lines. Due to this, a mix from the throttle to the elevator becomes necessary. This mix is setup as a standard mix that gradually comes in when the throttle brought back to idle. Most of the time, it is not doing any thing above three clicks above idle, but slopes in below that.

Note: This mix should be setup so that the throttle trim does not effect the mix.

The above are the basic mixes that are helpful on most giant scale planes setup for IMAC, 3D and pattern and are left on all the time, i.e. are not switched in and out.

Throttle Curves.

In torque rolls, as you get closer to the ground, it becomes helpful to program in a flatish spot on the throttle throw. The reason for this is that some times, one click is too much. Basically, if you move the stick one click, the plane climbs, if you reduce it one click from the climb, it descends. For this reason, it is nice to have a very narrow flatish spot in the throttle curve. If you keep it narrow enough, it will go unnoticed in normal flying.

Some people also setup a curve modification for normal flying. In general, this is done so the motor has a linear feel power wise from top to bottom.

Channel setup.

Aileron.

In general, multi aileron servos can be handled with a "Y" harness in each wing and with each wing getting its own channel. By having a separate channel available per wing, getting the up and down throw on each side, including or not, differential, becomes very easy.

Elevator.

In general, two channels are used for the elevators. The reason for this is much like the ailerons, i.e. getting the left and right side to match each other.

Rudder.

In general, one channel is used with a "Y" harness in place where multiple servos are used. Several people are using more than one channel on the rudder and this is done to help with binding of servos that don?t match all that well, or to compensate for linkage geometry that does not match.

Notes on channels.

Using end points and center points to match surfaces is Ok if the values are small but in general, you should try to get it is close as possible with the linkages before going at it electronically.

Trim rates.

With planes setup for 3D, often one click of trim is too much. Because of this, having an electronic way of desensitizing the trim is good.

Dual Rates and Triple (not tribble ;-) Rates

Dual rates are help full to make the plane more manageable in different flight modes. i.e. Hi Rates for 3D, Low rates for IMAC, and Pattern.

Triple rates can be useful setup low & med for IMAC and Pattern, and hi for 3D.

Some examples.

Often I see people burying the plane in snaps. If you use low rate rudder and elevator and med rate ailerons, you can get a cleaner snap presentation in level flight from upright or inverted. Saying that, you can go to medium rate rudder for Knife Edge snaps and so forth. At the same time, medium rate on the elevator for Humpties can give more definition than low. While triple rates are great once you get used to them, many don't have them or use them and there is nothing wrong with that. Saying that, as the planes become more versatile, triple rates become more useful.

Expo

Expo is used to desensitize the sticks around neutral. One thing many do is work hard on the low rate throw and expo settings to get the plane flying the way they like it, but not so much on hi rates. What many do is turn up the throw as much as possible on hi rates and program in whatever amount of expo is needed to make the plane more or less manageable.

What is better is to play with the expo on hi rates to get the plane to feel right not only in un-stalled flight, but also in 3D. I can tell you that expo settings make a big difference in ease of torque rolling.

Separate rates / expo for up, down, left and right.

Most planes I have flown require more down elevator in a push from a down line, than they do up elevator in a pull. What I do on mine is to use less expo and slightly, maybe 2 more degrees of elevator travel down then up. What you are doing in effect is making the plane feel more symmetrical pushing and pulling. Hint: This also helps with negative snaps.

What is interesting here, is that while in IMAC or pattern, a plane needs more down then up to feel the same pushing or pulling, the opposite is true in 3D. In general, a plane will have more negative elevator pitch authority then positive elevator pitch authority.

Due to this, I generally set up hi rates to give 5 degrees more up elevator than down elevator and Adjust the expo, up and down accordingly.

Basically, in IMAC or pattern you want more down then up (lo rates) and in 3D (hi rates), more up then down.

Ailerons are sort of similar.

In IMAC or pattern, an even throw and expo left and right seems to work well, where in 3D, you want more right aileron authority then left to even out the planes motor torque.

The rudder also has different right and left requirements.

Throw

(This all depends on the plane but here are some starting points that work well on Caps and 3D capable extras)

Rudder. 45 degrees left and right Hi rates. 25 degrees left and 30 degrees right low rates.

Aileron. 35 left and 40 right hi (if you need diff, add it in), 25 low left and right.

Elevator, 50 up and 45 down hi rates, 10 degrees up and 13 degrees down low rates.

1. What does roll coupling look like?

Roll the plane to Knife Edge Flight and let go of the elevator / aileron stick, while holding the plane in Knife Edge with the rudder.

Watch what the plane does.

If it goes off course to the belly or canopy, you have pitch coupling.

If it rolls of Knife Edge to inverted or back level, you have roll coupling.

2. What do you mean when you say "burying the plane in snaps"?

Burying the plane in a snap is basically giving it too much elevator and or rudder. This will cause too deep of a stall that will cause the plane to loose much energy and can also cause the need for heading correction on the snap exit.

3. When I do an outside loop my plane requires constant course adjustments that are not required in inside loops. What are the possible causes?

There are several possibilities. Here are a couple.

If your plane has too much dihedral for normal up right flight, when inverted, it will "hunt" in yaw and roll.

If you fly positive loops hundreds of times, you will find that you stop thinking about the small corrections that you are making. Its just becomes natural.

If you have just started flying inverted loops, it will not feel automatic yet and every small correction registers in your brain.

If your elevators are not tracking together in inverted flight, this will cause the plane for come off trim and need correction.

4. What is the difference between a mix and a point mix?

Please refer to pitch and roll coupling paragraphs.

A normal mix is a linear mix. A point mix is a mix that has several points on it. You can alter these points to cause the mix not to be linear, but to curve any way you want it to.

Well, I know this is sort of basic, but I hope it's useful to some in getting better performance from there planes.