Initial Programming of a DLG by G_T

I'd probably tick off some people with my opinion on a good starting setup. I end up spending a fair bit of time at each contests reprogramming or adjusting people's setups. Then they fly them, and after a few flights I get a comment that the plane is a whole new plane, flying better and easier than ever before. I usually do 2-3 per contest, but it has been as many as 5 once.

Ok, so I guess it is time for me to tick some people off.

Part I

Efficient throws for smooth flying:

Flaperons aileron function +/- 3/8".
Rudder +/- 1/2".
Elevator - determined by testing.

Aggressive throws for tree huggers:

Flaperons aileron function +/- 1/2".
Rudder up to +/- 1".
Elevator determined by testing.

That's the easy part.

Setup procedure:

Start with verifying all control linkages are tight and that the servos are up to the job. Note that a D-47 on rudder is NOT up to the job. I know, those that do it won't believe me... Just switch to something like an SM-22, JR-241, JR-285, etc, (and there are a number of other good choices and good compromises for space challanged installations). You will find your launch is straighter and higher. If you needed a rudder preset before, you won't now.

Verify that the desired travel range is accomplished through utilizing nearly all of the servo's travel range. If not, then the power at the control surface, and the precision at the control surface, are reduced. For our purposes, that power is worth more than the speed of travel.

Take the transmitter sticks and set their spring tension to the max. With soft springs, one CANNOT feel the location of the control surfaces with sufficient precision. Soft sticks sell radios. Stiff sticks win competitions. If the max is not high enough, get stiffer springs. They are available for pretty much any radio.

As a philosophy, disable every control on the transmitter that you do not intend to use. Functioning controls can get bumped...

Disable all exponential, all dual rates. Zero out all trims in all flight modes. Get rid of any differential. Zero out offsets for flight modes.

Have a program that supports flight modes for launch, speed, cruise, and float. There needs to be a launch preset switch that enables the launch mode. There needs to be a three position switch for selecting between speed, cruise, and float. Why a single three position switch? Less controls to fiddle with, so simpler operation. If it isn't simple it takes thought. If it takes thought, then you are not flying the plane.

That gets rid of the preliminaries. Now on to the plane setup.

Start with the flaperons. Set the flap stick (it IS on a stick, right??? It should be on a stick and ONLY on a stick) and set it at half stick. Now set the servo subtrims for these two servos to match their angle of droop. This can be seen clearly by looking from the back of the plane with the tail held high. Match them exactly. Wiggle the sticks to make sure.

Now move the stick back up. Adjust the servo travel limit in that direction so that the flaperons are even with each other. Now move the stick full down, and repeat for the other direction of servo travel.

Now when the flap stick is moved, these surfaces should exactly match each other's travel. I've yet to have someone hand me a plane to help program where this was the case.

Now with the stick back up at the top, set the aileron travel. On some radios, this is through setting the dual rate. Keep the dual rate settings the same for all flight modes and all switch positions, if you can't disable the switch.

When the aileron stick is moved to its limit, both ways, there should be no evidence of the travel being clipped off. If there is, then adjust settings to get rid of that. Clipping of aileron travel with the flaps up is NOT ALLOWED. Clipping of aileron travel with the flaps down is a feature, if you want it. It improves roll control in that state.

Now with the flaperons up, move the aileron stick. Observe the relative travel of the left and the right aileron. Do they travel equal distance? If not very very close, then adjust differential settings to get them to travel equally. Note this is a preliminary setting that gets finalized in testing. Call it the vanilla setup.

Now go to the rudder. Set the servo subtrim so the surface is centered. Adjust the endpoints so you get the desired travel range. This is at a minimum 12mm, regardless of rudder chord percentage. Yes, a funny result. If you want the analysis on this, look up one of my analysis threads. Actually, for an asymmetric airfoil vertical stabilizer, you want a few percent more travel in the "down" direction than in the "up" direction. 12mm away from the throwing blade and 13mm towards it, for instance. That would be a minimum travel setting. Realize that any travel beyond this level causes rapid increase in drag. It should be avoided in flight. HOWEVER, if one is playing tag with treelines, then in some instances drag may become a far lesser consideration to dodging a tree! So one may want to increase the travel beyond this level, but don't bother going beyond an inch. Just try not to use that extra travel except for emergencies, ok?

Now on to elevator. Set the downward travel to about as much as you can get. Don't jam the elevator into the boom (seen that a lot) but get what you can. At the top of the launch, the plane is flying pretty dead slow. It can take a lot of travel to plop the plane over to horizontal with authority. That's about the only thing we use down travel for!

Leave up travel where it was for the momemt. It will be tuned in during flying.

End Part 1.

Gerald

Posted by kgantz:
While waiting for parts to be delivered I am still reading a lot about how to initially set up ailerons / flaperons. One of the best descriptions I've found is this post in the DLG forum.

After reading this post, I understand that flaperon trim and aileron trim are handled separately by the radio. This is not obvious to people who have not done this before but, I guess because you are working with 1 moving surface but it has 2 jobs, trimming has to work a little differently for each job! So now my question is, on the Spektrum radios--DX 9 in my case, is the aileron portion of the adjustment done with Dual Rates as suggested by the poster or is there a different way.

Posted by kgantz:
I'm starting to see the light at the end of the tunnel in programming my first aileron equipped DLG on my DX9, but I still have a few questions that I don't see answers for in the manual.

1) In the Camber System menu, what is the purpose of "Offset"?

2) Do I understand correctly that the purpose of the Camber System menu is to set up flap throws (assuming your servo travel limits are already set) and inflight "tweaks" to camber in certain flight modes by using slider switches or other switches of your choosing? And the other camber menu, Camber Preset, is also to change camber settings in various flight modes, to preset positions, while at the same time making appropriate elevator changes to maintain level flight? Does "offset" mean the same thing in this menu as it does in Camber System?

The flap portion of my flaperon radio program seems to be working nicely. The flaps have plenty of travel, they move equally and stop even with each other in the up and down direction and anywhere in between. The aileron portion of my program needs some work and I'm not sure how to get where I need to go. I have a little too much travel in both aileron directions. I'm aiming for 12mm of up throw and 8mm of down. I have about 20mm of up throw and about 25mm of down. I know I should not mess with the servo travel or sub trim because both sides are even with each other and my adjustments do not need to be made at the ends of servo travel, but rather somewhere in the middle. I have read that I need to set the aileron travel by using dual rates and differential but, so far, I have not been successful.

For both the Dual Rates and Differential adjustment I will use the switch setting of "On" because I do not want differences in travel (at least not yet) across the flight modes.

The Dual Rate screen looks like it is set up to apply a percentage of travel reduction (not really "rates" at all) to the left and right aileron independently or at the same time. If I put a +25% in both boxes I'm reducing both the up and down travel for both ailerons by 25%, correct? Now I noticed that if I push the stick to the right I can highlight just the number in the box on the right side of the screen. At the same time, the right aileron moves up since we are doing a right turn. If I adjust just that right box, am I changing both up and down travel of just the right aileron?

Lastly the Differential menu is supposed to let me adjust the "difference" between up and down travel across both ailerons. If I use a positive differential, it is supposed to decrease the amount of down travel without affecting the up. I'm assuming it should make that decrease happen on both sides equally, is that true? In my case I have a bit more down than up and and I want to have a bit more up than down so I will be using a positive number.

Is it better to do Dual Rates before Differential, or vice versa? That is, is it better to reduce the full travel of the ailerons to get the largest throw set first and then use differential to get the travel right in the other direction, or is it better to get the difference going in the correct direction first and then reduce the travel with Dual Rates? Or does it even matter?

Lastly, why does it say "Pos" at the top of the Differential screen? There are no positions to be set, and no switch positions to report on and it never indicates anything.

Reply by Andy Kunz:

Quote:

Originally Posted by **kgantz** ▶
1) In the Camber System menu, what is the purpose of "Offset"?

To position the start of control differently than normal. Set it to 50%, then move the stick, and notice when it takes effect.

Quote:

2) Do I understand correctly that the purpose of the Camber System menu is to set up flap throws (assuming your servo travel limits are already set) and inflight "tweaks" to camber in certain flight modes by using slider switches or other switches of your choosing? And the other camber menu, Camber Preset, is also to change camber settings in various flight modes, to preset positions, while at the same time making appropriate elevator changes to maintain level flight? Does "offset" mean the same thing in this menu as it does in Camber System?

Camber Preset is to select the base position of the trailing edge and elevator compensation based on a switch position (usually flight mode). These are the "optimal" settings of the airfoil for that mode. The Camber System is to tweak that for the conditions of this flight, in real time. And yes, Offset means the effective starting point.

Quote:

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Use the Dual Rates. This is the control for balancing the mix of the various inputs to a surface relative to one another.

If you're using a real small number, you should consider fixing the mechanicals of your aircraft first to reduce travel.

Quote:

The Dual Rate screen looks like it is set up to apply a percentage of travel reduction (not really "rates" at all) to the left and right aileron independently or at the same time. If I put a +25% in both boxes I'm reducing both the up and down travel for both ailerons by 25%, correct?

Not "by" 25%, but "to" 25%. Only 25% of the normal throw will be available. Note that it can INCREASE travel also, not just reduce it.

Quote:

Now I noticed that if I push the stick to the right I can highlight just the number in the box on the right side of the screen. At the same time, the right aileron moves up since we are doing a right turn. If I adjust just that right box, am I changing both up and down travel of just the right aileron?

On the Dual Rates screen that is affecting both ailerons when moved in the "left" or "right" direction.

Quote:

I'm assuming it should make that decrease happen on both sides equally, is that true?

Both will be affected, yes. That's the purpose of the Wing Type option - it takes care of all the linking of surfaces for you automatically.

Quote:

Is it better to do Dual Rates before Differential, or vice versa? That is, is it better to reduce the full travel of the ailerons to get the largest throw set first and then use differential to get the travel right in the other direction, or is it better to get the difference going in the correct direction first and then reduce the travel with Dual Rates? Or does it even matter?

Set things up mechanically first, then set maximum travels, then adjust balance of multiple functions.

Quote:

Lastly, why does it say "Pos" at the top of the Differential screen? There are no positions to be set, and no switch positions to report on and it never indicates anything.

If you change to a switch with multiple positions (what Pos stands for) then it will be intuitively obvious. It only looks funny because you're using On instead of a physical switch.

Andy