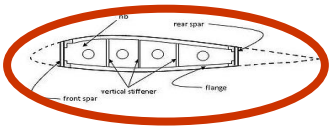
The Spare Rib News



KAPITI AEROMODELLERS' CLUB

The monthly newsletter of the Kapiti Aeromodellers Club

April 2022

www.kapitiaeromodellersclub.org.nz

Kapiti Aeromodellers Club group

The Presidential Scribe

Welcome to another newsletter. This weekend we lose daylight saving and one would hope the constant southerlies that have come with. A friend who has lived on the Kapiti Coast for 40 years can't remember as many southerlies has, we have had over the last few months.
This has made for many fewer flying days as we would like, as a S.E. really batters the strip.
We could complain, but nobody listens.

I reflect on the fact that when I wake up in the morning, I don't have to think of fighting a war or getting my family out of the country.
We are lucky in many ways.

Covid has been with us for 2 years now.
So, what does it look like for us?.
I know Covid is present in our retirement villages and village hospitals. It is in our neighbourhoods. Whilst Auckland seems to have peaked, we are on a bit of a roller coaster here.
For the past month, I've been tracking the active cases in total for Capital and Coast and active cases for us on the Kapiti Coast (Paekakariki to Otaki). Locally, these were dropping off, but now seem to be surging a little again. Perhaps the Mexican wave effect they have talked about.
Capital and Coast put an update out on the FB page twice/week.
So, what does that trend look like?

Date	Kapiti Coast	Total Capital and Coast.
3/3	399	6193
7/3	790	11764
10/3	1336	17433
14/3	1962	23263
17/3	1732	15858
21/3	1052	8433
24/3	1082	7966
28/3	1208	7606
31/3	1233	6843

It's picked up a bit locally of late, but over the DHB area is trending down.

As a committee we have a duty of care to members in not putting members at risk and we have been very cautious. Our decision to postpone the AGM was taken at a time we didn't know what the circumstances would be mid-April. Postponing to May makes sense and I'm sure things will have changed again by then.

Wanted.

Croz is on the hunt.
Wanted to borrow for a few months, 'Veron Deacon' plan.
Contact Ian Crosland 2972917

It's all about trimming.

When James was doing the trimming flights on his Extra, I was intrgued to note that he had a page of situations to check out and what would be applied to trim the model in each of the attitudes listed. When done, he then checked off the list.
I asked James to put something together for this publication, but he pointed me to a document which is on our website.
The only one of these I knew anything about, was Andrew instructing me to fly an inverted 45 deg upline and if the tail dropped, was tail heavy, if the nose climbed, it was nose heavy and the ideal was for the model to gradualy fall away nose first.
So, to save you all from bashing about the website, here is the document for your perusal and betterment.

Trimming guide by Peter Goldsmith.

Trimming.

You can trim the grass, trim the turkey or even trim the tree but in the RC world, "trimming" is mostly thought of as something you do with a new plane on its first flight to get it to fly straight and level, hands off. "It needed a few clicks of up elevator and a few clicks of right aileron, and it was good to go" is a phrase you may have heard or something pretty close to that. But is there more that you can do to get your plane to fly better? Oh yes. This article will describe a systematic process that will make your aerobatic RC model fly better and allow **you** to fly better.

This article will describe the trimming process developed by Team Horizon manager and TOC competitor Peter Goldsmith and what follows is a description of his "system". Several years ago, a friend of mine, Mike Hurley, was writing the Scale Aerobatics column in the AMA magazine and he interviewed Peter and published his techniques. That's when I was first exposed to this great trimming process. I'll be borrowing very heavily from Mike's article. If you Google "Peter Goldsmith trimming article" you'll find it but it's pretty long and I'm going to try to give you the short version.

About The Trimming Process

First thing that Peter says is that you won't ever find a perfectly trimmed plane and that's not the goal. It's pretty much impossible to do. The goal is to reduce the pilot workload so that you can concentrate on putting the plane where you want it to go and not spend energy fighting against what the plane is trying to do.

Another important note is that you must follow the recommended steps in the order shown. Each time you change something on the plane it can affect it in ways you aren't expecting. For example, balancing the plane, (determining the correct centre of gravity or CG) is the first step and if you get halfway through the process and then change the CG you have to start at the beginning again because the new CG has thrown off the other adjustments you've made.

This trimming process is intended for aerobatic planes – scale aerobatic (Extra, Yaks, etc) or pattern planes – but it may have applications in other types too- I have never tried.

To fully take advantage of this trimming process you'll need a radio that has the ability to "mix" channels. An example of a mix is when you input rudder the rudder moves as commanded BUT the elevator adjusts ever so slightly as well. Most radios these days have at least basic mixing capabilities.

You have to commit to the process. By that I mean it takes a lot of flights to get through it. It can take several flights on the plane just working on the first step: adjusting CG. You won't get it done in one day or even a week. Work on parts over time and go at your own speed. I've spent weeks trimming out a plane, dedicating a flight each time I come out the field to trimming, just continuing down the list.

Servos and Linkages

Of course, the better the servo you use the better your plane can perform. By better I mean…

- How fast is the servo (faster is better)
- How does it centre (the servo centres exactly at the same place every time you neutralise the stick)
- How much torque does it put out (the more the better)
- What kind of servo resolution do you have (the finer the better-this can be influenced by linkage setup)

You don't necessarily need to buy the best, most expensive servo you can find. There are many fine servos available now and it really boils down to what you want for yourself, and the trimming process will benefit you regardless of the servos you use.

You want tight, slop free linkages and strong pushrods that don't flex.

No matter what servos you use or what linkages you have, setting them up mechanically so that you're realizing the full potential of your servos is easy and important. For example- don't use a longer servo arm than necessary only to then restrict the servo throw in order to achieve the surface deflection you want (this also reduces servo resolution). Instead, connect your pushrod as close as you can to servo centre while maxing out the servo travel for more leverage and tighter servo resolution while getting the surface travel you need. How much surface travel should you have? That can be a personal preference, but I find for normal aerobatics (not 3D) I need no more than 10-15 degrees elevator, maybe 20-25 degrees of aileron and 30-35 degrees of rudder to start then adjust as I get used to the plane.

The Process and The Order:

1) Balance / Adjust for proper Centre of Gravity (CG): Is the plane nose heavy, tail heavy or just right?

2) Lateral Balance: Is one wing heavier than the other?

3) Engine thrust- right/left

4) Engine thrust- up/down

5) Aileron Differential- how much “up deflection” vs. “down deflection” in your ailerons

6) Throttle to Aileron mix: When you move the throttle, the aileron trim adjusts

7) Throttle to Rudder mix: when you move the throttle, the rudder trim adjusts

8) Rudder to Aileron mix: when you move the rudder stick the aileron trim adjusts

9) Rudder to Elevator mix: when you move the rudder stick, the elevator trim adjusts

10) Down line mix: making adjustments so that when the nose is pointed straight down the plane continues to maintain that straight line down and doesn’t pull out on its own

Let’s get started – remember, follow in the order described from 1 to 10

Trimming Step	Maneuver	What To Look For	What To Do
1. Center of Gravity (CG)	Pull to 45 degree up-line, release elevator, observe flight path	A. Nose rises B. Nose gently falls C. Nose falls quickly	A. CG too far aft, add nose weight B. CG is just about right C. CG too far forward, add tail weight
Notes: • Start with the “recommended” CG for your model • CG is largely a matter of preference- once you get to “about right” you can adjust to your comfort level • For precision aerobatics, a little nose heavy is better than a little tail heavy • If your model is very sensitive in pitch with minimal control throw, you are probably tail heavy			

Trimming Step	Maneuver	What To Look For	What To Do
2. Dynamic Balance (“Heavy Wing”)	Starting high, push to a vertical down line and throttle back, after about 3-4 seconds pull sharply to upright- observe if one wing drops- do this several times	A. Left wing consistently drops B. Right wing consistently drops C. Wings remain level	A. Add some weight to the right wingtip B. Add some weight to the left wingtip C. Nothing- you’re good
Notes: • When you pull, pull hard enough for a tight quarter loop to upright but not so hard that the plane will snap • Be careful not to input any aileron when pulling back on the elevator			

Trimming Step	Maneuver	What To Look For	What To Do
3. Engine Thrust- Right/Left	Fly overhead directly into any wind, pull to a vertical up-line and observe model as it climbs without giving any corrections	A. Plane veers to right B. Plane veers to left C. Plane continues on a straight line	A. Add left thrust B. Add right thrust C. Nothing- you're good
Notes: • Works best when you have a wind coming straight at you (crosswind) and you can fly straight away, pull up and see the top of the plane • Typically any aerobatic plane will start out with some right thrust- a 2-3 degrees and sometimes "adding left thrust" is actually done by removing some of the right thrust • Keep adjusting until you can get long extended up-lines with the plane continuing to climb without veering one way or the other			

Trimming Step	Maneuver	What To Look For	What To Do
4. Engine Thrust- Up/Down	Fly straight and level across the field at high throttle making sure that the plane is trimmed for level flight- quickly chop the throttle and observe flight path	A. Plane pitches up B. Plane pitches down C. Plane remains level and slowly begins to lose altitude due to reduced speed	A. Add up thrust, re-trim for level flight, re test B. Add down thrust, re-trim for level flight, retest C. Nothing- you're good
Notes: • When you have too much down thrust and trim for level flight you are carrying unnecessary up elevator trim to maintain altitude when flying with power. This condition shows itself when you cut the power. Once you add up thrust to correct you'll end up needing to take out some or all of the up elevator trim- you'll see that when you retest			

Trimming Step	**Maneuver**	**What To Look For**	**What To Do**
5. Aileron Differential (more throw in one direction or the other- ex: ailerons have 20 degrees of up deflection but only 15 deg down)	Fly overhead directly into the wind or downwind, pull to a 45 degree line, give full left aileron and perform one roll	A. The plane "walks to the left" B. The plane "walks to the right" C. The plane remains on the same line	A. Reduce down aileron throw B. Reduce up aileron throw C. Nothing- you're good
Notes: • Differential is required when the drag of the "up-going" aileron is different that he drag of the "down going" aileron • The example above was with left aileron- do it both ways and fix for both right and left aileron			

Trimming Step	Maneuver	What To Look For	What To Do
6. Throttle to Aileron Mix	Climb to high altitude, fly overhead go to idle and push to a down line. Hands off the sticks and watch for any rolling before pulling out	Look to see if the plane rolls at all on the down line	Set up a mix in your radio so that the aileron trim changes at the low throttle settings

Notes:

- Most planes require a little bit of right trim at high throttle due to the rotation of the propeller – it wants to ever so slightly roll to the left (the opposite direction of the rotation of the propeller)
- The trim you put in for high throttle isn't needed at reduced throttle settings so you set up your radio so that the trim goes away as you reduce the throttle

Trimming Step	Maneuver	What To Look For	What To Do
7. Throttle to Rudder Mix	Climb to altitude, fly overhead, into the wind and push to a vertical down line for a few seconds- observe the plane	A. Plane veers to the right B. Plane veers to the left C. Plane continues to flight straight down	A. Mix in a little bit of left rudder that doesn't activate until near idle B. Same but right rudder C. Nothing- You're good

Notes:

- Assuming you bothered to trim for yaw (rudder) – most don't, your plane is likely trimmed for high throttle settings. At reduced throttle settings, the plane is likely to yaw differently
- This is a good mix to have active at only lower throttle settings (no mix at high throttle- it kicks in when you get below, say, half throttle)

Trimming Step	Maneuver	What To Look For	What To Do
8. Rudder to Aileron Mix	Fly wings level across the field in front of you then apply and hold right rudder	A. Plane slowly rolls to the right B. Plane slowly rolls to the left C. Plane does not roll	A. Mix in some left aileron with right rudder, retest B. Mix in some right aileron with right rudder, re-test C. Nothing- you're good

Notes:

- Description above is for right rudder – you'll need to trim for left rudder too. It works the same.
- Most people actually do this test on knife edge- but it's easier and just as effective to do it from level upright
- You can do it both ways- knife edge or upright- to be thorough

- You usually need in the neighborhood of 3%-8% mix to eliminate rolling with rudder
- The safest way to make adjustments is to land, secure the plane, make the mix adjustment on the ground, take off and retest- repeat until satisfied

Trimming Step	Maneuver	What To Look For	What To Do
9. Rudder to Elevator Mix	Fly wings level across the field in front of you then apply and hold right rudder	A. Plane pitches down B. Plane pitches up C. Plane does not pitch	A. Mix in some up elevator with right rudder, retest B. Mix in some down elevator with rudder, retest C. Nothing- you 're good

Notes:

- Description above is for right rudder – you'll need to trim for left rudder too. It works the same.
- Most people actually do this test on knife edge- but it's easier and just as effective to do it from level upright
- You can do it both ways- knife edge or upright- to be thorough
- You usually need in the neighborhood of 3%-8% mix to eliminate pitching with rudder
- The safest way to make adjustments is to land, secure the plane, make the mix adjustment on the ground, take off and retest- repeat until satisfied

Trimming Step	Maneuver	What To Look For	What To Do
10. Down Line Mix	Climb to altitude, fly overhead with the wind to the side, push to vertical downline, center controls and observe path as the aircraft dives	A. Plane pitches towards canopy B. Plane pitches towards belly C. Plane stays perfectly on track of vertical downline	A. Mix in a little bit of down elevator (1-2%) at idle B. Mix in a little bit of up elevator (1-2%) at idle C. Nothing- you're good

Notes:

- In almost every case, the plane will pitch toward the canopy (begins to level out)
- Let the aircraft continue on the downline for several seconds
- Mix should not kick in until idle- anything above idle should not include the mix

We know we all cant be a James or Phil etc but applying these trimming guides will give us a better-behaved model and in turn, improve our confidence in flying.

It,s the end of March.

It's the end of march and end of daylight saving.
So what have the last few months looked like?
We decided to adopt an evening flying night, being Wednesday. Over thye course of the summer the decent Wednesday nights could be count on less the one hand. We started off positive, but the wind wore us down. Our last Wednesday was this week, 30th March. James and Andrew gave it a spin.

For once conditions were good, although they were gone by 7 as it got too dark.

←

Thursday 31st dawned the best day for sometime and many came out to play.

→

Oh, for more days like this.

Old men's corner…

Lunch on the deck.

No need to fly when you can watch somebody else.

Noise testing

I recently sent out a club notice about noise testing at the strip.

I said I would put more detail in the newsletter.

The last time we worked through this, Don did a lot of testing over an extended period. Although the final report covered the larger models, a lot of smaller models were covered during the process. The report was eventually developed into a format suitable to become part of our licence application. (If anybody would like to see that, contact me and I'll send you a copy).

Noise is something we must take responsibility for at our strip. Too many strips have been lost in various parts of the country due to noise.

So, I make the following points.

1. This isn't about and individual, it's about everybody.
2. It's about reviewing noise at the strip.
3. The work a few years ago resulted in several models being modified.
4. There haven't been any complaints from the public, but we do know that the background noise can be heard far afield.
5. Models tested. No models are exempt as a rule. We would not, however, bother with electric. Last time we tested across a very large range.
6. Overtime all the larger models will be tested and many smaller ones. There is a process to the testing so that all readings for all models are taken using the same criteria.
7. Standards. There are standards we are trying to achieve. Model Flying NZ have a set of standards you can have a look at. If you go here, MFNZ - Model Flying NZ - Clubs you can click on the noise button and get stuff. There are also standards being pushed by IMAC which we will also be perusing.
8. Jets. There have been comments that jets are very noisy. Not necessarily so. It's a different noise and the jets are much quieter in the air than many smaller models.

What we did find last time was that most of the larger petrol engines (say above 50cc but depends) have quite inefficient exhausts when it comes to noise. Standard exhausts are jokingly referred to as noise deflectors in some circles.

We will also be looking to measure noise in the air. Engines unload in the air and prop tip noise becomes a real problem. It's one of the reasons why James has gone for a 3 bladed prop on the Extra and why they are now using a wooden 3 bladed prop on the Corsair which doesn't howl the same as the carbon fibre one did.

All of this will happen over time.

Any questions at this time, get in touch.

Steve.

P.S. My DLE20 was noisier than many larger engines. This was fixed by rolling a piece of aluminium into a tube, drilling holes in the upper part and inserting up through the exhaust to the top of the muffler. The join was then prised open to stop it falling out and a clamp on the exhaust itself helped make it tighter. Works a treat.

How lucky are we?

The Hawkes Bay club field is on a flood plane.
It's a large area which enables lots of activities.
The risk, of course, is flooding.
The recent weather events had that effect.
Their FB page showed the extent of flooding.
These photos lifted from their newsletter.
They have a lot of work ahead of them.

And yet more…..

I spied the following on the RC Aerobatics NZ FB page and asked the writer for permission to publish.
More food for thought..
Steve Johnson is an Australian who obviously follows this group.

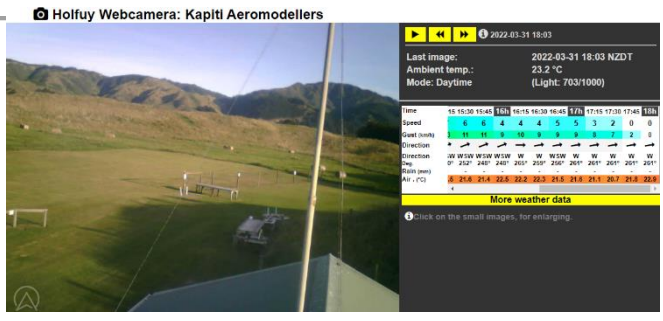
No, the other Left Rudder
"No! not that left rudder – the other left rudder!" a caller screamed to the pilot in the heat of the moment at a recent competition … and it got me thinking.
It takes real commitment and lots of practice to master the skill and learn the subtleties of which rudder, and the amount to use to correct line during a pattern schedule.
I hope through this discussion to highlight some simple ways to get the correct control input in the first place and help beginner to intermediate pilots in this aspect of flying radio-controlled aerobatics.
One thing for sure, a lot of people have had to suffer over the years to learn the art of rudder input. I have noticed one constant when I ask these skilled pilots how they do it so successfully; it turns out most have developed some simple rules based on the attitude of the model, so that when the pressure comes on, they do not have to think – they simply apply the principles.
If you think about it, just as with maintaining level wings, there is a small window to make the correction before the problem becomes too big to manage and you find yourself way off course with the scores ticking down like a NASA countdown behind you.
Note that this discussion is strictly in the context of calm conditions; I will prepare a follow up article on cross wind flying. it is important to reiterate that wings levels must remain the primary means of maintaining line and precise geometry. If you find yourself in a bind, and it becomes necessary, then rudder corrections can be introduced.

Here are some rules that I have learned over the years and that seem to work for me. There may be others and I would love to hear them and try them out, as they are gold dust to a pattern pilot. Some of these may work for you and some may not, but the process of continually testing and learning is key to improvement as a pilot.
So here we go.

- Upright flight - Rudder is Normal
- Rule 1 - Rolling from upright to inverted - rudder is opposite to aileron
- Rule 2 - Rolling from inverted to upright - Rudder follows aileron
- Rule 3 - Knife edge - If you see top of model, input rudder to tail to maintain attitude
- Rule 4 - Knife edge – If you see bottom of model, input rudder to nose to maintain attitude
- Rule 5A (Option) Inverted flight - either push nose away or pull tail toward yourself
- Rule 5B (Option) 'Wingtip Technique' visualise grabbing the wingtip with your hand (rudder stick) and drag the model back online by rotating the model around its centre in yaw
- Rule 6A Vertical climb – If you see the bottom of model, input opposite rudder to align.
- Rule 6B - If you can see the bottom of the model in a vertical climb and the nose is off the left or right; push the rudder stick to the nose - or the mistake - and it will correct back online

As I mentioned earlier, making the inputs takes time and practice. Small corrections made early and blended into and through the manoeuvre seem to work for me - Sometimes it costs points and sometimes not, but if you find yourself offline, and if done early, it will save you points in the overall manoeuvre.
I once heard that, for something to become habitual, it takes a month of practice. I am not sure if this is an old wife's tale or based in empirical science, but either way it seems to work for me. Keep this in mind when assessing your expectations of improvement.
So, what are some practical things you can do to practice rudder input?
1. Try flying past yourself inverted and using the wingtip technique. In your mind visualise your hand reaching up into the sky and grabbing the wingtip closest to you. Move that in the direction you want to nose to go. Do this from both directions. Practice over and over so it becomes habitual.
2. Roll the model at a reasonable rate and stop on opposing knife edges. You should aim for rudder inputs to become instinctual to hold the model's attitude. It is a good one to practice on the simulator, as you can really speed up the roll rate and not risk a 'whoopsie daisy' with the model ending up pointed at the ground, wagging its tail. You can also try this with knife edge snaps when you get more skilled and confident.
3. Fly past yourself on the line inverted and try rolling from Inverted to upright. Remember rudder follows aileron. Roll both ways, bounce the rolls, and fly in both directions on different line heights. Then roll upright and practice the same routine, remembering when upright rudder is opposite to aileron.
4. Fly simple turnarounds (half loops both inside and outside, half Immelmann's with either top or bottom exits, humpty bumps and stall turns, with or without rolls.) Make sure half the time you can see the bottom of the model in the verticals. Make small inputs and get used to where you can get the inputs in, so they are not super obvious.
5. Experiment with expo on the rudder. In a low expo scenario, the model will tend to jerk about the sky when rudder inputs are made. Also, one thing that has worked for me personally is a rudder delay slowing the servo down. This becomes more important with Contra rotating electric models when the rudder has far more authority.

These practice drills can be combined with the ones I covered in my previous article 'Straight and Level'; if you master them, flying competitive aerobatics will suddenly become a lot easier and much more fun.
Inputting left and right rudder controls will be like tying left and right shoelaces and your caller's voice can then return to normal conversation levels.



And that's it from me for another month.
As Don would say, fly hard, land soft.

Steve