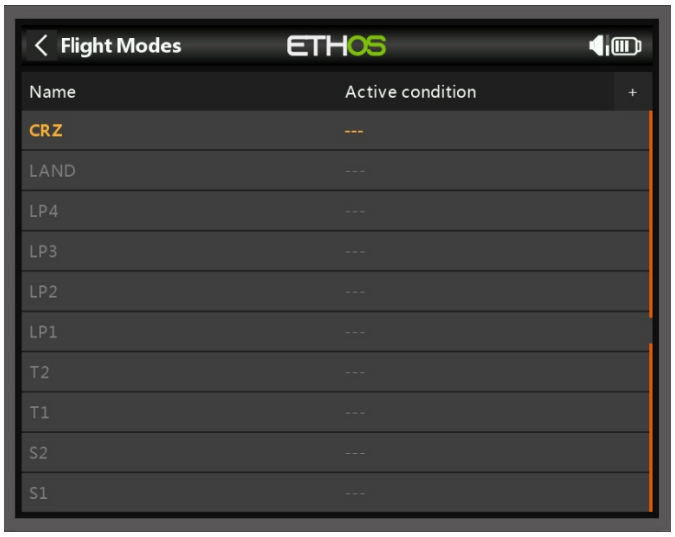
Here are the programming tips. I chose to high-light some of the more critical parts which can pretty much be used for reference through the rest. They all basically follow the same pattern.

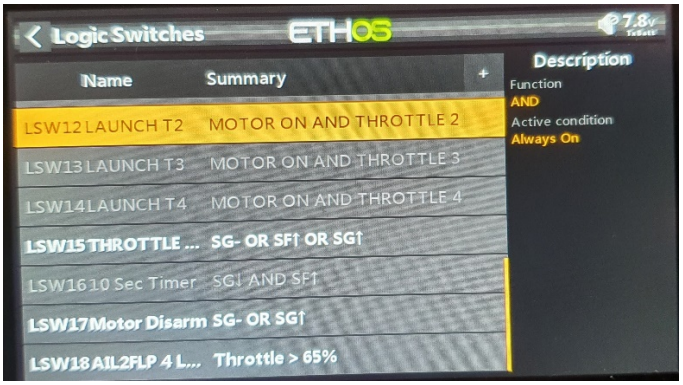
I. FLIGHT MODES

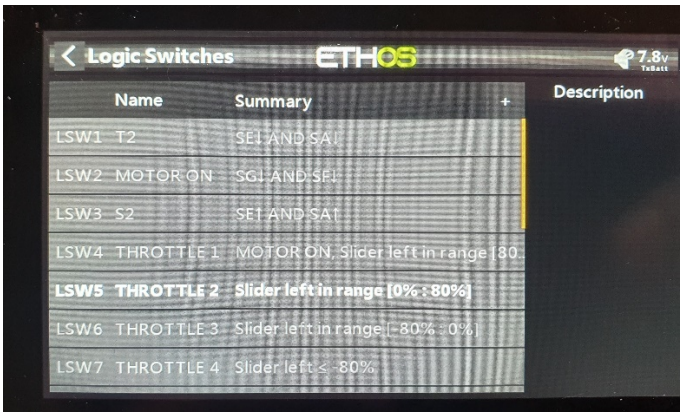


The first step is to think of and name all the various flight modes you will need. This is created in the FLIGHT MODES (FM) menu. (Airplane icon at bottom of screen)

Ranked Highest priority from top to bottom, except for the default FM (Cruise for our case), which is always at the top

II. LOGIC SWITCHES





Next is to scroll left to second page and assign switches to FM. I make every switch a logic switch, even a simple on/off one.

We have to put some thought into this since FM switches should correspond to what we are actually doing on the radio.

For instance, I have my launch sequence broken down into 3 parts, with 3rd part having additional FMs.

1. is to arm the motor (using SG)
2. is to turn on the motor at launch (using SF)
3. is motor control using Left Slider, broken down into 4 sections for:

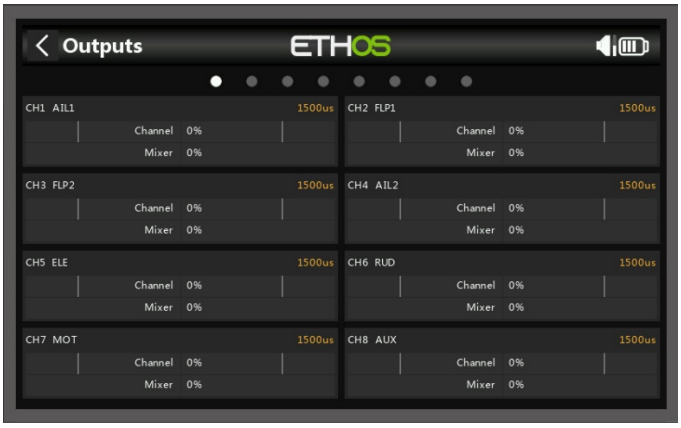
a. idle throttle – Thermal 2 camber

b. low to med – Cruise camber

c. med-high – Speed 1 reflex

d. high - Speed 2 reflex for dashing

III. OUTPUTS

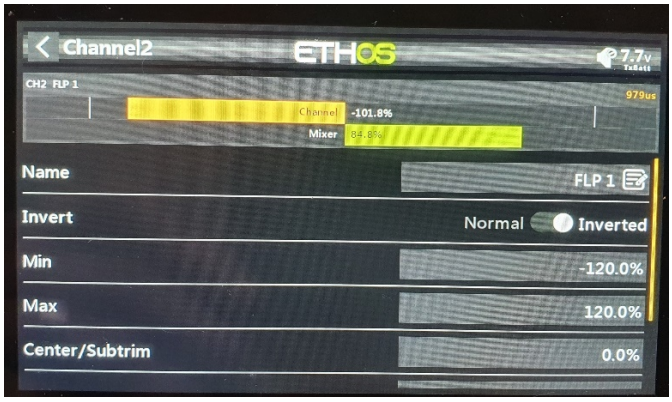


In this menu we assign channel mapping and global servo throws (min and max end points). I set all control servo throws to 120% as explained in post 1.

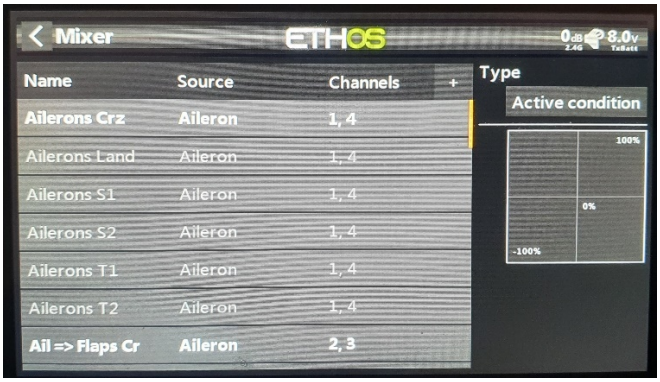
Also, channel mapping is named from a perspective of top view, left to right. Hence:

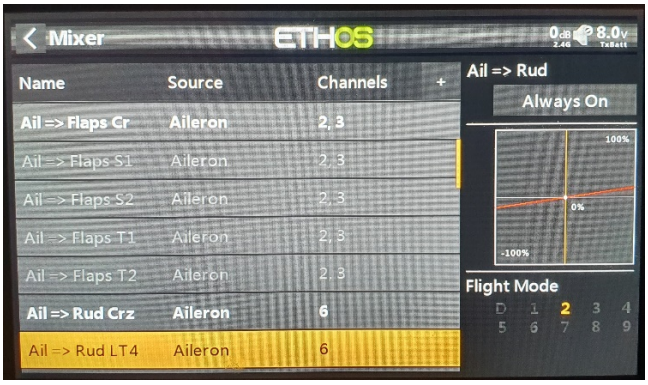
1. first control surface is left ail (AIL1), followed by…
2. left flap (FLP 1)
3. right flap (FLP2)
4. right ail (AIL 2)
5. ELE
6. RUD

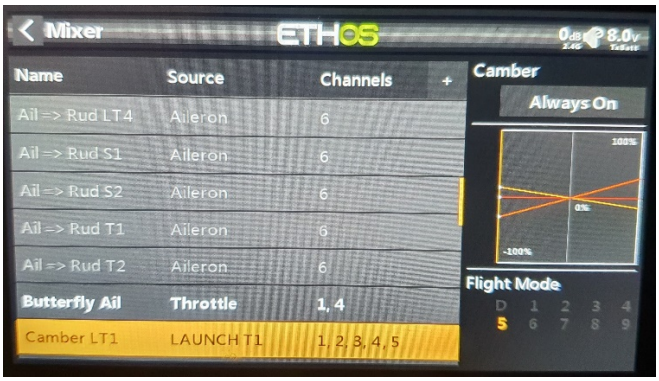
Tapping the CH# brings up the submenu of an output and the only thing to adjust here is the servo throws, subtrim, direction. Leave everything else alone. Do this for every control surface you have. Motor control can remain at +-100%.

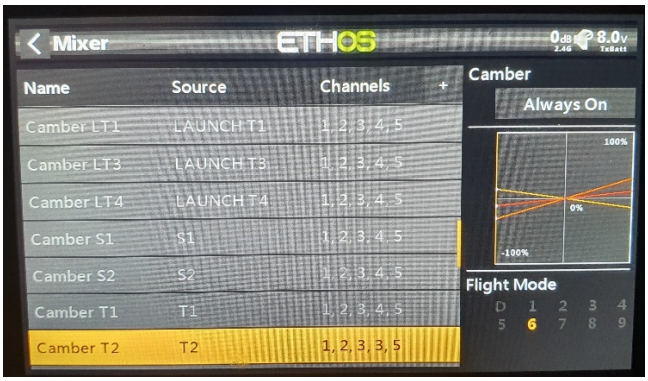


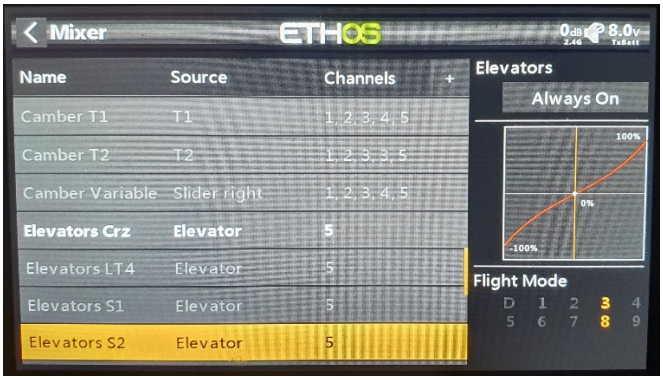
IV. MIXER

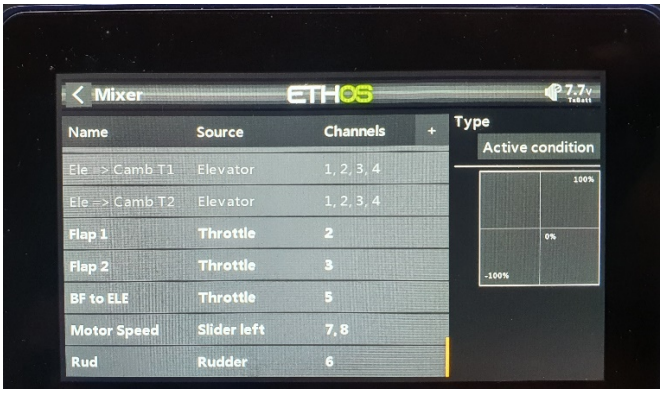












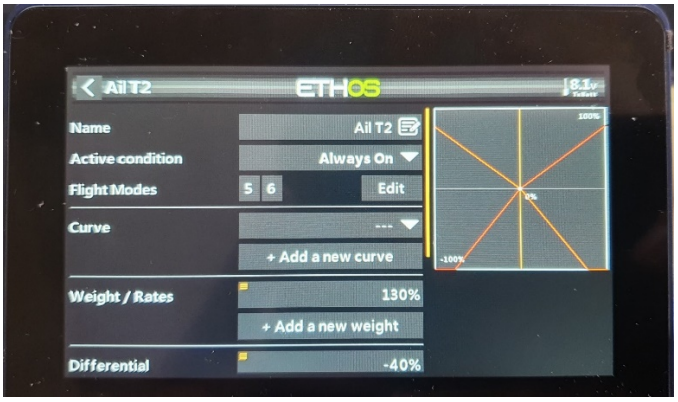
This is where the bulk of the programming is done. In this menu, we define how every control surface will act and interact in each and every flight mode.

There many ways to do things in here and I tried to do it in the easiest, most intuitive way with the lowest number of MIXERS. So, for instance, just the AIL would have 10 mixers since we have 10 FM. In our program we use 6 since the throws are the same for a few of the flight modes.

Of course, this is personal and you can use just 3 AIL mixers if you want since cruise, t1, sp1, have very small te camber deflections to begin.

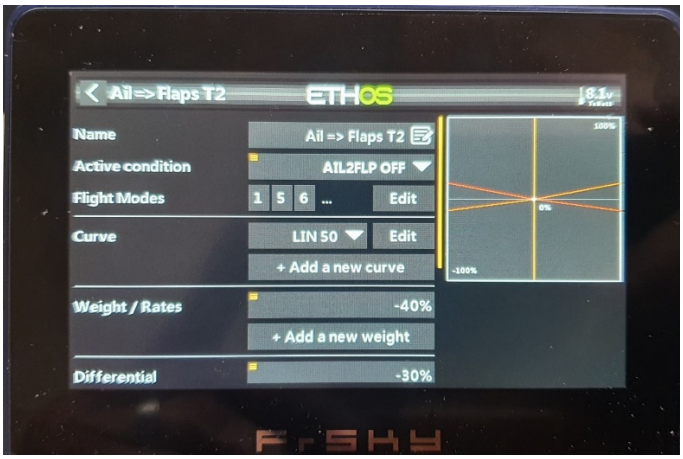
I chose to make all ten since it's not that much more effort.

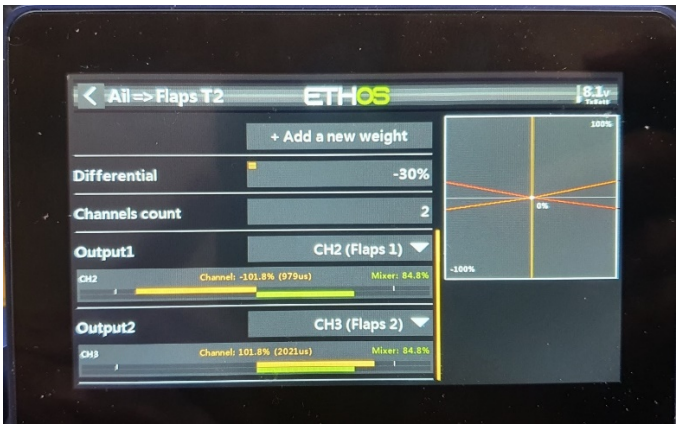
Take AIL deflections at T2 for example. Since the TE is already deflected down around 5° in T2, we need to have them travel up more than down (differential). Tapping this MIXER gets us into its submenu. From here we can assign:



1. FM it applies to
2. A curve (its linear @100% by default)
3. WEIGHT/RATES = The amount of throw
4. Differential amount.

Another Example – AIL to FLP MIXER in T2 (FLAPERONS)



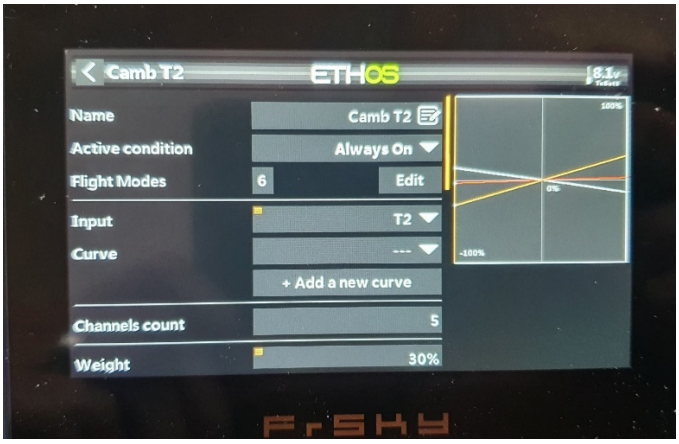


Here, we are actually making a mix in the traditional sense. Since the FLP will travel much less than the AIL in this mix, we have to assign a non-default curve. DIFFERENTIAL can be adjusted and needs to be since in T2 the whole trailing edge is down by ~5° already.

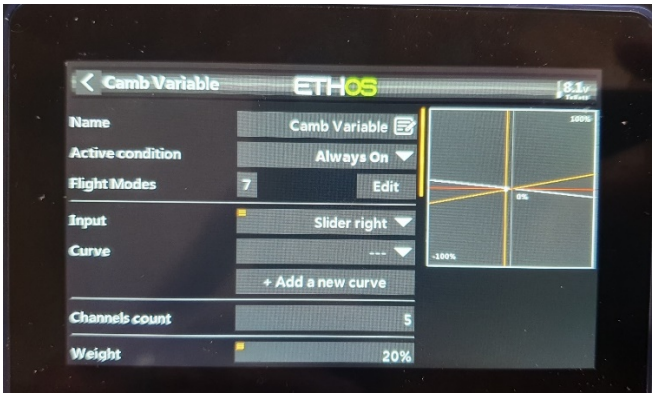
One note here is that AIL to FLP mix turns off in LAND MODE when throttle stick deploys a settable amount.

You should adjust it so it works to about 10° of down flaps deployment

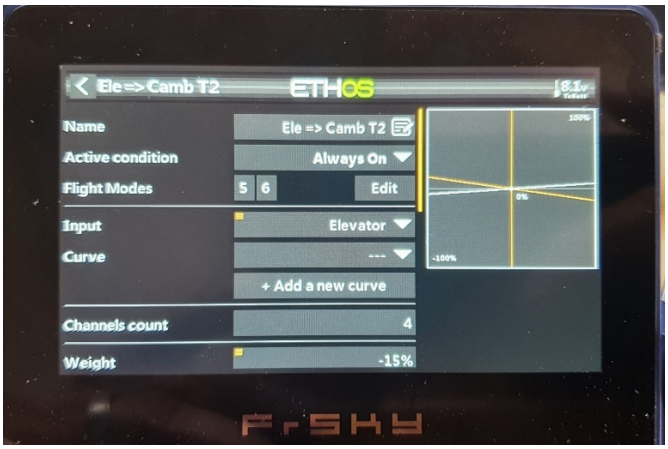
CAMBER is self-explanatory with the exception of Variable Camber. It's only variable in T1 settings.

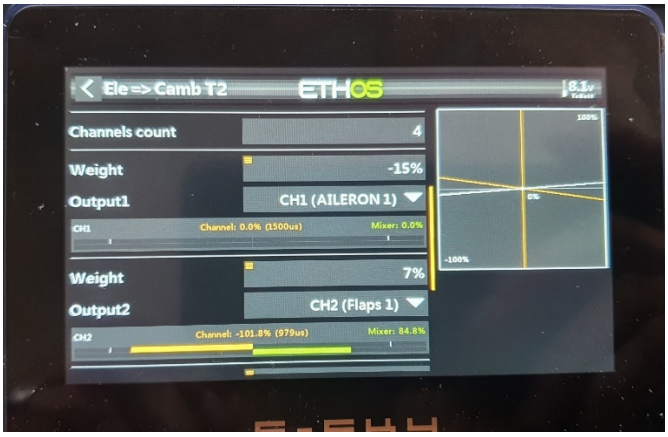


For Variable CAMBER, create a MIXER and use the right slider. You can see in the picture that it is only active in FM 7 which correlates to T1.



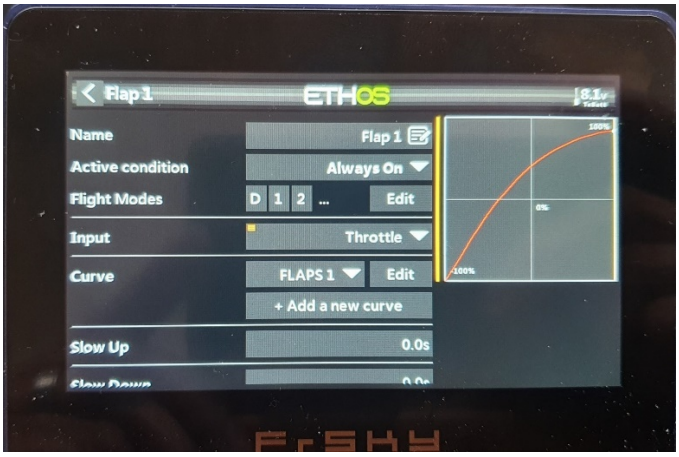
ELE to CAMBER





Pretty Simple here. Various curves for the various conditions.

BRAKES for LANDING - FLAP MIXER

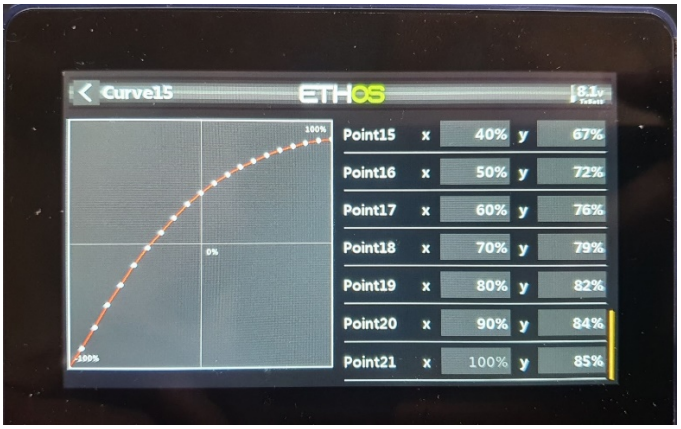


Ethos has a template called [B]BUTERFLY[/B] in which to work properly, needs 3 or more Butterfly Mixes. This is due to separate curves needed for the Flaps, AIL and ELE.

I chose not to use the canned mix, but rather a free mix for the brakes.

One of the things to note here is to have both flaps deploy the same amount when landing. If your mechanics are perfect (I rarely see this) you don't need this part. Otherwise, this is one way to program that.

I use a 21pt mix for each flap. Pretty self-explanatory here too.



I adjusted the curve to be a linear relationship to the stick. i.e. at 25% stick deployment it gives me 25% of flaps. So, if flaps drop 90°, the stick will:

@ 25% stick = 22.5°

@ 50% stick = 45°

@ 75% stick = 67.5°

@ 100% stick = 90°

Keep in mind that the stick itself has a 5% deadband, so keep the curve at the airfoil neutral side somewhat flat. In my curve, 100% stick is 85% , while 90% is only 84%. See pic more more clarity.

And, as noted earlier, Flaperons turn off at a set brake flap (throttle stick) deployment.

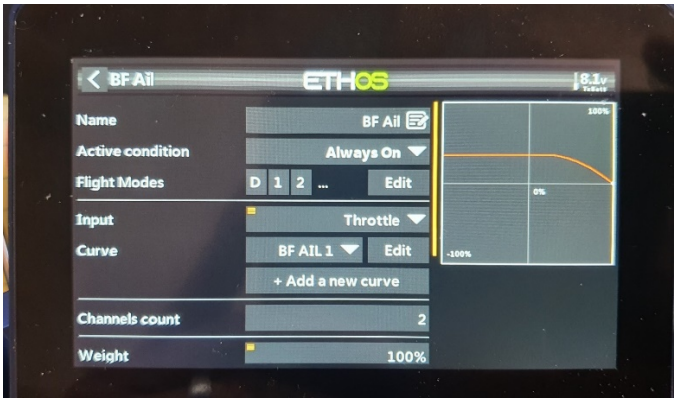
Brakes for AIL are labeled BF AIL. There are a few implementation options. You would adjust the curve for the desired response. I have it as # 2.

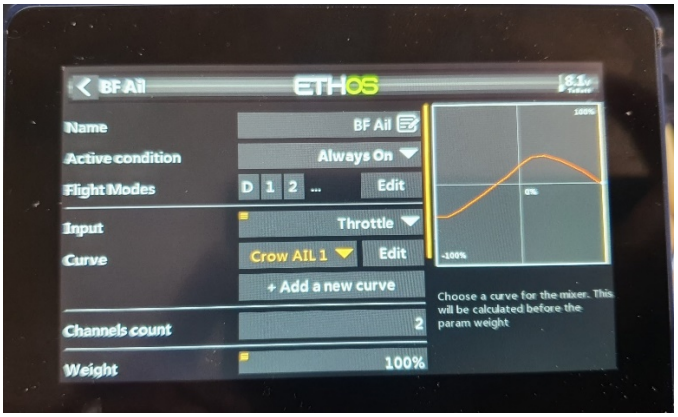
[B]1[/B]. Ail remains neutral while FLPs are deployed

[B]2[/B]. AIL follows FLP partially to whatever you like and remains in cambered position. (BF CURVE)

[B]3[/B]. AIL follows FLP to down, then back up through neutral to full up deflection (CROW CURVE)

[B]4[/B]. AIL deflects opposite of FLP, to the up side and remains in the up position (Negative BF CURVE)





I have the ELE comp MIXER for the flap brakes labeled as BF to ELE. I used a FREE MIX here so that I can add a slight delay to the ele going down and up when pulling and closing flaps respectively. From the F3J days, when coming in hot and pulling flaps quickly, I've seen instances where no delay results in smacking the model into the ground and stalling it when closing flaps quickly. Prob not as important for 5J bust still good practice.

Ok, here's a way of adding some useful "on the fly" mixing adjustments to the ELE 2 CMBR and Aileron Differential.

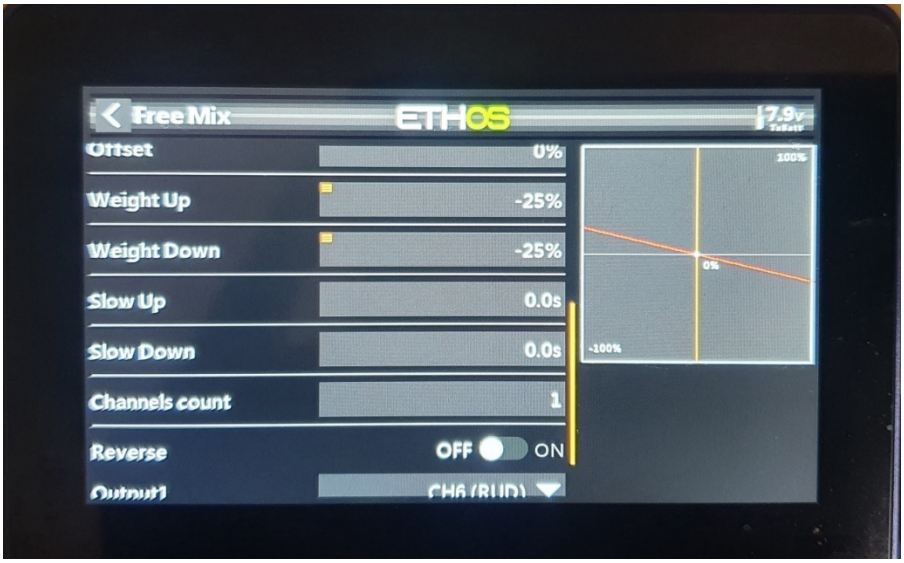
This can be used to tune in the model and once tuned, make it a hard mix by touching the OUTPUT box next to the trim control and setting as displayed in the output box.

Ok, a little background for info. In the TRIM menu, under Rudder, we can DISABLE the trim levers. However, doing this completely "turns off" the trim levers so they can't be used at all.


Trims
ETHOS
0dB 0dB 2.4G 900M 7.7V TxBatt
Trim Rudder
Trim Mode
Medium
Extended trims
OFF ON
Independent Trim per F
OFF ON
Trim Elevator
Trim Mode
Fine
Extended trims
OFF ON
Trim Mode
Disable
Extra Fine
Fine
Medium
Coarse

If we don’t turn off the trim levers, the rudder channel will be affected by any movement of the levers up to 25% of the servo travel (in non-extended trim mode). To navigate around this, we simply create a mix outputting -25%, to both left and right, outputting to the rud channel. See pic.

If we don’t turn off the trim levers, the rudder channel will be affected by any movement of the levers up to 25% of the servo travel (in non-extended trim mode). To navigate around this, we simply create a mix outputting -25%, to both left and right, outputting to the rud channel. This mix is labeled RUD TRIM OFF Mix. See pic.

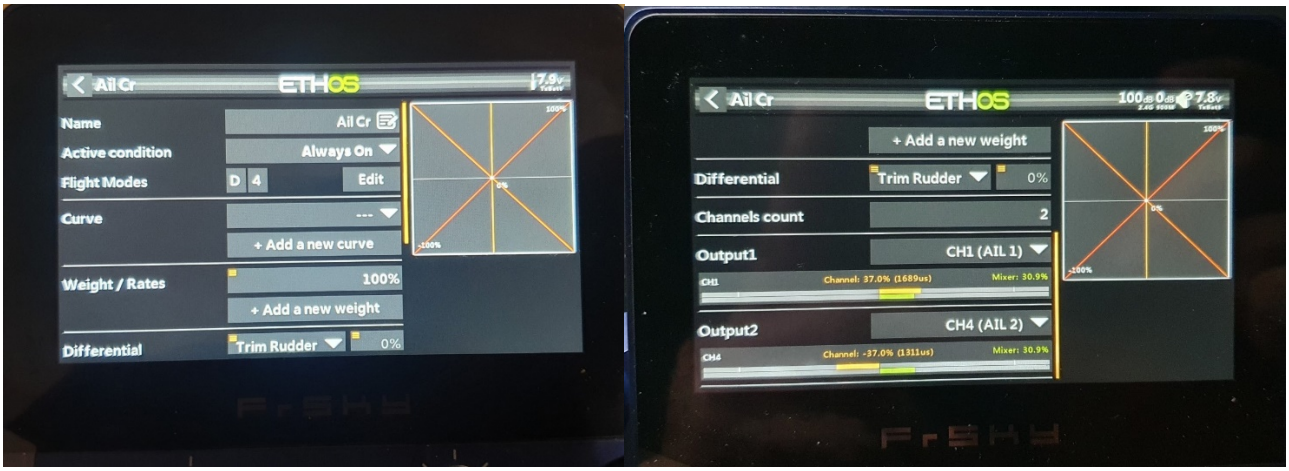


DO this also to the throttle trim lever.

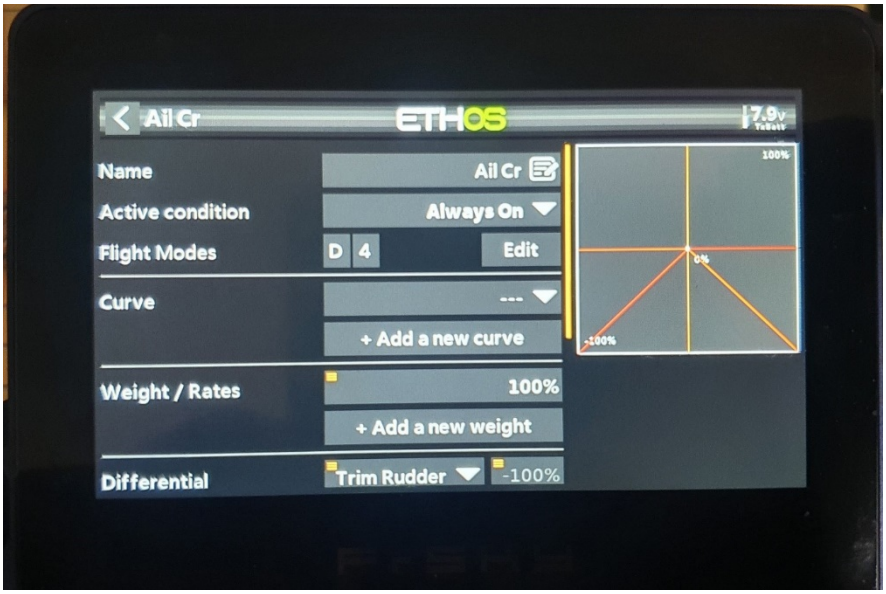
Now we can go use these levers for some fine-tuning adjustments.

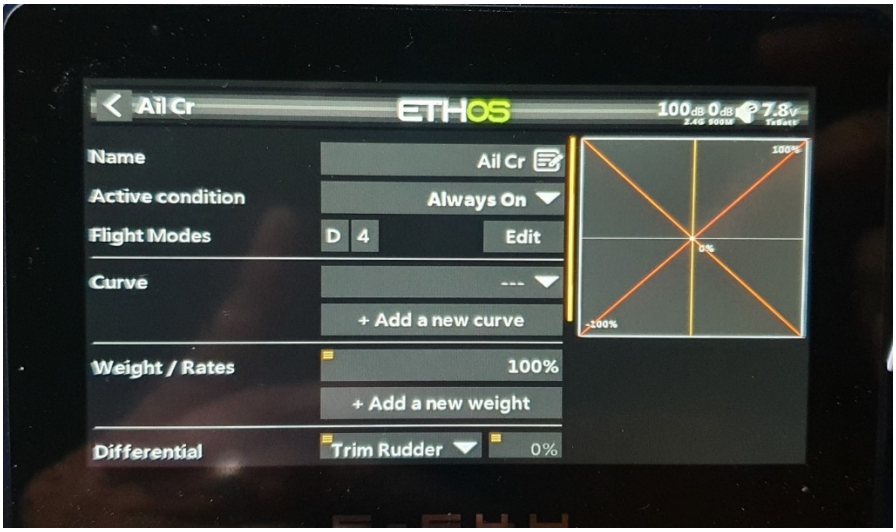
We'll do the differential mix first using the RUD trim levers.

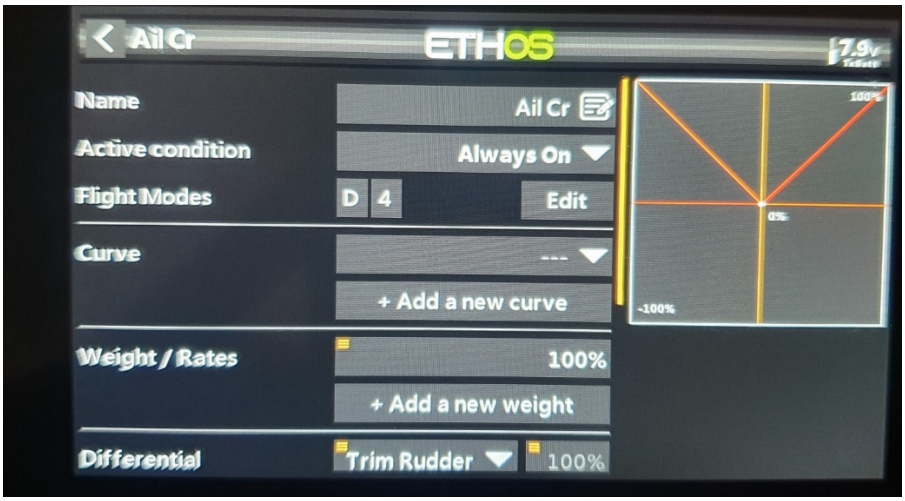
In each of the MIXER for AIL, where DIFFERENTIAL is, we change that to have the RUDDER TRIM LEVER control the output.



Here are some graphs to show the trim lever at -100, 0, +100. Note that the WEIGHT/RATES is at 100%



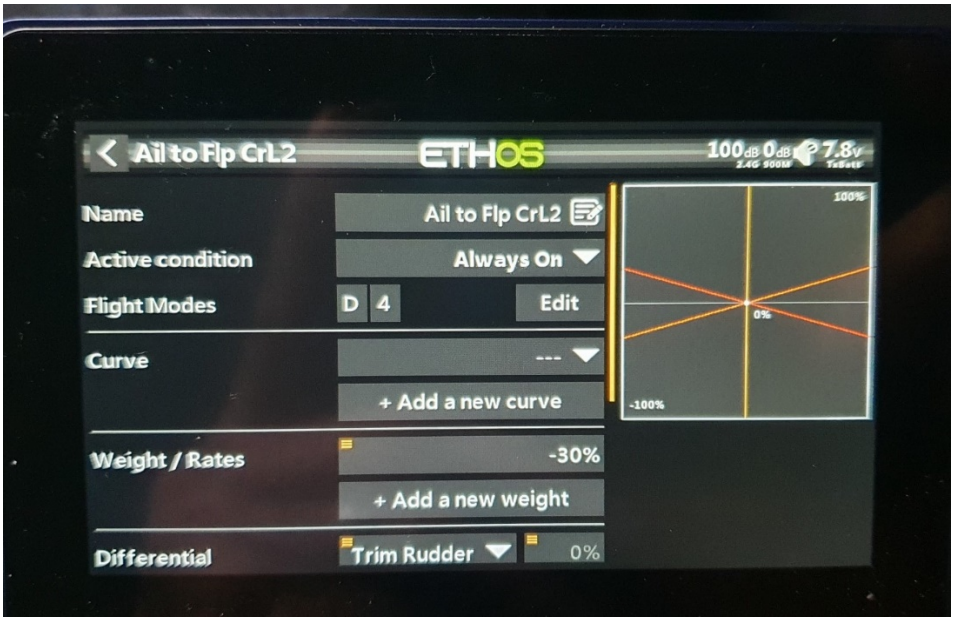




Then we also have to do that for every flaperon in every flight mode. NOTE that the WEIGHT/RATE absolute value is 30% (the neg could be positive depending on servo make and linkage geometry).

In practice I run very little diff, but by default thermal 2 will have the most.

The reason is I run ~ +- 15° from where wing's best LD is. This usually corresponds to my speed 1 setting of ~ 1° reflex, and use that as the envelope for AIL travel for all other modes. So say, if the ails are ready cambered 5°, the up going aileron will travel 21° up while the down will go another 9°.



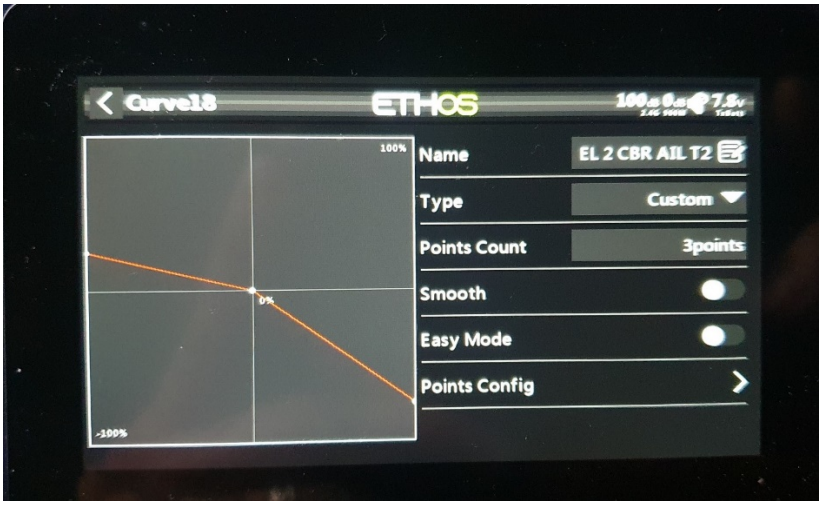
II. ELE to CMBR

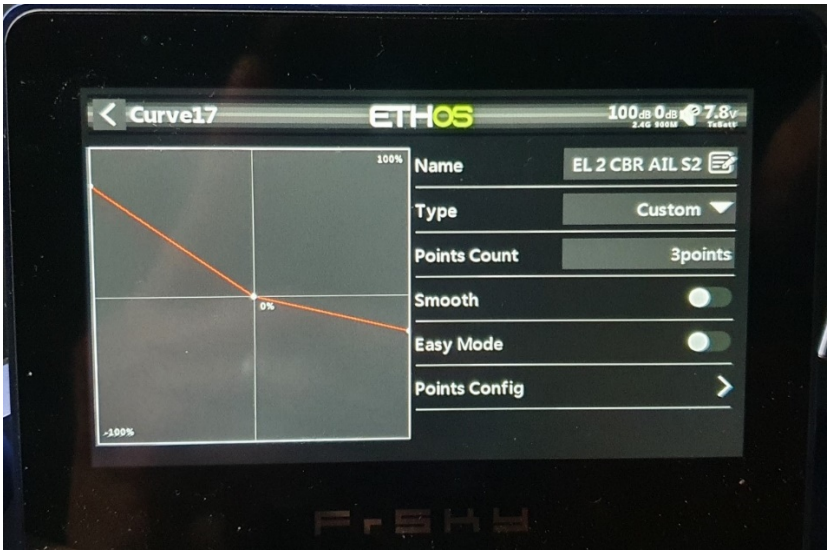
For the ELE to CAMBER mix, we will use the throttle trim.

For every MIXER that starts with the words EL 2 CBR… we need to apply the Throttle trim as the control.

Here is an example of the mix for elevator to camber of the ail in cruise mode (EL 2 CBR AIL CR)

Here is an example of what the AIL “snapflap” curve for Cruise, T2 and S2 may look like:





Remember, we have to do this for all flap modes also. The BIG difference with flaps is that the curve shape is similar, but the throws (Y co-ordinates) are about ½ of the AIL CURVE.

In practice, I only set this “snap flaps” in Thermal 2 mode and once I think it is optimized, I set that as the envelope for all the other flight conditions.