

V-Tail Differential Mix with Live/In-flight Adjustments

- Rudder differential mix for dialing out yaw-pitch coupling in the vtail
 - Requires addition of a single mixer, the Rudder-Elevator mixer with a 3-point custom curve
- Shown below with a FrSky X20S transmitter running on ETHOS v.1.4.9, and adding the mix in an existing E-Soar MAXX F5J template from Mike Shellim where Channel 5 is the right-vtail and Channel 6 is the left-vtail (<https://rc-soar.com/ethos/templates/esoarmaxx>)
- Live mix adjustment via the X20S's red slider (Pot 3); after adjustment, long press Pot 3 and select Convert to Value'
- Last 2 screenshots are of the DevMon Lua script from Mike Shellim to display the differential adjusted by the red slider; slider middle is no differential, slider moving up increases differential (slider moving down is reverse differential)
- Credit: this is a revision from mawz's post on RCG, with screenshots from current ETHOS version

1. Go to your model's Mixer section
2. Add Rudder → Elevator mix
 - a. Free Mix
 - b. Analogs – Rudder as the input

The screenshot displays the ETHOS transmitter's Mixer configuration. The top bar shows 'Mixer' and 'ETHOS' with status indicators for 0 dB Ext and 8.3 V Tx Batt. The mixer list includes:

Name	Source	Channels	+
60V DisarmAt30	0%	60	
61V IsFastIdle	5%	61	
62V IsMotTimer	0%	62	
63V IsPostTimer	0%	63	
64V IsCompDflt	5%	64	
RUD-ELEV	Rudder	5, 6	
END OF CONFIG	0%	None	

On the right, the 'Free Mix' section is active, showing 'Always On' and a graph with a 3-point curve. The graph has a vertical axis from -100% to 100% and a horizontal axis at 0%. The curve starts at -100%, goes up to 0% at the center, and then goes down to 100%.

Below the graph is the 'Flight Mode' section with buttons labeled D, 1, 2, 3, 4, and 5.

3. In Edit screen for this Rudder-Elevator mix, add a custom curve
 - a. In Curve section, Add a new Custom curve and label it VTAIL DIFF
 - b. Custom curve with 3 points of 100, 0, 100 so that you get the same input on each side of the rudder

RUD-ELEV ETHOS 0dB Ext 8.3V Tx Batt

Name: RUD-ELEV

Active condition: Always On

Flight Modes: D 1 2 3 +2 Edit

Source: Rudder

Function Type: Add

Curve: VTAIL DIFF Edit

+ Add a new curve

Offset: 0%

Choose a curve for the mixer. This will be calculated before the param weight

Curve15 ETHOS 0dB Ext 8.3V Tx Batt

Points Count: 3 points

Smooth:

Easy Mode:

Points Config:

Point	x	y
Point1	-100%	100%
Point2	0%	0%
Point3	100%	100%

4. Then go back to the edit page for the Rud-Elev mix
 - a. Either adjust the weights for the 2 output settings with a specific value, or
 - b. For live/in-flight adjustments, long press the Weight Up and Weight Down boxes, select use a source, then select the adjuster, in this case, Pot 3 (X20S's red slider).
 - c. Make sure you have the same input setup for each channel, in this case, Channel 5 is the right vtail and Channel 6 is the left vtail

RUD-ELEV ETHOS 0 dB Ext 8.3 V Tx Batt

Curve: VTAIL DIFF Edit
+ Add a new curve

Offset: 0%

Weight Up: Pot3 59%

Weight Down: Pot3 59%

Slow Up: 0.0s

Slow Down: 0.0s

Graph: Select the amount speed down

RUD-ELEV ETHOS 0 dB Ext 8.3 V Tx Batt

Channels count: 2

Reverse: OFF ON

Output1: CH5 (Elev/RtVee)
CH5 Channel: 23.1% (1618us) Mixer: 2.1%

Reverse: OFF ON

Output2: CH6 (Rudd/LtVee)
CH6 Channel: 23.6% (1621us) Mixer: 2.1%

Graph: Select the channel you want to be affected by this mixer

5. DevMon Lua script showing the mixer's effects

- a. Top: red slider in the middle, no differential with full right rudder stick
- b. Bottom: red slider moved slightly upwards with some differential with full right rudder stick

