

Crow-aware Adaptive Trim v3.4

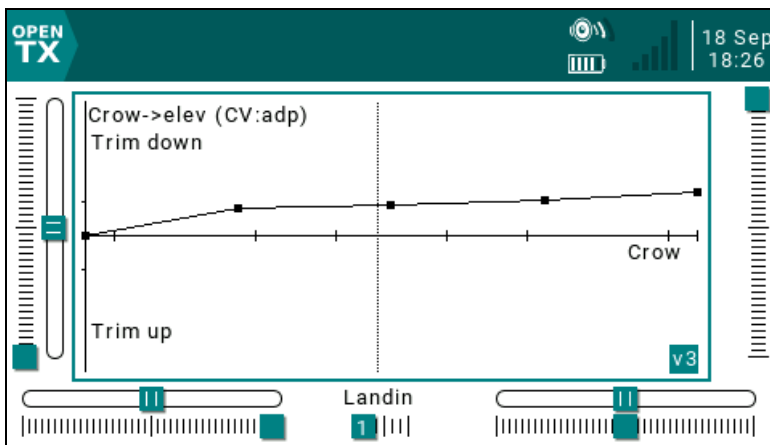
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URL: <https://rc-soar.com/opentx/lua/adaptivetrim/>

Description

This script enables repurposing of elevator trim to *bend the crow compensation curve*. This allows the pilot to quickly optimise the trim across the full range of crow. A custom telemetry screen displays the curve.

This document describes how to integrate the script into an existing setup.



Requirements

- Any OpenTX or EdgeTX transmitter (RM TX16S Mk 1/2/3, TX15, X9-Lite, X9D, X10/12S, Jumper T16 etc.)
- OpenTx 2.2.2 (or greater) or EdgeTX 2.4 (or greater)
- Crow channel with output range -100% (full crow) to +100% (crow off). These are already available in the RC-Soar templates.

The script is installed either as a telemetry script or a widget depending on the transmitter. The script works in conjunction with some simple mods to your setup.

How it works

Here's a quick overview:

1. The elevator trim is disabled so it behaves as a dumb two-sided momentary switch (*Model setup>FlightModes*)
2. Trim clicks are captured via two logical switches (*Model setup>Logical switches*)
3. The script monitors the logical switches. When a click is detected, it reads the crow value and adjusts the nearest point(s) on the compensation curve.
4. The curve is applied to a standard crow->elevator mix. (*Model setup>Mixers*)

Integration instructions

This section shows how to integrate the script in your setup. Please backup your setup first. The screenshots are from a colour screen transmitter, however the procedure for is the same for mono screens.

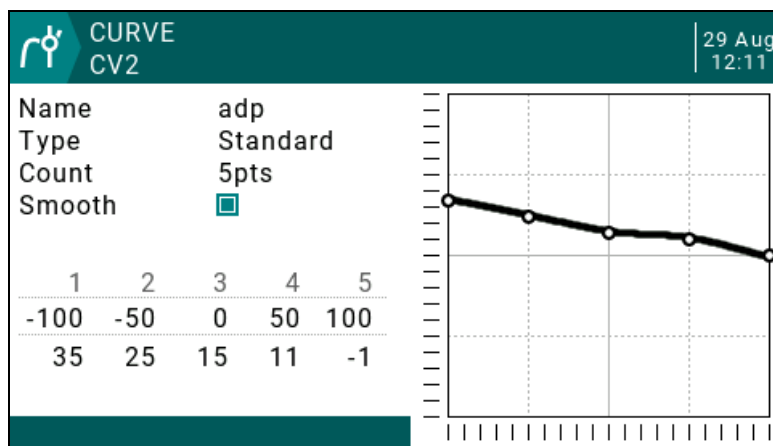
1. Assign a crow-trim curve

In the CURVES menu, find an unused curve for the crow-trim curve. Alternatively, if there is an existing compensation curve, you can reconfigure it.

Set the curve options as follows:

- name = 'adp' (*exact spelling!*)
- 5 points
- standard (fixed) X
- 'smooth'

Initial y values are not critical, they will be adjusted later.



2. Suppress normal trim behaviour

In this step, the elevator trimmer is repurposed as a dumb two-way switch.

1. Go to the FLIGHT MODES menu.
2. Highlight the flight mode where crow brakes are active ('Landing' mode on the author's templates).
3. Set elevator trim mode to '--' or 'Trim disabled'.

The screenshot shows the 'FLIGHT MODES' menu. The 'Landing' mode (FM2) is highlighted. The elevator trim mode is set to '--'. A red box highlights the elevator trim mode column, and a red arrow points to the '--' value in the 'Landing' row.

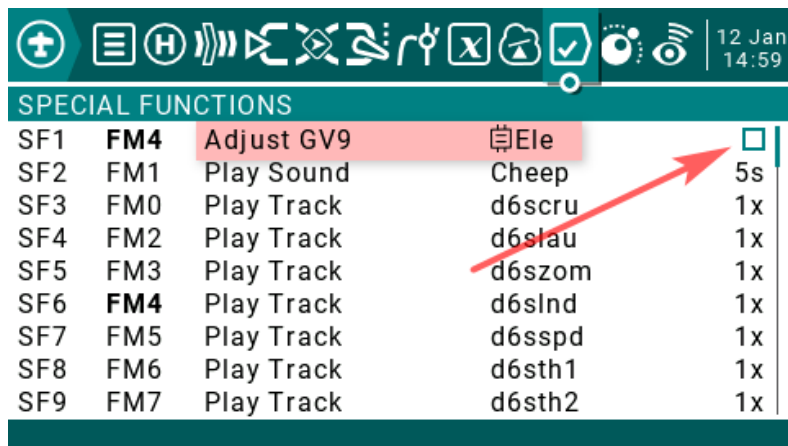
FLIGHT MODES								Elevator Trim	
FM0	Normal	N/A	:0	:0	:0	:0	:0	0.0	0.0
FM1	CAL	L20	:1	:1	:1	:0	:0	0.0	0.0
FM2	Landing	L11	:2	--	:2	:0	:0	0.2	0.2
FM3	Reflex	L17	:3	:3	:3	:0	:0	0.0	0.0
FM4	---	---	:4	:4	:4	:0	:0	0.0	0.0
FM5	Pump	L30	:5	:5	:5	:0	:0	0.0	0.0
FM6	Climb	L08	:6	:6	:6	:0	:0	0.0	0.0
FM7	---	---	:0	:0	:0	:0	:0	0.0	0.0
FM8	---	---	:0	:0	:0	:0	:0	0.0	0.0

Test, by entering Landing mode and moving the elevator trim. There should be no system beeps.

3. Disable 'Supertrim'

Some newer templates have a Supertrim feature which must be disabled. To determine if you have Supertrim, open the Special Functions menu, and search for a special function 'Adjust GVn' with source = elevator trim.

If the special function is found, clear the check box in the last column. This will disable the special function.



SPECIAL FUNCTIONS				
SF1	FM4	Adjust GV9	Ele	☒
SF2	FM1	Play Sound	Cheep	5s
SF3	FM0	Play Track	d6scru	1x
SF4	FM2	Play Track	d6slau	1x
SF5	FM3	Play Track	d6szom	1x
SF6	FM4	Play Track	d6slnd	1x
SF7	FM5	Play Track	d6sspd	1x
SF8	FM6	Play Track	d6sth1	1x
SF9	FM7	Play Track	d6sth2	1x

4. Capture trim clicks

Note: In selected RC Soar templates, the logical switches are already defined in which case skip this section.

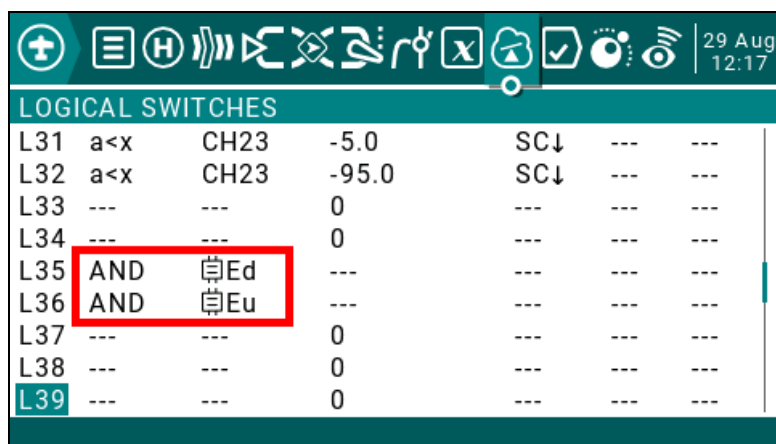
In this step, you'll define logical switches to capture the trim clicks.

Go to the LOGICAL SWITCHES menu and create two logical switches L(n) and L(n+1):

- L(n) = AND, trim down
- L(n+1) = AND, trim up

The LS's must be adjacent, and the order is important. Make a note of 'n', as you will need this in step 6.

In this example, n=35:



LOGICAL SWITCHES					
L31	a<x	CH23	-5.0	SC↓	---
L32	a<x	CH23	-95.0	SC↓	---
L33	---	---	0	---	---
L34	---	---	0	---	---
L35	AND	Ed	---	---	---
L36	AND	Eu	---	---	---
L37	---	---	0	---	---
L38	---	---	0	---	---
L39	---	---	0	---	---

Note that 'trim down' may be listed as *Ed* or *Ele-* and 'trim up' as *Eu* or *Ele+*.

To test, enter Landing mode; move the elevator trim up and down and check that the corresponding LS is highlighted.

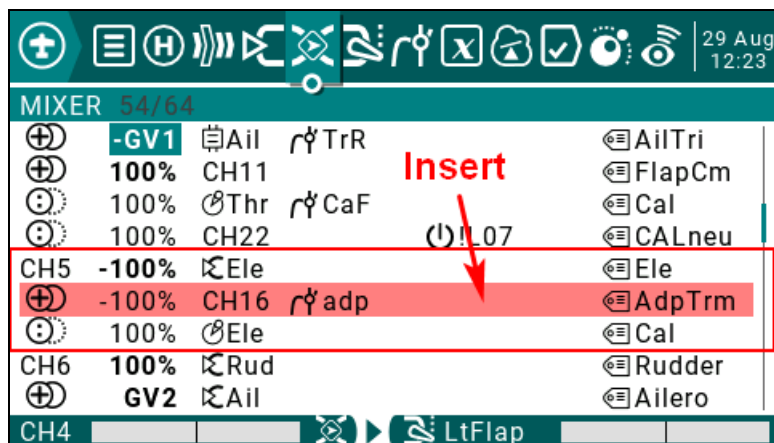
5. Create compensation mix

In this step, you will add a new crow compensation mix, or modify an existing one.

1. Open the MIXER menu and scroll to the 'Ele' channel, or, if using the author's V-tail setups, the 'VeeCm' channel.
2. Search for an existing compensation mix (in the author's templates, the mix is 'CrComp' or 'SpComp' or 'BrkComp').

If found, reconfigure the existing mix according to options below.

If not found, create new mix 'AdpTrm'. The new mix must be inserted *above* the CAL mix (if present):



Set the mix options as follows:

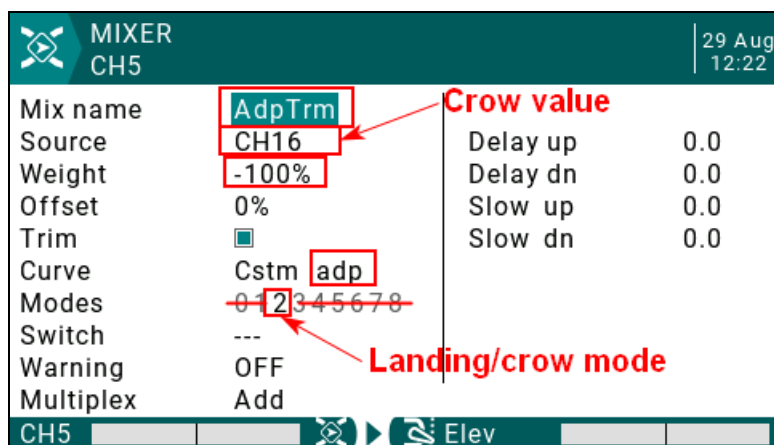
Name= 'AdpTrm' (the name is not critical)

Source = Channel supplying crow value, with -100 = full crow, +100 = zero crow. On the author's templates, this is usually CH16. (Note: in F3F V6.0, the crow channel is CH21.)

Weight= -100% (note minus sign)

Modes = Tick the flight mode(s) in which crow is active.

Curve = 'adp' (not '!adp' or '-adp')



6. Pass information to the script

In this step, you'll define curve 'prm' for passing information to the script. The script will look for this curve during startup.

Note: In selected RC Soar templates, curve 'prm' is already defined in which case skip this section.

In the CURVES menu, locate an unused curve and set the options as follows:

- Name = 'prm' (exact spelling required)
- 5 points
- Standard (Fixed) X
- Set the points as follows:

Point 1: Flight mode number in which crow is active ('Landing' mode in author's templates)

Point 2: Set this to $-n$, where n = logical switch for 'Ele trim down' which you set in step 4. *Note negative sign!!*

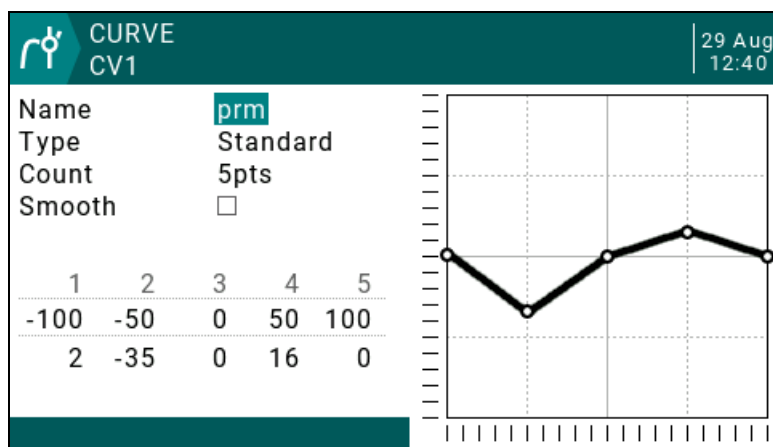
Point 3: [not used]

Point 4: Channel number 1-32 containing crow value - use the channel you specified as source in Step 5.

Point 5: Adaptive trim behaviour at minimum crow:

- 0 - emulates normal trim behaviour, $\pm 25\%$ trim travel, with centre/limit callouts (*recommended*)
- 1 - trim is pinned to zero
- ≥ 2 - trim is not constrained

Here is an example. Note that the point values may differ with your setup:



7. Installing/updating the script in your transmitter

So now we've prepared the setup, it's time to install the script files. The process is the same whether installing for the first time or updating the script.

1. Extract files from the ZIP file, preserving the folder structure
2. Connect your transmitter via USB, and copy the files to the SD card, again preserving the folder structure:

```
SD-card:/SCRIPTS/TELEMETRY/adptr3.lua
        /WIDGETS/adptr3/main.lua
```

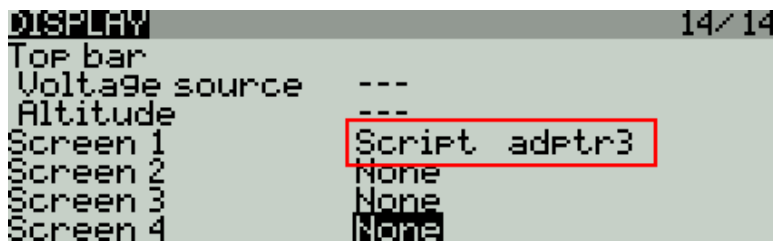
8. Activate the script

The script should be activated only after the previous steps have been completed.

The procedure depends on the type of transmitter as follows:

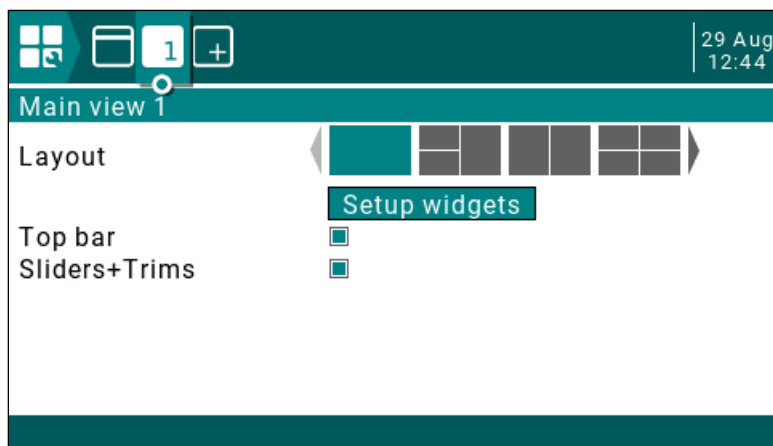
For transmitters with a mono screen

In the TELEMETRY menu, choose a free screen and select the adptr3 script:



For transmitter with colour screen

Press the 'TELEMETRY' button and install the adptr3 widget.



9. Final testing

Go to the custom screen and:

1. Enter crow/landing mode
2. Check that the dotted bar moves with the crow stick
3. Click up and down on the elevator trim and verify that the active points move.

With the model assembled, check mix directions:

- Check elevator trim direction in Landing mode
- Check elevator trim direction in other FMs
- Check elevator *stick* direction

10. How to refresh script parameters

If you make changes to the parameters curve:'prm', then you'll need to refresh the script. Follow these steps:

For colour screen tx's

From the TELEMETRY button, remove then reselect the widget. Alternatively, power cycle the transmitter.

For mono screen tx's

Press the '+' key, or power cycle the transmitter.

11. Migrating to a different tx

Duplicate the model in the usual way, then simply install the script as described in section 7.

12. Restrictions and failure mode

Only one instance of the script should be run per model. If the script is not loaded or terminates prematurely, the compensation will remain active but the trim lever will have no effect on the curve.

13. SAFETY

Test carefully before flight!

USE AT YOUR OWN RISK. IF IN DOUBT, DO NOT FLY!!

14. Feedback

Feedback and queries are always welcome, you can contact me by email via:

<https://rc-soar.com/email.htm>