

TRIMMING PROCESS **for aerobatic planes**

GENERAL

This file is a compilation of information from many informed sources and, while I do not make any claim of authorship, it is the process I use to trim a plane. If it is followed, the plane will fly true and straight.

RULES FOR TRIMMING

ONE -- Run the trim tests in order. If it passes a test, then go right to the next one. No need to land and refuel. It is good to have a helper to keep track of the results and to judge some of the results. Use this file to note the results and the changes you make. You will need the information later. Keep the settings in a file for the plane, as it will help if you ever need to reset it after some damage to the plane.

Two -- If adjustment is required after any test, you **MUST** adjust and go to test #one and rerun all of the tests! This sucks, but it really is required in order to make sure the interactions are eliminated

Three -- Try, *really try*, to hang in there and complete all the tests.

Four -- I am assuming there are no mixes turned on (that comes later), and that there is no differential dialed in to any of the surfaces. Also the ATV is set at the max (120 on some transmitters and more or less on others). Set the expo to no more than 20 on JR and -20 on Futaba

Five -- Once you are done with all the tests it is really necessary to go back and mechanically set all the trim linkages so that all your trims are centered on the transmitter. Using sub-trim, ATV, and trim are not advised on a new plane unless you really understand the process. (Use of ATV throws off your trim authority and has an effect on the DR and the EXPO.)

Six -- While running the tests, do the best you can to judge the results. Run the test several times and get a good result. Remember, nothing is perfect and you should get as close as you can. Do not go overboard on accuracy.

FOLLOW IN ORDER

PRE-FLIGHT

The plane has CG documented and measured properly and the lateral balance has been checked and is set at zero.

FIRST trim check

Trim the plane at full throttle so that it flies flat into the wind. Ensure that the sub trims and trim settings are at 0 to assist in the adjustments later. Do this by making trim adjustments and then changing the linkage to allow the trim to be set to zero on the transmitter and retested in the air.

SECOND thrust line check

Fly at full throttle into the wind and ensure it is wings flat and body level.

Quickly cut the throttle to idle and observe the path of the plane.

- If it continues on the same path for quite a distance it is correct
- If it falls off quickly, it needs more down thrust and then re- trim step one and retest step two
- If it climbs after cutting power it has too much down thrust and it should be adjusted and retested
- If it banks right or left, then add thrust in the direction it moved and re-trim prior to re-testing

Continue with this test until you have it adjusted and it passes the first two tests

THIRD center of gravity check

Fly into the wind at full throttle trimmed flat and level. Roll 60 to 90 degrees and release the controls. Watch the plane

- If the nose falls off gently then the CG is close
- If the nose pitches down then it is nose heavy - correct by moving CG
- If the nose pitches up it is tail heavy - correct by moving CG

Once this is corrected, roll the plane to inverted. You should need a small amount of down elevator to hold the plane level.

- If it climbs it is tail heavy
- If it requires a lot of down elevator, it is nose heavy

The plane should pass both of the CG checks

FOURTH lateral balance checks

The plane was lateral-balanced in the final checks before the first flight, now it is time to fine tune it a bit.

Fly the plane into the wind at full throttle trimmed flat and level and roll to inverted. The plane should remain wings flat.

- If it puts a wing down on several tries, add weight to the other wing (be careful here as you are inverted and it is easy to mess up).
- Get this to where you can fly wings flat inverted and upright (do not forget to go back to step one as the aileron trim will need to change if you add weight to a wing, and move in small steps).

Fly into the wind at full throttle with wings flat and plane level. Fly a tight loop using **ONLY** elevator and observe the position of the wings when done. The wings should be flat and if repeated testing reveals a wing is always low, then make a small correction and re-test.

FIFTH rudder trim

Rudder trim is different in the three phases of flight. This process trims for stunt flying and ignores take off and landing configurations.

Fly into the wind wings flat and plane level and perform gentle loops with the elevator only. Watch the nose of the plane

- If the nose stays straight during the loop, it is OK
- If the nose yaws right, add left trim until it tracks straight

SIXTH wing incidence

Fly high and reduce to idle -- put it in a vertical dive, release the controls and watch the plane

- If it pulls out it has too much incidence
- If it goes inverted it has too little incidence

Adjust until it passes the test.

SEVENTH aileron differential

Fly toward yourself and pull up to vertical. Use ailerons to roll $\frac{1}{2}$ of a revolution and look at the nose. If the nose is still vertical, the aileron differential is set correctly.

Aileron differential is due to the adverse yaw from the downward aileron and is different for each plane.

- **If the nose is yawed away from the roll direction, then more differential is needed.**

Adjust differential in the transmitter in small increments so that the plane passes this test.

You did it! Your plane will be the envy of the field and you will be ready to make further adjustments to the way the plane flies. I can give you steps for the additional changes but you should burn some gas and enjoy the plane for now. Your skill will increase directly with constructive practice sessions! Glad you asked ... 'Constructive' is defined by some smart folks and I can give you their web sites.

Good Luck

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