

Another big day. Time to mount the vertical stabiliser on the horizontal stabiliser.

This is another critical job that will influence the way the airplane flies, so patience and lot's of measuring is required. It's one of those places where you measure 10 times and drill once.

Draw centerlines on top and bottom part of the F-781, F-712 and mark the centerline on the fuselage top skin. There should still be a centerline on the aft deck from when you mounted the horizontal stabilo.

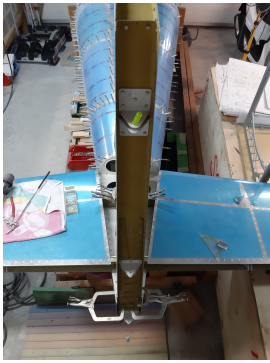
The alignment of the vertical stabilo can move up and down, tilt back and forward and left and right. All these axes need to be aligned well in order to fly straight in straight and level flight and also to have proper edge distance on all fasteners involved. What makes things even a little more tricky is that the tip of the vertical stabilo has a left offset of about 1/4". The plans have you place also a washer on the back of the F-712 to compensate for this offset.

First you clamp the vertial stabilo using the F-781 vertical stab attach plate to the front spar of the horizontal stabilo. Center the F-702 on the F-781 top side and then center and clamp the bottom side of the F-781 on the front spar of the horizontal stabilo. This will give you an initial starting point. I had to use a doubler in my case on the F-781.

Then you measure 7 11/32" from the top of the longeron to the surface of the bottom hinge breacket of the rudder (VS-410PP). Center the rear spar of the vertical stabilo on the centerline made earlier on the F-712 bulkhead and start with the measurement above. This may still vary as it's only a starting point.

To ensure that the stabilo is straight and that the rudder won't bind, attach a fishing line and a plumb bob through the hinges of the rudder.

I used some lego blocks on the top hinge to hold that line. Now comes the tricky work that needs patience from your side. Clamp and reclamp until the fishing line goes straight through all holes in the hinge brackets and doesn't touch on either side.

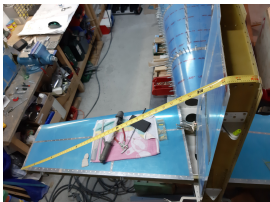


Once you're happy with it, measure with a tape rule the left and right side distance from the horizontal stabilo aft outer corner to the edge of the vertical stabilo (same height).

I measured exactly 1/16" less then 4Feet on both sides, see images below showing left and right measurements.



Now measure from the same position on the horizontal stabilo to the aft top corner of the vertical stabilo at the point where you see the rear spar.

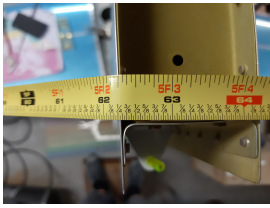


This is the measurement from the pilot side : 62" 9/32

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Check from the passenger side in the same way



The verdict is : just little over 62" $8/32$ ". Looks as close as I can get it and my fishing line in the back is still straight. The $1/32$ " difference could be caused by the way the tention is on the taper ruler.

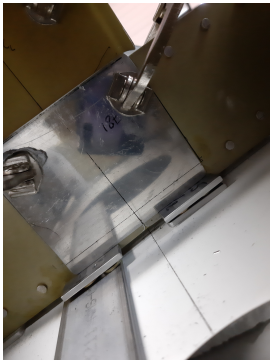
I assume the fishing line is more accurate than the way I can hold a flexible ruler in such a distance so I'm trusting my plumb bob more.



On the forward side, It was kind of hard to estimate edge distances.

I had to slide 2 spacers underneath the F-781 in order to get it in the position I thought was the maximum to retain edge distance for the bottom AN3 bolts at $3/8$.

The line on the F-781 in the bottom indicates that $3/8$ " lines.



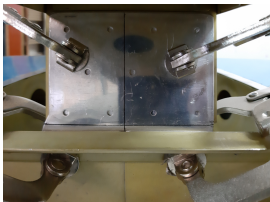
On the top plate attaching the F702 forward spar of the vertical stabilo. You have the same alignment problem in the bottom . Make sure that you have enough edge distance on F702 for the bottom row of rivetted holes.

This how mine looked like. I had to go to minimum distance in the front and lower the rear spar in the back to more than the 7" 11/32 in order to get the fishing line straight again.

Lowering the rear spar is not a bad thing. Mine almost rests on the WD409 weldment in order to get the vertical level again.

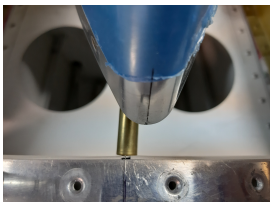
It even gives you a little more playing room in the back when you'll have to drill the 3 bottom AN4 bolts.

If you want to have the 7 11/32, you can't cut the VS-702 as it indicated on the plans. Van's just makes you cut way too much.



Then checked the offset of the vertical stabilo tip in relation to the centerline of the fuselage.

You can see the fishing line I put on the centerline of the fuselage in the image below and the centerline onthe vertical stabilo tip.

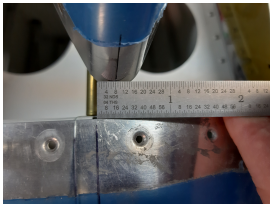


Measuring it with the ruler gives me exactly 1/4" offset.

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Recheck all measurements again, check the fishing wire and only when you are completely satisfied with the reading, go and drill the elevator stops to the rear spar of the vertical stabilo.



Both AN3 bolts drilled and installed.



Now drilled the F-781 attach plate to the VS702 and clecoed it.



Finally, drilled the F-781 to the horizontal stabilo forward spar using the predrilled holes in the horizontal as guides. Then enlarged to #12

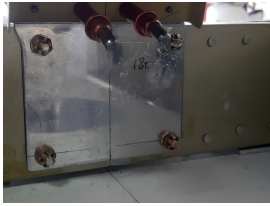


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Installed the bolts with castle nuts.



Another nerve breaking tasks done but very happy with how it came out. I will do final edge distance measurements when I disassemble the empennage again but eye-balling the result looks good.

