

# F19 SEA WASP CONSTRUCTION GUIDE

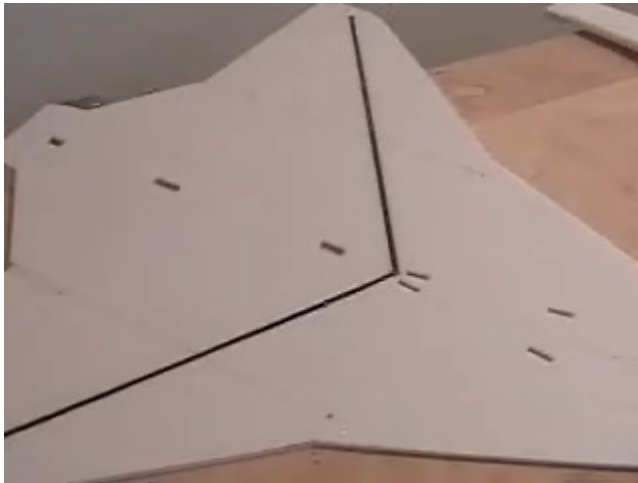
**NOTE: Please read this guide completely through before you start cutting anything – The foam you save might be your own!!!**

This is not a step by step guide but more of a narrative. Please read this before starting to cut out parts. On my build I used notches on the forward fuse sides and the aft fuselage center pieces. The notches are not shown on the plans for any of the parts, but from the pictures you can see where I had them. They are not necessary; I just use them to help assembly. If you want to use this style, then remember to add tabs (6mm tall by 24mm long) to the bottom of forward fuse sides (B) and the aft inboard fuselage sides(C). On the parts sheet, most of the parts are labeled something like this: (upper nacelle (2) 6mm L&R) This would mean to make 2 pieces out of 6mm Depron or FF, and make one left handed and one right handed. If some thing is not clear to you or you have question post your question on the thread and I will try and answer them. This plane can be made several ways and I will try and point out what can be changed. I have set it up with moving canards, elevons, and rudders. I used a firewall mount for my motor but it can be modified for a 10 mm stick mount. It can be built with fixed canards and no rudders. Here we go:

1. First you need to cut out your parts, on the nacelles and other curved parts, if there is straight line, go ahead and cut right to it, for the curved areas leave about 1/8" extra for fitting. On the main pieces which are part (A) on the sheet, leave the canards attached until after the canard control tube is cut in.
2. Cut out the two main assemblies (A) and glue together.
3. On parts (A), mark the locations of the wing spars, and the canard control tube, note that the wing spar is cut in from the bottom, and the canard tube is cut in from the top. Also draw in the location of the fwd fuselage sides and nacelles.



4. Cut the wing spar grooves and epoxy the .21 carbon fiber tubes into place.



5. **NOTE:** If using fixed canards omit this step. Turn over and cut canard tube slot. Cut notch where canard control horn will be located. Remove canards from part (A). Epoxy in the pieces of 3/16" aluminum tubing for the canard pivot. Be sure to carry them out to about 1/32" from the end of the LEX's. Use the .157 CF tube control to align the pieces along with the canards, being careful not to get any epoxy on the CF tube.



6. Lay out both fwd fuse side (B) with the bulkhead locations, making sure to make a left and right. Glue sides (B) to (A) making sure sides are vertical. You can pre-form the sides with a heat gun to make it easier, if you use the notches there is no need for pre-forming. Glue both of the aft inboard fuse pieces (C) together and epoxy in place, again making sure to keep it vertical. NOTE: IF you are going to use a 10mm stick mount you would probably want to install it now while it is accessible. If you are going to use a firewall mount you can cut the notch in piece (A) as needed for your particular motor.



7. Install F-1, F-2, and F-3 bulkheads, gluing them to (A) and (B). Install 6mm x 9mm doublers between the bulkheads on the top only. Also fill in the area where the canopy front and back will rest with scrap foam.



8. For the next few steps it is easiest to do one side start to finish then do the other side. First glue on the upper LEX or strake doubler (G). This piece is used to strengthen this area where the canard control tube has been notched out. Next install the intake bottom (P), it butts up against (G) in the front. This is mostly a cosmetic piece, but it also helps for installing the outboard nacelles (E) by giving something to push up against and glue to. Next glue in the outboard nacelle (E). You can pre-form this piece with heat to help. After this is dry, install a 6mm x 9mm doubler strip to the upper inboard edge of (E). This gives more gluing area for the nacelle top and the ability to sand a radius on the outboard upper edge.



9. Next glue on the intake top (F). There is a pretty substantial curve in the front intake lip, so you can perform the curve to make it easier. I transferred the line to the fuselage sides and then used foam safe CA for the inboard side then used UHU-CREATIV for the outboard side since it is easier to sand through.



10. Next on the aft nacelle tops (H), cut a 45 degree bevel on the inboard edge (straight side) then glue in place. With both tops installed there should be a "V" in the center.



11. Repeat steps 8-10 for the other side. If you want you can sand the tops of the nacelles round while there is nothing in the way.



12. Next install the vertical stabs. They are angled in at about 7 degrees. **NOTE:** If you are planning on using rudders, remove them now before you install the vertical stabs.



13. Next install the vertical stab fairings (O). There are 4 of them, take two of them and cut 6mm off the bottom. These will be the inboard fairings and they are a ledge for the inboard wing upper surface to rest on.

**NOTE:** The inboard upper wing surface is mostly cosmetic since it hides the rudder cables and the wires for the elevon servos. I will say for practical reasons that it also creates an airfoil shape, and it seems to help with the flat plate wing syndrome, by getting rid of some of the dead or neutral zone that causes a flat plate wing to “hunt” in the air. If you decide not to use the upper inboard wing surface, then leave all of the vertical stab fairings the same. You can mount the elevon servos in the lower vertical stabs and route your wires under the wing and up into the intakes ending up in the forward fuselage. I am not sure what you would do with the rudder control rods unless you could snake them through the intakes or just don’t use rudder control.

If you are going to use the inboard upper wing surface, then glue the inboard fairings in place. Take the outboard fairing and hold it against the outboard side of the nacelle (E) lining it up even with the front of the vertical stab and mark a line for the height where the inboard upper wing surface will glue to. Then install the outboard vertical stab fairings.



14. Next you have to make the three spars / rib pieces that are shown on the plans. They are made from 6mm foam. On the inboard side they should be 3mm short of the line you marked on the nacelles. On the outside they are the same height as where they meet the inboard vertical stab fairings (O). If you are going to use rudder control, figure out your routing of your control rods and notch the center spar on the bottom for the control rod to go through, place a notch on top of the aft spar to hold the control rod up on its way to the rudder. Also now is the time to install your elevon servos so you can pass them through this area to get inside the fuselage. I had to use servo extension wires on mine.



15. After you are sure your cables and rods are correct install the 3mm upper inboard wing surface (I). I wish there was an easy way to install these pieces but their really isn't. It will take several attempts to trim, shave, and sanding to get it to fit correctly. Just take small amounts off at a time till you get it right. Don't get it too tight or it will try and straighten up your vertical stabs. They make filler for a reason!!! Install the turtle deck top (D) now and cut the elevons free from the wing. After they are cut out bevel the front of the elevon and hinge either with tape or hinges.



16. Next it is time to install the canards, while the bottom is still flat. Place the .157 CF tube into one side and push it through until you reach the notch you cut out earlier. Install your control horn (I used a drilled out servo arm), then push the rod the rest of the way through and center it. Slide the canards into place and epoxy them to the CF tube carefully so you don't glue them to the LEX or pivot tube. Do not glue the control horn to the CF tube until the final assembly when you are installing the electronics.



17. Now it's time to work on the bottom. Install the lower nacelle pieces (L) outboard, and (M) inboard. NOTE: The arrow that points to the top, goes towards the fuselage. Then glue in the 6mm x 9mm doublers to the out board lower nacelles (L) to what will be the bottom side



18. Next install both lower nacelle bottoms (K). The straight edges go to the center again making a V in the center. NOTE: It is best to sand them to shape before you install them. After it all dries go ahead and sand the lower nacelles to shape.



19. Install the lower forward bulkhead (R) and other pieces (can't think of what to call them) (U), (S), and (T) then glue on the 3mm forward lower fuselage skin (J). You could also do this by skipping R, U, S, and T, and cutting piece (J) out of 6mm and then sanding to shape. Just make sure the canard control horn doesn't rub, just clearance the under side of (J) a little if it does.



This is the only picture I have of the bottom with the lower fuse skin on sorry it is a little out of sequence



20. Next install the lower vertical stab pieces (N). They are made up of two 6mm pieces glued together. The tab looking part at the end needs to be cut at an angle to meet up with the back of the wing.
21. The next steps are to glue on the nose assembly, either made up of several layers of Depron, or a block of rigid foam. Just rough sand it out for now until after the canopy is in place then you can sand it all together by eye until you like it.



22. Next is the canopy, again it can be made from laminated 6mm Depron or block foam. For mine I made a 6mm Depron canopy deck by placing a piece of 6mm foam on top of the canopy opening and tracing the outline, then I placed a piece of 2" rigid foam block (DOW) on top of that. **NOTE:** If you do this you need to add 14mm to the aft end of the canopy template on the plans, just eyeball the upper line to continue it. After it was rough sanded I used a piece of scrap CF rod in the front of the canopy and magnets to hold the back of the canopy down.



23. The rest of the assembly consists of sanding, filling, more sanding, and finishing, unless you want to wait until after your maiden!!! Next you need to install your electronics. I placed my speed controller in the right intake with Velcro. I extended the motor wires to meet it and wrapped them with two layers of foil. The rudder servo was mounted between F-2 and F-3, the canard servo and receiver were mounted between F-1 and F-2. **IMPORTANT:** Make sure you go back and glue the canard control horn to the CF tube once you have your canard linkage set. The battery was actually mounted on a 6mm shelf with Velcro above the rudder servo between F-2 and F-3 (I thought it was going to go up front but it had to go back there to balance). Speaking of balance, CG might be nice to know since I left it off the plans. On the first flights I had set right at the wing break, and now I have it set 1/8" in front of the joint of the wing spars. It is very easy to fly with the following throws:

- Rudders - 1.25" left and right
- Canard - .75" up and down (set so full aft stick gives .75" canard TE down)
- Elevons - .375" up and down with elevator input and .75" -.875" up and down with aileron input

Mine came in a 19.2 oz with paint and ready to fly. I used a Hacker A20-20L with an APC SF prop. The battery is a KOKAM 3s1500 lipo. Depending on how big your hands are you will need a finger hole or have to mount a dummy pylon on the center line to grip it for launching, this plane is extremely wide at the bottom, and the lower nacelles are a little too close to the prop when launching.

Hope you enjoy it.

