MOLT MODELS

SPECIALIZING IN PARKFLYER WARBIRDS

Parkflyer F6F Hellcat

Molt Models Background Design Philosophy

When I was first introduced to this hobby back in 1987, I saw my first WWII warbird and I was hooked. Several years later when I began building radio controlled model airplanes on my own, I learned that along with the intriguing warbird looks came a plane that was usually difficult to fly. After a few disheartening attempts with some larger glow powered warbirds I thought about how great it would be if I could design a spirited yet forgiving warbird that could be flown in a space the size of a soccer field. At that time, the level of technology was not advanced enough to make this a reality, but the developments in the last few years have made it possible and economical.

The Molt Models design philosophy is comprised of methods that enhance scale appearance and all around flight performance. The first thing you'll notice about a Molt Models kit is that the majority of wood parts, illustrations and plans are CAD based. These items are derived from the same 3D modeling environment that the plane was designed in. My goal is to cut down on wordy instructions and use a more visual approach that will get you from kit to airborne in as little time as possible.

Molt Models Parkflyer F6F Hellcat

Thank you for purchasing the Molt Models Parkflyer F6F Hellcat. This kit represents a true first in parkflyer warbirds in that it possesses characteristics that make it both enjoyable to build and more importantly, fly. I sincerely hope that you enjoy your new Molt Models kit. Please visit us at www.moltmodels.com for updates and information on future kits.

Manual Revisions

Rev A - General format updating and miscellaneous typo correction
Addition of parts list

GENERAL BUILDING INSTRUCTIONS AND SUGGESTIONS

Please be sure to study the plan sheet and carefully read the following instructions before attempting to build your Hellcat. Having a good idea of what to expect as you progress will cut down on mistakes and allow you to better organize your project. Checkboxes have been provided in front of each step that allows you to easily keep track of your work. This manual is organized as blocks of text and illustrations that correspond to the current build section.

The Hellcat is a fully functional aileron, rudder, elevator, and throttle controlled aircraft (4 channel). You may build the Hellcat to fly with aileron, elevator, and throttle only by gluing the rudder to the vertical stabilizer. If you decide to do this, I would recommend that you leave the landing gear off as take off and landing on a hard surface will be difficult without a rudder. I also recommend leaving the landing gear off if you intend to fly on grass only. If you fly on a nice hard surface, the Hellcat with all functions and landing gear is quite impressive. Do not attempt to fly the Hellcat as a rudder, elevator, and throttle only model.

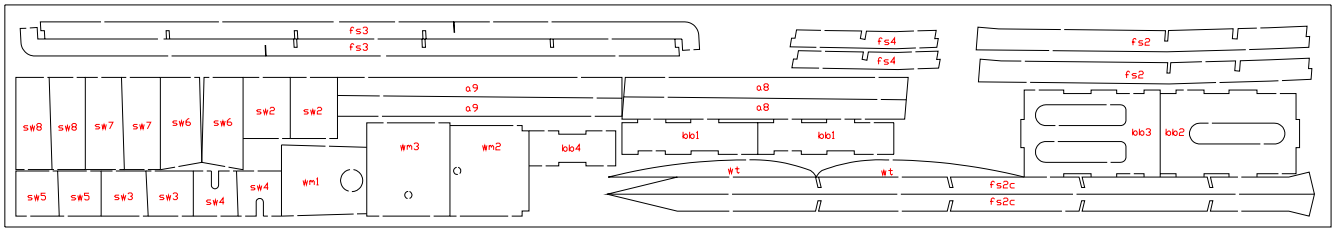
HELLCAT SPECIFICATION TABLE	
Length	23.5 in
Wing Span	30 in
Wing Area	170 in^2
Flying Weight	7.0 ~ 8.0 oz
Wing Loading	5.93 ~ 6.77 oz/ft^2
Power System	Brushless - 17T LensRC IPS Mount *(high performance)* Brushless - Feigao installed in DX-A gearbox *(sport performance)* Brushed - GWS DX-A IPS *(standard performance)*
Functions	Aileron, Elevator, Rudder, & Throttle
Battery Pack	7.4V Lithium Polymer (pack dimensions smaller than 0.5" X 1.4" X 2.5")

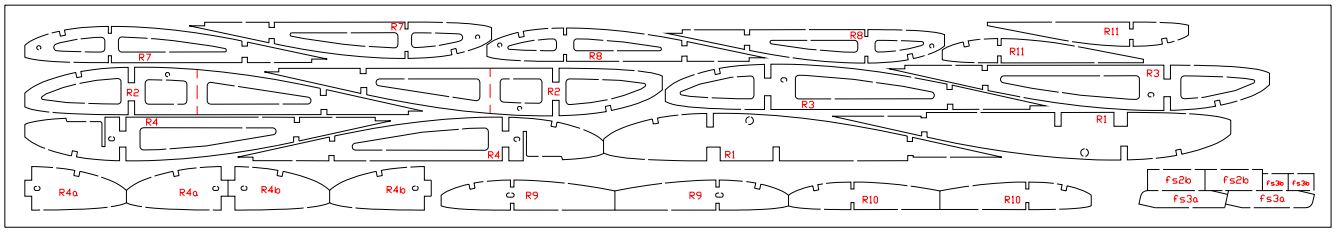
What you will need to complete the Hellcat kit:

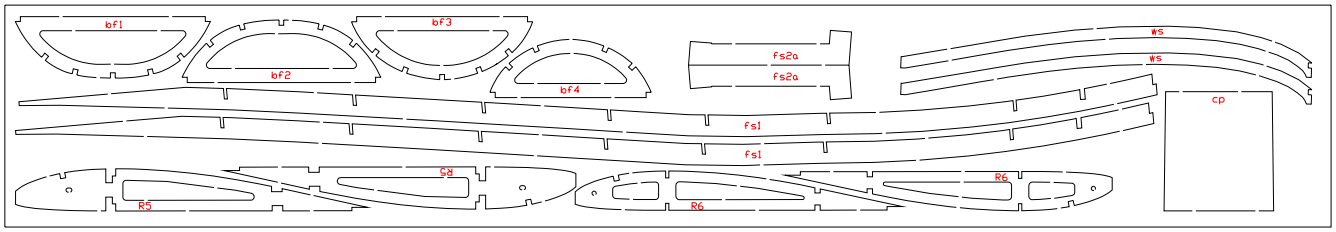
- 1.5" Dubro wheels (if landing gear is installed)
- Small tail wheel (if landing gear is installed)
- Receiver
- Servos (Hitec HS-55 or GWS Pico/Naro) (3 Req. for 4 Channels)
- Speed Control
  Brushless – Castle Creations Pheonix-10 or equivalent
  Brushed – Castle Creations Pixie-7P or equivalent
- Motor/gearbox – see "HELLCAT SPECIFICATION TABLE"
- 1 roll of Solarfilm Lite AKA Solite covering
- Glue, paint, and other misc. building tools

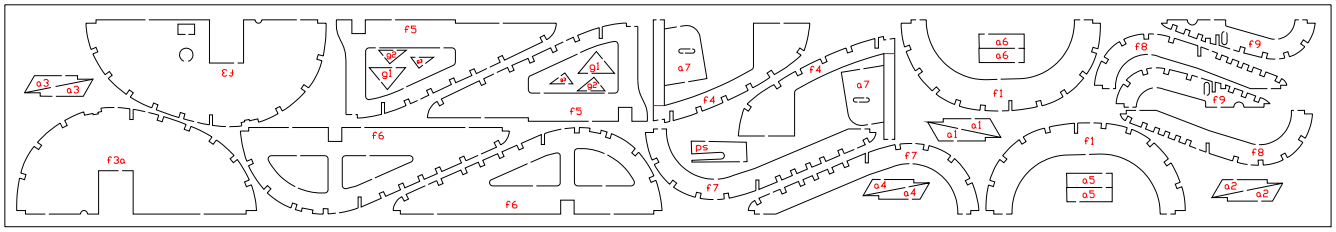
PARTS LIST

1/16” Laser cut balsa sheet

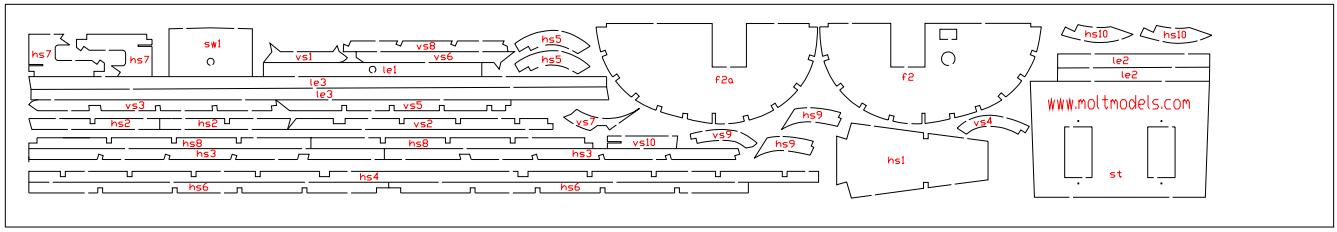




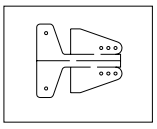




3/32” Laser cut balsa sheet



1/32” Laser cut plywood sheet



Other items included

Quantity	Description
Loose Wood	
25	3/32” X 3/32” X 24” Balsa stringers
2	1/16” Diameter X 12” Hardwood dowel
2	1/16” X 1/8” X 24” Balsa sticks
2	1/16” X 1/4" X 24” Balsa sticks
1	1/8” X 1/4" X 24” Balsa stick
Wire/Controls	
2	1/32” Diameter X 18” Music wire (control wire and tail gear)
1	1/16” Diameter X 12” Music wire (landing gear)
1	1/32” Diameter X 36” Sullivan flex cable with outer yellow tube
Plastic	
1	Vacuum formed cowling
1	Vacuum formed canopy
Bagged Parts	
1	1/4" X 1/2" X 3-1/8” Balsa stick
1	1/4" X 1/4" X 3-1/8” Balsa stick
3	0.06” X .320” X 2.86” Laser cut plywood stick
1	3/32” X 3/32” X 2” Hardwood stick
1	1/8” Diameter X 3” Hardwood dowel
1	#8-32 Nylon bolt
1	#8 Brass threaded insert
2	Black plastic semi-spherical press on wheel collar
1	1/2" X 4” Plain Velcro (non-sticky back)
5	Du-Bro RC - Mini E/Z Connector
2	Du-Bro RC - Micro E/Z Link
2	Du-Bro RC - 1-1/2" Mini Lite Wheels
1	Du-Bro RC - 1/2" Micro Tail Wheel
Plans	
1	34” X 22” sheet

FUSELAGE BUILDING INSTRUCTIONS

- ❑ Pin **fs2** through **fs4** on the plan sheet and glue adjacent edges together.
- ❑ Glue formers (**f1** through **f9**) to (**fs2** through **fs4**) making sure they are perpendicular to the building surface. You also need to pay close attention to the orientation of all the formers. For instance, the notch in each former that accepts **fs1** should be perfectly in line when looking down the front of the fuselage.
- ❑ Align and glue **fs1** to the notches of **f1** though **f9**.
- ❑ Glue the wing saddle **ws** to **f3** through **f6** of the fuselage half.

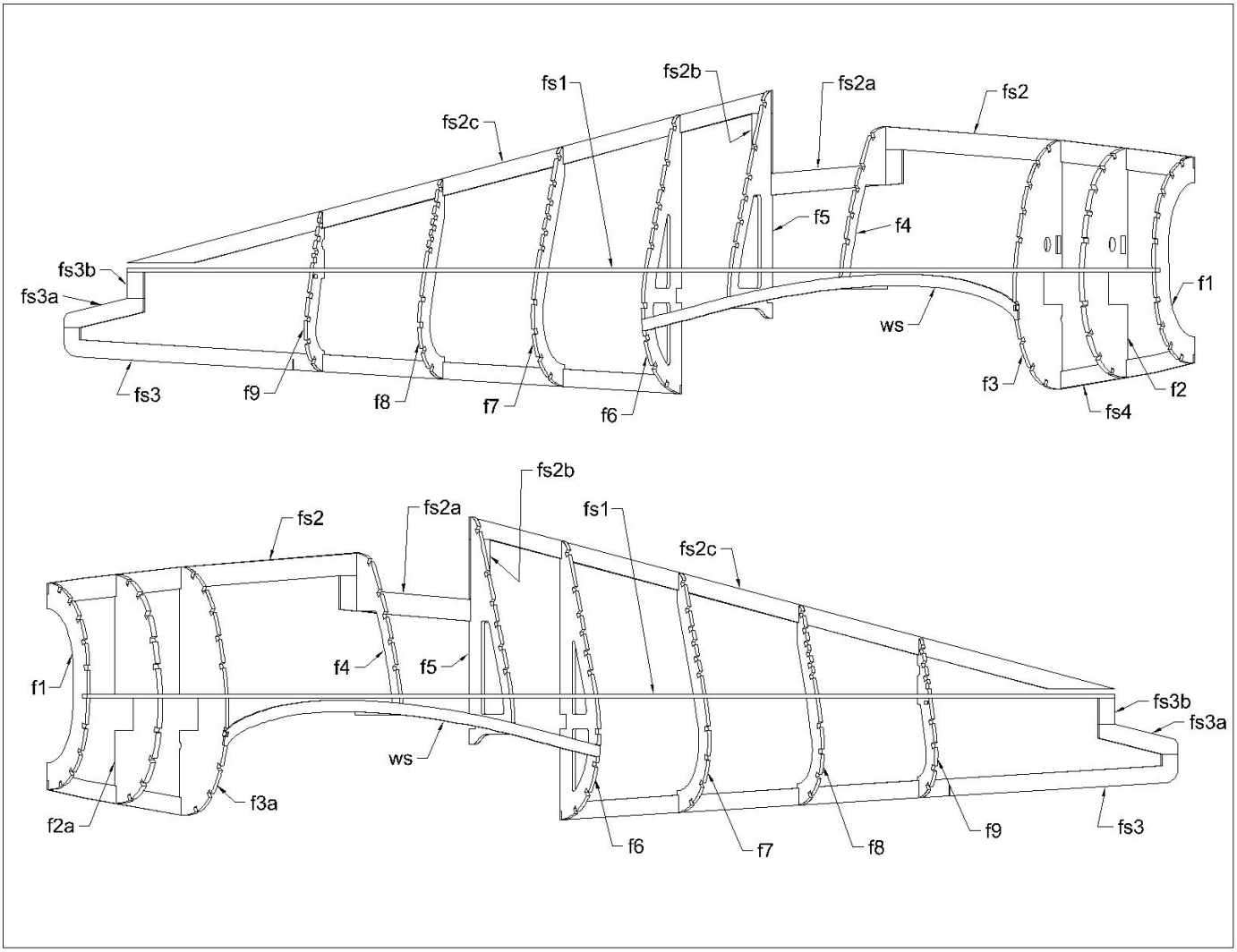


Figure 1

- ❑ Glue all 3/32" SQ balsa stringers to both fuselage side assemblies noting the end points of each stringer in Figure 2.

- ❑ Glue the elevator pushrod exit **ps** to the fuselage side shown in Figure 2. When each fuselage half is removed from the building board they may warp ever so slightly, this is due to the stress the 3/32" SQ balsa stringers introduce on the structure. Do not be concerned, as the two fuselage halves will straighten each other out when they are joined together.

- ❑ Glue the fuselage halves together. Be sure to fit the plastic cowling to the front of the fuselage before covering. The cowling is designed to have a tight friction fit to reduce the weight of components that might be necessary to hold it on. Sand the circumference of the front of the fuselage until the plastic cowling has a nice tight fit. The plastic cowling should slide about 1/8" to ¼" over the front of the fuselage.

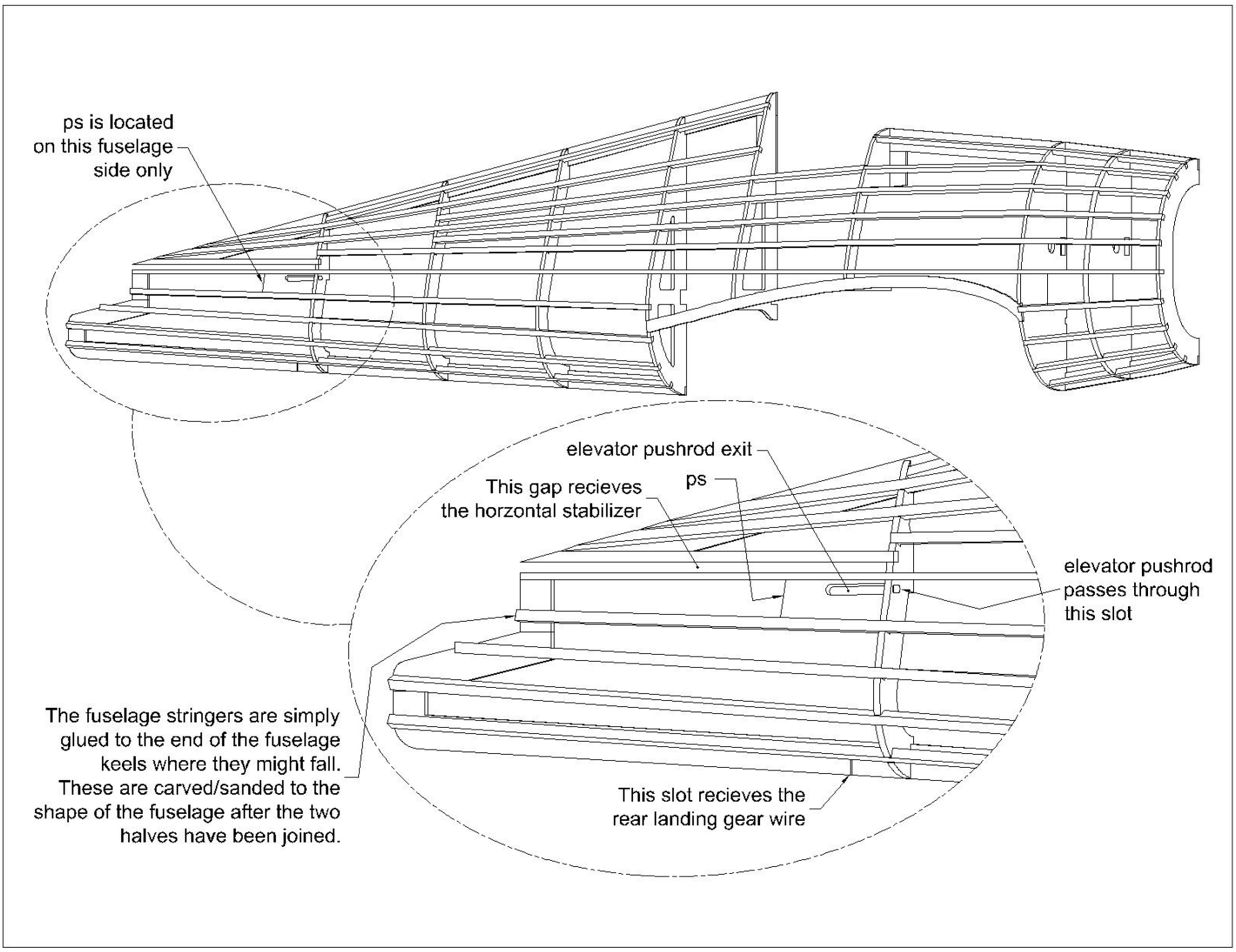


Figure 2

- ❑ Install the cockpit floor **cp** by gluing it to **fs2a**, **f4**, **f5** and the 3/32" SQ balsa fuselage stringers. Refer to Figure 3 for **cp**'s location.

- ❑ Install the servo tray **st** by gluing it to **f3/f3a** and the 3/32" SQ balsa fuselage stringers. Refer to Figure 3 for **st**'s location.

- ❑ Build the battery box using the laser cut balsa parts **bb1** through **bb4** per Figure 3. When the battery box is complete, glue it to the fuselage formers **f2/f2a** and **f3/f3a** per dimension shown in Figure 3.

- ❑ Glue the 1/4"x1/2" balsa wing mounting block to the fuselage formers **f5** and **f6**. Glue the 1/4" balsa triangle wing mounting support gusset to the 1/4"x1/2" balsa wing mounting block and fuselage former **f5**. This is illustrated in Figure 3.

- ❑ Laminate the (3) 1/16" thick precut 5/16"x2-7/8" plywood pieces to construct the GWS IPS mounting stick. Glue the laminated GWS IPS mounting stick to formers **f2/f2a** and **f3/f3a**. This is illustrated in Figure 3.

- ❑ Remove the section of former **f4** shown in Figure 3.

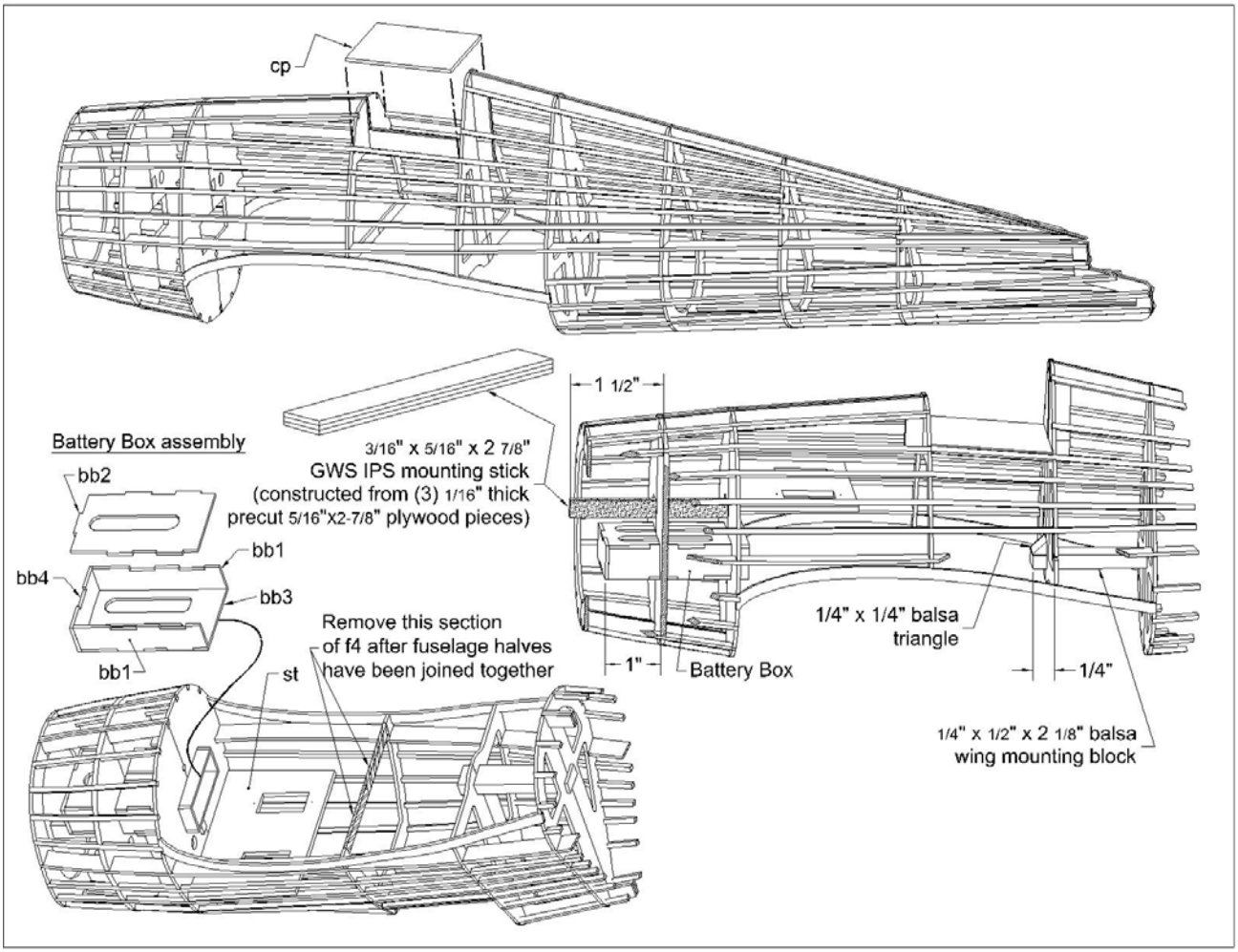


Figure 3

❑ Install the elevator and rudder servos and motor as shown/described in Figure 4.

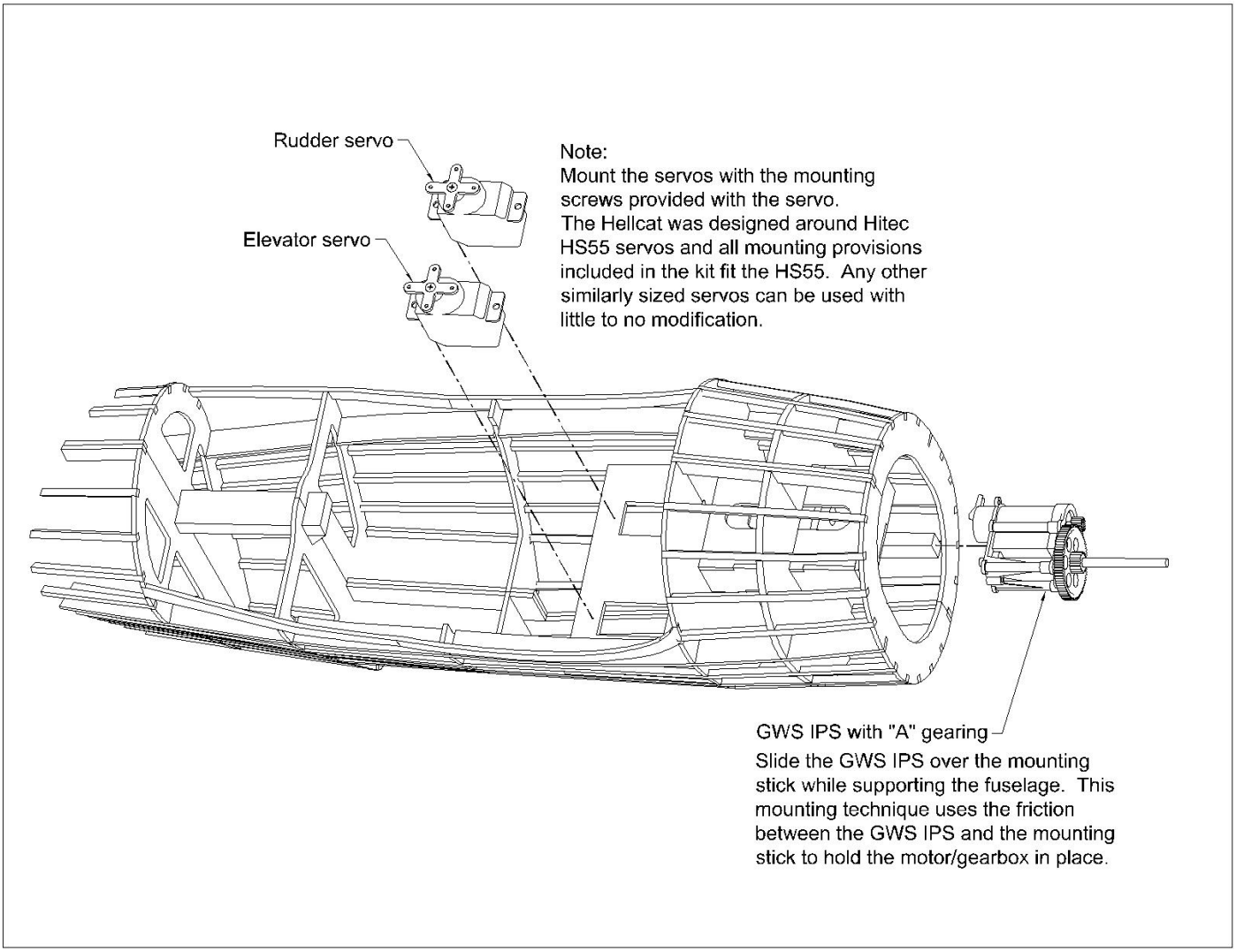


Figure 4

- ❑ Build the elevator and rudder pushrods as shown on the plan page.
- ❑ Install the thin plywood control horns in the receiving slots in the rudder and elevator after these control surfaces have been covered. Note this is after the horizontal and vertical stabilizers have been built.
- ❑ Refer to Figure 5 for the routing and connection of the pushrods to the servos, elevator and rudder.
- ❑ The control rods at the servo end are attached to the servo with the adjustable Dubro E/Z connector. The control rod wires at the control surface ends are attached by the 1/32" music wire that passes through the holes in the control horns. Be sure the wires passing through the control horns extend about ¼" so that the Dubro E/Z Link will retain the control rod to the control horn. This is illustrated in Figure 5.

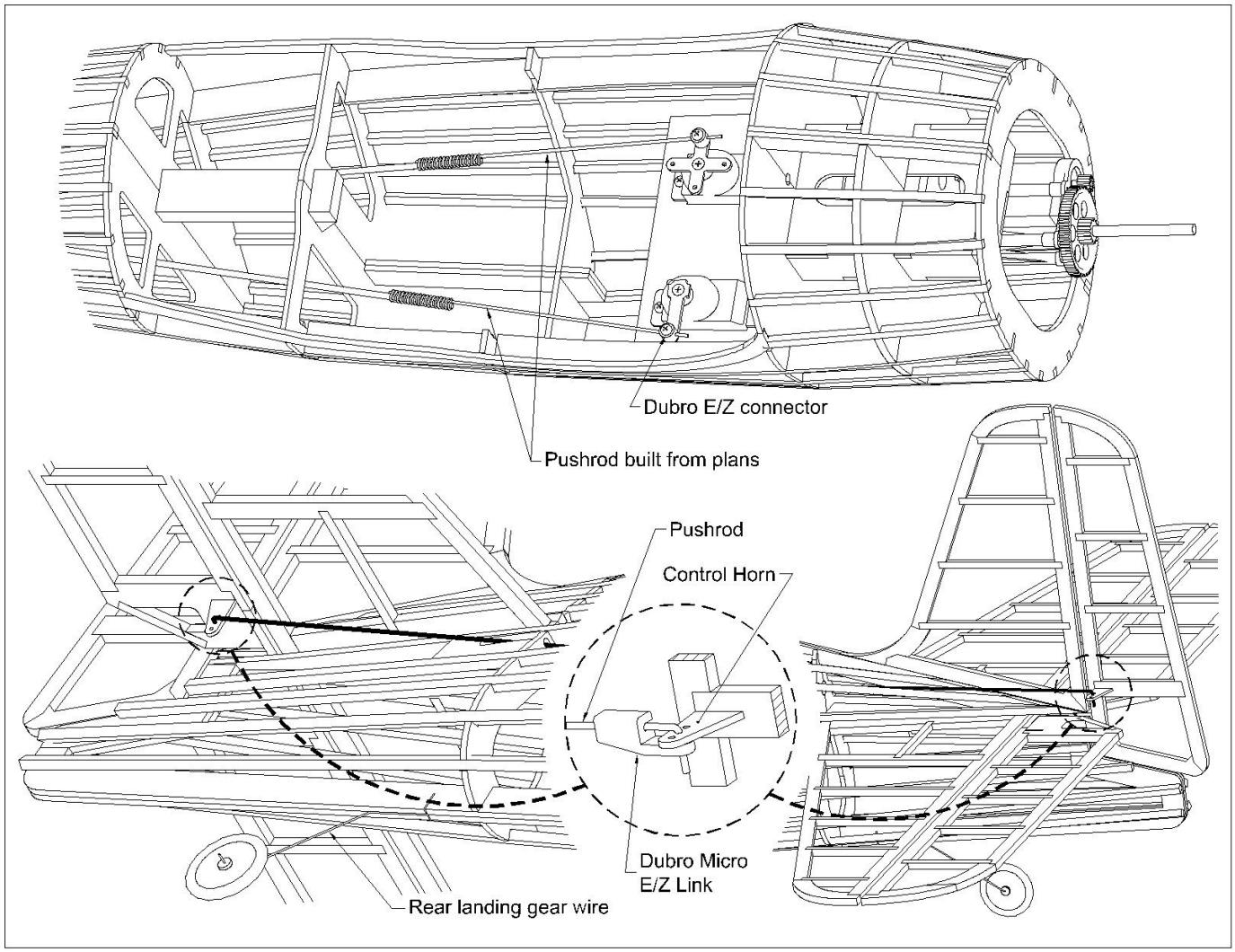


Figure 5

WING BUILDING INSTRUCTIONS

Wing Center Section

- ❑ Cut and pin the bottom 1/8"x1/4" balsa main spar, 1/8"x1/4" balsa servo mounting rails, 3/32" SQ balsa rear spar, **wm2**, and the 1/16"x1/4" balsa trailing edge stock to the wing plans on the plans sheet. Note the gap between the servo mounting rails was set per the dimensions of a Hitec HS-55 servo. You may need to modify the location of these two rails if you plan to use a different servo manufacturer.

- ❑ Build the landing gear support rib subassemblies using ribs **R4**, **R4a**, and **R4b**. Note the differences in each subassembly by referring to Figure 6.

- ❑ Fit, and then glue **R1**, **R2**, **R3**, **R4**, **R4/R4a/R4b** subassembly, and **R5** ribs to the connecting spars and adjacent wood parts making sure that each rib is perpendicular to the building surface.

- ❑ Glue the top 1/8"x1/4" balsa main spar to the center section ribs **R1** through **R5**. Note that this spar must be "cracked" in the center to allow it to follow the taper of the wing's design. Flood this crack with CA glue after it is glued to the notches of ribs **R1** through **R5**.

- ❑ Glue the top 3/32" SQ balsa rear spar to ribs **R1** through **R5**. Study the enlarged **R5** rib illustration in Figure 6 for a better look at the spar location in **R5**.

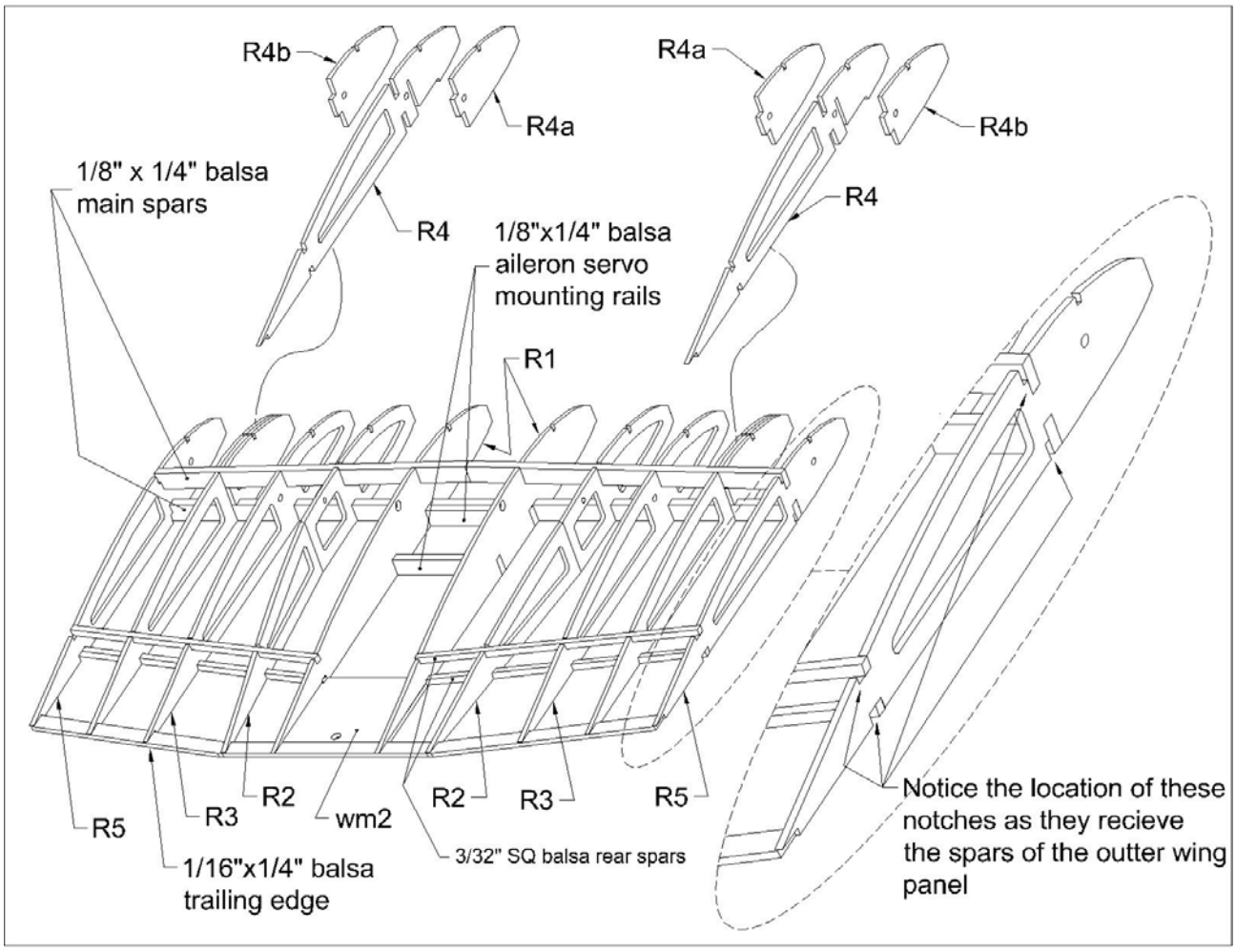


Figure 6

- ❑ Glue **wm3** to **wm2**, ribs **R1**, and trailing edge stock. The hole in **wm3** is aligned to the hole in **wm2** as shown in Figure 7.

- ❑ Glue in the laser cut shear webs **sw1** through **sw5**. Note that the grain of each shear web runs perpendicular to the building board. The hole in **sw1** should be oriented so that it is closest to the bottom of the wing. This hole accepts the wing-mounting dowel.

- ❑ Glue the leading edges **le1** and **le2** to the front of each rib. Align the leading edges so that they are centered on the front of the ribs.

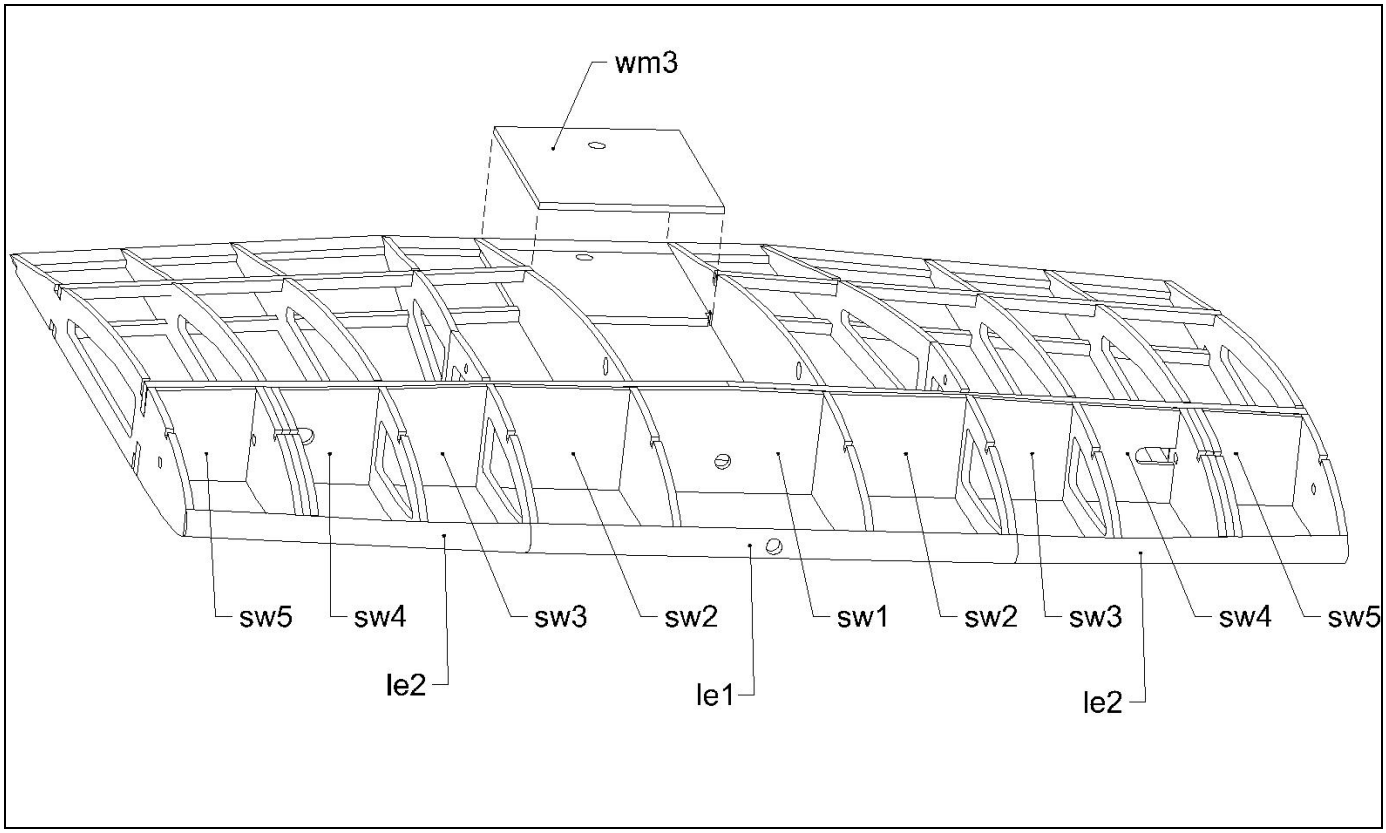


Figure 7

Wing Tip Sections (follow steps 9 through 18 for both outer wing panels)

- ❑ Cut and pin the bottom 1/16"x1/8" balsa tip spar, 3/32" SQ balsa bottom rear spar, **g1**, and the 1/16"x1/4" balsa trailing edge stock to the wing plans on the plan sheet. Study Figure 8 before proceeding. The bottom spars only extend to the inside of Rib **R5**.

- ❑ Fit, and then glue **R6** through **R11** ribs to the connecting spars, and adjacent wood parts making sure that each rib is perpendicular to the building surface. **DO NOT** glue any part of the outer wing panels to the center wing section. **g1** should only be glued to the 1/16"x1/4" balsa trailing edge stock at this point of the build. The outer wing panels will be glued to the center wing section after the dihedral angle has been set.

- ❑ Glue the top 1/16"x1/8" balsa tip spar and top 3/32" SQ balsa rear spar to ribs **R6** through **R11**. Note the overlapping dimension for both the top 1/16"x1/8" balsa tip spar and 3/32" SQ balsa rear spar shown in Figure 8.

- ❑ Glue **a9** to ribs **R8** through **R11**, then glue **a7** to **a9** and **R9**.

- ❑ Glue **wt** to **R11** along with its support gussets **g2** and **g3**.

- ❑ Glue in the laser cut shear webs **sw6** through **sw8**. Note that the grain of each shear web runs perpendicular to the building board.

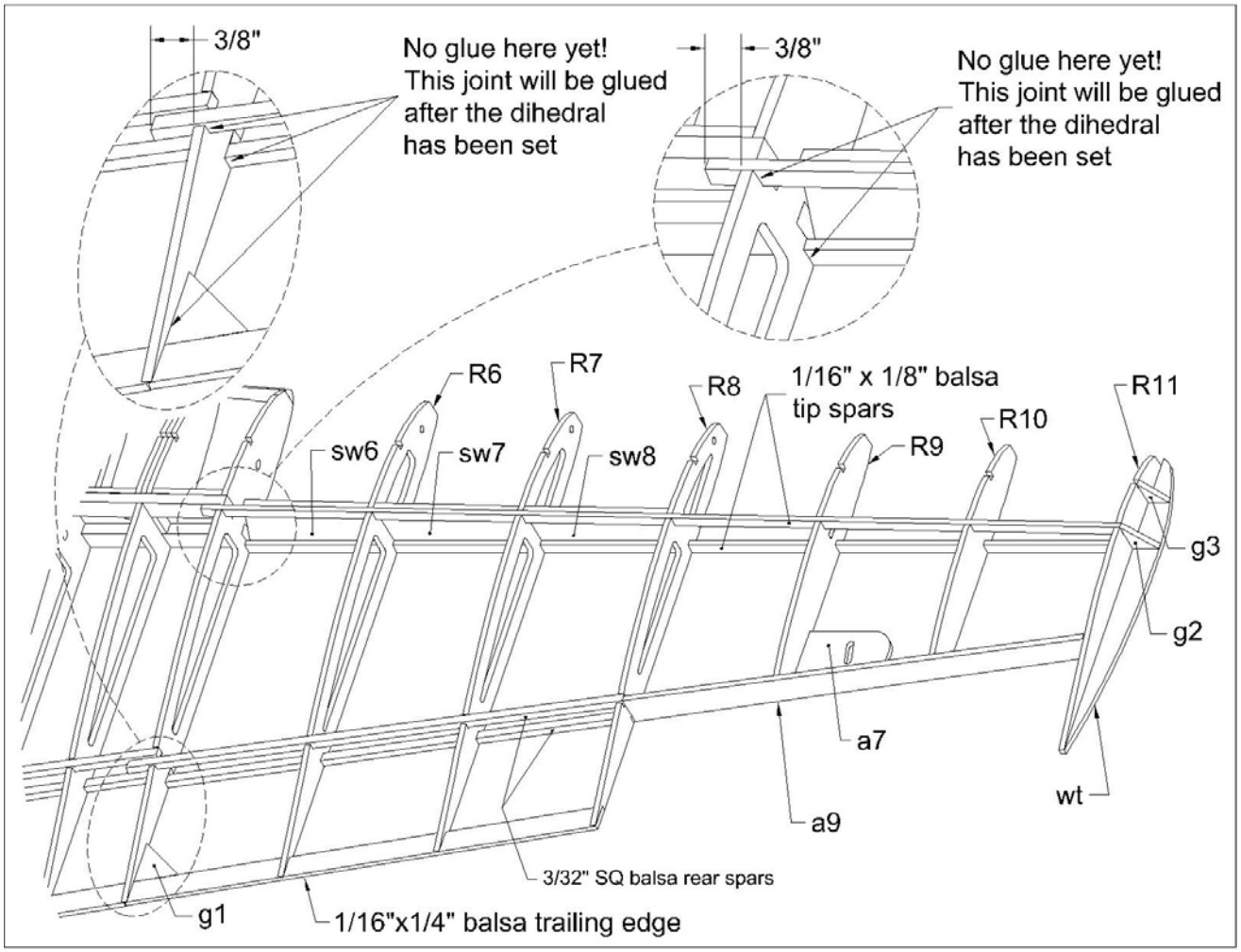


Figure 8

- ❑ Unpin each outer wing panel and "block up" each tip to the dihedral dimension shown in figure 9.
- ❑ At this point glue the outer wing panel spars to the center wing section spars as shown in Figure 9. Use a 90 deg triangle to make sure the outer panels are aligned over the plans.
- ❑ Glue the leading edge **le3** to the front of ribs **R5** through **R11**. Align **le3** so that it is centered on the front of the ribs.
- ❑ Glue the top 3/32" SQ balsa front spar across the entire wing.
- ❑ Glue the 1/8" wing-mounting dowel to **sw1** and **le1** per the plan sheet and Figure 9.

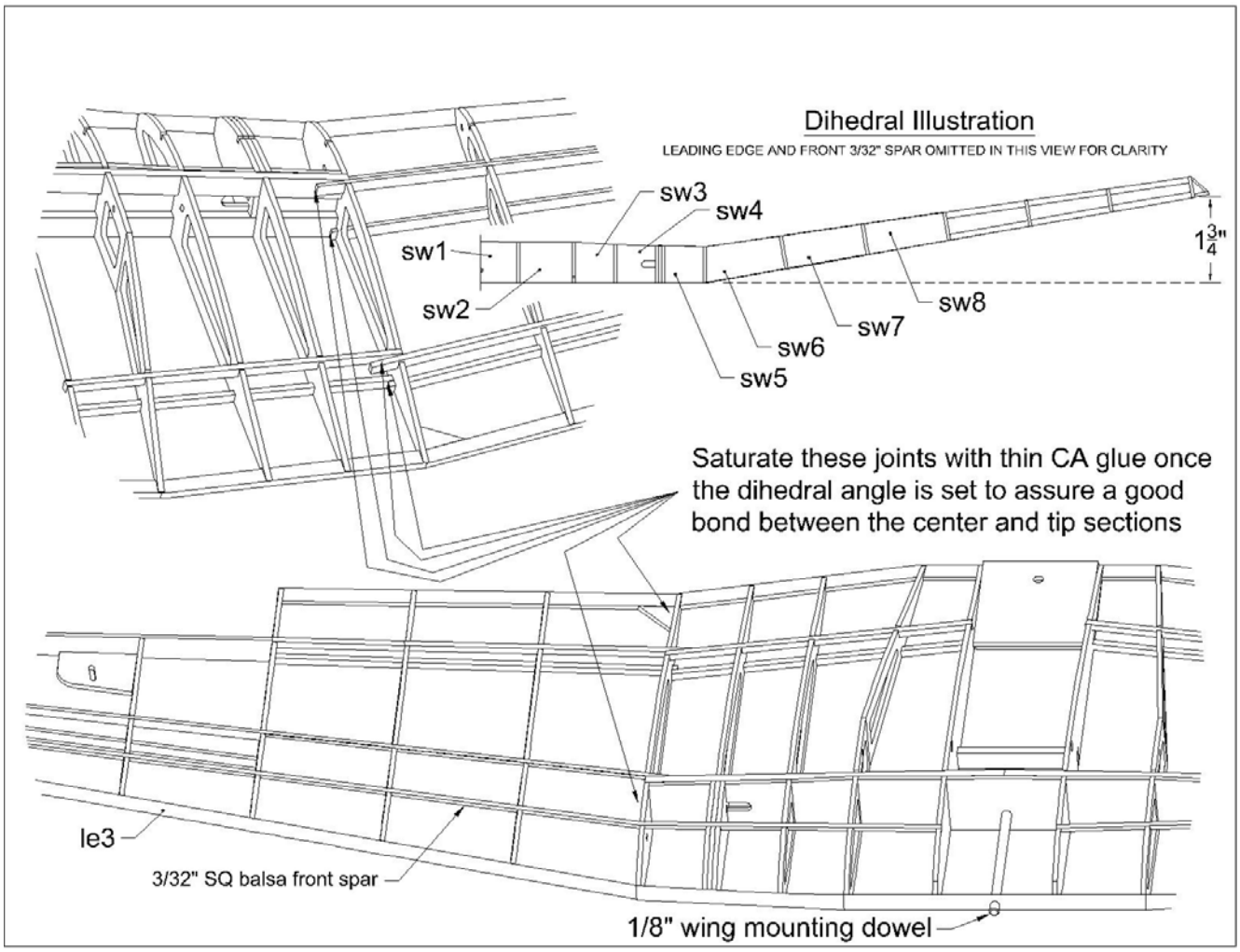


Figure 9

- ❑ The aileron servo installation is accomplished with the mounting screws provided by the servo manufacturer and left up to the builder's preference. Fasten the servo to the 1/8" x 1/4" balsa servo mounting rails. I do not recommend the use of the rubber grommets that are included with the servo.

- ❑ Route the yellow sleeve (tubing) through the wing as shown in Figure 10. Be sure to make the tubing run through each hole in the ribs so that it is not "kinked". If the tubing is not a smooth continuous run, it might create additional friction with the control cable and make the aileron servo work harder to control the plane. When you are satisfied with the tubing fit, glue the tubing to the ribs it passes through. Trim the tubing flush with the inside of ribs R1. Next, slide the 1/32" braided cable inside the tube as one continuous run. Just slide the cable inside the tubing and through the Dubro E/Z Connector on the aileron servo. Make sure that the aileron servo arm is positioned so that the cable does not bind with the tubing and EZ Connector.

- ❑ Build the ailerons per the plan sheet.

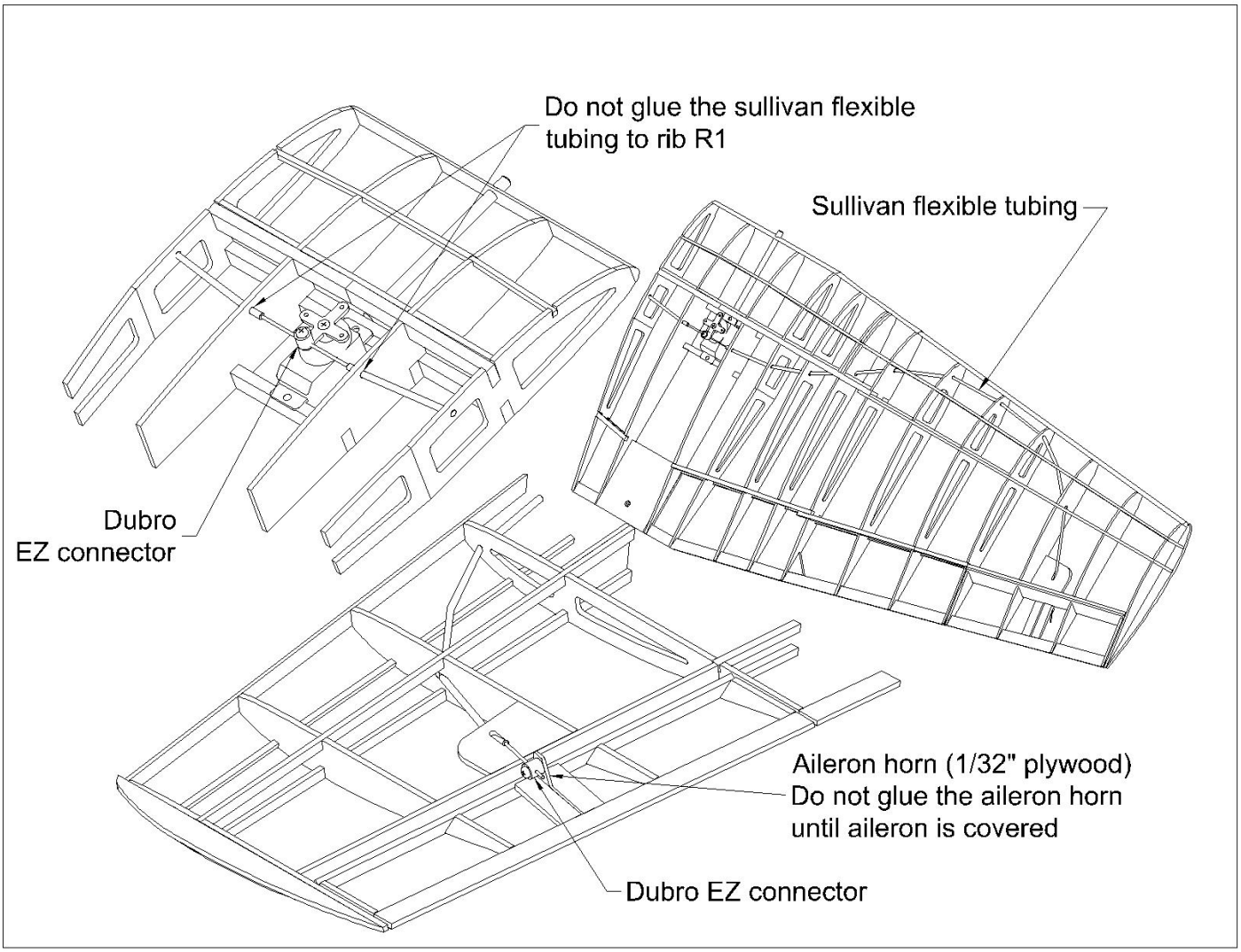


Figure 10

VERTICAL STABILIZER AND RUDDER BUILDING INSTRUCTIONS

- ❑ Pin **vs1** through **vs10** on the plan sheet and glue adjacent edges together where applicable.
- ❑ Next, cut and glue each of the remaining 3/32" SQ balsa sticks to complete the plans. Note that each 3/32" SQ balsa stick is a square cut, a new straight razor will make short work of these.
- ❑ The vertical stabilizer and rudder are complete at this time. If you do not plan to use the rudder on your Hellcat, you can glue it the vertical stabilizer.

HORIZONTAL STABILIZER AND ELEVATOR BUILDING INSTRUCTIONS

- ❑ Pin **hs1** through **hs10** on the plan sheet and glue adjacent edges together where applicable.
- ❑ Next, cut and glue each of the remaining 3/32" SQ balsa sticks to complete the plans. Note that each 3/32" SQ balsa stick is a square cut, a new straight razor will make short work of these.
- ❑ Join the two elevator halves with the 3/32" SQ hardwood stick provided in the kit. Do not use 3/32" SQ balsa here as this will most likely lead to structural failure.
- ❑ The horizontal stabilizer and elevator are complete at this time.

WING MOUNTING INSTRUCTIONS

- ❑ Mounting the wing to the fuselage on the Hellcat is pretty straight forward since the 1/8" wing-mounting dowel is positioned in the wing and the hole in the fuselage formers **f3** and **f3a** receives the wing-mounting dowel.

- ❑ With the wing inserted into the fuselage formers and laying flat in the wing saddle, adjust the wing so that the distance between the rear of wing tips and rear of fuselage are the same. When this is achieved, the wing is square with the fuselage. You may need to sand the leading and trailing edge of the wing to get a good fit. Take your time here, as this is an important part of the plane.

- ❑ Using the holes in **wm2** and **wm3** to align the drill bit, match drill a hole through the 1/4"x1/2" balsa wing mounting block. The diameter of the drill bit should match the inner diameter of the threaded brass insert. See Figure 11.

- ❑ Thread the threaded brass insert into the 1/4"x1/2" balsa wing mounting block until it is flush with the top of the wing-mounting block. Wick a small amount of CA glue around the outer edge of the brass insert and wing-mounting block to secure it. Be careful not to let the CA come in contact with the inner machine threads of the brass insert.

- ❑ Attach the wing with the supplied nylon bolt and the wing is officially mounted.

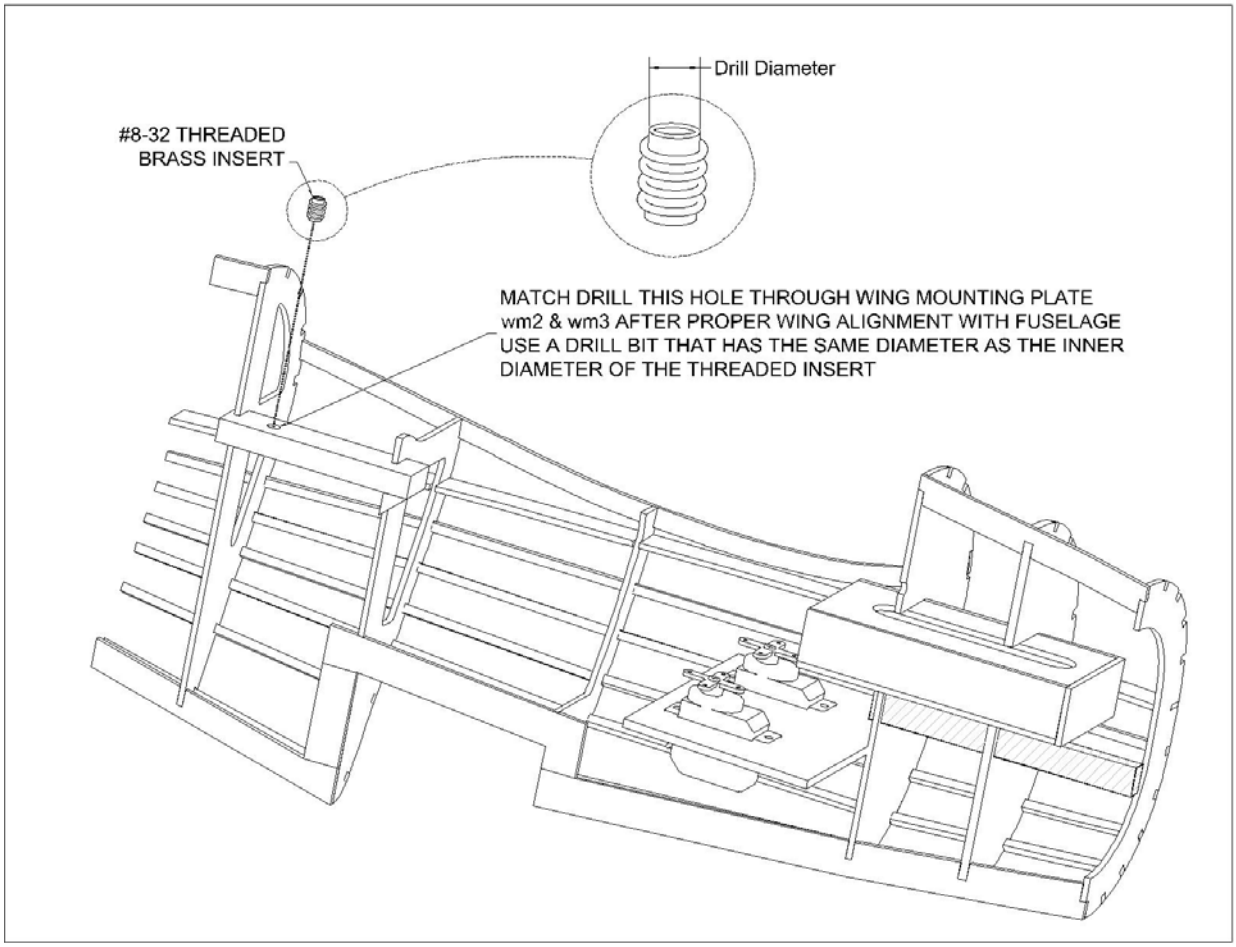


Figure 11

UNDER WING FILLER SECTION BUILDING INSTRUCTIONS

- ❑ Fasten the wing to the fuselage.
- ❑ Pin and glue the belly formers **bf1** through **bf4** on the bottom of the wing. The order of the belly formers is shown in Figure 12. Note the distances between the belly formers **bf1/bf4** and fuselage formers **f3/f3a/f6** shown in figure 12. These gaps are necessary to make the wing removable.
- ❑ Glue all 3/32" SQ balsa stringers to the belly formers.
- ❑ Glue **wm1** to **bf3**, **bf4** and adjacent 3/32" SQ balsa stringers.
- ❑ Create a small tube from scrap paper the same diameter as the hole in **wm1**. Insert the paper tube into the hole in **wm1** and align it with the holes in **wm2** and **wm3**. Glue the paper tube to **wm1, wm2, and wm3**. It will not hurt to soak the tube with thin CA to make it more durable. This tube will aid in the alignment of the nylon wing bolt.

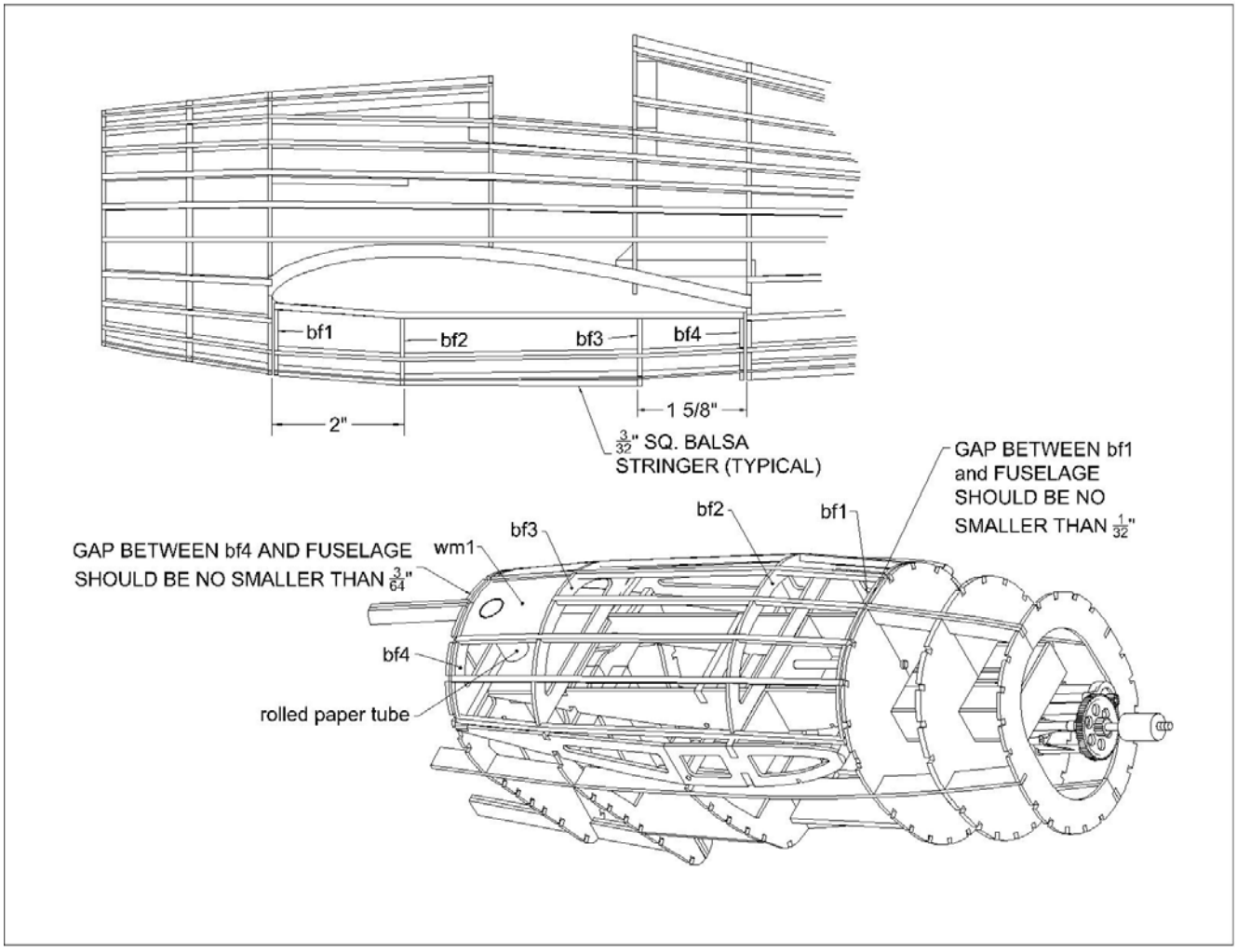


Figure 12

GENERAL FINISHING INSTRUCTIONS AND FLIGHT RECOMMENDATIONS

- ❑ The battery is held inside the battery box with Velcro. Orient and glue the Velcro to the top and bottom of the battery box so that it will create a "belt" to keep the battery from coming out of the battery box in flight as shown in Figure 13. If you chose to use a longer battery pack that is longer than the depth of the battery box you will need to make the hook component of the Velcro longer.

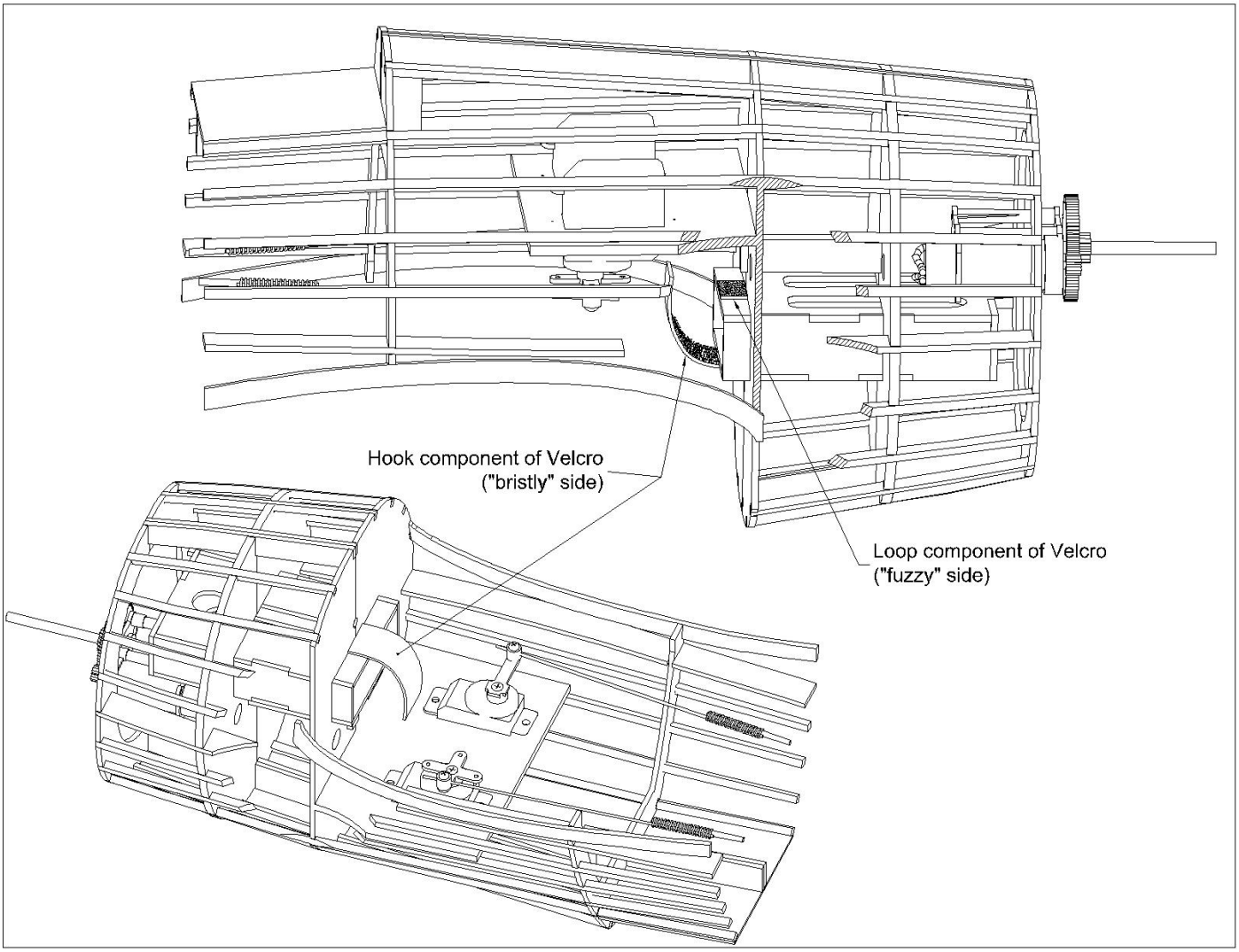


Figure 13

- ❑ Trial fit the horizontal and vertical stabilizers before covering. Perform any necessary sanding to achieve a good fit.

- ❑ Cut out and fit the plastic canopy and cowling before painting and covering the fuselage. Perform any necessary sanding to the fuselage to achieve a good fit. The cowling slides over the front of the fuselage and should have a snug fit.

- ❑ Sand the entire model smooth and round the wing leading edge to match the shape of the airfoil.

- ❑ If applicable, bend the landing and tail landing gear to the required shape by using the supplied landing gear wire bending templates as shown on the plan sheet. Install the main landing gear into the receiving portion of the **R4/R4a/R4b** subassembly with the wire oriented so the wheels are facing the wing tips. Install the bent tail landing gear into the receiving portion of the two-**fs3** formers that are on the bottom rear of the fuselage. Install the Dubro main wheels and tail wheel at this time. The main wheels are held on with the included hemispherical black plastic wheel collars. These collars are attached with thin CA glue to the main landing gear wire, be careful not to glue the wheel to the landing gear wire. The tail wheel is held on with a scrap piece of Sullivan Flexible Tubing (left over from aileron tubing). The scrap Sullivan Flexible Tubing is attached with thin CA glue to the tail gear wire, be careful not to glue the wheel to the landing gear wire. This is illustrated in Figure 14. (Note, the Dubro wheels may have to be drilled out to fit the landing gear wire)

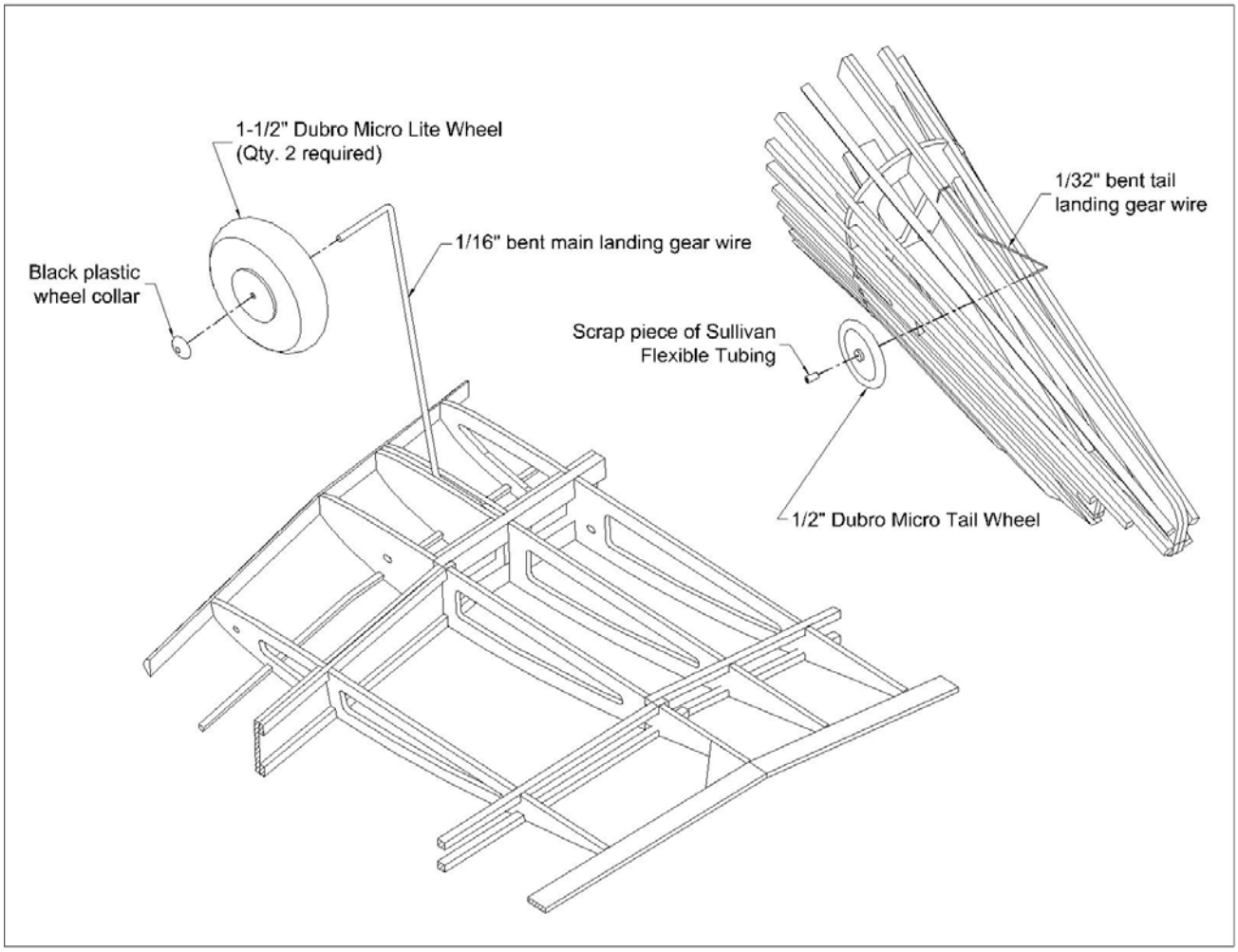


Figure 14

- ❑ Cover and paint your model. I recommend *Solarfile Lite* AKA *Solite.* These coverings can be purchased from www.mountainmodels.com. Scale paint schemes can be found on www.rcgroups.com and the World Wide Web.

- ❑ Glue the control horns in the ailerons, elevator, and rudder.

- ❑ I recommend Scotch #600 3/4" brand tape or equivalent for hinges. Run the tape down the top of the entire control surface with half of the tape on the moving surface and the remaining half on the stationary surface. Leave about a 1/32" to 1/16" gap between the control surface and stationary surface to assure you have enough movement.

- ❑ I recommend you set the amount of control surface throw to the following settings...
Aileron: 3/8" either direction, **Rudder:** 1/2" either direction, **Elevator:** 3/8" either direction

- ❑ With everything installed in your Hellcat to make it flight ready, be sure the plane balances on the range shown on the side view of the first plans sheet. After your test flight, feel free to move the balance point to get the desired performance. **The range shown on the plans is very conservative.**

- ❑ With proper balance, you're ready for your first flight with the Hellcat. On the first flight, get the Hellcat high enough that you can let off the control sticks to see what it does without risking a crash. The Hellcat is a very forgiving model and depending on the equipment you chose to finish it, you may have to trim it out as necessary.

Picture taken by Hellcat owner, James Good

