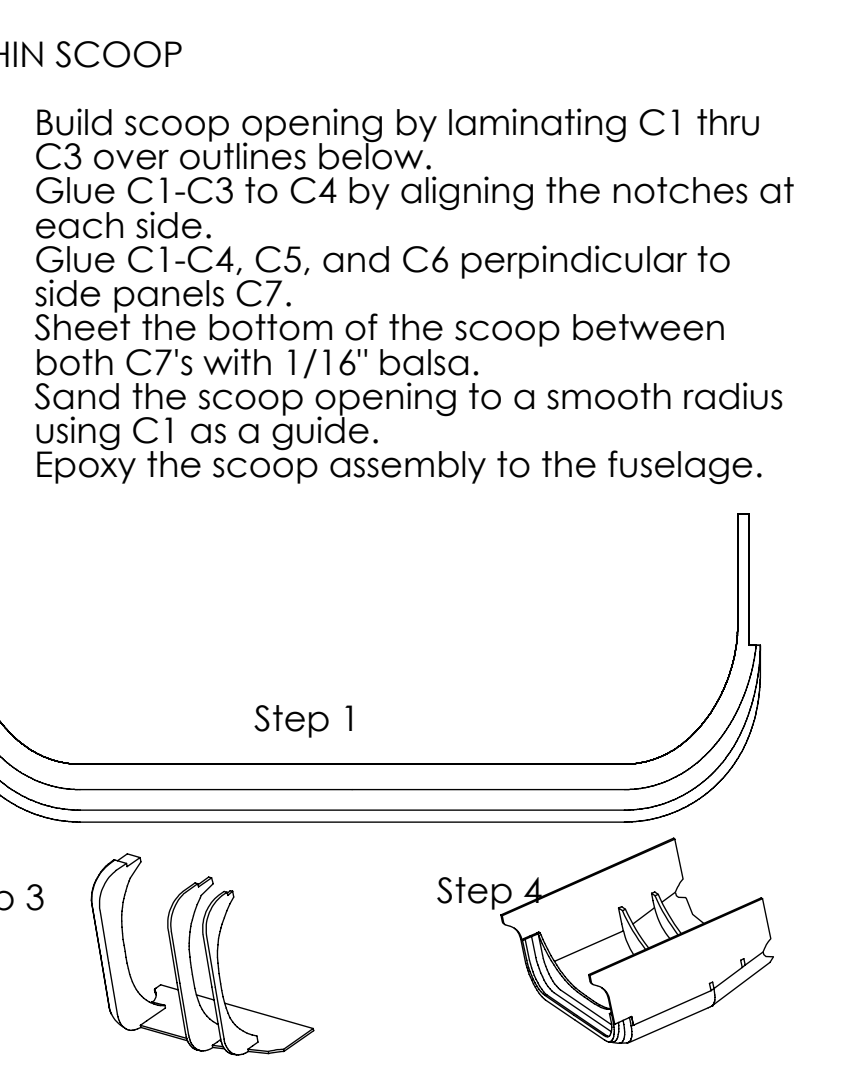
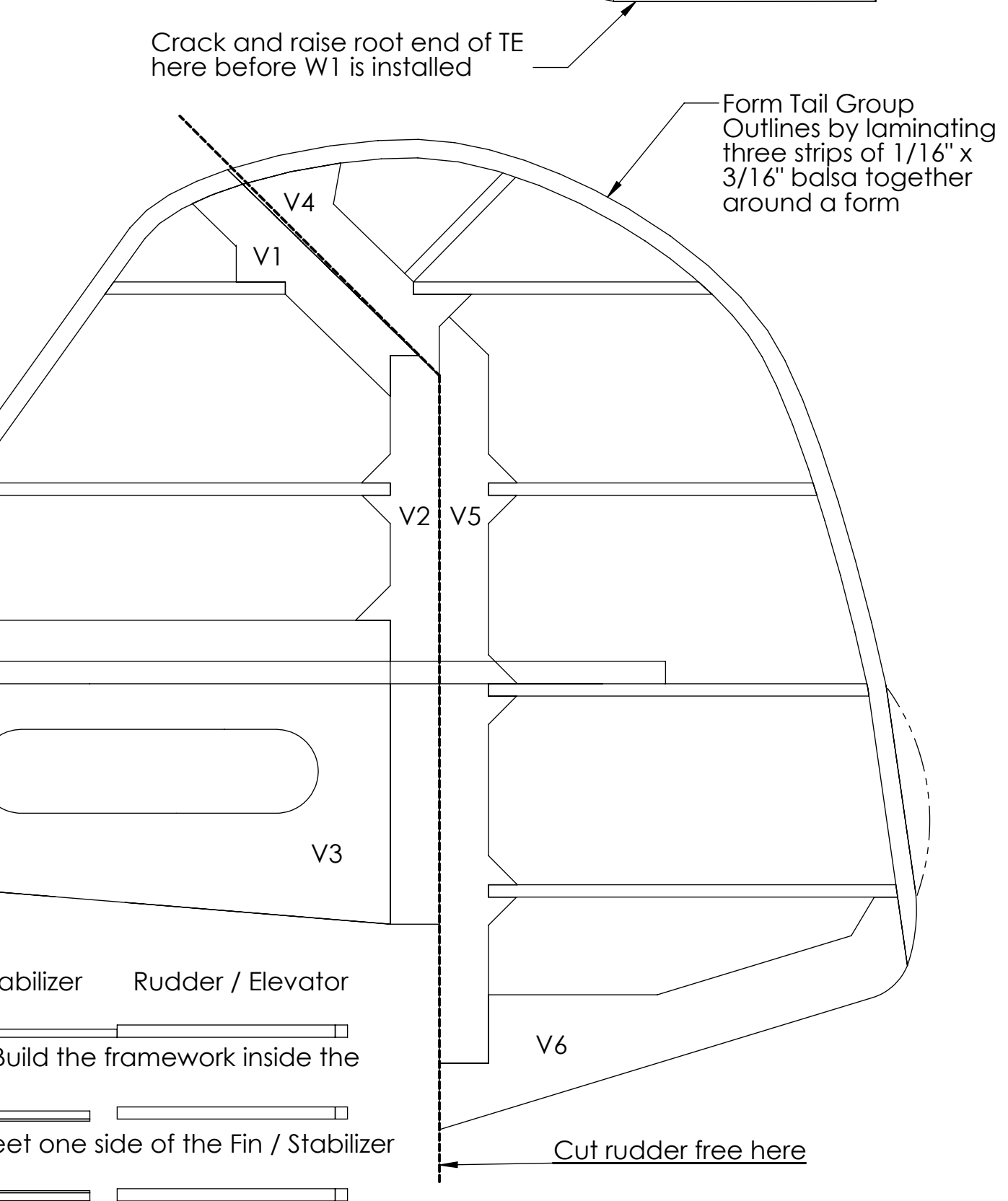
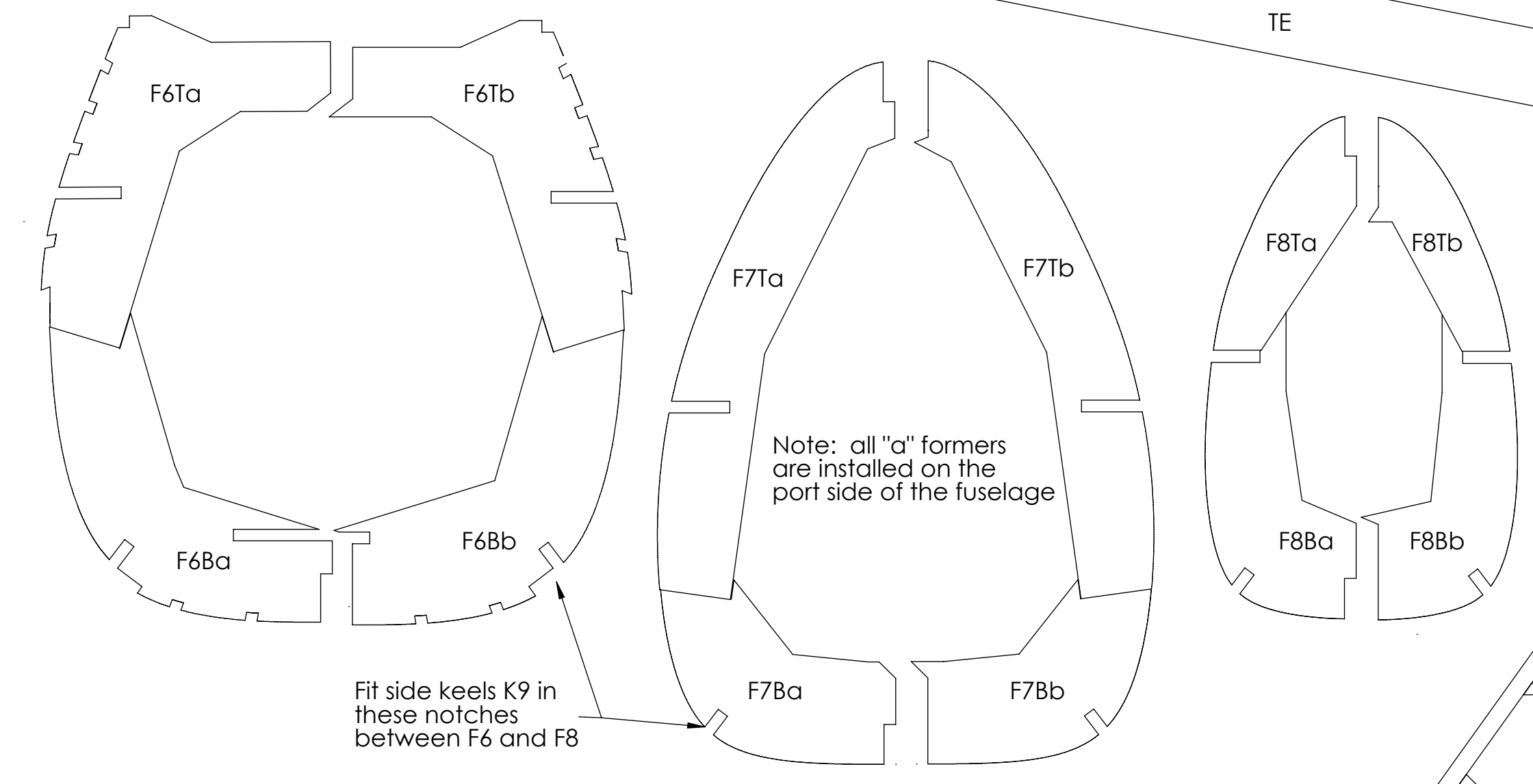
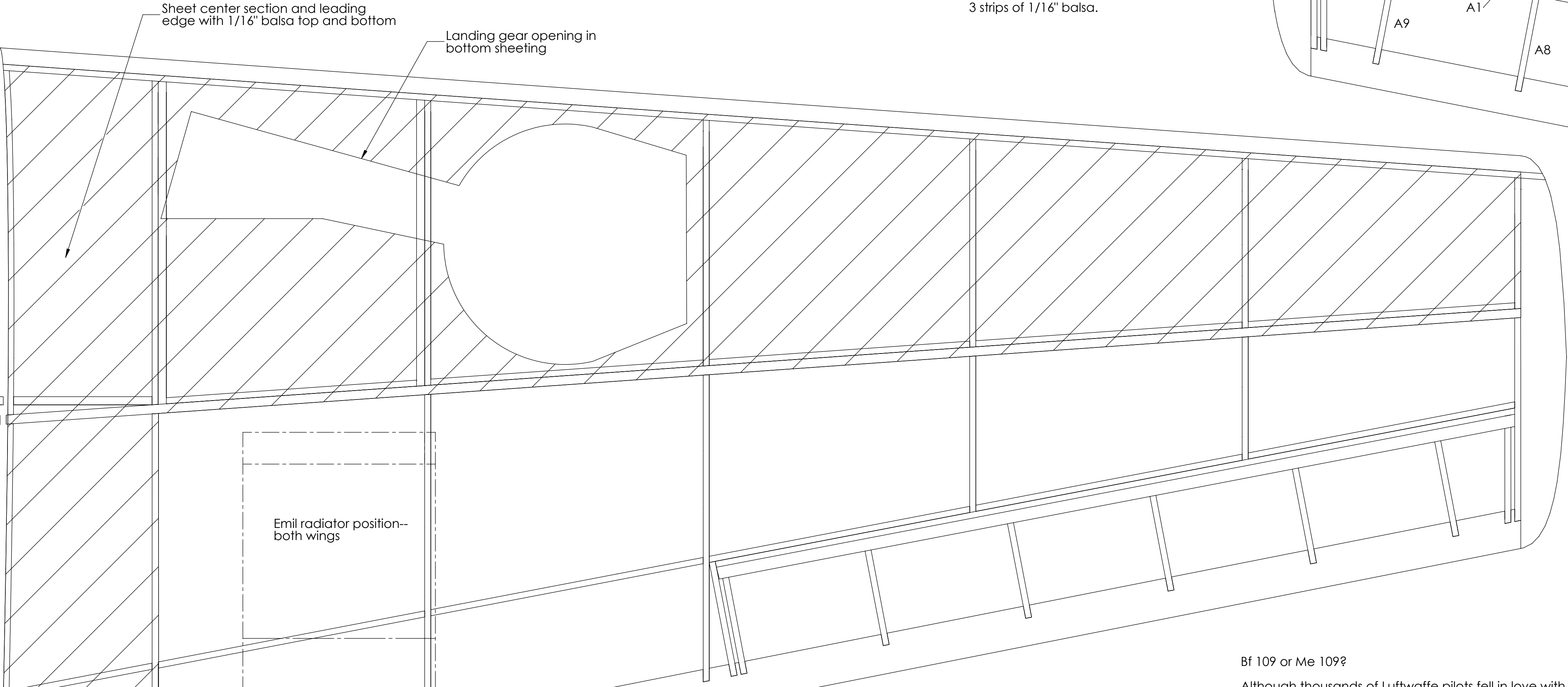
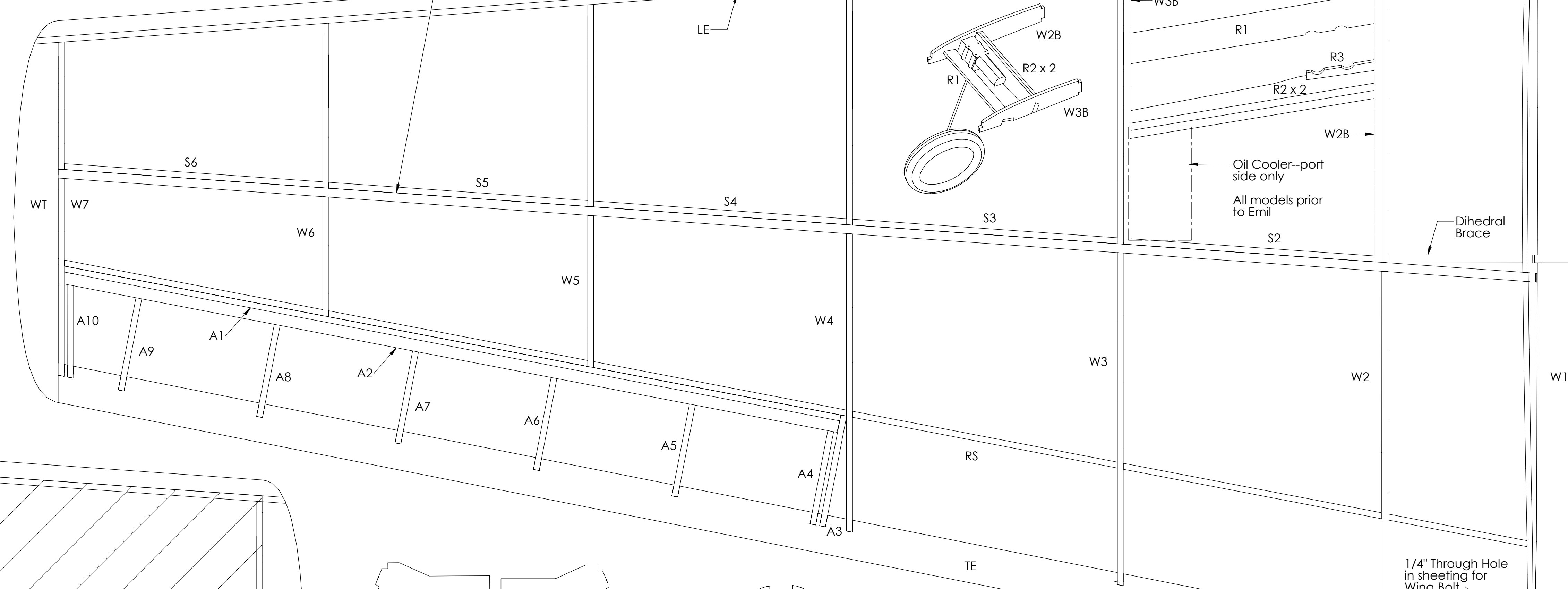


**DIHEDRAL**  
The dihedral is set by installing center wing rib W1 at the angle provided by the Dihedral Gauge.  
Completed wing assembly should measure 2 13/16" / 71mm from board to bottom of W7 when wings are level and supported by W1.

1/8" x 3/16" balsa or basswood upper and lower Mainspars with 1/16" balsa Shear Webs  
1/4" soft balsa Leading Edge



- CHIN SCOOP**
- Build scoop opening by laminating C1 thru C7 over outlines below.
  - Glue C1-C3 to C4 by aligning the notches at each side.
  - Glue C1-C4, C5, and C6 perpendicular to side panels C7.
  - Sheet the bottom of the scoop between both C7's with 1/16" balsa.
  - Sand the scoop opening to a smooth radius using C1 as a guide.
  - Epoxy the scoop assembly to the fuselage.
- WING--assembly order**
- Pin the lower main spar and rear spar (RS) to the board.
  - Raise the lower main spar by shimming it with 1/16" balsa scrap--this will allow the sheeting to cover the spar later.
  - Laminate Rib Doubler W2B to W2 and W3B to W3.
  - Ribs W2 thru W7 perpendicular to board.
  - Trailing edge (TE)--crack near root where shown on plan and lift to flatten the belly area.
  - Rib W1--set angle with Dihedral Gauge.
  - Upper mainspar, and shear webs.
  - LE, upper mainspar, and shear webs.
  - Wing tip (WT).
  - Unpin assembly from board.
  - Retract parts R1 thru R3.
  - Stack two R2's together.
  - Sheet as shown with 1/16" balsa.
  - 1/4" Soft balsa leading edge.
  - Join wings with ply Dihedral Brace.
  - Install a wing pin from 1/4" dowel where marked on ribs W1.

- FUSELAGE--assembly order**
- Build the port (left) side first on a building board.
- Formers F6 thru F8--preassemble over plan above.
  - Keels K5 and K6--preassemble over template below--make two.
  - Keels K1 thru K4--pin these parts flat to the plan.
  - All "a" Former parts--install perpendicular to plan.
  - F3T is tilted slightly back to allow the hatch to come off easily.
  - Keel K5/K6--glue into "a" Formers.
  - Keel K9--ties formers F6 thru F8 together.
  - Wing Saddle W5--align upper edge with notches in F3 thru F6.
  - Dampen outer surface of W5 and it will curl into place.
  - Add a few stringers below the side keel to lock the assembly into shape.
- NOTE: all fuselage stringers are 3/32" square balsa.
- Remove assembly from board after it has fully cured.
  - BATT--battery tray.
  - WP--wing pin plate.
  - WB--wingbolt pad.
  - All "b" Former parts.
  - Keel K5/K6.
  - Hatch formers F1H, F2H, and F3H--glue only to keel K1.
  - F1--ply nose former, glue only to K1, K3, and K5's.
  - Lower hatch rails K7--glue only to F1, F2, and F3T.
  - Upper hatch rails K8--glue only to F1H, F2H, and F3H.
  - Keel K9--ties formers F6 thru F8 together.
  - Wing Saddle--dampen and align top edge.
  - Stringers--alternate from side to side to avoid warps.
  - Knock out K1 between F4 and F5 to create cockpit opening.
  - Knock out K3 between F3 and W8 to create wing pocket.
  - Epoxy C1 into vac-formed cowling.

**Bf 109 or Me 109?**  
Although thousands of Luftwaffe pilots fell in love with the 109, Willy Messerschmitt wasn't appreciated by everyone in the aircraft industry. In particular, he had run afoul with Erhard Milch in the 1930's. As the head of the Reich Aviation Ministry, Milch refused to honor Messerschmitt with the "Me" description for the 109. Instead, he insisted that the aircraft be named Bf 109 after the Bayerische Flugzeugwerke plant where it was produced. Bf 109 was the official designation in German government documentation of the time. Of course, the Allies and even Luftwaffe field units were free to disregard this directive.

**Bf 109 VARIANTS**  
Oddly, the very first 109 to take to the air was powered by a Rolls Royce Kestrel engine. Because this engine was "upright", V1 had a very different appearance than her progeny.  
From V2 onward, the 700hp Junkers Jumo 210 inverted vee powered all Bf 109 models until the Emil arrived with its 1100hp Daimler-Benz DB 601. The Jumo-powered birds are identified by their large chin scoop, single small underwing oil cooler, and small carburetor scoop. Several changes were made to the exhaust stacks, ranging from rows of mere holes in the cowling to individual pipes nearly a foot long.  
Although the performance of the Emil was a dramatic improvement over earlier marks, very little of its airframe was changed. This makes it easy for the builder to upgrade this model to the Emil standard. The addition of the boxy underwing and chin scoops, a supercharger scoop, and the late-style exhaust stacks easily turns this model into an E. Outlines for the wing and chin scoops are included on Page 2.

**THE MODEL**  
This model was originally designed with a 30" wingspan and no landing gear. At 45", the scaled up airframe is perfect for servoless retracts. The wing shown here and its shortkit have been modified with mounting points for a pair of HobbyKing HK-15094M units. These were the smallest retracts I could find to fit this thin wing. Even with these small retracts, the strut geometry had to be adjusted from scale. The struts are a bit more verticle and a little shorter.  
The scale wheel will measure 3 3/16" / 81mm in diameter by 1/2" / 12mm thick. The landing gear leg length is 5 7/16" / 141mm from the retract to the axle.

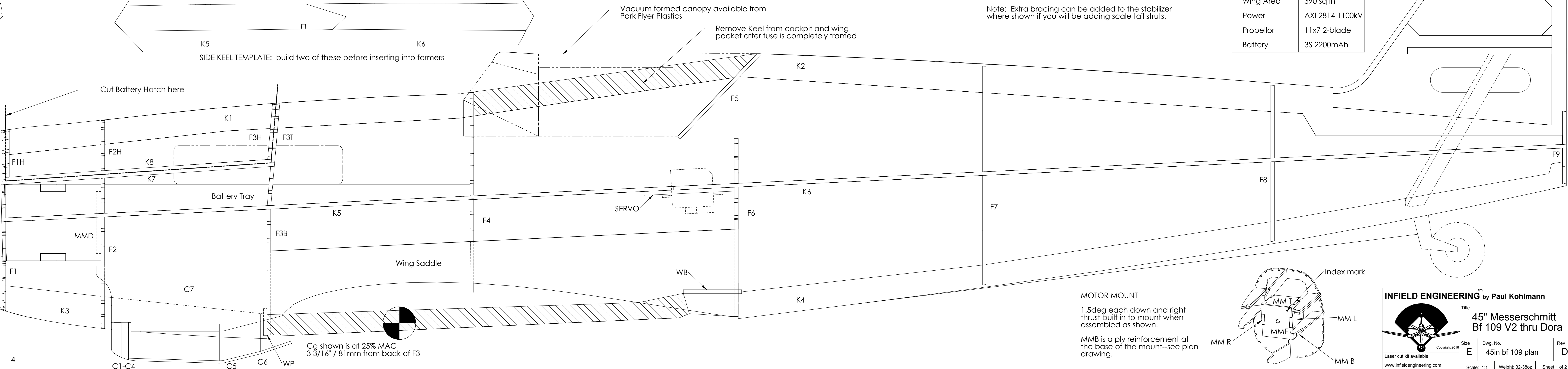
- TAIL GROUP--see diagram-->**
- Sheeting the fin and horizontal stabilizer and covering the rudder and elevators as open frameworks provides durability with a scale appearance.
- Begin tail group assembly by laminating outlines from three strips of 1/16" x 3/16" balsa around a form.
  - Three strips provides plenty of material for sanding.
  - Two strips can be used if preferred by the builder.
  - Pin the cured outlines into place over the plan.
  - Install the tail framework parts in numerical order.
  - Glue in the balsa bracing:
  - Use 3/32" x 1/8" for the Fin and Horizontal Stabilizer.
  - Use 3/32" x 3/16" for the Rudder and Elevators.
  - Separate the Rudder from the Fin and the Elevators from the Horizontal Stabilizer by cutting through the outlines where shown.
  - Sheet the Fin and the Horizontal Stabilizer on both sides with 1/32" balsa.
  - Sheet the bottom sides first.
  - Sand away excess material from the top of the outlines with 60 grit.
  - Sheet the top sides.
  - Once sheeting is in place, thickness of fin and stabilizer will match rudder and elevators.
  - Sand to shape and install hinges.
- Note: Extra bracing can be added to the stabilizer where shown if you will be adding scale tail struts.

**PROTOTYPE SPECIFICATIONS**

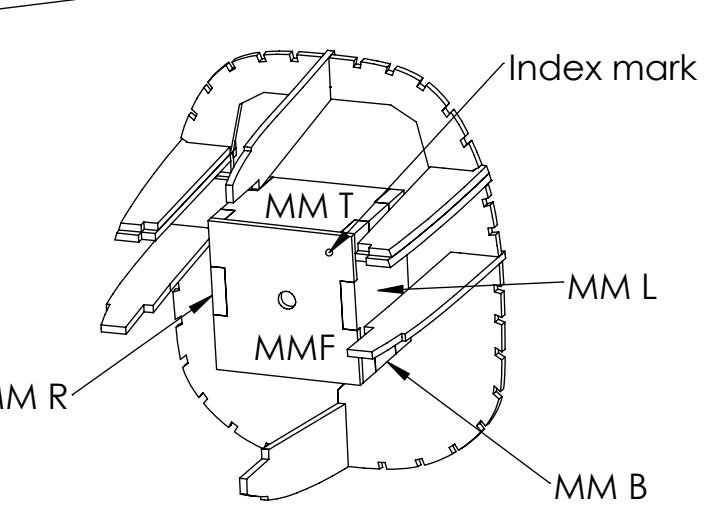
Wingspan	45.7"
Length	44.8"
Weight	33oz
Wing Area	390 sq in
Power	AXI 2814 1100kV
Propellor	11x7 2-blade
Battery	3S 2200mAh

**SPINNER and Detail Parts**  
3D printable parts for this model are available as open-source files on Thingiverse.com. These include the spinner and backing plate, instrument panel, and exhaust stacks. Search Infield Engineering Bf 109.

Use caution with printed parts--it is the builder's responsibility to work with a reputable printer and to verify that the resulting part is safe for use.



**MOTOR MOUNT**  
1.5deg each down and right thrust built in to mount when assembled as shown.  
MMB is a ply reinforcement of the base of the mount--see plan drawing.



**INFIELD ENGINEERING** by Paul Kohlmann

45" Messerschmitt Bf 109 V2 thru Dora

Scale: 1:1 Weight: 32-38oz Sheet 1 of 2