

Starwood Models SA315B Lama



Assembly Manual – Turbine version

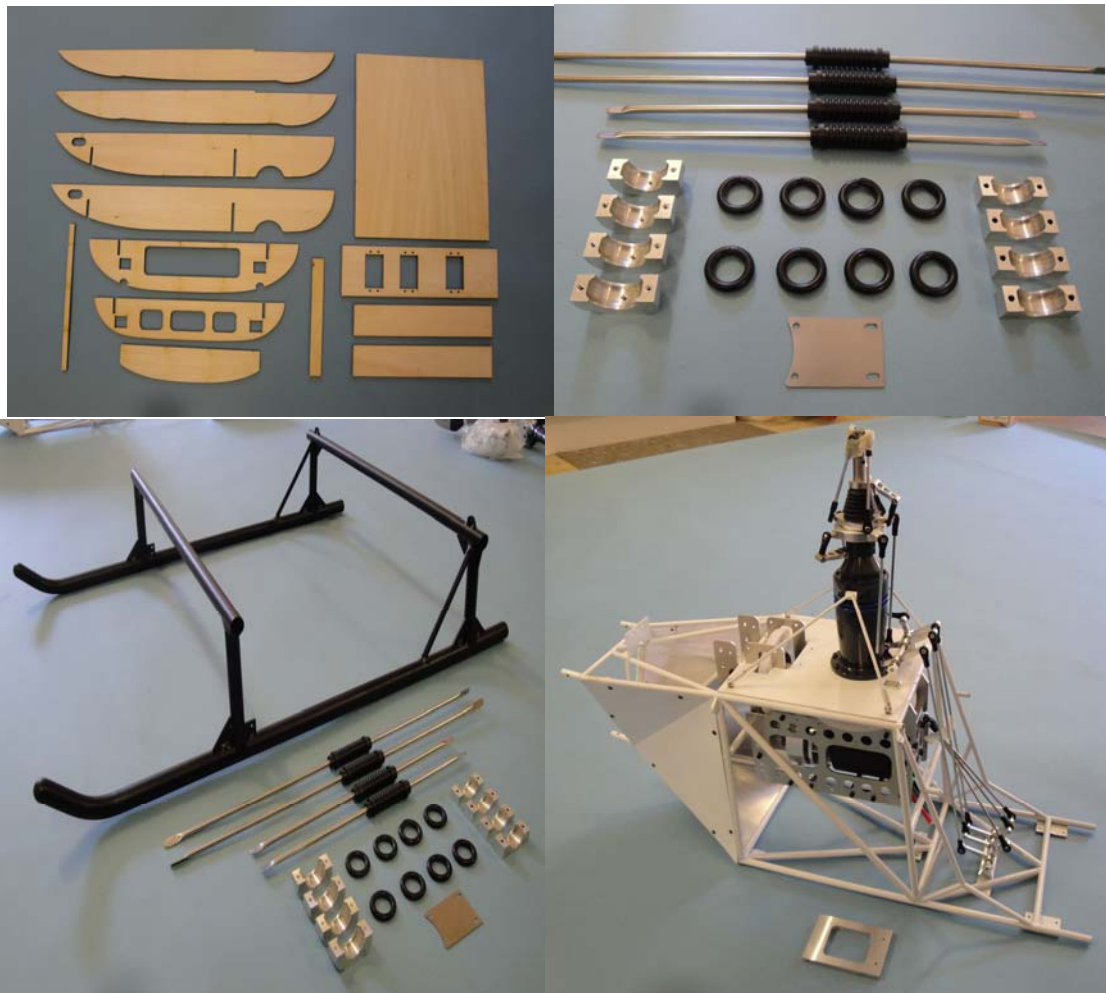
- SA 315B Lama Helicopter Kit**
- Optional Functional Scale Fuel Tank**

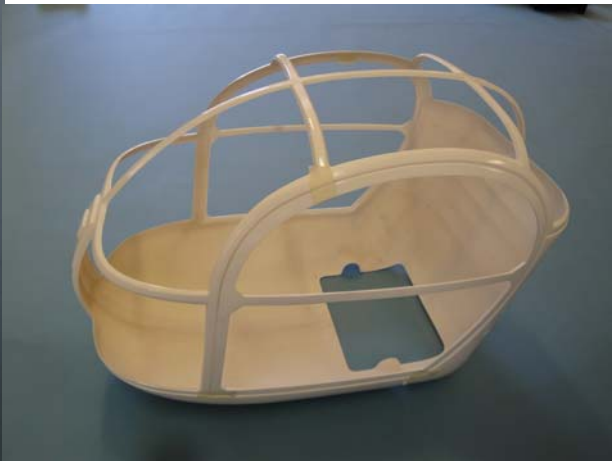
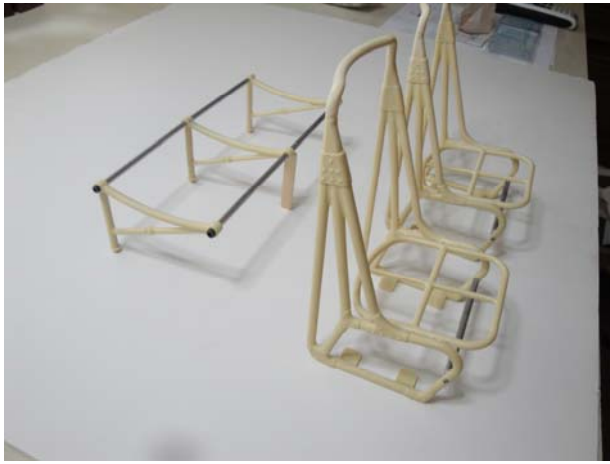
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Thank you purchasing the SA 315 B Lama helicopter kit. We hope you enjoy your new helicopter!

-Starwood Scale Models

1. Carefully unpack and inspect parts.





2. Start with the Main Mechanics assembly.

3. Remove the 3 side panels. (For painting and access to mechanics)



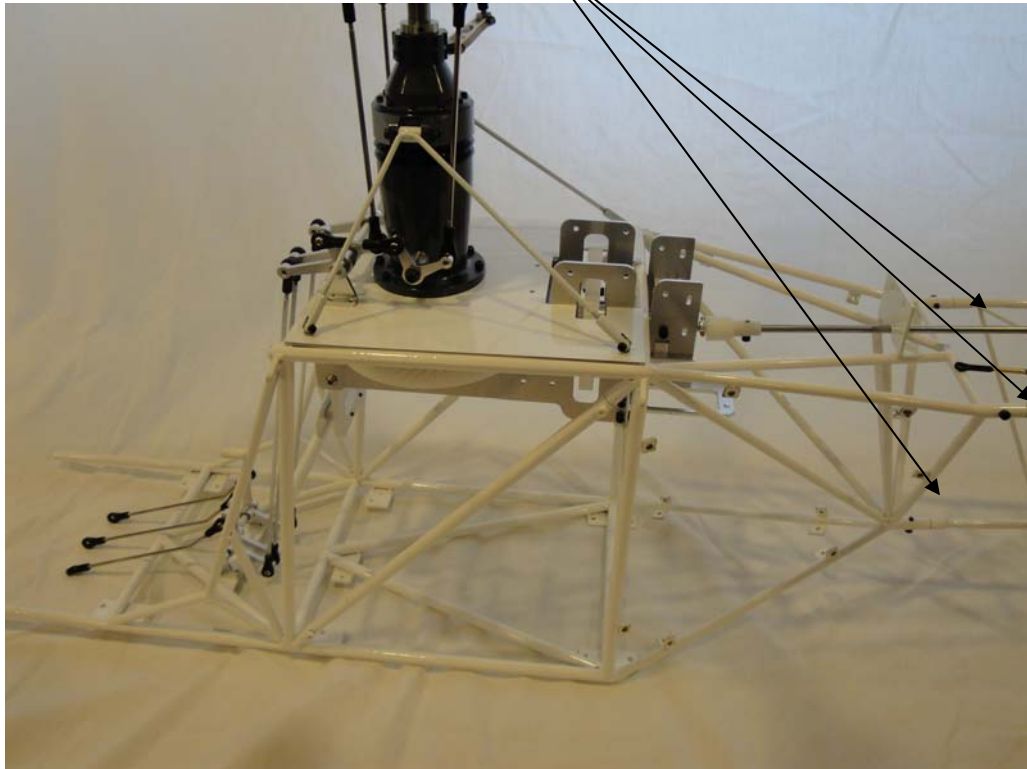
4. Install landing gear to the bottom of the mechanics making sure the rubber antivibration dampers are securely in place around the landing gear cross tubes. **Center the mechanics on landing gear.**



5. Trial fit, drill ends, and attach the 4 landing gear struts as per photo. You will have to drill both ends of each rod for the nut and bolt, so measure twice. Button head bolts may be substituted if desired.



6. Mount tail assembly to mechanics with the three (3mm) Bolts. Button head 3 mm bolts may be substituted for the socket head bolts supplied if desired.



7. Trial fit the torque tube in place along the top of the tail boom. Slide the front end of the torque tube fitting into the drive cog on the tail shaft output shaft on the mechanics. Slide the back end of the torque tube into the tail gear box fitting and mount the tail gear box with three (3 mm) bolts.

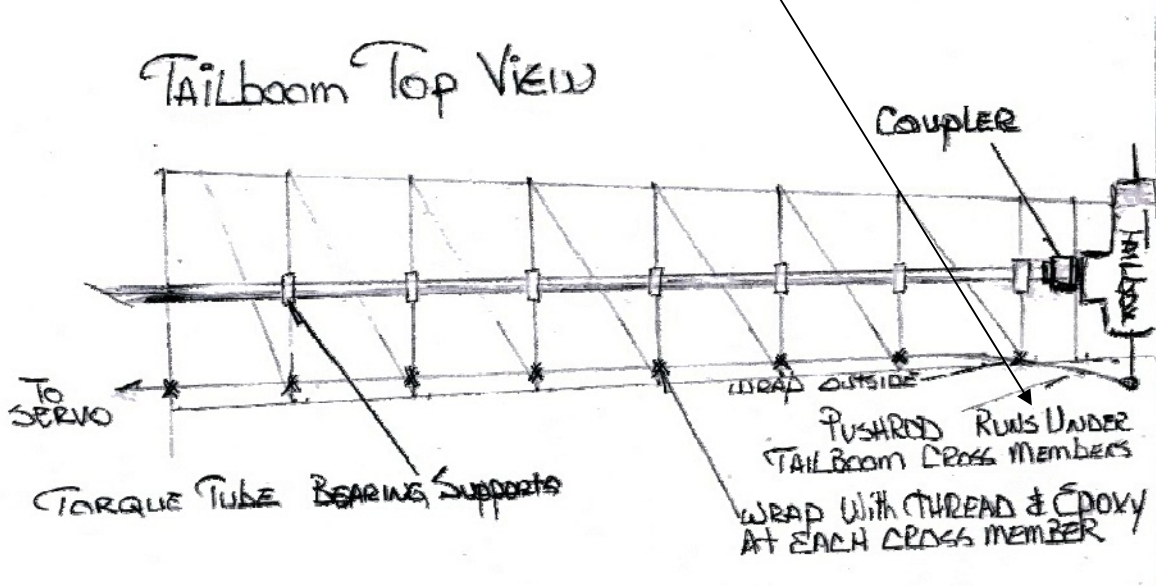
Align all the Bearing supports with Cross members. Carefully glue bearing supports with High Grade 2 part slow epoxy (like AeroPoxy), making sure there is No Binding and the torque tube runs smooth and free.

The Rubber “O” Rings on the couplers are for Adjusting Tension. The “O” rings can be added/removed to adjust the end tension on the torque tube. There should be no compression on the tube.



Hint: You will find it easier to get the torque tube straight and true if you glue the front, middle, and end support bearings first, let them set and then glue the remaining bearing blocks. Use a straight edge along side the torque tube to check for correct alignment of the tube.

8. Mount your tail rotor servo. Refer to drawing below for pushrod location and place the tail pitch control rod and tube in position on the tail boom. Once in place attach one end to the Tail Rotor Gearbox, the other to your servo arm. At each Cross member along the tail boom **TIE** the pushrod outer tube in place with multiple wraps of thread (DO NOT GLUE YET!). After adjusting the pushrod tube and rod for proper smooth function and correct location. Check the alignment from servo arm to tail box. When you are satisfied all is the proper location, place a drop of CA on each thread wrapped location along the tail boom. This will tack the push rod in place. Add a dab of 2 part slow epoxy to all thread/ CA connections for additional strength.



Hint: You can remove the tail push rod connection at the servo when you think everything is aligned, but before final gluing. The tail push rod can then be moved and felt for minimal friction while moving. Try to obtain as little drag as possible before gluing the tail push rod in place.

9. Locate the four wood cabin formers. Assemble the formers upside down on a flat surface with a piece of wax paper under the formers. Square the formers to each other and tack together with medium CA glue. When you are sure formers are square to each other run a bead of CA along the former joints and let the CA set. Turn the former assembly over (floor side up). Trial fit to inside the cabin. Former assembly will not be a perfect match to the bottom of the cabin. The formers will however sit parallel and about 1/8" below the edge of the door bottoms. The floor boards, when installed, should end up flush along the door bottoms. Add 3/4 x 3/4 rails to either side of the front to back formers. See Fig 9, 13, 17

This is a good time to add additional holes in the former assembly to run tubing for pumps and wiring later when assembling the helicopter electronics. This is important when building the turbine version of the Lama. (Fig 9)

Do not sand the woodwork to fit exactly where the formers meet the cabin surface. Once the assembly fits in the cabin as described above, using a pencil, mark where the formers will be glued to the cabin shell and remove the assembly. Use some coarse sand paper to scuff up the fiberglass surfaces where the formers will be glued. Replace the assembly in the cabin shell and tack it in place with CA where the assembly makes contact with the cabin shell.

Using two part, slow epoxy and micro balloons or epoxy fiberglass resin and cotton fiber (mixed to a tooth paste consistency), glue along the entire former assembly/ cabin contact area edges, filling any gaps. (Fig. 9) **Hint:** Double check again the former assembly is properly aligned before doing final gluing.



Fig 9

10. Now decide where you want to place the servos. **See Fig 10 & 21.** Cut/adjust the servo tray to meet installation requirements and dry fit. The supplied servo push rods can be cut down and rethreaded to locate the servos closer to the rear of the cabin. This creates a little extra room for the new Jakadofsky ECU to fit properly and also allows room for two battery packs (flight pack and ECU pack).

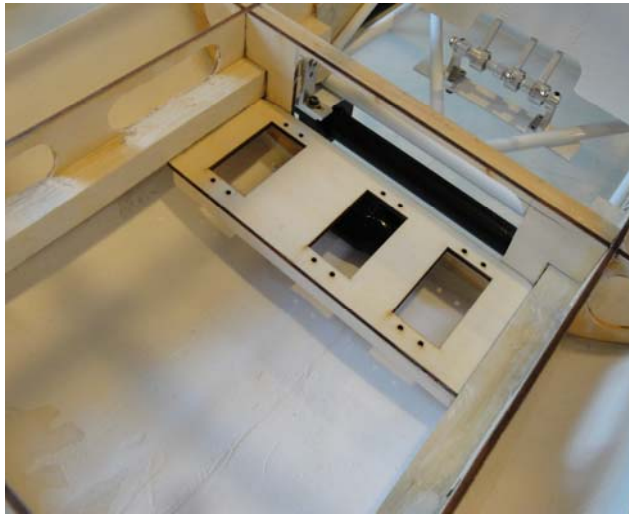
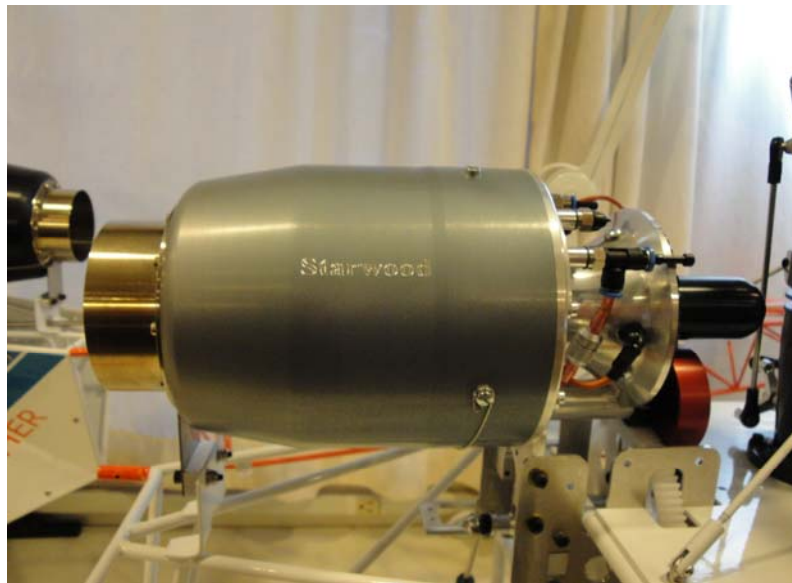


Fig 10

Note: Due to space limitations under floor, Kerosene start is not recommended for use with this model.

11. Mount your turbine as shown in photo below. Be sure to leave some gear lash between the clutch and spur gear. It is very important to leave some clearance here as the spur gear will “grow” in size while in flight. Running the spur gear too tightly can damage the turbine output shaft bearings. Use the supplied spacer and mounting plate to attach the rear of the turbine to the mechanics.



12. The rear bottom of the canopy needs to be cut to allow space for the lower bell cranks and frame members. Align the bottom of the Cabin cutout **template** with your canopy as shown on the template. See Pg 10

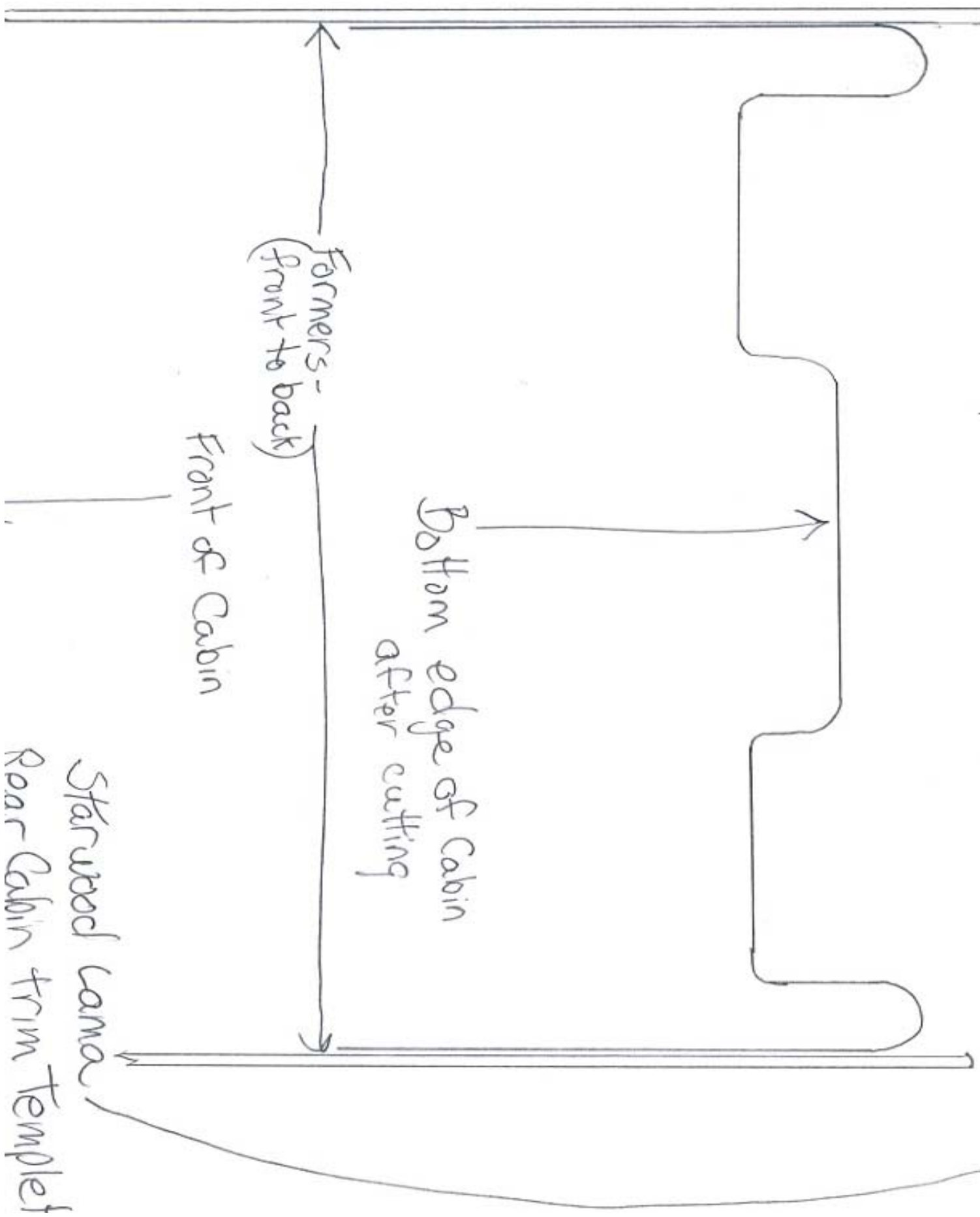




Fig 13



Fig 14

The bottom rear edge of the cabin fiberglass needs some trimming with a Dremel sanding drum to allow clearance of the three rear bell cranks and the frame near where the cabin is mounted. See **Fig 13 & 14** and Cabin cut **Template**.

13. Please double check that the cabin stand offs at the side of framework (behind cabin) measures 22 mm at the short point. See Fig 15& 16. Extend the stand offs with brass tubing glue in place and glue with 2 part slow epoxy as necessary.



Fig 15



Fig 16

14. You should now be able to slide the cabin onto the forward projecting, lower horizontal mounting tubes mounted to the main frame system.

15. There will be a gap of approximately $\frac{3}{4}$ inches between the horizontal mounting tubes on the main frame and the rear wooden rails in the cabin. Use two small scrap blocks of wood (not supplied) approximately $\frac{3}{4} \times \frac{3}{4}$ inch to create a snug fit between the wooden rails and the metal mechanics tube beneath it. Add some thin shims as necessary. Ensure the cabin door bottom rails are level with the mechanics framework and landing gear. Double check all is correct and **tack glue** the shims to the spacer blocks with CA. **Do not let the CA run down and glue the blocks to the metal rails! The cabin must be free to slide on and off sitting on the two bottom rails.** See Fig 17

After the CA has set, remove the cabin and epoxy the spacer blocks in place.

16. The cabin should now slide on and off snugly onto the bottom tubing projections of the mechanics, with the rear cabin stand offs just touching the back of the cabin. Everything should be level.

17) Two thin additional spacer plywood pieces (not supplied) can now be glued to either side of the vertical front to back floor formers to keep the cabin from sliding side to side. **See Fig 17**

18) The two supplied aluminum angle brackets should now be added to the front landing gear attachment bolt at each side. The brackets should also be attached to the inner side of the $\frac{3}{4}$ inch former rail with a wood screw. **See Fig 17**



Fig 17

19. With the cabin mounted in the correct position, you can now mark the location of the two upper standoff bolts that attach the upper part of the cabin to the mechanics framework.

Use a pencil and draw a light line around the standoffs at the back of the cabin. Remove the cabin and carefully drill a 3 mm hole at the center of the holes you have just marked at the back of the cabin. Slide the cabin back onto the mechanics rails and install a 3 mm bolt and washer at the back of the cabin. **Fig 15, 16** Glue wood washers in place on the inside of the cabin. If cabin standoffs have been extended, (step 13), glue a small wooden plug in the brass tube extensions (3 mm hole in the center). used as a solid filler in the standoffs.

20. Main Cabin Windows have been pre cut to approximate size although you will have to do some minor fitting. Take your time and fit the windows carefully. As you fit the windows, use masking tape to hold the glazing in place as you go along. **TAKE YOUR TIME!!** Double check all window edges again after you have everything taped in place. If all looks good, you can start pre drilling screw holes with a .030 drill a few holes at a time and installing the 1/32 inch Phillips screws into the cabin rails. Work you way around the cabin structure while checking fit of the window as you proceed. See Fig 18

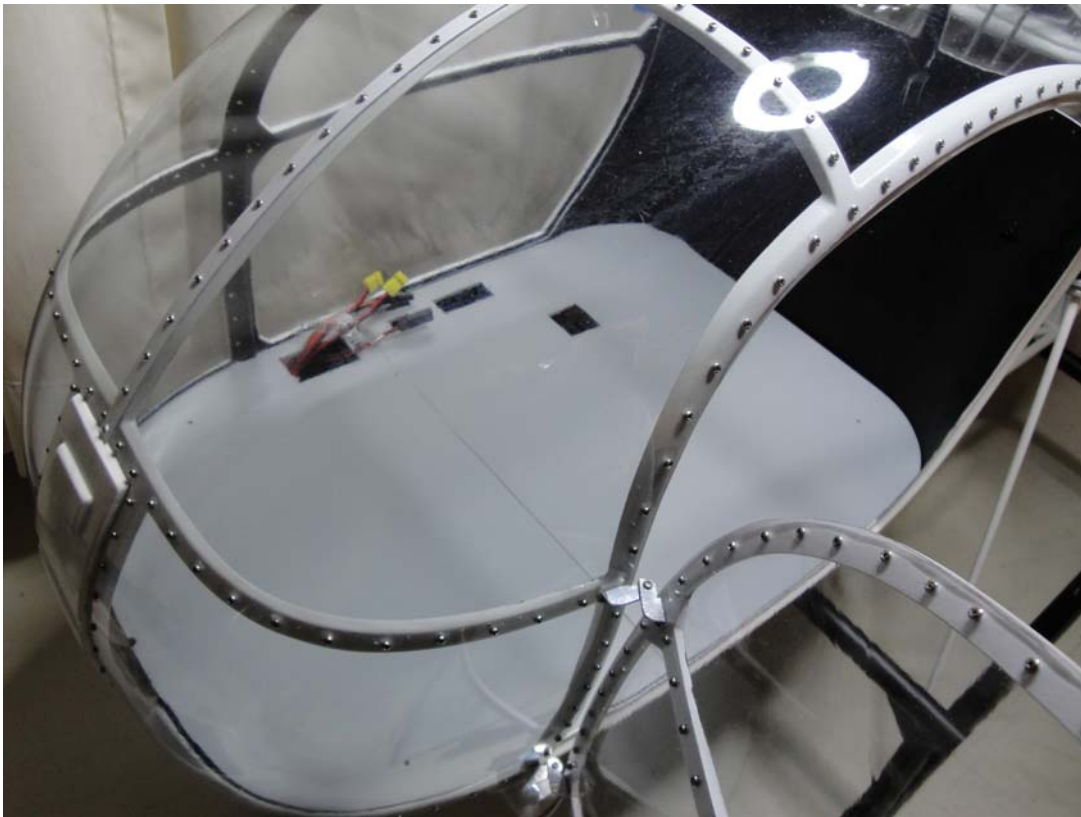


Fig 18

Hints: Install the center metal strip last. Use the same hole spacing as the center metal strip for all you canopy screws. Only remove masking tape after area has been screwed down.

Door Windows are taped to the door frame. Carefully mark with a water soluble marker the outline of the door on the window. Remove window and carefully cut to exact outer shape of the door frame. Reattach the window to the frame with masking tape and Drill and screw as per instructions above.

Hint: Be careful when installing screws in window frames not to push down on the frame work while installing glazing screws. This will tend to “flatten” out the curve of the door causing a misfit when the door is fitted.

21. The wood floor can be built with the included cut wood parts or with the upgraded full-size pattern provided. This is up to you which one you like, we like to give some choices during the build. Pattern floor pictured below with center cut for access to under floor space.
See Fig 19

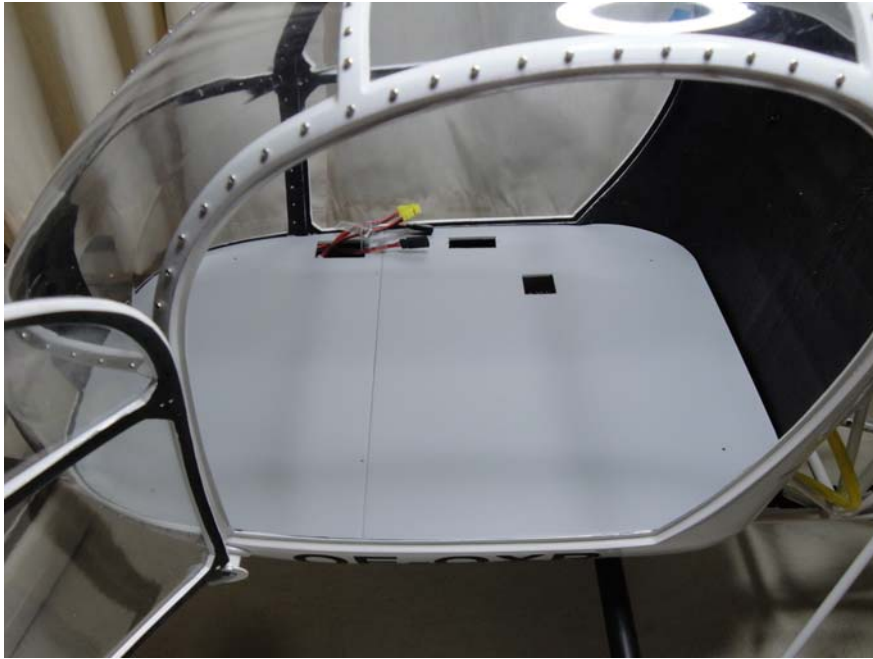


Fig 19

22. The **Rotor Head** is assembled but you will have to add the final details. The Dampers bolt on as shown in the Photo. The Cables will be cut to equal lengths and ends will be soldered on then screwed in place as shown in Fig 20. These part are decorative only.

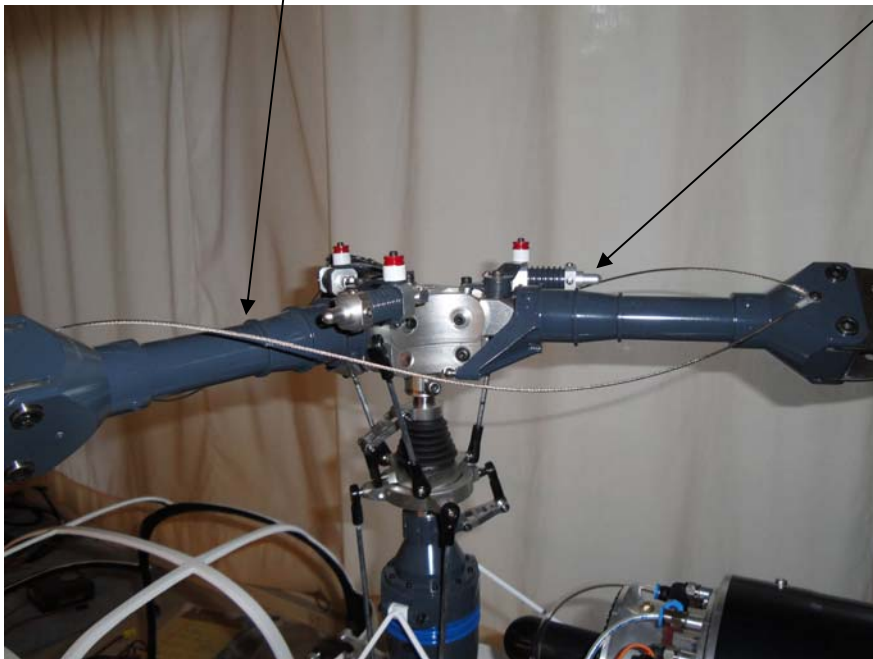


Fig 20

23. Basic Servo installation is shown in the photo below. Servo tray is fitted forward in this picture.

Note: This location fits the standard electric installation. The servo tray should be moved towards the rear for turbine installations. (Refer to Fig 10 & 21)



Fig 21

24. Fuel Tank installation is straight forward. If you purchased the Optional Scale Fuel Tank, please proceed with the following instructions.

Cut lower member and epoxy split couplers in place as shown. This allows this tubing section to be removed for fuel tank access. See Fig 22



Fig 22

With bottom and side frame members removed, swing in the bottom of the scale fuel tank in place from the side. Position the tank carefully and replace lower and side frame tubing members. Gently slide the fuel tank towards the rear (approximately 5/8 inch). This will allow enough access in front of the tank to install the lower front mechanics brace. This brace is a rectangular, 1/4 inch thick piece of aluminum with a hole cut out of the center. The bracket must be installed before the tank is in its final position. Install front mechanics brace and slide the tank forward to hide the brace. Glue the rear support (carbon rod & 2 piece wood end) approximately 60mm up from the bottom of tank snug against the rear of the tank with the carbon rod at a slight downward angle and seated against rear frame tubing junction. **The carbon rod is not glued at the rear.** After fitting and gluing the carbon support rod and blocks to the rear of tank, the two screws may be removed from the two piece wood block set and the carbon rod (and the tank) can then be removed.

Before removing carbon rod support, glue the bottom wood support (1/4 in angle shaped plywood) under the tank and snugly between angled frame members. Hold with masking tape or wedge in place with block until glue sets. This will hold the bottom of the tank in place! **Do not get any glue on the frame or the tank will not be removable.** See Fig 23

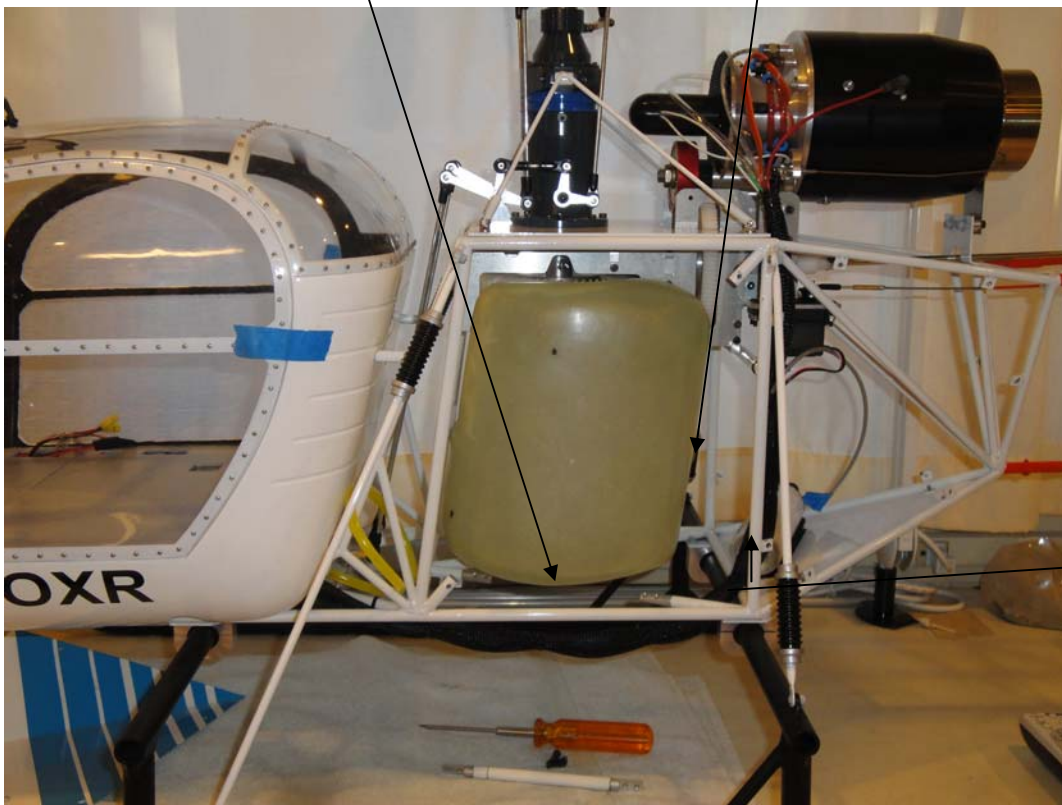


Fig 23

25. The air filter molding is made up of 4 pieces. There should be a box molding, a grill rim molding, a screen, and a mounting bracket for each air filter. You will need to supply a small piece of light 1/8 inch plywood to cap the back of the air filter boxes and six small screws for the filter grill. Glue plywood back on the air filter box and lightly sand edges smooth. Measure/ locate the correct set of holes in the mounting bracket. Drill 3 mm holes. The bracket attaches to the plywood back piece and the existing holes in the side frames (left and right hand). Refer to Fig. 24



Fig. 24

26. There is an abundance of Scale fittings included in this Kit! Take your time and look over the photos of the scale full size Lama's included on the documentation CD.



27. Paint the Model to your specifications, Check Main and Tail Blades for balance.



Be Safe and Fly Safe!

Enjoy your new Lama!

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