SE5a 26 5/8″ 1/12th Scale

R/C Scale Model Instructions

CONTACT INFORMATION
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Manufactured and Distributed by:

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SE5a 1:12th scale

Thank you for purchasing the 1/12th scale SE5a model for electric flight.

THE MODEL

A semi scale adaptation of the SE5a, this model is designed to be easy to build and exciting to fly.

R/C GEAR

A four function mini receiver and two or three micro servos are all that are required.

Model Specifications

More than 380 laser cut parts

Scale: 1/12th
Channels: R/E/A/T
Wingspan: 26 5/8"
Wing Area: 247 Sq. in
Weight: 10 Oz.
Power System: GWS IPS S1
Prop: 9x6 prop
Covering: Balsa and Litespan or Polyspan covering
Wheels: Balsa & plywood, Neoprene foam tires
Cowl: N/A/
Spinner: N/A/

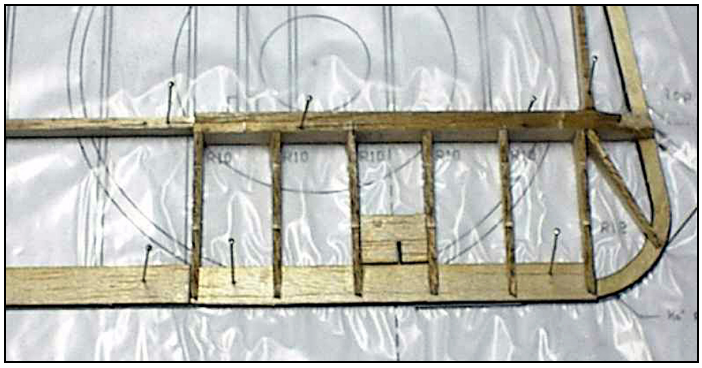
BUILDING THE MODEL

Before Starting

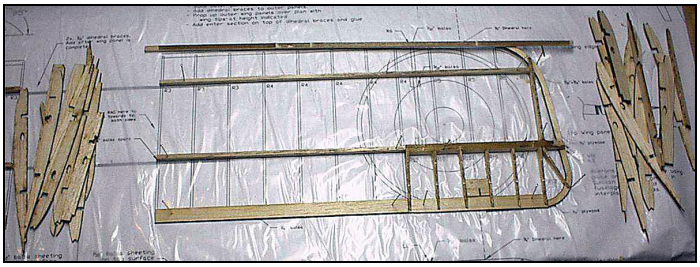
A note about the photos: The photos were taken of a prototype and the parts supplied may look slightly different from them. However, the concepts illustrated are the same. The following manual is taken from construction notes supplied by Steve Perry who built the aileron equipped version. The model may also be built with ailerons fixed in place and set up as R/E only.

Construction began with the upper wing panels. I tried something new for me and found it worked better than my usual method, so I'm passing it along. I built the ailerons first.

After laying out and pinning down the spars, I assembled and glued the aileron structures. After that had set, I then added the rest of the wing panel structure. Some care is necessary when gluing wing panel parts around the edges of the ailerons, especially the rear spar cap piece. The ailerons will come out attached, but are easily separated with a blade after sanding the panels.

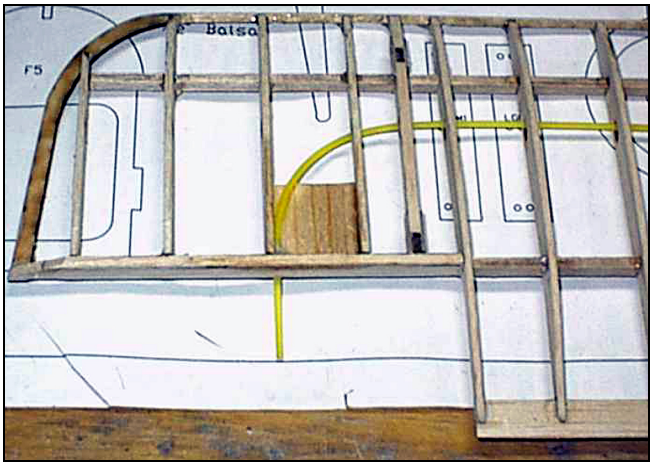


The wing tips are non standard and warrant some discussion. The ply tips are a great idea and will make the model much more durable. The rear portion of the tip, which is part of the aileron, is laid out flat on the board. The forward part needs to rise off the board from it's joint at the rear spar up to the leading edge. The R11 rib is notched to fit around the ply tip bow. I slid the bow piece into the notch in R11 without glue and then glued the ply bow to the rear spar and the leading edge. When those joints were set, I then positioned R11 and glued it in place.

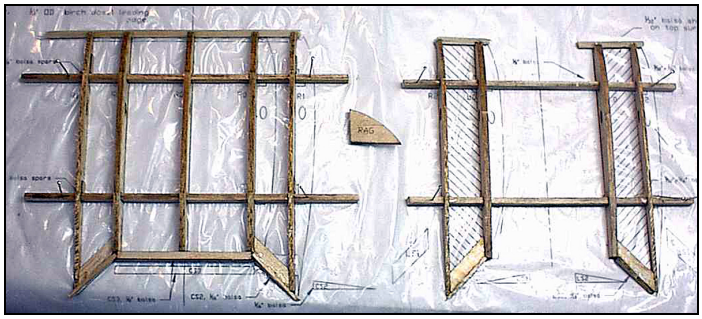


On the thick ribs that have the strut notches, I used bits of 1/32 ply to box in the notch instead of the balsa strips called out on the plans. I find this makes a better box. If you think your covering will need more area to stick to, add a balsa strip over the ply, but the better strut box formed by using ply is worth the effort.

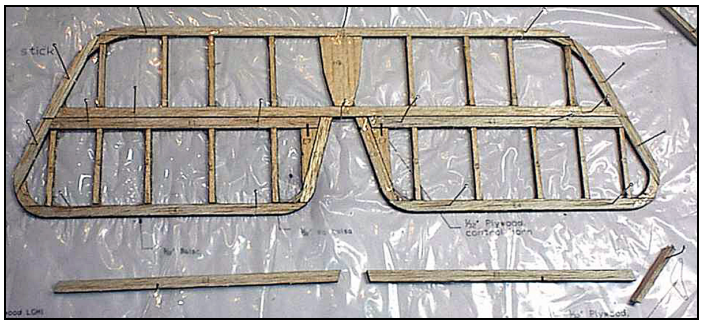
Except for the root end sheeting and the embedded aileron pushrods, the lower wing panels are identical to the upper ones. Be very sure to rough up the outside of the plastic tubing for the push rods After gluing the roughed up tubing in place in the front of the oval cut-out an each rib. If you saved the little ovals with the notch lasered into them as you separated the ribs, just glue them back into the holes, sans notches, to secure the tubing. The more secure the tubing, the smoother the aileron actuation will be.

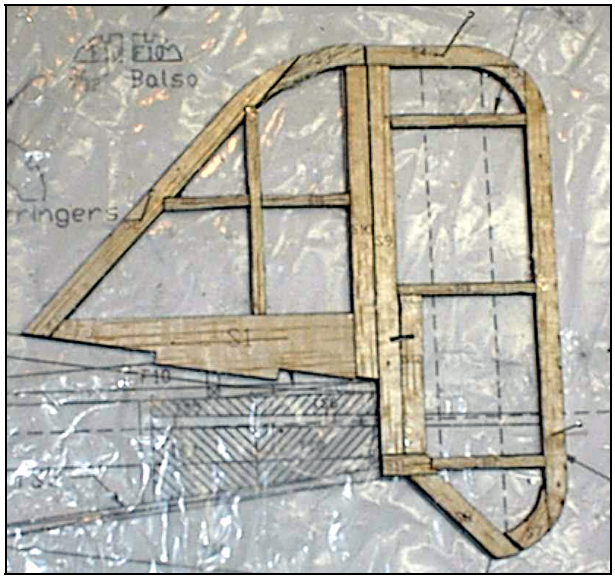


The center sections are next. I did not fully box in the cabane strut notches on the R2 ribs because the outside needs to be flush with the root rib of the wing panel which forms that side of the box when attached later. I laid out the sections with over long spars and leading edges as this allowed me to pin them down without sticking pins in a structural part of the spar. The plans and parts are quite precise, so be sure to get the root ribs aligned perfectly with the plan and at the correct dihedral angle by using the RAG.

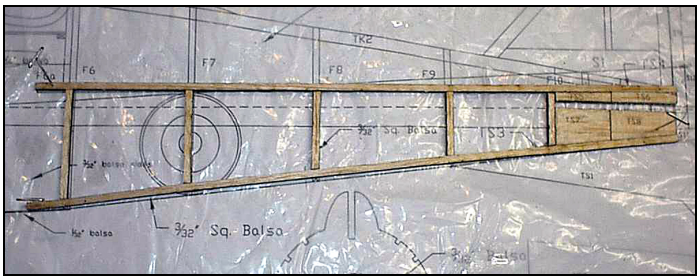


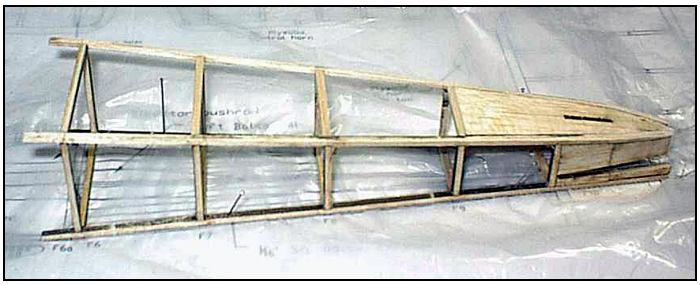
The tail feathers are the next logical structure to attack. They are completely straightforward with the added touch that the internal framing sticks have all been cut to exact size and even given lased part numbers. Not much "short" about this kit. Just to make sanding easier, place the little pieces with the scorched edges on the sides leaving un-scorched balsa on the upper and lower (left/right) sides of the surfaces.





The fuselage rear side frames are simple structures, but the four pieces that form the horizontal stabilizer slot need some care and attention. Sand the laser bumps off the mating edges and the pieces will line up perfectly. The slot sets the incidence for the stab and needs to be spot on here.

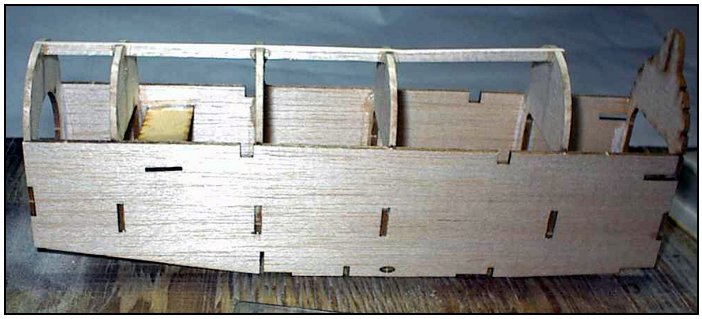




Joining the rear frame panels into a box structure is always a dicey operation. A couple of finer points may make it easier. First, carefully cut the cross member pieces to exact size and angles. Do this before covering the plan with plastic. Second, build the box upside down by pinning the top longeron, (the level one), directly to the top view on the plan.

There is a whopper of a bend at the tail. Let the box dry well before adding the two balsa plates. You may need to make a couple of small relief cuts in the outer side of the longerons in order for them to make the bend.

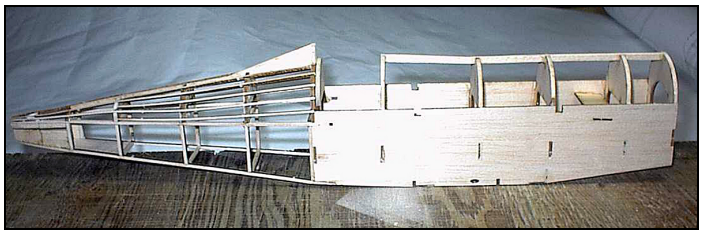
The front box pretty well builds itself. Dry fit each former in it's associated slots in the balsa side panels. You may need to trim to get a good fit with the part fully seated in the slot. CAD drawing and laser cutting are so precise that slight variations in the thickness of the sheetwood can give a tight fit in a precisely cut slot. Use care when squeezing the sides together, the lower portions of the formers can be broken with too much pressure.



Be sure to use squares, triangles and anything else to ensure the box structure is true and square. Also, do not forget to get the motor stick plate glued in right side up.

Mate the front and rear fuselage structures. Dry fit and make any "adjustments" required to get a perfectly straight and true fuselage before using any glue.

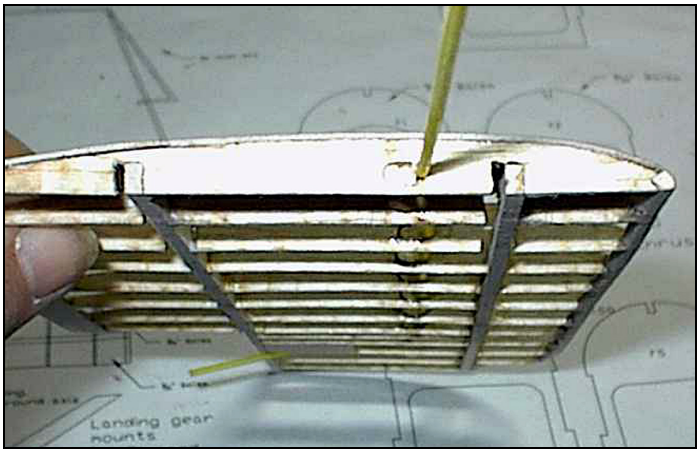
Attach the turtle deck formers and the upper keel pieces, ensuring the formers are all true and vertical. Add the stringers. I found it easier to leave the stringers that run all the way to the tail unglued at the tail until all the stringers are on. Then glue and trim the stringers at the tail end.



At this point it is a good idea to install the radio and power system before adding the sheeting. In these small models, you can use all the finger access you can get.

Assembly of the model should begin before any covering is started. Carefully dry fit the lower center section to the fuselage. Trim, fit and fiddle until the fit is perfect and all the notches for the dihedral braces are clear and wide enough to accept the braces. Ensure that the bottoms of the root ribs fit exactly even with the lower edge of the fuselage. I did this before adding the 1/32 sheeting and then once again after adding the sheeting to make sure everything is correct and true. Once assured of a good fit, remove the center section for assembly of the outer panels and dihedral braces. Care and precision in fitting the lower center section is critical for alignment of the whole model, so take some time and get it correct now.

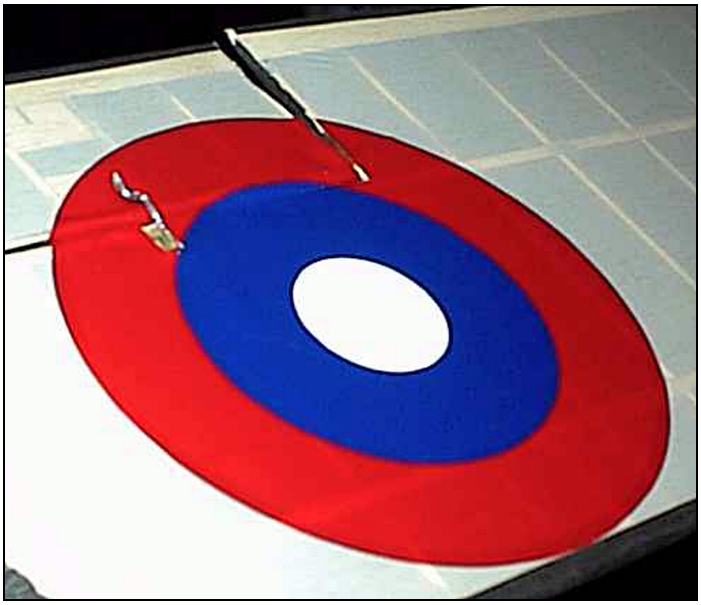
Aileron control cables need to be installed in the lower wing panels. I used Sullivan #507 thin braided cables inside a plastic tube. I saved some of the notched out oval cut-outs from the wing ribs. After running the cable through the oval holes in the ribs, I plugged each hole with one of the notched oval cut-outs, securing it with a drop of CA. This eliminates any flex in the cable as it is actuated and results in all the servo movement being transmitted to the aileron instead of being spent flexing the cable. I added a notched piece of sheet between the ribs to support the cable where it exits the lower surface of the wing.



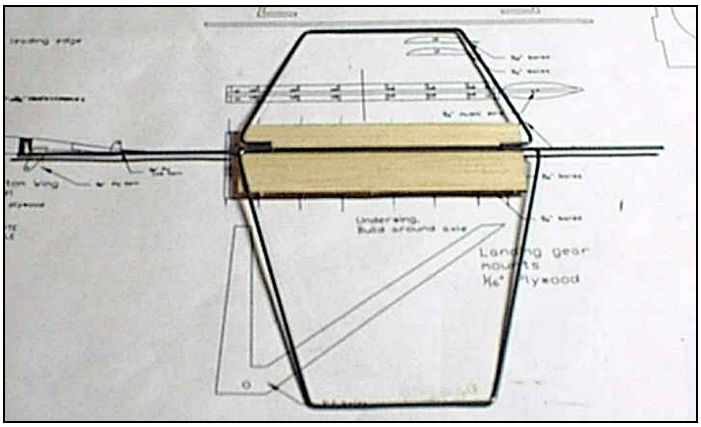
Installation of the radio and power gear is up to the builder since so many variations are possible. I used a Feigao brushless in a GWS S.1 gearbox, a Jeti ESC of 10 or 12 Amps, 3 GWS Pico servos, GWS Rx and a 340 MaH 3 cell LiPo.

I found it easier to leave the sheeting off the front of the fuselage until I had installed the gear. Scale elevator control wires are not practical on this small an SE.5a. You can go with a pull/pull system in a non-scale position or yo can go with non-scale push rods. I went with the push rods because they were easier to hide. Make sure you install the elevator and rudder servos so as not to interfere with the aileron servo mounting.

Covering is also up to the builder. I used CoverLite, however your mileage may vary. I always leave covering the rear fuselage underside until last in order to make it easier to run control wires or push rods. This way I can attach the tail feathers, connect and test them before sealing everything up.



The U/C is rarely fun modeling, but it has to be done. Step One: Buy lots more wire than you think you'll need and don't be afraid to pitch a piece that isn't right. Fit and fiddle is the method and you do what you have to until you get a set of usable pieces.



When it comes to soldering, or even binding & gluing, use sandpaper to brighten up the wires where the joint will be. I take the measurement of the distance between the legs off the model, not the plans. I then mark it off on a board and tape the wire pieces down at the marks. If bent right they will meet together where the axle joins and can be bound and soldered or glued at the proper angle.

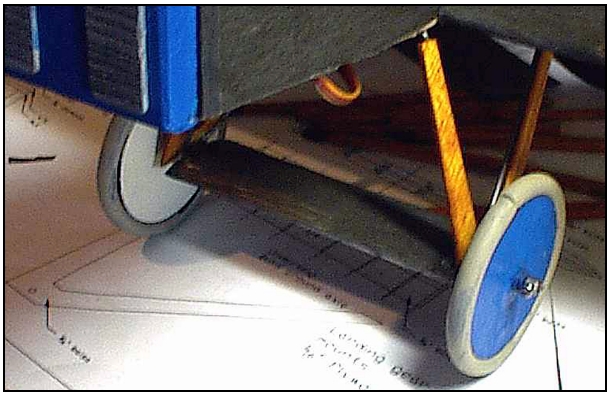
I use 30 lb test Super Pro line for rigging and binding. With line this strong it isn't necessary to go overboard binding the wires to the ply U/C plates. Just a loop or two

through each set of holes tied down tight and CA will set it in place for any landing the rest of the model will survive.

The spreader bar and U/C legs will need to be custom fit to the wire U/C and the top ribs and covering added to the spreader bar. Epoxy is good here.

WHEELS

Gluing the ply sides on the 3/8" balsa core makes the basis for the wheels. Use the brass hub for alignment. Epoxy the hubs in place and add a sufficient amount of epoxy around the base of the hub to reinforce the connection of the hub to the ply. Plywood reinforcing hubs are provided that are to slip over the brass tubing as shown. Next, CA glue the neoprene cording together to from a"tire". Use thin CA sparingly as the CA bonds very aggressively to the rubber. Press the CA wetted ends together for an instant bond. The best way to align the ends is to glue them while they are in place on the wheel. Then attach the tires to the wheels and CA in place. A thin bead of CA around the rim makes for a secure tire. Paper cones are cut out. Use a ballpoint pen to score each line on the back to make an impression of "spokes". It is helpful to do this operation on a paper tablet so that the pen makes a good crease. Fold the paper along the crease lines to exaggerate the raised lines. One of the sections forming a wedge is cut out. Make cuts to the center of the circle along a pair of the spokes. Close the paper cut out to form a cone and tape the joint inside the cone. The inside cones may now be attached to the wheels. The outside cones may be attached at this point if wheel collars are to be used. Alternatively, after installing the wheels on the landing gear, a washer may be soldered to hold the wheel in place and then the cone is attached. This method makes a very nice scale appearance.



Attaching the top wing was pretty straight forward. The CAD precision on cutting the angles on the struts and the notches in the ribs makes the process much easier. I glued the mainplanes in place on the lower wing and let them dry well. I was then able to pop the upper ends into their respective notches in the upper wing. The alignment was spot on.

The cabanes were a but long, but I took advantage of that by sliding the lower ends into the holes in the fuselage side and then gluing the upper ends into their notches in the upper wing. When those were dry, I was able to slide the lower ends up or down in their lower fuselage holes to ensure correct alignment and wing incidence and lock it in place with CA.

My example balanced perfectly as built, but there is plenty of room for shifting the battery position if you need to on yours.

I made two hatches on the fuselage bottom. The front one, nose to U/C strut is attached with magnets and is easily removable for battery access. The rear one for servo access is held in place with 2 servo screws

The designer provides an astounding amount of detail for a "short kit" I CA hardened the Foster mount for the Lewis gun as I expect it will get stressed if the model noses over on landing. I made the exhaust pipes out of very soft & light 1/4" square stock sanded round. The windshield frame was cut out of 0.01" plasti-card, painted and then the windows were added out of clear sheet. The gun sight is painted aluminum tube supported by styrene rod mounts.

Balancing The Model

Balance the model at the point shown. It is best to position the battery to do this operation.

FLYING

The model should ROG on grass, pavement or hard surfaces. The model may require coordinated turns using both ailerons and rudder control. This is due to adverse yaw. The property my be reduced by halving the aileron down throw. This can be accomplished by rotating the control arm of the aileron servo forward about 20 degrees.

The tail surfaces should not need excessive throws. Let the model gain altitude slowly off the runway. Applying too much up elevator at slow speeds risks a stall. Make your turns gently as tight turns risk tip stalling in any model. Don't expect the elevator to make the model climb. Think of the elevator as a device to change the attitude of the model. The wing and airspeed ultimately make the model climb. Often down elevator applied at stalling can avoid a major crash. The most important details for proper flight operations are:

1 CG location. Tail heavy models never fly well or at all.

2 Down and right thrust

3 Straight and non warped wings.

Here are some excerpts of Steve's maiden.

"I got a chance to maiden the model last Sunday. The rudder is very effective, it taxis on the tailskid like it has a steerable tail wheel.

The final AUW is 10.7 oz. The model balances perfectly where the designer marked the CG. The down & side thrusts were built in as designed. I had about 15% rudder mixed in with the ailerons. The ailerons were about 1/32" up at dead neutral.

It took off and wanted to stick it's nose up. I wrestled with it until I got a little altitude and then tried down trim. Used all of that and it helped, but did not cure the nose uppedness. Turns were good and response to aileron and rudder good.

I was waiting to land and got a little far afield and lost orientation. (I don't see much better than Mr. Magoo) . The model went in, but it was low & slow and the grass was tall so there was no damage)

I got rid of the little bit of neutral up in the ailerons and adjusted the elevator to be slightly down at neutral stick & trim. I'll try it again if/when the wind dies down. "

CONTACT INFORMATION

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