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DSC LUCIFER BUILDING INSTRUCTIONS

Welcome to the quiet world of electric powered flight!

The LUCIFER electric sailplane has been designed to accept any of a variety of 05 electric motors now available, either direct or reduced drive. It was designed to not only be easy to fly with a very wide speed range, but also very simple to build.

We suggest that you use the new cyanoacrylate adhesives, both the thin and gap filling types with an accelerator when required. All of the prototypes were bult with the "super glues" as are all DSC kits. The results are always fine.

Prior to starting, look over the plans carefully to become familiar with the kit and the construction. You will note that there are two types of motor areas shown, direct or reduced drive. The prototypes have been flown with both types. Either one will give you great performance. There is more detail shown for the direct drive because there is little difference betwen the 05 motors now available except that the Astro 05 Cobalt is now as wide. If you plan to use the reduced drive with a folding propellor, you will have to determine the best way to mount it. If you intend to use an 049 engine instead of an electric motor, an overlay showing the engine mount is included at the end of these instructions.

WING

The wing is first because you will need it when you build the fuselage to assure that the formers are properly located. The 1/8 x 3/8 spruce spars are used with shear webs to give extra strength without adding the weight of sheeting. The airfoil has been computer-designed and is already used on both the Prophet and the Prophet 941. It is a highly modified Epler 192 with a 5% surface drop from 40% of the chord to the trailing edge. The wing has maximum coefficient of lift of .83 with a designed coefficient of lift of .51. The LUCIFER has a very wide speed range to not only allow you to drop the nose and cover a lot of area, but also to lift the nose to slow it down without stalling.

Some paper stretch may occur in the blue printing process. The parts are cut to the correct size and should be used to determine proper fit.

1. Build the center panel and wing panel at the same time. They will be joined later.

2. Cover the plans with plastic from your last roll of covering material. Trim and pin down the trailing edges after notching each one with a hacksaw blade to hold the rear of the ribs.

3. Using the ribs as a guide, position and pin the bottom spars.

4. Glue the W-1 ribs on the main wing. Glue ribs W-2 through W-9 in place. Do not glue in the two W-1 ribs at the polydihedral joint at this time.

5. Using the 1/16 x 3 x 5 balsa sheets, cut, fit and glue in the bottom sheeting to the spar and the trailing edge. Glue the front sheet only to the spar.

6. Trim 1/16" off of the top and bottom of four W-1 ribs for each wing as shown in the end view to accept the center sheeting.

7. Position and glue the W-1A rib closest to rib W-1.

8. Position the two 1/16 ply dihedral braces as shown on both sides of the spar. When you are sure of the fit, glue in place. Cut to size and glue in the two center W-1A ribs.

9. Cut two W-1B ribs from the ribs cut in Step 8 to size and glue only to the spar and to the first inch of the sheeting closest to the spar.

10. The dihedral angle is 2-1/2 degrees for each center wing panel. Make a small gauge and position and glue both the remaining W-1A and the 3/16 W-1B to this angle.

11. Position and check the fit of the 1/4 x 3/8 leading edges. Place 3/16 shims under the leading edge of the main wing in four places and trim away and excess off of the front bottom sheet to get a good fit. Glue the leading edge in place to each rib and to the sheeting. Shim up the sheeting to fit prior to gluing.

12. Fit and glue the gussets at the ribs in Step 10 and at W-9.

13. Sand the tip leading edge so that it tapers from 1/4" at W-1 to 5/32" at W-9 as shown on the plans. This is necessary so that when you sand in the airfoil it will not be pointed and subsequently affect flying performance. A rounded leading edge will perform better.

14. Position and check the fit of the tapered leading edge by shimming under it to get a proper fit. Glue it to the ribs.

15. Cut and fit the wing tip from the 1/4 x 5 x 5-1/2 block. Glue in place.

16. The other wing is built up by repeating Steps 1-14. However, you will have to block up the main wing section you just finished at the end of the spar 2" so that you can glue in the spars when you reach Step 6.

17. Glue in the gussets at W-1A and 8 and at W-9.

18. Carefully cut, trim and glue in the center top sheeting. Feather the edges of the 1/32 plywood top plate and glue in place.

19. Cut, fit and glue in the shear webs on the main wing sections.

20. Pin down one side of the main wing prior to attaching a wing tip section. Block up the tip 4-1/2" at the spar at W-9 and sand the proper angle into the spars and leading and trailing edges at W-1.

21. Fit and trim and 1/32 ply poly braces and glue in the front one. Block up the tip an additional 1/4" and glue in the rear poly brace. Leave the tip blocked up for Steps 22 and 23 to build in the wash out.

22. Reglue all of the spar/rib joints and cut, fit and glue the shear webs between W-2 and W-6.

23. Cut, fit and glue the two W-1 ribs at the polydihedral joint and glue in the four gussets.

24. Repeat Steps 20-23 for the other wing tip section. Sand the leading edge to shape and finish-sand the entire wing.

STABILIZER

When cutting the 1/8 x 1/4 or 1/8 x 1/2 balsa, cut the longest lengths first so that you do not have to splice later on for either the stabilizer or rudder.

1. Pin down the two 1/8 x 1/2 x 17-1/2 pieces. Slot and shape the 1/8 x 1 center piece and glue to the 1/8 x 1/2 piece.

2. Cut and pin down all of the 1/8 x 1/4 pieces and glue. Cut, fit and glue the 1/8 square cross pieces and the two gussets.

3. Cut out the rear 1/8 x 1/2 piece to fit in the 1/8 x 1/4 spruce brace and glue it in place.

4. Remove from the plan when the glue is dry. Sand it to shape as shown on the side view. Cut out and fit for the hinges, but do not glue them in place.

RUDDER

1. Pin down the two 1/8 x 1/2 uprights and the front and rear 1/8 x 1/4 uprights. Cut and fit the horizontal 1/8 x 1/2 pieces notching the front one to fit into the stabilizer slots. Glue all of the pieces together.

2. Cut and fit the 1/8 x 1/4 top piece and the 1/8 square cross pieces and the two 1/8 x 1/2 gussets. Glue all of these in place.

3. Remove from the plans when the glue is dry. Sand to shape as shown on the plans. Cut out and fit for the hinges, but do not glue them in place. Cut out the notch for elevator clearance.

FUSELAGE

The precut sides are cut to accommodate the larger reduced drive motors. If you plan to use a direct drive motor, you can cut the proper shape into the sides now.

1. Pin down one of the sides and pin the 3/16 square, 1/8 x 1/2 stringer and 1/8 x 1/4 stringer in place. Glue by wicking in thin super glue. Repeat for the other side making a right and a left side.

2. Determine what servos you are going to use and cut the appropriate holes into F-3. Also, cut the notch for the antenna tube. Glue F-1 to F-2.

3. Pin down one fuselage side and check the fit of F-1 and F-3 in place. Check the distance between the formers to be certain the wing will fit. Glue both in place making certain they are both at 90 degrees to the side.

4. Carefully position and clamp the other side to F-1 and F-3. Check the alignment at the tail and sand in the taper as shown in the top view. Clamp the sides at the tail and glue in the formers.

5. Cut, fit and glue the bottom 1/16 balsa cross-grained planking. Cut the 1/8 skid to shape and glue in place.

6. Study the plans carefully and plan your motor mount. You will have to shim up the 3/8 triangle stock pieces to support the motor when you slide it in place. Keep in mind that you will need the 4 degree downthrust with either the direct or the reduced drive. Regardless of the system you use, the triangular pieces will mount the motor and you can secure it by screws through the 1/16 ply plates. The reduced drive will have to be secured by blocks of balsa.

7. Position and glue the 1/16 plywood bottom planking. Position, fit and rough cut the canopy to shape. Tack glue the canopy in place and sand the front to shape as shown at Section A-A so that it blends into the spinner.

8. Cut the canopy on the angle shown and cut it away from the tack gluing. Cut the air flow hole and fit and glue the 1/8 ply mounting plate. Drill through the canopy and the plate and glue in the blind nut.

9. Position the servos and set up your control rods while the fuselage rear is still open on top. Cut out for the antenna tube and glue in place. Cut and glue the 1/16 balsa crossgrained top sheeting.

10. Fit in a filler piece above the fuselage side and next to the 1/8 x 1/2 stringer in the area behind F-1. Sand the wing saddle so that the wing fits in on the incidence angle shown. Do not change this as it will significantly change the flying performance.

11. Position and glue in the 1/8 plywood wing mounting plate. Set the wing in position by measuring the distance from the wing tips to the tail and centering it. Hold it in position and drill through the wing and mounting plate. Glue in the blind nut and remount the wing.

12. Check the centering again and drill through F-1/F-2 and into the wing with a 3/16 drill as shown on the side view.

13. With the wing still in position, check the fit of the stabilizer and rudder to be certain of their alignment.

14. Finish sanding the fuselage to shape as shown in Section B-B and blend in the area near F-1.

FINISHING THE AIRCRAFT

1. Cover everything with your favorite covering materials, keeping it as light as possible. Remember the 1/4" washout in the wing tip sections when covering the wings. You will have to cut out some of the covering in order to glue the stabilizer to the fuselage and the rudder to the stabilizer.

2. Cut through the covering and super glue the hinges in place after first pre-bending them. Drill through the surfaces for the control horns.

FLYING

1. Position the motor control, motor batteries, receiver batteries and receiver so that you have the model balanced on the C.G. as shown. There is ample room for everything. Everything but the servos can be held in place by wedging them with foam.

2. The center of gravity is very important with elecric-powered models, because if you are too far off of the proper C.G., the effect can be dramatic as electric sailplanes tend to be heavier than non-electrics.

3. Prior to powered flight, check the performance by test gliding. Set the elevator to 1/2" throw each way and the rudder to 1" throw each way. Test glide by throwing straight out at first to be certain you have it right. You should get a long, flat glide. If you don't, adjust the C.G. Check to make cetain that both the elevator and rudder are centered.

4. When ready to fly, turn on the radio and the motor harness. Turn on the motor with your throttle and launch at the same time, throwing it straight. Do not let the model "hang" on the propellor, but let it climb in a steady, shallow climb. You will find that in less than a minute, you will be high enough to want to turn off the motor and glide.

5. In the event you want even more power, you will find that the Astro Cobalt 15 with 12 cells will easily fit. But keep in mind that there is a trade-off in power because of the extra weight of the additional five cells. Regardless of the motor/propellor combination you select, be careful to respect the speed of the propellor. Even though the motor is very quiet, it can still have a lot of power and can cause an injury.

DSC LIMIT OF PRODUCT LIABILITY

In the use of DSC products, our only obligation shall be to replace such quantity of the product proven to be defective. User shall determine the suitability of the product for their intended use and shall assume all risk and liability in connection therewith.

LUCIFER PARTS LIST

2	3/32	Balsa fuselage sides
1	1/16 x 3 x 36	Balsa fuselage top and bottom
12	1/16 x 3 x 5	Balsa wing planking, gussets
3	1/16 x 3 x 24	Balsa die cut ribs
2	1/16 x 3 x 14	Balsa die cut ribs
1		Antenna Tube
4	3/16 sq. x 36	Balsa fuselage, control rods
3	1/8 sq. x 12	Balsa stabilizer, rudder
2	1/8 x 1/2 x 36	Balsa stabilizer, rudder, skid
3	1/8 x 1/4 x 24	Balsa stabilizer, rudder
2	1/4 x 3/8 x 20-5/8	Balsa leading edge
4	3/16 x 3/4 x 24	Balsa trailing edge
8	1/8 x 3/8 x 22	Spruce spars
20	1/16 x 1 x 2-1/4	Shear web
2	1/4 x 3/8 x 19	Balsa leading edge
		Plans
		Instructions

BAG 1

2	1/8 x 1/2 x 8-1/4	Stringers
1	1/16 x 2 x 9	Plywood fuselage
1	1/2 x 2 x 7-3/4	Canopy
2	1/8 x 1/4 x 6	Spruce stringer
2	1/16 ply	Main polydihedral braces
4	1/32 ply	Polydihedral braces
2	1/4 x 5/8 x 5-1/2	Wing tips

BAG 2

1	1/8 x 3/4 x 1-13/16	Plywood Wing mount
1	3/16 x 3	Dowel wing mount
1	1/32 x 1-1/2 x 3	Plywood plate, wing
2	1/16 x 3/8 x 1-1/2	Plywood motor support
2	1/4 sq. x 1-1/2	Fuselage nose
1	1/16 x 1-5/8 x 2	Fuselage nose
2	1/8 x 1-5/8 x 2	Fuselage nose

BAG 3

2	6/32x1 Screw
2	6/32 Blind nut
2	Control horns
4	Control horn screws
2	Nylon clevis
2	Threaded rod
9	Hinges

BAG 4

4	3/8x1-1/2	Triangle motor mount
1	1/32x1/2x1-3/8	Plywood canopy mount
1	1/8x1/4x2	Spruce elevator
2	3/16	W1B ribs
1	1/8x1x3	Stabilator
1	1/8 Die cut sheet formers and canopy mount	

049 Engine conversion for the LUCIFER electric sailplane

To use, overlay this sheet on the plans and substitute a 1/8 x 1 3/4 x 1 5/8" plywood engine firewall for the 05 electric mounting shown.